

Non-Registered Site Treatability Test Report

TVA Gallatin Fossil Plant
Summer County, Tennessee

Tennessee Valley Authority

Revision 1

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Quality Information

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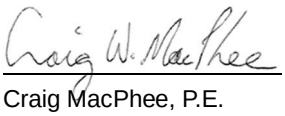	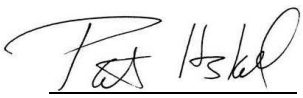		
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Executive Summary

This report details a series of laboratory treatability tests conducted in response to the Tennessee Department of Environment and Conservation (TDEC) Commissioner's Order Number OGC19-0004 (the Order). In accordance with the Order, the Tennessee Valley Authority (TVA) is conducting a laboratory treatability test and field demonstration aimed at adjusting (increasing) the pH to sequester metals along the Non-Registered Site (NRS) boundary adjacent to the Cumberland River at the Gallatin Fossil Plant (GAF). The work was conducted in accordance with the NRS Treatability Test Work Plan (AECOM, 2019) approved by TDEC on November 25, 2019.

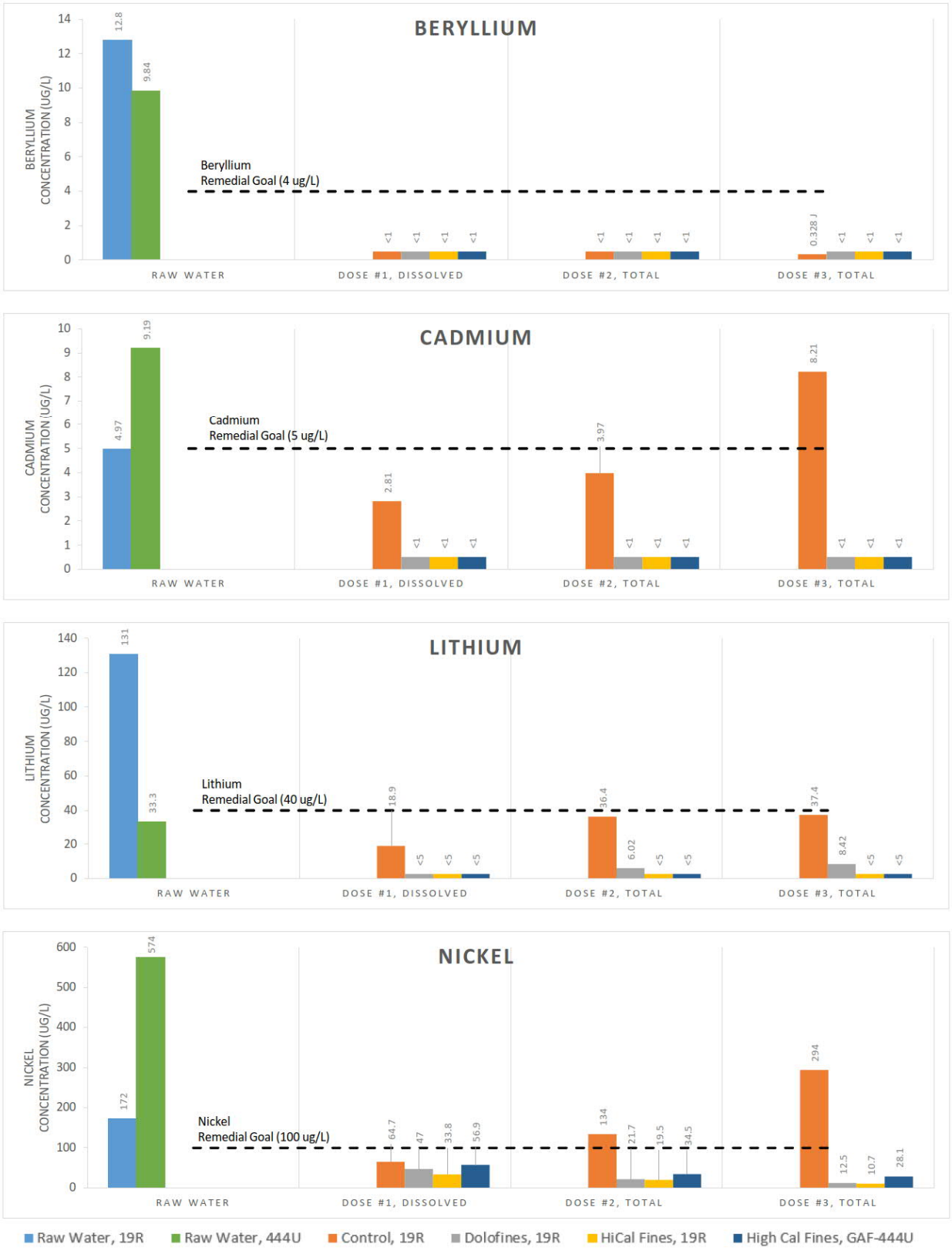
This report documents laboratory treatability test activities performed to identify remedial amendments that can be used in a Field Demonstration to achieve the objective of meeting groundwater protection standards (GWPS) at the downgradient boundary of the NRS. Based on the results of the testing and the field investigation documented in the NRS Field Investigation Report (AECOM, 2021), a Field Demonstration Work Plan, which will present the design for a permeable reactive barrier (PRB), and an associated monitoring plan are being developed. In addition to testing the downgradient PRB concept, a series of tests were conducted in support of potential source material treatment by direct soil treatment and in-situ stabilization (ISS). Source treatment may be an element of the overall NRS remedial approach and included in the Field Demonstration Work Plan also.

The treatability testing presented in this report included the following series of tests:

- A table-top study of a wide range of potential remedial amendments and selection of the most promising amendments for laboratory testing;
- Simple titration testing, which tests the effect of mixing remedial amendments with site groundwater;
- Microcosm testing, which tests the remedial amendments with combinations of site groundwater/amendment/sand and groundwater/amendment/site soil; and
- Column testing, using site groundwater and sand to simulate field conditions during remedial implementation of a PRB consisting of sand and remedial amendments.

The treatability testing included testing of 16 different possible amendments selected from the table-top study. In the titration trials only FerroBlack® (an iron sulfide based remedial amendment) provided treatment of all four target metals (beryllium [Be], cadmium [Cd], lithium [Li] and nickel [Ni]). Several other amendments treated Be, Cd, and Ni but showed poor treatment of Li in the titration trials. In the subsequent microcosm trials with sand, two limestone products provided the best treatment, including removal of Li. The successful limestone products were Dolomitic Fines (DoloFines) and High Calcium Fines (HiCalFines). DoloFines has a higher percentage of magnesium compared to HiCalFines. Successful treatment of target metals in site groundwater (both downgradient wells 19R and GAF-444U) with both HiCalFines and DoloFines is shown in Figure ES-1.

Figure ES-1 Microcosm Stage III Trials



The laboratory testing included adding site groundwater to DoloFines/sand mixtures until breakthrough of target metals was observed. In the laboratory studies, the fraction of DoloFines in sand with the maximum

concentration tested (0.2% by weight) providing the best results (i.e., the most site groundwater treated before breakthrough of target metals at concentrations above GWPS). This concentration corresponded to an effective dose of 0.45 liters of impacted site groundwater per gram of DoloFines. Thus, the a 0.2% DoloFines/sand mixture is anticipated to be used for design of the PRB field demonstration. The effective dose, along with calculated groundwater flow velocities and desired PRB amendment effective lifespan, will be used in the Field Demonstration Work Plan to determine dimensions of the pilot scale PRB.

The NRS Treatability Test Work Plan (Section 4.1.1) established five criteria for a successful remedial amendment. The criteria and evaluation that led to the selection DoloFines as the remedial amendment are as follows:

1. *Is appropriate for safe handling and application at field scale at the NRS in the vicinity of the Cumberland River:* **Meets this requirement.** DoloFines is a natural product derived from crushed limestone with high magnesium content. Groundwater with similar chemistry from the underlying limestone aquifer already discharges to the Cumberland River. As used in the PRB application, the DoloFines/sand material can temporarily generate a pH up to 11 within the barrier wall. However, this elevated pH will quickly dissipate in the native formation prior to reaching the river.
2. *Reduces metals concentration to below GWPS in groundwater:* **Meets this requirement**. In several trials DoloFines reduced concentrations of target metals (beryllium, cadmium, lithium and nickel) to below the GWPS values.
3. *Sequesters metals such that they are not remobilized above the GWPS:* **Meets this requirement with appropriate PRB design.** The effective dose for a 0.2% DoloFines PRB wall is 0.45 liters of groundwater treated per gram of reagent. Longevity of the PRB will depend on the location specific groundwater flow velocity, the width of the PRB selected, and the flow of groundwater through the PRB. Field verification of PRB longevity is a goal of the Field Demonstration. The PRB will not have an indefinite effective lifetime. The treatability testing showed that after the effective dose is exceeded, continued exposure to low pH groundwater will cause desorption of metals from the PRB and potentially exceedance of the GWPS in downgradient areas. The PRB therefore must be designed and maintained to stay within the effective dose of the treatment reagent.
4. *Does not alter aquifer geochemistry in such a way as to mobilize non-target metals at concentrations, approaching GWPS at a point-of-compliance:* **Meets this requirement.** Treated groundwater was tested for a comprehensive list of metals, anions, and general chemistry parameters in site soils. No GWPSs were approached or exceeded. The chemistry of the treated groundwater is similar to naturally occurring groundwater in the area that is not impacted by low pH or target metals. Use of DoloFines does not introduce new constituents to alluvial groundwater, which overlies limestone bedrock, and thus adding additional monitoring parameters in the demonstration test is unnecessary.
5. *Has the potential to be utilized in a long-term cost-effective remedial treatment in terms of capital cost and operations and maintenance:* **Meets this requirement.** DoloFines is a commercially available product readily available to the Gallatin area. DoloFines used in the treatability testing was provided by Longview Quarry in Saginaw, Alabama operated by Carmeuse Lime and Stone. Options for PRB construction and associated cost will be evaluated as part of the Field Demonstration Work Plan. Cost of reagents will be a small portion of the overall cost of a PRB demonstration or full-scale application. Cost-effectiveness of the PRB is most likely to be driven by the cost of construction, monitoring and operation.

Path Forward for PRB Field Demonstration

The treatability results provided the basis for the next step, preparation of the Field Demonstration Work Plan for a downgradient PRB. The Field Demonstration Work Plan will specify the use of DoloFines, and the effective dose for sizing the PRB wall and calculating durability will be 0.45 liters of groundwater per gram of DoloFines. As the Field Demonstration Work Plan is being developed, some additional treatability tests are proposed to optimize the PRB design, including:

- The PRB longevity may be extended by increasing the dosage of DoloFines. Thus far, doses of 0.0082%, 0.1% and 0.2% have been tested. Each increase in dose provided some improved treatment. Testing of higher doses of DoloFines in sand column studies is recommended.
- Another area of optimization testing is the use of alternative sources of sand. Testing alternative sources of sand is proposed to see if alternative sources increase longevity or are less likely to leach metals after the PRB effective lifespan is exceeded.

The above tests can be conducted relatively quickly before fieldwork for PRB Field Demonstration begins. The results of these tests only affect the concentration of DoloFines and potentially the source of sand, and flexibility to accommodate such minor variations will be incorporated into the design provided in the PRB Field Demonstration Work Plan. For the purposes of the Field Demonstration Workplan, the concentration of DoloFines will be presented as a range from 0.2% to a maximum of 0.6%. The exact DoloFines concentration and sand source will be determined based on supplemental testing and will be specified in the Field Demonstration Workplan or in an addendum prior to the start of PRB construction.

Path Forward for Evaluating Source Treatment

Over the course of the treatability testing and field investigation conducted at the NRS, TVA has identified the possible need to also complete remediation of source material in addition to conducting a field demonstration for a downgradient PRB, as a means of providing both upgradient and downgradient treatment. If the upgradient sources are removed or reduced, the PRB will either no longer be needed or will last longer and potentially not have to be regenerated or replaced. Both In-Situ Stabilization (ISS) and direct treatment of suspected source area soils (blending in an amendment to neutralize the acid but not creating a cement-like monolith) are being considered. Testing to date has been conducted as generally described in the Treatability Test Workplan and is presented in this report. Lessons learned from testing to date has led to develop of new methods to prepare and test samples. Laboratory testing of suspected source area soils was detailed in an Addendum to an earlier version of this report and is attached hereto as Appendix A.

1. Introduction and Purpose

AECOM has prepared the following Treatability Test Report on behalf of the Tennessee Valley Authority (TVA) to detail results of laboratory bench testing in response to the Tennessee Department of Environment and Conservation (TDEC) Commissioner's Order Number OGC19-0004 (the Order). The Order requires that TVA conduct a laboratory treatability test and field demonstration aimed at adjusting pH to sequester metals along the Non-Registered Site (NRS) boundary adjacent to the Cumberland River at TVA's Gallatin Fossil Plant (GAF) to evaluate whether such actions can result in achievement of groundwater protection standards (GWPS). The Order also requires development of a Field Demonstration Work Plan, a Monitoring Plan, and ultimately a Corrective Action/Risk Assessment (CARA) Plan for closure of the NRS and remediation of groundwater to be completed following the field demonstration.

This report documents bench-scale treatability testing of potential remedial amendments (reagents) under various conditions. Based on the bench-scale studies conducted, recommendations for specific reagents and doses to be used in subsequent field demonstrations are provided in this report. The work described herein was conducted in accordance with the NRS Treatability Test Work Plan, TVA Gallatin Fossil Plant, Summer County, Tennessee (AECOM, 2019).

1.1 Background

The NRS location is depicted in Figure 1-1. The NRS is an approximately 70-acre closed surface impoundment historically used for the disposal of coal combustion residuals (CCR) prior to 1970. During groundwater monitoring activities for the NRS, concentrations of beryllium (Be), cadmium (Cd), nickel (Ni), and lithium (Li) were detected in groundwater samples collected from downgradient monitoring wells at concentrations greater than TDEC GWPS (TVA, 2017a). Cobalt concentrations were also noted at concentrations above GWPS, but those were previously determined to be naturally occurring and were the subject of an Alternative Source Demonstration (ASD) approved by TDEC in 2003. A copy of the ASD and the TDEC approval are provided in Appendix B.

The Draft Environmental Assessment Report (EAR) indicated that the source of the GWPS exceedances at the NRS did not appear to be associated with CCR, but rather with disposal of pyrite, which oxidizes to form acid in the presence of water and oxygen. The acidic conditions are believed to have resulted in Be, Cd, Li, and Ni concentrations above the GWPS in places along the downgradient boundary of the NRS. The Draft EAR concluded that the use of a pH adjustment strategy appears to be a feasible and effective groundwater corrective action technology to mitigate potential GWPS exceedances in the alluvium at the NRS.

Preliminary treatability testing was performed in 2018 to test reagents that could remove dissolved Be, Cd, and Ni from NRS groundwater samples and to obtain additional data necessary to develop additional pre-design studies. The preliminary treatability testing assessed five amendments: three strong bases (i.e., sodium hydroxide [NaOH], EnviroBlend® (EB), and AQUAMAG®) and two combination reagents (i.e., zero valent iron and FerroBlack®) that alter pH and/or oxidation-reduction potential (ORP). The preliminary treatability testing also looked at the nature of solids that precipitated during testing and the stability of those precipitates. The results of the treatability testing indicated that NaOH, EB, and FerroBlack®) were successful at reducing Cd, Be, and Ni concentrations in groundwater samples. At the time of the 2018 bench testing, Li had not been identified as requiring treatment. At the conclusion of the preliminary treatability test, it was recommended that additional treatability testing be performed using site soil and incorporating additional site data to support the design and implementation of an in-situ pilot study.

On June 13, 2019, TDEC issued the Order requiring that TVA perform a treatability test and field demonstration to effect remediation of groundwater such that GWPS are met along the NRS boundary at compliance points adjacent to the Cumberland River. The Order also requires the submittal of a monitoring plan prior to the implementation of the field demonstration project and that a Corrective

Action/Risk Assessment (CARA) Plan be developed by TVA and approved by TDEC following the demonstration project to develop a comprehensive remedial approach for the NRS.

1.2 Objectives

The objective of the laboratory treatability test and subsequent field demonstration is to determine whether pH and geochemical conditions can be adjusted in alluvial groundwater at the NRS and if such an adjustment can be an effective method to meet GWPS at the NRS boundary compliance points. The GWPS goals are:

Metal	GWPS (µg/L)
Beryllium (Be)	4
Cadmium (Cd)	5
Lithium (Li)	40
Nickel (Ni)	100

µg/L – micrograms per liter

As described in the NRS Treatability Test Work Plan a successful reagent would also meet these criteria:

1. Is appropriate for safe handling and application at field scale at the NRS in the vicinity of the Cumberland River,
2. Reduces metals concentrations to below the GWPS in groundwater,
3. Sequesters metals such that they are not remobilized at concentrations above the GWPS,
4. Does not alter aquifer geochemistry in such a way as to mobilize non-target metals at concentrations approaching GWPS at a point-of-compliance, and
5. Has the potential to be utilized in a long-term cost-effective remedial treatment in terms of capital cost and operations and maintenance.

1.3 Overview of Approach and Report Organization

The bench-scale testing was conducted at the AECOM treatability test laboratory in Austin, Texas. Tests were conducted using soil and groundwater samples collected from the NRS. Collection of soil and groundwater samples is described in Section 2.0.

Bench-scale testing was designed and conducted in support of three possible remediation scenarios, a permeable reactive barrier (PRB), soil blending, and in-situ stabilization (ISS). These remedial scenarios and the way they were approached in the treatability testing are described below.

In a PRB, the treatment reagent or amendment is blended with a permeable material (e.g., medium sand), and the mixture is placed along the groundwater flow path. As impacted water flows through the PRB, groundwater comes into contact with the amendment and the metals are removed from solution and sequestered within the PRB materials. Testing and development of the PRB scenario was a four-step process:

1. The first step was a table-top evaluation of a wide range of potential amendments to select the most promising amendment for laboratory testing.
2. The second step was titration testing of wide range of potential amendments. In these tests site groundwater was mixed with potential amendments to determine which reagents could be effective at removing metals to concentrations below GWPS.
3. The third step was microcosm testing of promising amendments identified in the titration studies. Microcosm studies consisted of blending amendments with sand and then repeatedly dosing the mixture with site groundwater. Water from each dosing was analyzed and the results compared to the GWPS. The dosing and testing cycles were continued until GWPS were no longer met. The

microcosm testing provided both an indication of amendment effectiveness and required dose (amount of water treated per unit of amendment).

4. The fourth step was column studies. In these tests, the best amendments from the microcosm studies were blended with sand and placed in vertical columns. Site groundwater was then pumped into the bottom of each column at a controlled rate. The column studies provided data on the reaction time necessary for the metals to precipitate and further data on effectiveness and required dose.

The approach for PRB testing is shown in Figure 1-2 and presented in Section 3.0.

The second remediation scenario is direct blending of treatment amendments with site soil and site groundwater. This approach would most likely be applied in the source area rather than downgradient areas. Amendments could be delivered by injection or by soil blending. The titration testing was used to identify promising amendments for the direct blending tests. Promising reagents were first tested with site soil and site groundwater in a series of microcosm studies. Subsequent testing was conducted with site soil and site groundwater with the resulting mixture subject to a series of leaching tests. Direct soil treatment testing is described in Section 4.0.

The third treatment scenario is in-situ stabilization (ISS). For the ISS scenario, the goal is to treat source materials to create a low permeability area that rainwater and groundwater will flow around the material instead of passing through it. Under this concept, groundwater with elevated metals and low pH is not generated and therefore does not migrate to downgradient areas. The ISS testing involved mixing site soil with various doses and types of Portland cement. The resulting mixtures were subjected to hardness, permeability, leaching and long-term durability testing. ISS testing is presented in Section 5.0.

Conclusion and recommendations are presented in Section 6.0.

This report is primarily focused on development of amendments for use in a downgradient PRB. This report provides specific information on the anticipated effectiveness, required amendment dose, durability and limitations of a PRB. Testing of remedial options for source material is also presented in this report. Those options include direct soil treatment and ISS. The information presented in this report will later be used to evaluate the feasibility of various remediation scenarios.

2. Site Groundwater and Soil Collection

Soil and groundwater samples were collected at the site in accordance with the NSR Treatability Test Work Plan, as documented in the Field Investigation Report (AECOM, 2021) and shipped to the treatability laboratory. The following samples were collected:

- Groundwater from monitoring well 19R: This is a downgradient location near the river and contains low pH (<5) groundwater with Be, Cd, Li and Ni at concentrations above the GWPS.
- Groundwater from monitoring well GAF-444U: This is a downgradient location near the GAF Discharge Channel and contains low pH (<5) groundwater with Be, Cd and Ni at concentrations above the GWPS.
- Groundwater from monitoring well GAF-441U: This well is located in the suspected source area and contains low pH (<5) groundwater with Be, Cd, and Ni at concentrations above the GWPS.
- Groundwater from monitoring well GAF-440U: This well is in close proximity to the suspected source area but has neutral pH and metals are below the GWPS. This well is being used in the treatability testing to represent groundwater that would be present around the source area after direct soil or ISS treatment.
- Soil from the monitoring well GAF-441U Area: This soil was collected from boring NRS068 in the suspected source area at the same depth as the well screen for GAF441U and has been used for the direct soil treatment and ISS trials.
- Soil from monitoring well 19R area: Soil was collected from boring NRS068 at the same depth as the well screen for well 19R to be used in conjunction with groundwater from well 19R.
- Soil from the monitoring well GAF-444U area: Soil was collected from boring NRS070 at the same depth as the well screen for GAF-444U to be used in conjunction with groundwater from well GAF-444U.

Sample collection locations are depicted in Figure 2-1. Baseline laboratory analysis of groundwater and soil samples was conducted. The baseline laboratory analysis was used in this report to compare chemical parameters before and after treatment. Baseline results for groundwater are provided in Table 2-1. These baseline results were also used to assure that water collected for treatability testing would exceed the GWPS and thereby provide a valid test of the amendments. Groundwater used in the treatability testing was then re-tested periodically and those results are presented with each applicable trial. Baseline soil sampling results are provided in Table 2-2.

3. Bench Study Tests in Support of Permeable Reactive Barrier (PRB) Design

Bench testing for the PRB design included titrations studies, microcosm studies and column studies. A flow chart for these tests is shown in Figure 1-2. These tests are discussed in Sections 3.1 to 3.3. A summary of findings is provided in Section 3.4.

3.1 Titration Studies

As presented in the NRS Treatability Test Work Plan, a wide range of potential reagents (also referred to as amendments) were screened based on their anticipated safety and effectiveness, likelihood of avoiding adverse impacts during field application, and whether the reagent was a proven technology. The final screening table is provided in Appendix C. Based on this screening sixteen different reagents were selected for titration testing to determine whether they could reduce target metal concentrations to below GWPS. Reagents selected for titration testing included reagents designed specifically for groundwater treatment, food-grade products and other commodity chemicals. This range of reagents includes sulfur-based products, phosphate-based products, products high in magnesium and several carbonate-based products.

3.1.1 Titration Test Procedure

The titration test set-up is depicted in Figure 3-1:

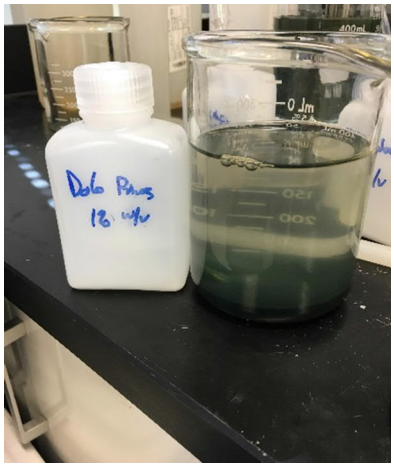


Figure 3-1 Titration Test Set-up

Titration testing was performed by adding measured amounts of the test reagent to site groundwater (water from monitoring wells 19R and GAF-444U). Reagent addition continued until the pH was near neutral. The blended water was then sampled for target metal concentrations.

To facilitate titration, solid reagents were first blended with deionized water to allow measured addition to the site groundwater. For solid materials with very low solubility a slurry was prepared, and the slurry was added to the groundwater sample and allowed time (>1 hour) to react.

After titration the treated water was allowed to settle and then water was decanted from the top for laboratory analysis. All samples were submitted for total metals (no filtration) for the target metals (Be, Cd, Ni and Li). To determine whether the presence of metals was the result of suspended particles in the sample, a subset of samples was also submitted for dissolved metals analysis. The bulk of the laboratory analyses were conducted by Eurofins TestAmerica, Pittsburg, Pennsylvania.

3.1.2 Titration Test Results

Table 3-1 provides a summary of the titration testing conducted and results.

Titration testing was completed with no significant deviation from the NRS Treatability Test Work Plan. Three phases of titration tests were conducted for a total of 24 individual tests. In the first phase, a large number of potential reagents were tested. The second and third phases focused on improving Li treatment and repeating earlier successful trials. The primary goal of the titration testing was to screen a large number of potential reagents down to a shorter list of the most promising reagents for use in subsequent testing.

Findings of the titration studies were as follows:

- In the first phase of testing, four products (MagOx®, Tennessee Valley Limestone, Hydroxyapaite, PeroxyChem Geoform ®) failed to treat more than two of the four target metals and were dropped from further consideration.
- In the first phase, several reagents successfully treated three metals (Be, Cd, and Ni) but failed to treat Li.
- During titration testing, only the FerroBlack® products provided adequate Li treatment in the titration studies.

An effort to improve Li treatment was made in the second and third phases of testing. Efforts to improve Li treatment included combining reagents with calcium chloride ($CaCl_2$) and zeolite and allowing three weeks for possible biological reactions to take place. These tests were generally unsuccessful.

For the titration trials, total metals results were similar to dissolved metals results, indicating that solid particles were not a significant source of recorded Li or other metals concentrations. In some cases dissolved metals concentrations were higher than total metals. This may be a result of interaction of the water with the preservative.

One limitation of titration studies is the lack of a solid matrix onto which metals can precipitate or to which they can adhere. This limitation was inferred to be a reason for the limited effectiveness of most reagents for Li and the relatively good performance of the FerroBlack® products, which rapidly generated a solid phase that settled out of solution during titration testing. Due to this known limitation, additional reagents were retained for use in the microcosm studies, which incorporate sand or site soil.

Among the reagents that treated Be, Cd, and Ni, but not Li; High Calcium Fines (HiCalFines) and Dolomitic Fines (DoloFines) were selected to advance to the microcosm trials, based on the following:

- Ni treatment with these reagents was generally better than other reagents in titration testing;
- These limestone-based products are known to be compatible with the site geochemistry, which is affected by limestone bedrock; and
- The processed limestone products were expected to have greater longevity compared to more soluble carbonate additives, such as sodium bicarbonate.

Sodium hydroxide (NaOH) was also selected to advance to microcosm studies because it provided good treatment for Be, Cd, and Ni and because NaOH is highly soluble in water and would be expected to be easier to inject in the field compared to FerroBlack®, HiCalFines or DoloFines. Its non-carbonate chemistry was also deemed desirable for purposes of comparing results between amendments during testing.

An expanded list of metals was also analyzed for the two best overall reagents (FerroBlack® and DoloFines). This testing was conducted to determine if the reagents contained metals or other constituents that may exceed the GWPS. Results are provided in Table 3-2. No metals or other constituents of potential concern were identified.

3.1.3 Recommendations from the Titration Testing

Four reagents were retained for the next stage trials (microcosm testing). The reagents retained for microcosm testing were FerroBlack® (T22 and Fe+ products), HiCalFines, DoloFines, and NaOH. $CaCl_2$ was also retained as a possible amendment to improve Li removal.

3.2 Microcosm Testing to Support PRB Design

The initial microcosm testing relied primarily on analytical testing for the target metals. The initial trials were followed by increasingly complex analytical testing of successful reagents, as described in Sections 3.2.1 to 3.2.5. The microcosm trials were conducted as described in the NRS Treatability Test Work Plan. As microcosm testing proceeded, additional trials were added to test different reagent combinations and to confirm earlier testing. Overall conclusions from the microcosm studies with recommendations for the column studies are provided in Section 3.2.6.

3.2.1 Microcosm Test Procedure

The microcosm test set-up is depicted in Figure 3-2.



Figure 3-2 Microcosm Test Set-up

The microcosm testing was designed to simulate the interactions between the site groundwater, reagents, and the PRB matrix material (in this case sand). The microcosm testing was conducted in 2.5-gallon buckets with spigot drains near the bottom. To conduct a trial, the test reagent was blended with the sand and then placed in the bucket. Site groundwater was then poured in from the top until the sand mixture was fully saturated and a small layer of water remained at the top of the bucket. For these trials, the mixture was allowed to react for one to two weeks after each dosing prior to sampling. Sampling was conducted by draining water out of the spigot. Water samples were allowed to settle for one hour and then the sample bottles were filled. The remaining water was then drained from the bucket and the bucket re-dosed with groundwater. Each redosing required approximately 1.8 liters of water to fully saturate the sand mixture. Buckets were then resampled and re-dosed at approximately one-week intervals. Trials were conducted with groundwater from well 19R, and separate trials were conducted with groundwater

from well GAF-444U. For each set of trials, a control (sand but no reagent) was also run. Concrete sand from a Gallatin local source was chosen as the PRB matrix material. This sand was selected because it has a low organic carbon content, is highly permeable and is readily available in the area. Specifications and metals analysis of the sand are provided in Appendix D.

Three phases (Phase I, Phase II, and Phase III) of microcosm testing were conducted. Results of each test were reviewed and evaluated to plan the next phase of testing.

In total, 12 microcosm buckets were prepared and tested. The number of dosing and draining cycles was 3 to 5 cycles as shown in the tables. Most of the early trials continued until breakthrough (i.e., when one or more target metals exceeded GWPS). Laboratory analysis in the early phases of microcosm studies focused primarily on the target metals (Be, Cd, Ni, and Li). In the final phase (Phase III) testing of successful reagents was repeated and additional laboratory analysis conducted. Additional analysis of treated groundwater included a longer list of metals, (including major cations calcium, sodium, and magnesium), anions, and alkalinity.

In the Phase III trials, the buckets were opened after the groundwater dosing and draining sequences were completed. Sand was removed from the approximate center of the bucket and sent for laboratory testing. The sand from the buckets was tested for metals, by sequential extraction, and minerals analysis. The sequential extraction analysis is a specialty analysis performed by TestAmerica, which is described in Section 3.2.4.

3.2.2 Microcosm Results for Target Metals

The microcosm results are provided in Tables 3-3a and 3-3b and depicted as bar graphs in Figures 3-3a, 3-3b and 3-3c.

Three controls were run during the microcosm trials. Two controls were run with sand and groundwater from well 19R, and one control was run with sand and groundwater from well GAF-444U. No treatment reagents were added to the controls. In the first trial with 19R water (Table 3-3a) all target metals were met after the first dose. The second dose exceeded the GWPS for Cd, Li, and Ni. Metals increased in subsequent dosing and failed for all four target metals by dose 4. The repeat of the sand/19R trial (Table 3-3b) had very similar results with the first dose meeting the GWPS and subsequent doses failing. The early dosing results for the 19R/sand alone trial indicate that the sand alone has some treatment capacity for metals in site groundwater. This observation is supported by the observed neutral pH after one application of site groundwater. However, the treatment capacity of the sand only lasted for one application of groundwater to the microcosm (i.e., approximately one pore volume of water). After breakthrough, metals concentrations continue to increase with each dose. Ni, in particular, increased to levels above the influent 19R water. The GAF-444U/sand trial showed breakthrough of Be after the first dose. For the GAF-444U/sand trial the pH after the first dose was in the acidic range (4.84).

One FerroBlack® trial was conducted during the microcosm study. The FerroBlack®/19R trial showed Li breakthrough on the first dose. After the first dose Li results were uneven with a result below the Li GWPS in dose 2 and results slightly above the GWPS in doses 3, 4, and 5. Be, Cd, and Ni results for the FerroBlack®/19R trial were below the GWPS for all five dosing events. The cause for the poor treatment of Li with FerroBlack® in the microcosm trial is unknown.

Four trials were run with HiCalFines. Results of the first two trials are shown in Table 3-3a. The third and fourth trials are shown in Table 3-3b. The HiCalFines/19R and HiCalFines & $CaCl_2$/19R trials had similar results with successful treatment through three doses and breakthrough for Li and Ni at dose 4. Considering that no Li treatment was indicated in the titration studies, successful treatment of Li in the microcosm study indicated that the solid matrix (sand in this case) improves Li removal. The HiCalFines & $CaCl_2$ trial was conducted to evaluate calcium chloride ($CaCl_2$) as a supplement to improve Li removal through biologically mediated reaction. No improvement in Li removal by use of $CaCl_2$ was observed in either short-term testing, or in extended testing, wherein the amended microcosm was allowed to react in a temperature-controlled environment for one month. The Phase III trials for HiCalFines include a repeat of the HiCalFines/19R trial and a trial of HiCalFines/GAF-444U. In both Phase III trials, HiCalFines provided successful treatment through 3 applications of site groundwater.

Three trials were run with DoloFines. Results of the first two trials are shown in Table 3-3a and 3-3b. Results of the third trial are shown in Table 3-3c. The 19R/DoloFines trial showed successful treatment through two doses and then failure for all metals at dose 3. This result was only slightly better than the control/19R trial. On the other hand, the GAF-444U/DoloFines trial showed successful treatment as evidenced by no breakthrough of target metals through 5 dosing cycles, with failure for Ni at dose 6. In Phase III, repeat trials were conducted by preparing fresh test vessels (new sand and amendments) and repeating the cycles of adding and draining site groundwater. For the repeat trial in Phase III, the DoloFines dose was increased slightly (from 0.082% to 0.1%). The repeat trial with 19R water yielded better results (no evidence of breakthrough after 3 doses), compared to the Phase I and II trials.

One trial was run with NaOH and 19R water. NaOH provided treatment through two applications of groundwater, but Ni concentrations exceeded the GWPS on the third application.

Based on the results of the microcosm testing, HiCalFines and DoloFines were selected for additional testing. NaOH was omitted from further testing, due to its limited efficacy treating Ni. FerroBlack® was not recommended for further testing due to its inability to consistently treat lithium, combined with its greater perceived potential for adverse effects and more complicated chemistry to manage during design. FerroBlack® has been used successfully in several applications, but compared to the limestone amendments (HiCalFines and DoloFines), FerroBlack® represents a greater geochemical shift in the aquifer. The primary components of FerroBlack® are iron and sulfur. Sulfur and iron chemistry is complex and subject to change by several factors, including microbial mediated reactions and reactions with oxygen. Introduction of more reduced iron and more sulfur into the system presents the possibility of unintended reactions. Generation of hydrogen sulfide is one possible adverse reaction that can occur when FerroBlack® is combined with low pH waters. While no evidence of adverse reactions with FerroBlack® were observed in these trials, and the potential problems would likely be manageable, there is no reason to pursue the use of FerroBlack® when other more effective options are available. One additional test using FerroBlack® was later run, as discussed in Section 3.3.

3.2.3 Microcosm Testing of Additional Groundwater Parameters

In addition to testing for the target metals (Be, Cd, Li, and Ni), samples from the Phase III microcosm trials were tested for a comprehensive list of metals, anions, and alkalinity. The purpose of this testing was to determine if the treatment process was mobilizing other constituents at levels that could exceed the GWPS. The comprehensive testing was conducted on the HiCalFines, DoloFines, and sand-only controls. Results and comparison to the GWPS are provided in Tables 3-4a and 3-4b. Testing results for the 19R raw water are also provided for comparison. As shown in Table 3-4a, GWPS criteria were met for all metals in all the HiCalFines and DoloFines trials. As shown in Table 3-4b, anions and other general chemistry parameters were low and similar to the raw groundwater chemistry (except pH and removal of the target metals).

3.2.4 Sequential Extraction and Metals Analysis of Sand and Soil Samples

To gain insight on the mechanisms and durability of metals removal, sequential extraction testing was conducted on various solid materials. The sequential extraction analytical protocol followed a seven-step process with each step consisting of a different extraction solution. Conceptually, the extractions generally progress from the least aggressive extraction agent to the most aggressive, as follows:

- In the first extraction, a magnesium sulfate solution extracts weakly sorbed (exchangeable) metals and electrostatic adsorption.
- In the second extraction, a sodium acetate/acetic acid solution (pH = 5) extracts metals associated with carbonate minerals by precipitation, co-precipitation or adsorption. .
- In the third extraction, an ammonium oxalate solution (pH = 3) extracts metals co-precipitated or otherwise associated with non-crystalline, amorphous solids (e.g., iron oxides).
- In the fourth extraction, a HAD/HDC acetic acid solution (pH < 3) extracts metals adsorbed to metal hydroxide precipitates.

- In the fifth extraction, a sodium hypochlorite solution (pH = 9.5) extracts metals bound in organic complexes.
- In the sixth extraction, a hydrochloric acid/nitric acid solution (pH = ~1) extracts metals precipitated as sulfides or bound to sulfides.
- In the final extraction, a hydrofluoric acid solution digests the sample. The residual solid should contain mainly primary and secondary minerals which may hold trace metals. These metals are not expected to be released into solution over a reasonable time span under conditions normally encountered in nature (Tessier et al., 1979).

The extract from each test was analyzed for the target metals plus iron and, in the case of the sand trials, aluminum. These metals are common natural components of sands and soil and provide information regarding the concentrations of these metals naturally present in the sand, the leachability of these metals under various circumstances and the ability to compare these properties in amended and unamended sand. The resolution or ability to differentiate treated and untreated sand by sequential extraction was hampered by the fact that the amendment doses were low (0.2% and less). This is further compounded by the fact, as noted in the mineral analysis, that the sand used contained dolomite and other minerals also present in the treatment amendments. Total metals were also analyzed for each sample prior to any of the extraction processes.

These tests extract both metals that have sorbed or precipitated to the sand/soil matrix, but also extract metals bound in the mineralogical matrix of the sand and native clay soils. While these tests provide insight into the possible forms (minerals they may be absorbed on to or precipitates that may have formed) of the target metals most of the components of the extraction solutions are not present at the site. Thus, the sequential extraction testing is not a predictor of metals leaching under site conditions. In concept, if two different reagents provided similar removal of target metals in the microcosm trials but one of the reagents had markedly different performance in the sequential testing (lower rate of leaching in specific leaching steps), then the mechanisms for metals removal from solution could be inferred and the relative durability of metal sequestered from solution could be a factor in selecting the final reagent.

Sequential extraction was conducted on the following materials:

- Sand used in the trials with no exposure to groundwater (sand/no groundwater),
- Sand after three doses with 19R groundwater (sand control),
- Sand and HiCalFines after three doses of 19R groundwater (HiCalFines/sand/groundwater),
- Sand and DoloFines after three doses of 19R groundwater (DoloFines/sand/groundwater),
- Untreated soil from the well 19R area (19R soil) also referred to as sample identification NRS068,
- Untreated soil from the well GAF-444U area (GAF-444U soil) also referred to as sample identification NRS070, and
- Untreated soil from near well GAF-441U (suspected source area soil) also referred to as sample identification NRS069.

Sample collection locations are depicted in Figure 2-1. Sequential extraction results for sand samples collected as part of the microcosm testing is presented in Table 3-5a. Sequential extraction testing on untreated soil samples from the site are presented in Table 3-5b.

The total concentration of Be and Cd in the sand and treated sand samples was relatively low (less than 1 milligram per kilogram [mg/kg]), and thus the extraction results in some trials are near or below the laboratory detection limits. For the sand trials, results for treated and untreated sand were similar, because the total amount of metals deposited by the groundwater, which contains concentrations of metals measured in the parts per billion range, and thus metals accumulation on the treated sand is small and difficult for the laboratory methods to detect. For example, in these microcosm studies with 19R groundwater containing 197 micrograms per liter (μg/L) of Ni, three doses of site groundwater (total of 6 liters) could deposit a maximum of approximately 1,200 ug of Ni onto the sand. There is approximately

7,800 grams of sand in the vessel. Adding 1,200 ug (0.0012 grams) of nickel to 7,800 grams of sand would increase the Ni content of the sand by only 0.15 mg/kg. The sequential extraction results are most valuable when considered together with the microcosm studies, the mineral analysis, and the column studies.

Sequential extraction results are discussed from the least aggressive (Step 1) to most aggressive (Step 7).

Step 1 Exchangeable Fraction: For the sand trials (both treated and untreated sands), no leaching for any of the target metals, iron (Fe), or aluminum (Al) occurred in Step #1 with the exception of a single sample. Three percent of the total nickel leached from the control sand sample during the seven steps of the sequential extraction process was removed in Step 1. Results for the untreated site soils samples were similar to the sand trials with no significant leaching of metals (i.e., >5% of the total mass leached during the seven steps) in Step 1.

Step 2 Carbonate Fraction: For the sand trials, no significant (>5%) leaching occurred for Be, Li, Ni, Fe and Al. However, Cd was observed to leach from the sand/no groundwater, DoloFines/sand/groundwater and HiCalFines/sand/groundwater samples with 18 to 25% of the Cd present leaching at Stage 2. The sand control sample had no detection of Cd at Step 2. However, all the Cd results were either below the method detection limit or only slightly above the method detection limit for all of these samples, and the total Cd concentration in the sand samples was between 0.0344 and 0.0832 mg/kg. For the site soils, no significant leaching of any of the metals occurred at Step 2. This comparison suggests that Cd in the sand and sand exposed to groundwater is not as tightly bound as Cd in site soils.

Step 3 Non-crystalline Fraction: For the sand trials, leaching was observed for Be (6 to 10%), Cd (32-47%), and Ni (7-14%) in the non-crystalline fraction. No significant Li leaching occurred in Step 3. Iron leaching ranged from 5 to 9%. Leaching results for all the sand samples in Step 3 were similar, with one exception, the sand control sample from which 47% of the Cd leached during Step 3, compared to 25% to 32% for the other sand trials. The site soil samples had similar results to the sand trials for Be and Li. However, Cd results for the soil were significantly higher (68 to 76%), compared to the sand samples, exceeding the cumulative percentage of Cd extracted from the sand trials during steps 1, 2, and 3. Ni leaching from the soil samples remained low (<5%) in Step 3.

Step 4 Metal Hydroxide Fraction: For the sand trials, significant leaching occurred for all the target metals in Step 4. The proportions of target metals leached in the metal hydroxide fraction were Be (13 to 16%), Cd (32 to 35%), Li (16-18%), and Ni (44 to 51%). Step 4 was the first stage to see significant (>5%) leaching of Li. Fe leaching ranged from 28 to 33%. For the soil trials, Ni leaching remained low on a percent basis (5 to 7%) compared to the sand trials. Step 4 is where the highest percent of Fe was leached from site soils. For the soil trials, the last of the Cd leached at Stage 4.

Step 5 Organic Phase: For the sand trials, no significant (>5%) leaching for Be, Cd, Li, Fe or Al occurred in Step 5. Leaching of Ni ranged from 9 to 11%. Soil results for Step 5 also showed no significant leaching of any of the metals, with the exception of Ni in the 19R soil sample.

Step 6 Acid/sulfide Fraction: For the sand trials, significant (>5%) leaching is observed for Be (7-9%), Li (18-22%), Ni (19-20%), and Fe (33 to 37%). No significant leaching of Cd or Al is observed in Step 6 for the sand trials. Soil results for Step 6 were similar to the sand trials.

Step 7 Residual Fraction: For the sand trials, all metals were still present at the final step at percentages above 5%. The proportions of target metals remaining in the Step 7 extraction were Be (57 to 65%), Cd (11 to 24%), Li (63 to 64%), Ni (7 to 11%), Fe (22 to 31%) and Al (92 to 93%). Comparing the soil trials to the sand trials shows that result at Step 7 are similar for Be, Li, and Fe, whereas no Cd remained in Step 7 for the soil samples whereas 11-24% of the Cd remained in the sand samples. (Al was not analyzed in the soil trials.) For Ni the opposite was observed. Residual Ni at Step 7 was higher in the soil trials (46 to 56%) compared to the sand trials (7-11%).

As presented previously, firm conclusions cannot be drawn solely from the sequential extraction data. The sequential extraction data indicate that Li and Be are relatively tightly bound (>70% of these metals

leached in Steps 6 and 7) in the sand and soil samples. By contrast, 20 to 25% of the Ni leached in Steps 1, 2 and 3 in the sand samples, but less than 3% of the Ni leached from soil during those steps. Cd showed total leaching of 44 to 57% in Steps 2 and 3 in the sand samples but showed 68 to 76% in Step 3 in the soil samples. These results indicate that leaching of Ni occurs in later steps in the soil trials compared to the sand trials, suggesting that nickel is more tightly bound to the soil than to the sand.

Total metals analysis on the treated and untreated sand was also conducted and is presented in **Table 3-6**. Enrichment of sand exposed to three doses of site groundwater is difficult to observe because the mass of metals in impacted groundwater is relatively low and likely overshadowed by natural variation in the sand.

Metals concentrations in the sand with no exposure to groundwater or treatment reagents are compared to the site soil below:

Metal	Sand 6010B analysis (mg/kg)	Site Soil (average 19R/GAF-444U/GAF-441U locations) 6010B analysis (mg/kg)
Be	0.463	1.09
Cd	0.0539	0.462
Li	5.42	19.8
Ni	10.0	19.1

These data demonstrate that Metals concentrations in the sand are lower than those in the site soil, and cadmium concentrations are an order of magnitude lower. Considering that the GWPS goals are in the parts per billion range and metals in soil are measured in parts per million, even the low metals level observed in the sand samples could result in exceedance of the GWPS if it readily leaches to groundwater. This observation has implications in the selection of the sand to be used in the PRB, and points to the importance of designing and maintaining the PRB to avoid exceeding the treatment capacity of the amendment selected. Ideally the sand used in the PRB would either have very low concentrations of target metals or the target metals would be present in a mineral form that resists leaching when exposed to site groundwater. As discussed later in this document, the prudent approach is to both conduct tests to find the best sand and to design and operate the PRB in a manner to avoid breakthrough, as sand naturally contains metals and acidic groundwater has been shown to leach metals from both sand and site soil.

3.2.5 Minerals Analysis of Soil and Sand Samples

To gain insight into the nature mechanisms of metals removal, sand and soil samples were sent to DCM Science Laboratory, Inc. (DCM) in Wheat Ridge, Colorado for minerals analysis. Reports from DCM are provided in Appendix E.

DCM Science Labs ran X-ray Diffraction Analysis (XRD) on three untreated site soils (GAF-SB-NRS069-40-50-03092020, GAF-SB-NRS070-50-60-03102020, and GAF-SB-NRS068-40-58-03122020), which were obtained from adjacent to the screen intervals of monitoring wells GAF-441U, GAF-444U, and 19R, respectively. XRD responses were compared to a library of minerals.

- Bulk samples were 26 to 48% quartz with possible trace amounts of Goethite and K-Feldspar.
- Total clay ranged from 52 to 74%. Clay was mostly Illite and Kaolinite with possible trace Chlorite.

Quartz is a silicate crystal and probably has little bearing on the absorption/desorption of the target metals. Illite and Kaolinite are clay minerals that would be expected to have some capacity to absorb and desorb the target metals. Illite is a layered alumino-silicate with primary components of silicon, Al, Fe, Mg, and K. Cation exchange capacity is in the range of 20-30 milliequivalents per 100 grams of soil (meq/100g). Kaolinite is Al2Si2O5(OH)4 and will also contain Fe and other metals. Its cation exchange

capacity is generally weaker (1-15meq/100g) compared to Illite, indicating that it has less potential to sorb (or desorb) target metals present in the environment.

Chlorite is a ClO_2 crystal. It is not considered relevant to treatment of target metals, because it is not likely that metals would be removed from solution or prevented from being soluble by chlorite.

Goethite is an iron oxyhydroxide which can play an important role in the sort of precipitation reactions that treatment is intended to induce. Iron/sulfur/hydroxide chemistry is very complex and dynamic, continuously changing. These iron bearing minerals may allow mobilization of the target metals or cause them to precipitate. The presence of Goethite is probable but not definite.

The baseline mineral analysis yielded the following conclusions:

- Confirms field observations about clay content in soil,
- Identifies mineralogical species such as IIlite, Kaolinite, and Goethite that can affect the sorption and desorption of target metals, and
- Provides good baseline on the composition of minerals present, which can be compared to soils after treatment to better understand the treatment processes at work.

Mineral analysis samples were collected from the Phase III microcosm sand trials as follows:

AECOM-Sand - 073020: This material is sand without addition of any reagents or any dosing with site groundwater. The sand is a natural material with limited processing (water washed and sieved to meet ASTM standards for concrete sand). The material was produced by Pine Bluff Materials Company and was provided by a supplier in the Gallatin area (Garrot Brothers).

AECOM- CONTROL +2 – 073020: This material is sand from the same source as AECOM-Sand that has been dosed twice with water from monitoring well 19R. The process was to dose the sand with site groundwater, wait one week, drain the water out, and repeat the dose a second time, wait one week, drain it again, and then collect a sample of sand from the approximate center of the test vessel (bucket).

AECOM-DOLO - +2 – 073020: This material is sand from the same source as AECOM-Sand, which has been amended with 0.2% by weight of sand of DoloFines. The amended sand was then subjected to dosing with monitoring well 19R water two times and sampling as described for AECOM-CONTROL +2.

AECOM-Hi CAL +2 – 073020: This material is sand from the same source as AECOM-Sand which has been amended with 0.1% by weight of sand of HiCalFines. The amended sand was then subjected to dosing with monitoring well 19R water and sampling as described for AECOM-CONTROL +2.

Monitoring well 19R water used for the dosing has a low pH (<4) and contains Be (approx. 13 micrograms per liter [µg/L]), Cd (approximately 6 µg/L), Li (approximately 140 µg/L) and Ni (approximately 200 µg/L).

DCM conducted the following tests:

- Semi-Quantitative X-Ray Diffraction (XRD)
- X-Ray Fluorescence (XRF)
- Scanning Electron Microscopy (SEM)

The nature of the samples and purpose of the study were discussed with DCM prior to analysis. In addition to standard analysis, DCM was asked to focus on the following:

- Calcite (present in the HiCalFines and DoloFines),
- Dolomite,
- Quartzite,
- Illite and Kaolinite,

- Iron Fe(OOH)x, pyrite, and other iron minerals,
- Al,
- Cadmium – $CdCO_3$ (otavite) CdS (greennockite or hawleyite), $Cd(OH)_2$ (cadmium hydroxide),
- Beryllium (not detectable by XRF) – BeO, $Be(OH)_2$, (beryllium oxide and hydroxide),
- Nickel – NiS (millerite), NiS_2 (vaesite) Ni_3S_2 (heazlewoodite), Fe_5NiS_8/$(FeNi)_9S_8$ (greigite,/pentlandite), (Fe, Ni)O(OH) (limonite), $Mg,Ni)_3(OH)_4(Si_2O_5)$(garnierite), and
- Lithium (not detectable by XRF) – Li minerals can be divided into three groups: silicates (spodumene-$LiAlSi_2O_6$,petalite-$LiAlSi_4O_{10}$); micas (lepidolite-$[Li,Al]_3[Al,Si]_4O_{10}[F,OH]_2$, zinnwaldite-$[Li,Al,Fe]_3[Al,Si]_4O_{10}[F,OH]_2$ and phosphates (mainly amblygonite - [Li,Na]Al[F,OH].

3.2.5.1 XRD Results for Sand Samples

The results of the XRD testing is provided in Appendix E. All four samples were found to be predominantly quartz and silicate minerals (amphibole, K-feldspar, and plagioclase). These results are consistent with the sand that forms the base material for all four samples. Enrichment of calcite from the reagents is not apparent because only 0.1 to 0.2% of calcium bearing amendments were added to the sand samples. Enrichment of minerals associated with the target metals was not observable by XRD, because the amount of target metals deposited by dosing with 19R groundwater is very low.

3.2.5.2 XRF Results for Sand Trials

The results of the XRF testing is provided in Appendix E. As with XRD, the sensitivity of XRF makes it difficult to draw distinctions between the four samples tested. MgO appears slightly enriched in the AECOM-DOLO sample, consistent with the presence of MgO in dolomitic fines. Similarly, CaO may be slightly enriched in the amended samples. XRF results for Ni were essentially the same for all four samples. For the AECOM-DOLO and AECOM-Hi Cal samples, enrichment of nickel would be expected as nickel is removed from the groundwater during each dose and added to the sand. However, two doses of groundwater can only deposit a maximum of approximately 0.1 mg/kg of nickel. Thus, nickel enrichment from two doses of groundwater is not observable by XRF (10-15% precision/accuracy on the 1-100 mg/kg range).

3.2.5.3 SEM Results for Sand Trials

The results of the SEM testing are provided in Appendix E. The sample with no amendments and no dosing with groundwater (AECOM-Sand) shows trace amounts of calcite, dolomite, apatite and iron minerals. This finding explains why the unamended sand is providing a degree of groundwater treatment. These trace minerals are consistent with sand from a marine environment (calcite/dolomite from shell fragments, apatite from remains of fish bones).

The observation by SEM of calcite/dolomite fragments with primary and secondary coatings provides some insight into the mechanisms behind removal of the target metals from groundwater. Because the concentrations of amendments (DoloFines and HiCalFines) were less than 1% of the sand mass, it was difficult to observe major differences by SEM.

3.2.5.4 Overall Conclusions from Mineral Analysis

The mineralogy of amended sand and unamended sand are very similar. This is consistent with the relatively small doses of amendments that have been applied, the similarity of the amendments to minerals naturally present in the sand, and the low concentration of target analytes being treated in the microcosms. As anticipated in the NRS Treatability Test Work Plan, the mineral analysis does not have the resolution to observe the small amount of target metals deposited by application of site groundwater. It is also difficult to observe the amendments because the amount of amendments applied is very low.

Further mineral analysis with samples taken to failure (dosed with groundwater until breakthrough) or with much higher amendment doses (>1%) might provide clearer results. However, additional mineralogical testing is unlikely to change amendment selection or dosing. At this time, the practical value of further mineralogical testing seems minimal, and therefore, no further mineralogical testing is planned.

3.2.6 Discussion of Overall Microcosm Results and Selection of Reagents for Column Studies

HiCalFines and DoloFines were selected to advance to the next phase of testing (sand column studies). The selection was based primarily on meeting the GWPS for target metals (Tables 3-3a and 3-3b) as well as meeting GWPS for other metals (Tables 3-4a and 3-4b). Sequential extraction and minerals analysis did not show any major differences among untreated sand, DoloFines-treated sand and HiCalFines-treated sand. Both HiCalFines and DoloFines were effective for 3 or more dosings in the microcosm studies. Estimated effective doses are

- HiCalFines/19R Groundwater: >1.15 liters per gram of reagent
- HiCalFines/GAF-444U Groundwater: >1.10 liters per gram of reagent
- DoloFines/19R Groundwater: >0.81 liters per gram of reagent
- DoloFines/GAF-444U Groundwater: >1.16 liters per gram of reagent

The estimated effective doses were calculated by dividing the volume of groundwater added prior to breakthrough of one or more target metals by the mass of reagent blended into the sand. Effective doses for the two different limestone-based amendments with the two different groundwater sources were very similar. These results show consistency in treatment. While these calculations are a useful reference point for comparison among different amendments, the microcosm tests are a static batch process and may over-estimate the effective dose. The flow-through sand column tests (discussed later in this report) account for reduced contact time between the amendment and groundwater and typically provide more realistic estimates of effective dose. Thus, the sand column results will be used as the basis for selecting an effective dose for the field demonstration.

The matrix sand alone provided a limited degree of treatment. Mineral analysis of the sand showed traces of dolomite and other minerals that can provide pH adjustment and metals treatment.

If dosing with acid site groundwater past the effective dose occurs, desorption of metals from the sand/reagent matrix will occur as successive doses of acidic groundwater is added. Sequential extraction results further indicate that desorption, especially of Cd and Ni, is likely with these sand and reagent combinations.

FerroBlack® showed good treatment results for Be, Cd, and Ni but uneven results for Li. FerroBlack® was retained as an option, in the event that HiCalFines and DoloFines failed in subsequent testing.

NaOH provided short-term treatment and may be considered in regeneration trials at a later time but was eliminated as a primary treatment agent.

$CaCl_2$ did not provide improved treatment in the titration or microcosm trials and will not be tested further.

3.3 Sand Column Studies to Support PRB

The test set-up for sand column studies is shown in Figure 3-4.

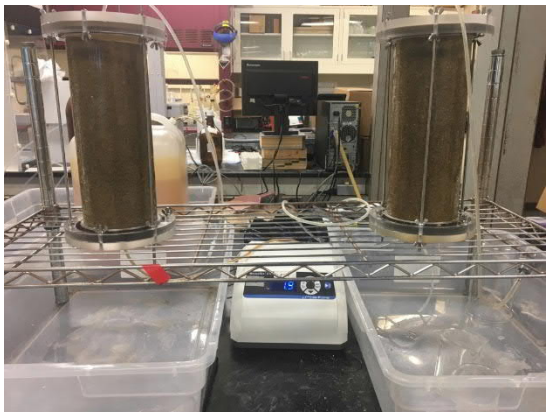


Figure 3-4 Sand Column Test Setup

In these trials, sand was blended with the test reagent then placed and lightly tamped into columns, which are approximately four inches in diameter and one foot high. During the column tests, water is pumped into the bottom of the column at a set rate, passes through the sand column, and comes out the top of the column. Water samples were periodically collected, allowed to settle in a beaker for one hour, and a subsample drawn from the top of the beaker and sent for laboratory analysis.

These studies are designed to mimic the dynamic condition of groundwater flowing through a permeable reactive barrier wall. The flow rates selected were an order of magnitude faster than the fastest local velocities expected in the field to accommodate the schedule for treatability testing. Flow rates were varied by a factor of two to assess whether reaction kinetics might bias the results of the column testing.

In total, six sand column trials were conducted as follows:

- Stage 1: Control Sand With no reagent, flow rate 0.5 milliliter per minute (mL/min)
- Stage 1: HiCalFines at 0.1% dose, flow rate 0.5 (mL/min)
- Stage 2: DoloFines at 0.2% dose, flow rate 0.5 (mL/min)
- Stage 2: ½ column FerroBlack® at 0.2%, ½ column HiCalFines at 0.2%, flow rate 0.5 mL/min
- Stage 3: HiCalFines at 0.2% dose, flow rate 0.25 mL/min
- Stage 4: Regeneration of DoloFines column, flow rate 0.25 mL/min.

Results of the sand column studies are presented in Tables 3-7a through 3-7d. As shown in Table 3-7a, the control column (sand only) was able to treat 1.39 liters of water (2.6 pore volumes [PV]) before breaking through for Cd, Li, and Ni concentrations and exceeding GWPS. Be breakthrough occurred after 3.01 liters (10 PV) of water was passed through the sand only column. The initial treatment followed by breakthrough of all the target metals is similar to results observed in the microcosm study controls (with sand only). After breakthrough, Li levels remained similar to the influent 19R groundwater. However, Be, Cd, and Ni levels after breakthrough increased to levels two or more times higher than the influent 19R groundwater. It is probable that repeated dosing of the sand with low pH groundwater eventually causes target metals naturally present in the sand to leach out of the sand.

In the Stage 1a trial with HiCalFines (0.1% dose), goals for target metals were met at 2.86 liters (5.5 PV) and showed breakthrough for Li at 4.47 liters (8.6 PV). The calculated dose for successful treatment was 0.7 liters per gram of HiCalFines. This result is similar to the microcosm studies. In this trial, breakthrough occurred when pH was above 7, and pH remained above 5 after breakthrough, whereas in the microcosm studies, breakthrough typically occurred as pH dropped below 5. Thus, the testing was continued to 21 pore volumes (10 liters). After breakthrough, Li and Be levels remained similar to the influent 19R groundwater. However, Cd, and Ni concentrations continued to rise and reach concentrations well above the influent 19R water, similar to the control column. For the HiCalFines trial, the test was continued to 21.6 pore volumes, which was well past the breakthrough point at 8.6 pore volumes. At that point, target metals concentrations in the water from the sand column were higher than the raw groundwater by a

factor of approximately 8 for Cd and 6 for Ni. For the control, the test was taken to 14.4 pore volumes, and target metals exceeded the raw water by a factor of 2 for Be, 6 for Cd, and 5 for Ni. Li levels in the control at the conclusion of the test were similar to the raw water (147 μg/L in control verses 131 μg/L in the raw water).

The cause for increasing metals concentrations after breakthrough is not known with certainty. In the early stages, target metals are removed from groundwater and adhere to the sand surface. As more low pH water is added, the amendment is neutralized and loses effectiveness. Newly deposited metals may then be desorbed from the sand with subsequent doses. However, the mass of recently deposited metals is not sufficient to account for the elevated metals concentrations at the end of the trials. It is therefore likely that removal of metals from the sand itself was occurring. This idea is supported by the sequential extraction studies done as part of the microcosm studies where target metals were removed from the sand only samples by the extraction steps that utilized a weak acid.

In Stage 1b (Table 3-7b), DoloFines at a 0.2% dose was tested. Goals for the target metals were met through 3.85 liters (7.9 PV) and showed breakthrough for Li at 4.40 liters (9 PV). The calculated dose for successful treatment was 0.45 liters per gram of DoloFines. After breakthrough, Li concentrations gradually increased as more groundwater was added and were similar to the influent concentrations at the end of the test. Be and Cd levels remained below the detection limit at the conclusion of the test, at which point 12.9 PV of groundwater had passed through the column. Ni levels remained below the GWPS throughout the test and showed a downward trend as more groundwater was added. At the conclusion of the test the Ni concentration was 0.477 µg/L (estimated below the reporting limit), which is far below the GWPS of 100 µg/L. Compared to the Stage 1a HiCalFines 0.1% trial, the DoloFines 0.2% trial had better results in term of the volume of groundwater treated before breakthrough and in terms of avoiding elevated metals after Li breakthrough.

In Stage 2, a layered column of 0.2% FerroBlack® and 0.2% HiCalFines was also tested to see if FerroBlack® could treat Be, Cd, and Ni and HiCalFines could remove residual Li. This concept was based on the microcosm trials where FerroBlack® provided successful treatment of Be, Cd, and Ni but provided mixed results for Li. Compared to the microcosm study, the dose of FerroBlack® was reduced from 2% to 0.2% to reduce the likelihood of coating the sand particles and plugging the column. Results for the layered column test are shown in Table 3-7b. Li breakthrough occurred at 2.63 liters (5.5 PV), similar to HiCalFines alone. Ni failed at 3.19 liters (6.6PV) and continued to climb to above the influent concentration. Cd remained below the GWPS (5 µg/L) but was detected above 3 µg/L. The addition of FerroBlack® did not improve performance compared to HiCalFines alone.

In Stage 3, an effort was made to improve the performance of HiCalFines by increasing the dose to 0.2% (same as DoloFines) and lowering the flow rate to 0.25 ml/min. The results of the Stage 3 trial are presented in Table 3-7c. The Stage 3 HiCalFines trial showed immediate breakthrough for Ni, but Ni concentrations fell as more groundwater was added and were below the GWPS at the conclusion of the test. The cause for temporary breakthrough of Ni is not known. Breakthrough of Li occurred at 2.64 liters. This result is not an improvement over the Stage 1 trial of HiCalFines.

In Stage 4, an initial experiment was conducted to evaluate the feasibility of regenerating amended sand after breakthrough has occurred by injecting additional reagent. The DoloFines column from Stage 2 was used for this experiment. After testing injection methods on untreated sand, a process for injecting fresh DoloFines into the spent column was developed. DoloFines were mixed at 8.5 g in 400 ml of deionized water to create a slurry. Water from the sand column was drained and the DoloFines slurry injected using a syringe at various depths starting at the bottom of the column. The concept was to simulate regeneration of a reactive barrier wall in the field by direct push injections. Visual observation showed that the distribution of the DoloFines slurry was uneven, and the slurry tended to rise to the top of the column. The effectiveness of the treatment regeneration was tested by pumping in 19R groundwater in the same manner as previous trials. Pumping water into the regenerated column was more difficult compared to previous trials, indicating that injection of the DoloFines slurry caused plugging of the column. It was possible to pump in 1.02 liters of groundwater and collect two samples of the effluent. Results are shown in Table 3-7d. Water passing through the regenerated column was successfully treated. However,

plugging of the column was a significant problem that would have to be resolved before deploying the regeneration method.

Conclusions from the sand columns trials are:

- DoloFines at a concentration of 0.2% provided the best overall treatment. The effective dose was >0.45 liters of groundwater treated per gram of DoloFines. Breakthrough was observed for Li at 4.40 liters (9.0 PV), but breakthrough of Be, Cd, and Ni was not observed during the test which ended at 6.32 liters (12.9 PV). For areas of the site where Li is below the GWPS (the GAF-444U area, for example), the effective dose for DoloFines will be higher (i.e., the PRB would remain effective for a longer period of time).
- As with the microcosm trials, dosing with acid water past the effective dose caused desorption of metals in the sand column trials. The effect was less pronounced with the DoloFines compared to HiCalFines. Field trials and full-scale applications must be designed to avoid exceeding the effective dose.
- The combination of FerroBlack® and HiCalFines in a layered column did not show improvement compared to HiCalFines alone. No further trials with FerroBlack® are proposed.
- For HiCalFines, increasing the percent of amendment from 0.1% to 0.2% did not increase the amount of water that could be treated before breakthrough.
- Regeneration of the spent DoloFines column was partially successful. The regenerated column was able to provide additional treatment but plugging of the column was observed. Further regeneration trials using liquid reagents or a thinner DoloFines slurry may be more successful. Additional testing of regeneration is anticipated, and the results will be compared to results for employing increased doses of DoloFines in the original sand mixture.

4. Trials in Support of Direct Source Soil Treatment

As described in the NRS Treatability Test Work Plan, a series of microcosm studies using site soil, treatment reagents and site groundwater was conducted. The purpose of these tests was to determine the feasibility and dosing for direct treatment of suspected source area soil. As discussed in Section 4.1 the microcosm trials were difficult to conduct as envisioned in the NRS Treatability Test Work Plan due to the low permeability and fine-grained site soils. Based on these observations, an alternative approach to developing direct source area treatment was envisioned. That alternative approach (Soil Blending) is discussed in Section 4.2. The Soil Blending Trials have not been completed and will be reported in a subsequent report addendum.

4.1 Microcosm Testing of Source Material Treatment

The microcosm testing was designed to simulate the interactions between the treatment reagents, site soil that may contain source material or residual source materials and site groundwater. For these trials, the approach was to blend site soil from an area of elevated metals in groundwater and low pH with treatment reagents, place in 2.5-gallon buckets, apply site groundwater, allow the site groundwater to drain from the mixture and sample the resulting water for target metals. This approach is designed to simulate treatment of soil and groundwater in an area of broad groundwater impacts. The concept was to continue adding impacted groundwater until breakthrough. At that point an effective dose for direct soil treatment could be calculated. The same bucket with spigots set-up used in the sand/reagent trials were used for the initial soil treatment trials. Blended mixtures were allowed to react for two weeks prior to sampling.

The first soil treatment trial was conducted with FerroBlack®. This trial was conducted shortly after the titration studies in which FerroBlack® provided the best overall treatment. For the first trial, small test mixes were used to establish the FerroBlack® dose required to reach neutral pH with the soil and groundwater. The first dose was 69.4 grams of FerroBlack® per kilogram of site soil. In the first trial, soil was obtained from near monitoring well 19R and 19R groundwater was used. A control sample was prepared by mixing soil from the 19R area with groundwater from 19R with no reagents added. The laboratory personnel reported significant difficulty blending the soil due to the high clay content (confirmed by the mineral analysis reported in Section 3.2) and stiffness of the soil. Further difficultly was encountered adding groundwater to the mixture. Very little water would seep into the blended soil and it was difficult to drain any water from the spigot at the bottom. Samples were drained from the spigot. After flow stopped, a vacuum pump was hooked up to the spigot, with a centrifuge tube in-line to collect the samples. The total metals split was centrifuged and then preserved. The dissolved metals split was filtered using a 0.45 µm filter and then preserved.

Results of the first and subsequent soil microcosm trials are presented in Table 4-1. The first trail with FerroBlack® was unsuccessful. Although the pH of the extracted water was near neutral (6.86), the water contained all target metals at levels above the GWPS. A probable explanation for elevated metals was the presence of very fine particles (less than 0.45 filter) in the water samples. The control sample with no reagent also had a neutral pH. The control failed for all target metals in the unfiltered sample but was below the GWPS in the filtered sample. Variability in the soil may partially explain the results. Acidic groundwater and acidic soils in the 19R area appear to exist as seams within a larger soil matrix of neutral pH. As the soil is blended, the overall pH becomes closer to neutral. Also, the test set-up is not well suited to very low permeability soils with very fine particles.

Lessons learned from the first trial were incorporated into the second trial. Soil for mixing was taken from the GAF-441U area which has more consistent low pH and a higher permeability. GAF-441U is located within the suspected source area for acidic groundwater. The test set-up and sampling procedures were also changed to include mixing with an epoxy-coated paint stirrer for an hour after the initial draining and prior to using the vacuum pump. The second trial used HiCalFines at a dose of 4.48 grams per kilogram site soil. HiCalFines were used because results of the early sand microcosm trails were available and were showing better results compared to FerroBlack®.

Three applications of groundwater were conducted in the second trial. The volume of water added and recovered in each application were very low, collecting only 0.5 to 0.6 L of per sample. In the second trial, the control samples consistently exceeded the GWPS. The HiCalFines samples met the GWPS for all metals in after all three applications of groundwater. The second set of trials showed that neutralization of site soil with low pH and meeting GWPS using HiCalFines was possible. However, the difficulties of blending the still low permeability soils remained. The primary problem for the test set-up was getting site groundwater to seep into the soil and then drawing a sample out for testing. While the microcosm trials did provide some useful information, an alternative method for preparing and testing was considered to be necessary. To compensate for the low permeability, an alternative test set-up was required and a more robust means of separating fine particles from leachate samples was needed. EPA sample preparation and leachate testing Methods 1315 and 1316, with modifications, were selected to assess amendment suitability for direct soil treatment. The alternative approach is discussed in Section 4.2.

4.2 Soil Blending and Leaching Studies for Direct Soil Treatment

As discussed in Section 4.1, the microcosm studies provided some encouraging results for HiCalFines (i.e., increased pH and target metal concentrations below the GWPS in treated groundwater), but the testing approach was not well suited to the low permeability soils and presence of very fine sand grains. The approach to testing direct soil treatment was revised. In the revised approach, the soil was blended with the reagent and then subjected to EPA leaching test methods 1315 and 1316. Water for the leaching tests was from the site, but not a monitoring well with low pH or elevated target metals. The logic for substituting out the impacted groundwater was two-fold. First using site groundwater that is not impacted better simulates a source area treatment where water infiltrating into the treated area would either not be impacted or be minimally impacted. The second reason is that conducting leaching tests with water that already has elevated metals would make it difficult to evaluate if the treated material is leaching or absorbing metals. Groundwater from monitoring well GAF-440U was selected for this testing because of near neutral pH, metals less than the GWPS, and total organic carbon (TOC) similar or above TOC level in wells impacted with metals. TOC may play a role in mobilizing or sequestering metals. Metals may be found in groundwaters with organic content associated with humic acid complexes or otherwise associated with decaying matter.

These trials consisted of the following formulations:

Test	Soil	Groundwater
Control – No Reagent	GAF-441U area	GAF-440U
0.5% HiCalFines	GAF-441U	GAF-440U
0.5% DoloFines	GAF-441U	GAF-440U
1% DoloFines	GAF-441U	GAF-440U

The above formulations were blended by hand by repeatedly overturning the soil in one third increments and then the blending of the whole volume. The blended soil was allowed to rest for one week before the start of the leaching tests.

EPA Method 1315 is an immersion test of whole samples. The test soils were compacted and placed in a permeable basket and submerged in the test water. Water was then sampled at predetermined times and tested for total and dissolved metals. The splits for total metals were centrifuged and decanted into the sample bottle. The dissolved sample splits were filtered using a 0.45 µm filter.

EPA Method 1316 is a leaching test where extractions are conducted using site groundwater and various liquid to solid ratios.

For both leaching tests the primary performance criteria for the reagent blends is demonstrating low levels of metals compared to the control. Achieving the GWPS in all leaching tests may not be a practical goal considering the aggressive nature of these leaching tests.

Results of the leaching tests for Direct Soil Treatment were reported in an addendum to an earlier version of this report. That addendum is provided in Appendix A.

5. Trials of In-Situ Stabilization (ISS)

ISS is designed to both immobilize metals within a matrix and to create a low permeability zone that minimizes groundwater flow through the treated area and reduces the mass flux of metals from the stabilized soil. In this specific application the stabilizing agent, Portland cement may also serve to increase the soil pH and further reduce the mobility of the target metals. ISS is primarily applicable to the source area and thus ISS testing was conducted with soils from the suspected source area near monitoring well GAF-441U.

For this project a low dose (lean) and high dose (rich) of Portland cement were tested. Each dose has a slightly different objective. The lean dose would be designed to immobilize the metals, reduce permeability of the soils but not create a solid monolith. The rich dose is designed to achieve the same objectives and to create a solid monolith.

Samples from each test were first homogenized using a large spoon. The necessary soil and Portland cement weights were measured with a scale. Portland cement was pre-blended with a measured volume of potable water to create a thick slurry (approximately a one to one ratio). The Portland cement and soil were thoroughly blended by hand. Blending continued until the material was uniform in color and no clumps of unblended material were apparent. The approximate volume change between only soil and blended soil with Portland cement was noted.

Once blending was complete, the material was immediately placed in 3-inch by 6-inch cylindrical forms. The forms were carefully filled to minimize void spaces. Each test run required filling of five forms (three unconfined compressive strength [UCS] tests [at 7, 14, and 28-day intervals], one permeability test, and one leachability test). Upon filling, the forms were capped and placed in a cooler. Samples were sent to a geotechnical laboratory for UCS and permeability testing. The geotechnical laboratory stored the samples in a cooler and ran the UCS testing at the 7, 14, and 28-day intervals.

5.1 Stage I Trials

The purpose of the Stage I trials was to find the optimal percent of Portland cement to meet specific goals for permeability and unconfined compressive strength (UCS). A lean mix (3% Portland) and rich mix (6% Portland) were tested. Results from the first Trials are shown in Table 5-1. The first trials were conducted using Type II Portland cement form a Gallatin local supplier. Both mixes meet the goals for permeability and UCS.

5.2 Stage II Trials

The approach proposed in the NRS Treatability Test Work Plan was to select the best single blend from Stage I for additional testing. Additional testing would include 1315 leaching tests and wet/dry cycling tests. Considering that both lean and rich mixes performed well in Stage I and the importance of developing a viable source treatment, it was decided to test both mixes in Stage I. To provide a better understanding of treatment effectiveness and to compare results with the direct soil treatments (DoloFines and HiCalFines), testing by EPA Method 1316 leaching was added.

Type V cement is formulated to reduce degradation of concrete in high sulfate environments. According to the U.S. Bureau of Reclamation, Concrete Manual (1975), use of Type V cement is recommended if sulfate in groundwater is in the range of 1,500 to 10,000 mg/L. Groundwater in the suspected source area (well 441U) has shown sulfate levels of 7,060 and 7,560 mg/L and indicates that use of Type V cement may be appropriate. The Stage II trials will use Type V Portland cement. Permeability and UCS tests will be repeated to confirm that those parameters still meet the goals.

Results of the ISS leaching tests will be reported in an addendum to this report.

6. Data Quality Assessment

The methods used to assess data quality during the treatability test deviated from the methods presented in the Treatability Test Workplan (AECOM, 2019) and associated sampling and analysis plan (SAP). The SAP referenced the default data validation protocols for the Environmental Investigation being performed at GAF. However, while these protocols are appropriate to site data that are used in support of risk assessment or compliance determination, such protocols are not applicable to analysis of samples that have been processed in a treatability lab.

The data developed in the treatability lab were used to develop qualitative information that supported the selection of reagents for application to a future Field Demonstration. While analytical data from the various treatability lab tests were compared to GWPS for purposes of assessing the relative utility of the various remedial amendments being tested, those data are used in a qualitative sense (e.g., DoloFines treated groundwater in the microcosms better than FerroBlack®), rather than as a quantitative metric.

Data developed from treatability lab samples were reviewed to ensure that analytical results were not rejected for data quality issues, but formal validation and identification of estimated values beyond those determined by the analytical laboratory was not performed. However, analytical results for samples of soil and groundwater representative of site conditions (**Table 2-1** and **Table 2-2**) were validated in accordance with the Quality Assurance Framework Addendum for GAF (TVA, 2019), and data qualifiers appended to the results accordingly. Laboratory reports for these data were provided in the Field Investigation Report (AECOM, 2021). Laboratory data reports for treatability testing activities are provided in Appendix F.

7. Conclusions and Design Inputs for Field Demonstration

Conclusions and design input are organized by potential treatment strategy (i.e., downgradient PRB and suspected source area) in Sections 6.1 and 6.2.

7.1 Downgradient PRB

Conclusions and recommendations for a downgradient PRB wall approach were developed based on the following testing:

- 24 titration tests;
- 12 microcosm tests, including 3 to 6 applications of groundwater and sampling of each microcosm;
- 6 sand column studies with 8 to 10 samples collected in each study;
- Testing of treated water for a full suite of metals, anions and general chemistry parameters;
- Sequential extraction tests of sand, groundwater and reagent combinations; and
- Mineral analysis of sand, groundwater and reagent combinations.

For the PRB application consisting of an amendment and sand mixture, HiCalFines and DoloFines provided similar results and consistently met GWPS for the target metals (Be, Cd, Li and Ni) in the microcosm and sand column studies. Both HiCalFines and DoloFines provide successful treatment of groundwater from both the 19R and GAF-444U locations. Both HiCalFines and DoloFines met all GWPS criteria when treated water was tested for a comprehensive list of metals and other groundwater parameters. DoloFines provided better treatment in the final sand column trials (3.85 liters treated with DoloFines compared to 2.86 liters treated with HiCalFines). Additionally, the DoloFines showed a lower rate of desorption of metals after the effective dose was exceeded. For these reasons, DoloFines is recommended for the field demonstration.

The mixture of DoloFines used in the final sand column studies was 0.2% DoloFines by weight of sand and provided an effective dose of 0.45 liters of groundwater treated per gram of DoloFines. These parameters are recommended for use in designing the Field Demonstration for the PRB. DoloFines showed a higher effective dose in the microcosm studies (0.81 liters per gram with 19R groundwater and 1.16 liters per gram with GAF-444U groundwater). Thus, use of 0.45 liters per gram for pilot study design purposes has a degree of conservatism.

A PRB constructed with DoloFines or any reagent will have a finite life. When the PRB is operated past the design life, breakthrough of metals will occur. In the DoloFines sand column studies, application of groundwater after breakthrough of Li did not result in excess desorption of Cd, Be, or Ni and Li after 6.32 liters (12.9 PV) added. However, the potential for desorption of metals was observed in the microcosm studies. Based on the results of the column studies using unamended sand, desorption of metals after breakthrough is inferred to be due to leaching of metals from the sand used in the treatability tests. Testing of alternative sand for use in the PRB Field Demonstration is recommended.

The NRS Treatability Test Work Plan established criteria for a successful reagent. The criteria and evaluation for DoloFines is as follows:

Is the amendment appropriate for safe handling and application at field scale at the NRS in the vicinity of the Cumberland River?

Meets this requirement. DoloFines is a natural product derived from crushed limestone with high magnesium content. Groundwater with similar chemistry from the underlying limestone aquifer already discharges to the Cumberland River. As used in the PRB application, the DoloFines/sand material creates a pH up to 11 within the barrier wall. However, this elevated pH will quickly dissipate in the native formation prior to reaching the river.

Will the amendment reduce metals concentration to below GWPS in groundwater?

Meets this requirement. In several trials DoloFines reduced concentrations of target metals (Beryllium, Cadmium, Lithium and Nickel) to below the GWPS values.

Does the amendment sequester metals such that they are not remobilized at concentrations above the GWPS??

Meets this requirement if PRB is properly designed. The effective dose for a 0.2% DoloFines PRB wall is 0.45 liters of groundwater treated per gram of reagent. Longevity of the PRB will depend on the location specific groundwater flow velocity, the width of the PRB selected, and the flow of groundwater through the PRB. Field verification of PRB longevity is a goal of the Field Demonstration. The PRB will not have an indefinite effective lifetime. The treatability testing showed that after the effective dose is exceeded, continued exposure to low pH groundwater will cause desorption of metals from the PRB and potentially exceedance of the GWPS in downgradient areas. The PRB therefore must be designed and maintained to stay within the effective dose of the treatment reagent.

Does the amendment avoid altering aquifer geochemistry in such a way as to mobilize non-target metals at concentrations approaching GWPS at a point-of-compliance?

Meets this requirement. Treated groundwater was tested for a comprehensive list of metals, anions, and general chemistry parameters in site soils. No GWPSs were approached or exceeded. The chemistry of the treated groundwater is very similar to naturally occurring groundwater in the area that is not impacted by low pH or target metals. Use of DoloFines does not introduce new constituents to alluvial groundwater, which overlies limestone bedrock, and thus adding additional monitoring parameters in the demonstration test is unnecessary.

Does the amendment have the potential to be utilized in a long-term cost-effective remedial treatment in terms of capital cost and operations and maintenance?

Meets this requirement. DoloFines is a commercially available product readily available to the Gallatin area. DoloFines used in the treatability testing was provided by Longview Quarry in Saginaw, Alabama operated by Carmeuse Lime and Stone. Options for PRB construction and associated cost will be evaluated as part of the Field Demonstration Work Plan. Cost of reagents will be a small portion of the overall cost of a PRB demonstration or full-scale application. Cost-effectiveness of the PRB is most likely to be driven by the cost of construction, monitoring and operation.

Path Forward for PRB Implementation

The treatability results provide the basis for the next step, preparation of a PRB design and development of the Field Demonstration Work Plan. As the PRB design is being prepared and prior to site work, some additional treatability tests are proposed to optimize the design. The PRB longevity may be extended by increasing the dosage of DoloFines. Thus far doses of 0.0082%, 0.1% and 0.2% have been tested. Each increased dose provided some improved treatment. Column studies of higher concentrations of DoloFines in sand (e.g., 0.3 to 0.6%) is recommended. Another area of optimization testing is evaluating alternative sources of sand. After breakthrough, when the treatment capacity of the reagent dose was exceeded, continued application of low pH groundwater appears to leach metals from the sand used in the treatability studies. Testing alternative sources of sand is proposed to minimize the potential for leaching metals and possibly extend the life of the PRB.

7.2 Suspected Source Area

Two options for source materials treatment are undergoing supplemental treatability testing. One option is direct soil treatment utilizing amendments similar to those tested for downgradient treatment. Initial trials of direct soil treatment showed some promise using HiCalFines. However, the low permeability of the soil made effective testing using microcosms and dosing with groundwater difficult. Trials with direct blending and subsequent whole sample leaching (EPA Method 1315) and aggressive mixing and extraction (EPA Method 1316) are on-going. These tests will be reported in an addendum to this report. The second option for source materials treatment is ISS. Initial trials showed that 3% and 6% doses produced low

permeability and cohesive monoliths. EPA Method 1315 and 1316 leaching tests of ISS samples are underway. Those results will be reported in an addendum to this report.

The leaching results for direct soil treatment and ISS will provide the data necessary to evaluate if source treatment is a viable option. The data may further be used to develop a field demonstration of source area treatment.

8. References

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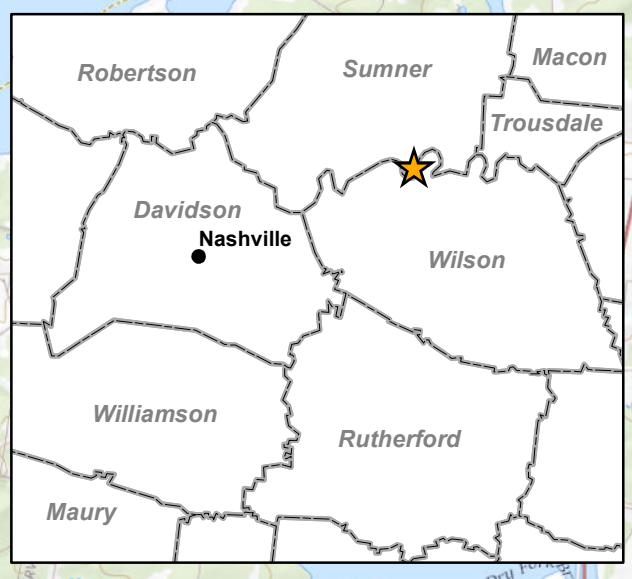
Figures

Gallatin

Gallatin Fossil Plant

NRS



LEGEND

Non-Registered Site (NRS) Boundary

TVA Gallatin Fossil Plant Property Boundary (Approximate)

N

0 4,000 8,000

Feet

NOTE: USGS 7.5' Topographic Quadrangle Map
Source - ESRI USGS Topo Layer

AECOM

Figure 1-1

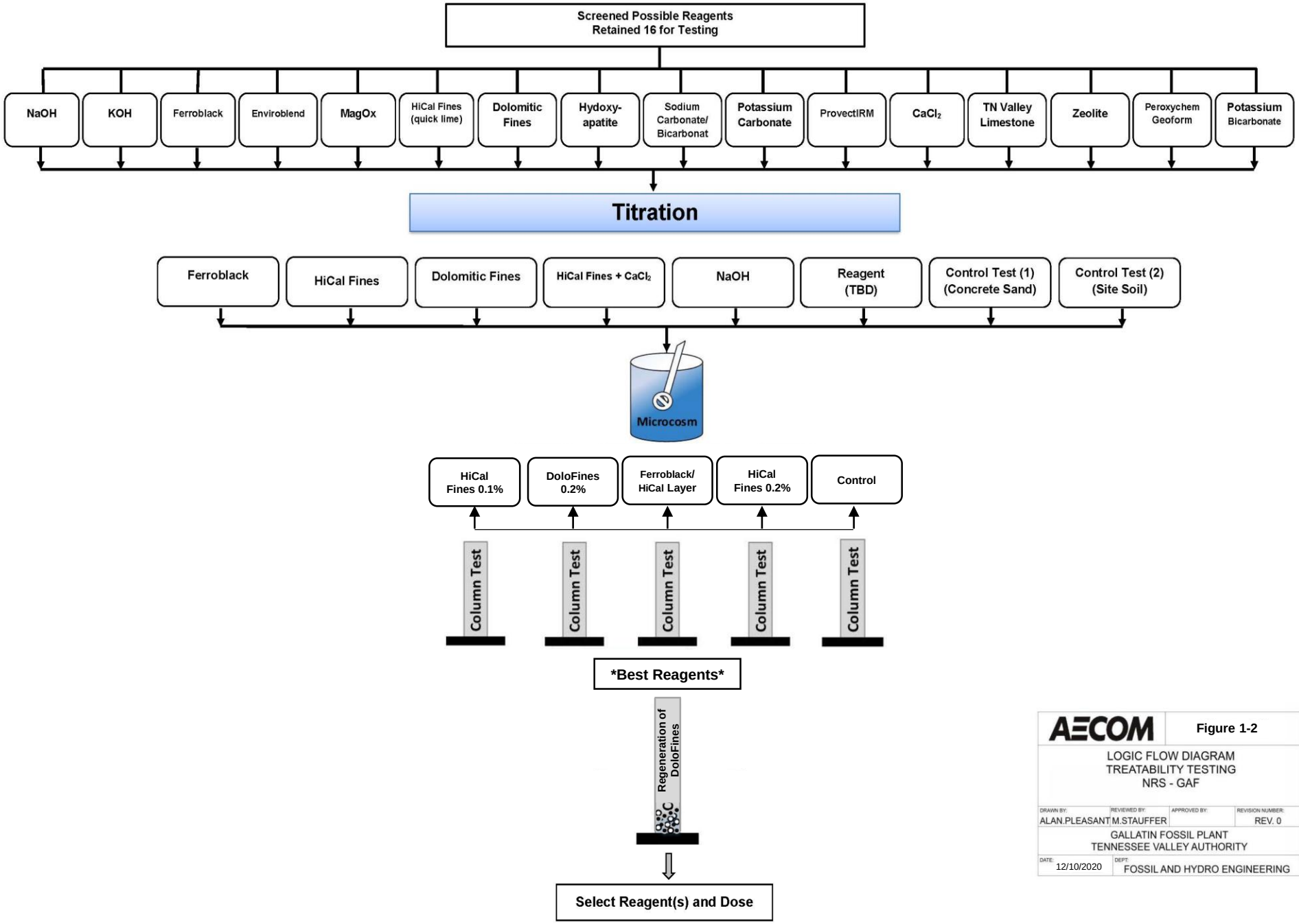
GALLATIN FOSSIL PLANT (GAF)
LOCATION MAP

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
CARRIE.SMITH	M.STAUFFER	M.STAUFFER	REV. B

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
11/2/2020	FOSSIL AND HYDRO ENGINEERING

Document Path: M:\EnvDataViz\TVA_GAF\NRS\920 - GIS\SITE_LOCATION_MAP.mxd



AECOM

Figure 1-2

LOGIC FLOW DIAGRAM
TREATABILITY TESTING
NRS - GAF

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
ALAN.PLEASANT	M.STAUFFER		REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
12/10/2020	FOSSIL AND HYDRO ENGINEERING

Non-Registered Site (NRS)

Coal Yard Runoff Ditch

Coal Yard

Coal Pile

Primary Suspected Source Area

Scrubber Facility

Ash Silos

Lime Silos

GAF-440U

GAF441U/NRS069

19R/NRS068

GAF-444U/NRS070

Discharge Channel

Cumberland River

LEGEND

Asbestos Landfill Limit

CCR Management Units

Primary Suspected Source Area

Approximate Locations for Groundwater and Soil Collection

N

0 400 800

Feet

Notes:
CCR - Coal Combustion Residuals
Aerial image dated February 2017

AECOM

Figure 2-1

GROUNDWATER AND SOIL COLLECTION LOCATIONS

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
T.ADHAM	M.FRIEDMAN	C.MACPHEE	REV. B

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
12/23/2020	FOSSIL AND HYDRO ENGINEERING

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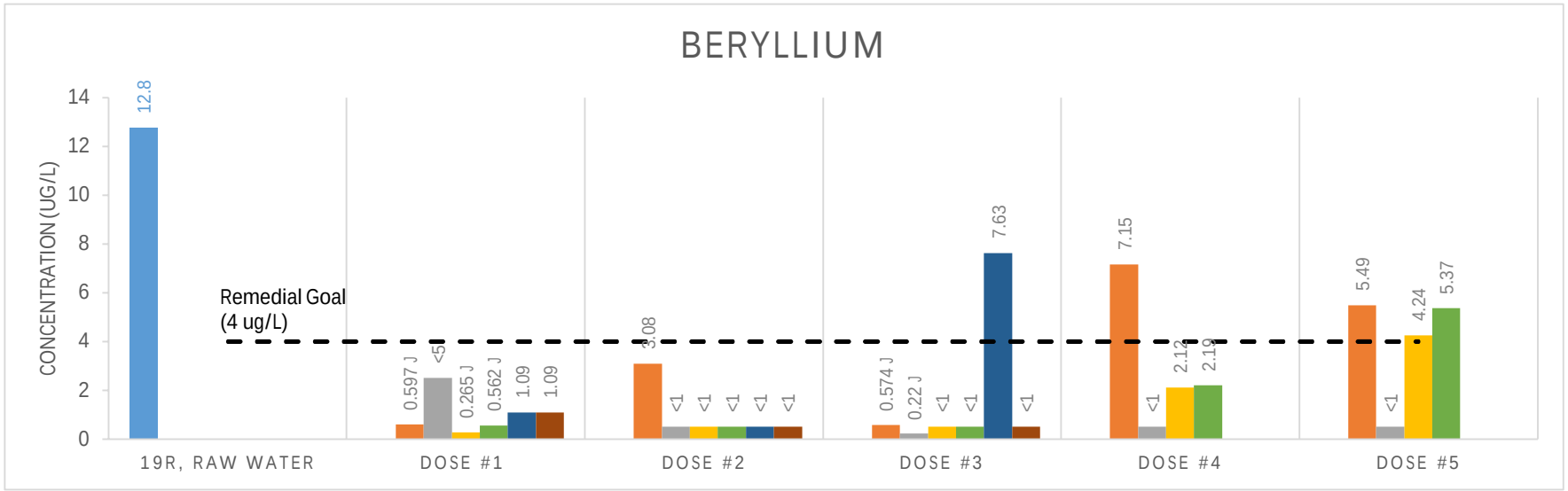
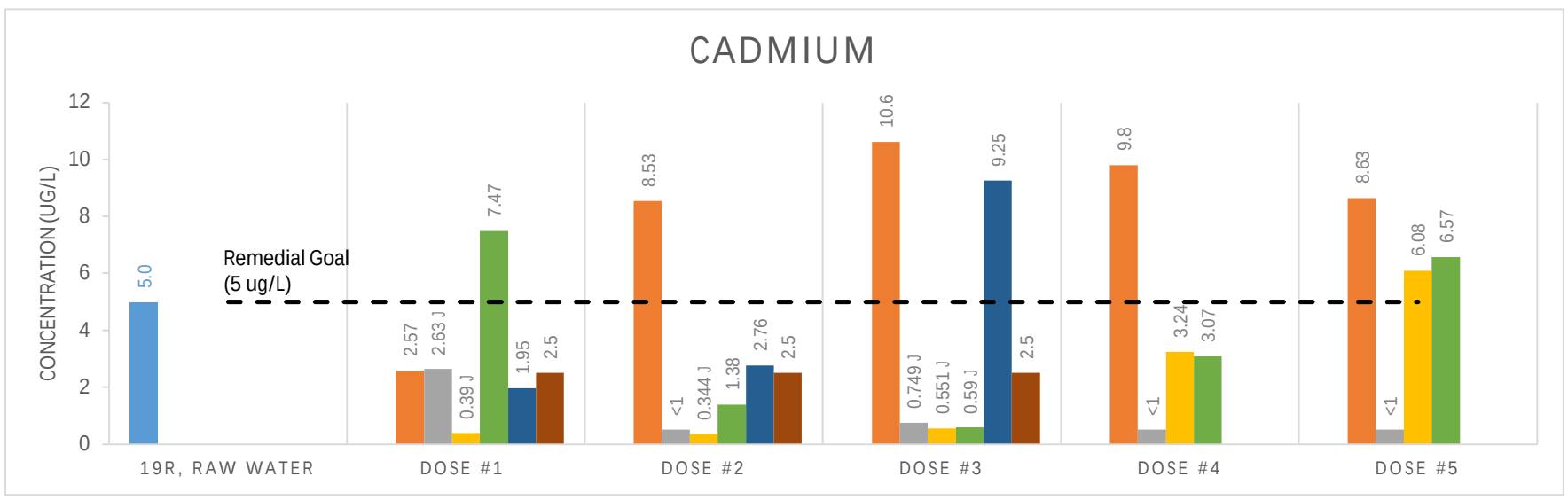
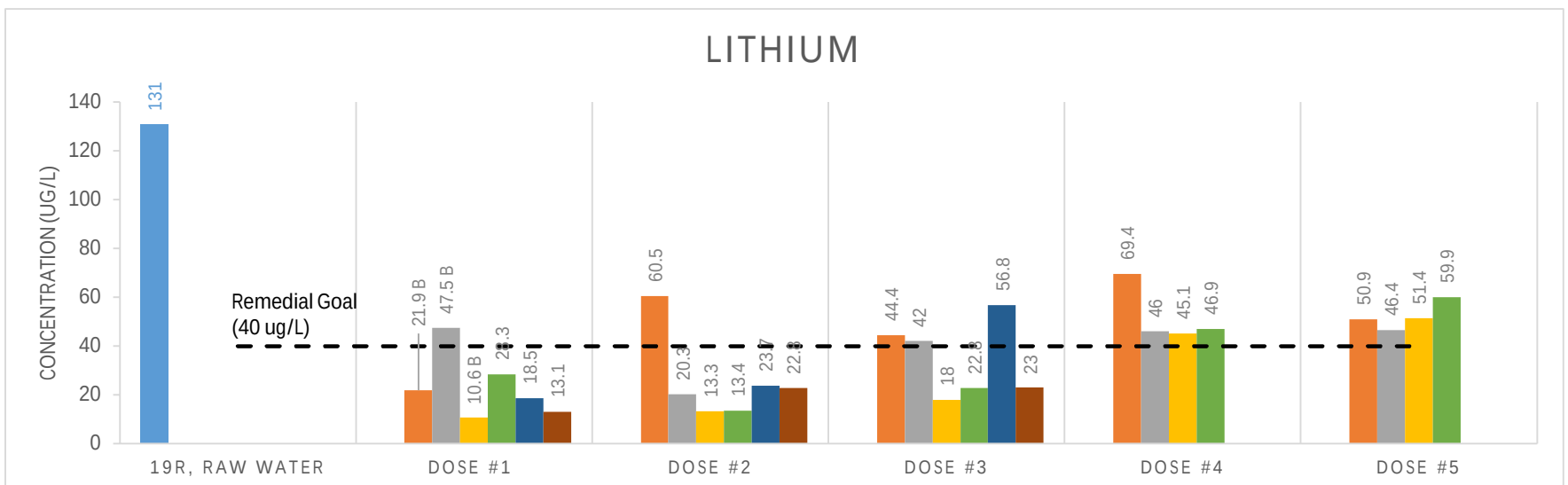
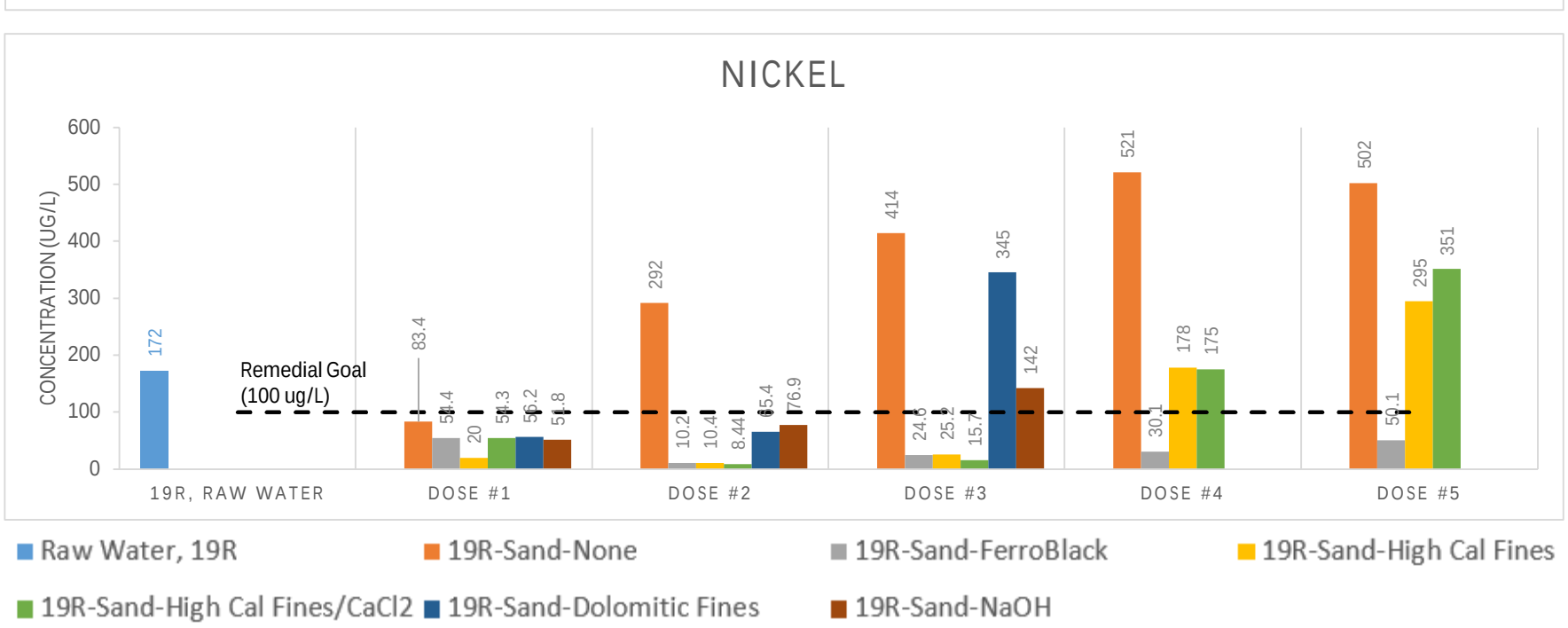








Microcosm nomenclature: Well Water-Solid Matrix-Treatment Reagent

Raw water concentration is an average of the "total metals" concentration at monitoring well 19R over three groundwater sampling events (January 2020, April 2020, and June 2020) and is provided only for comparison purposes.

Total metals concentrations from the treatability testing were used.

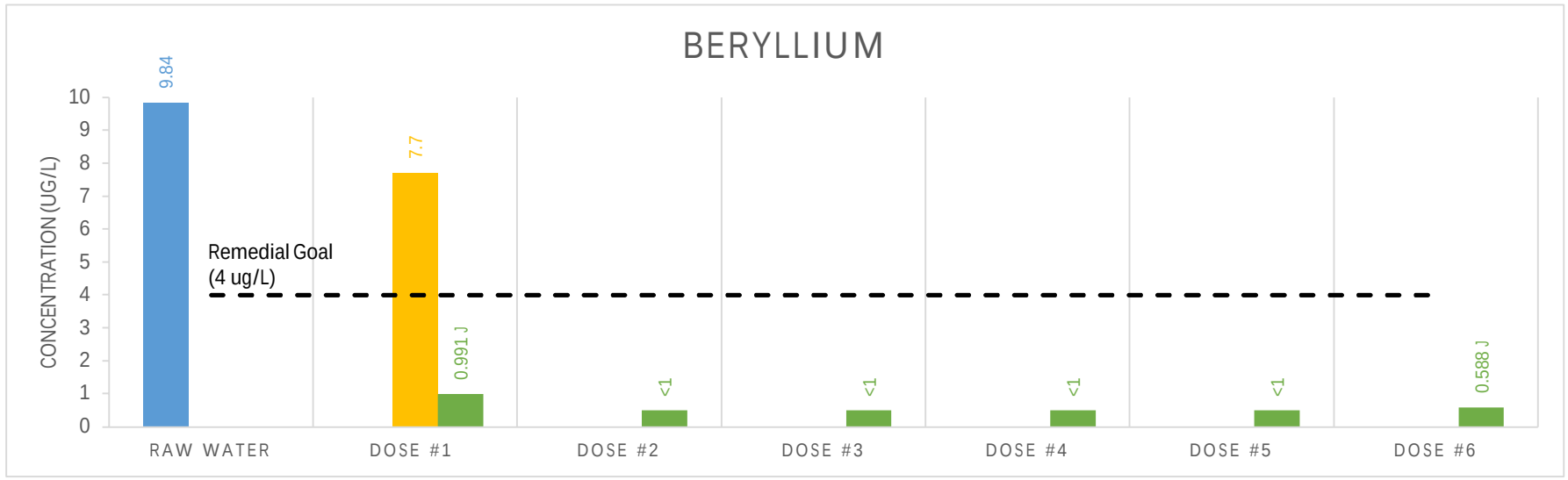
ug/L = micrograms per liter

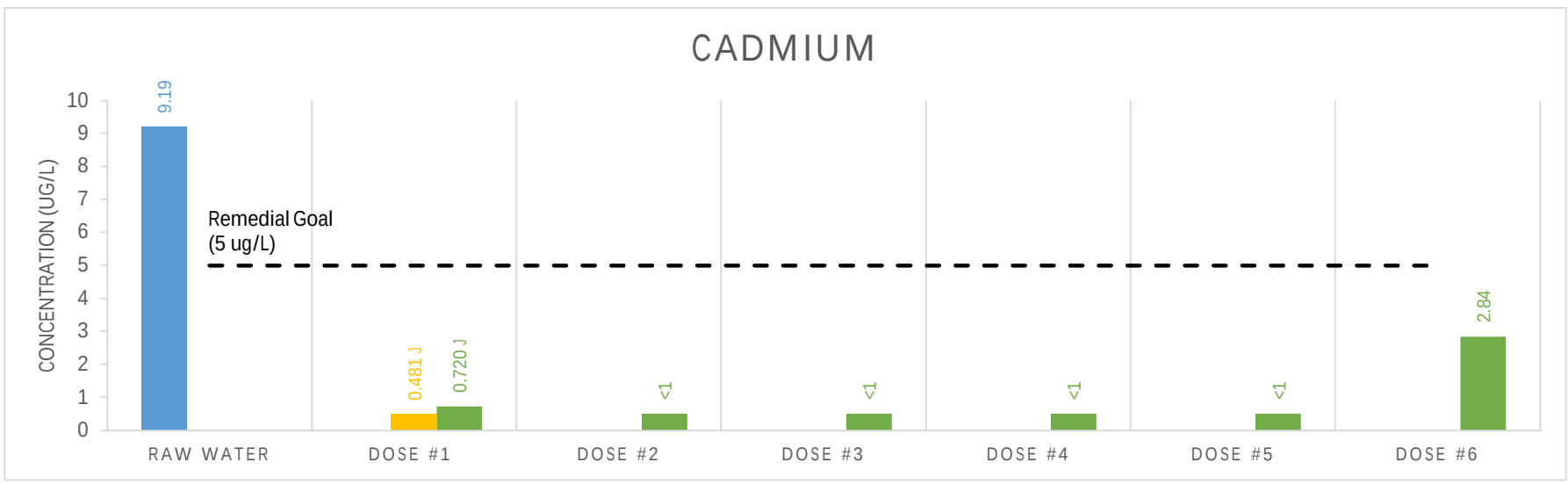
J = estimated concentration between reporting limit and method detection limit

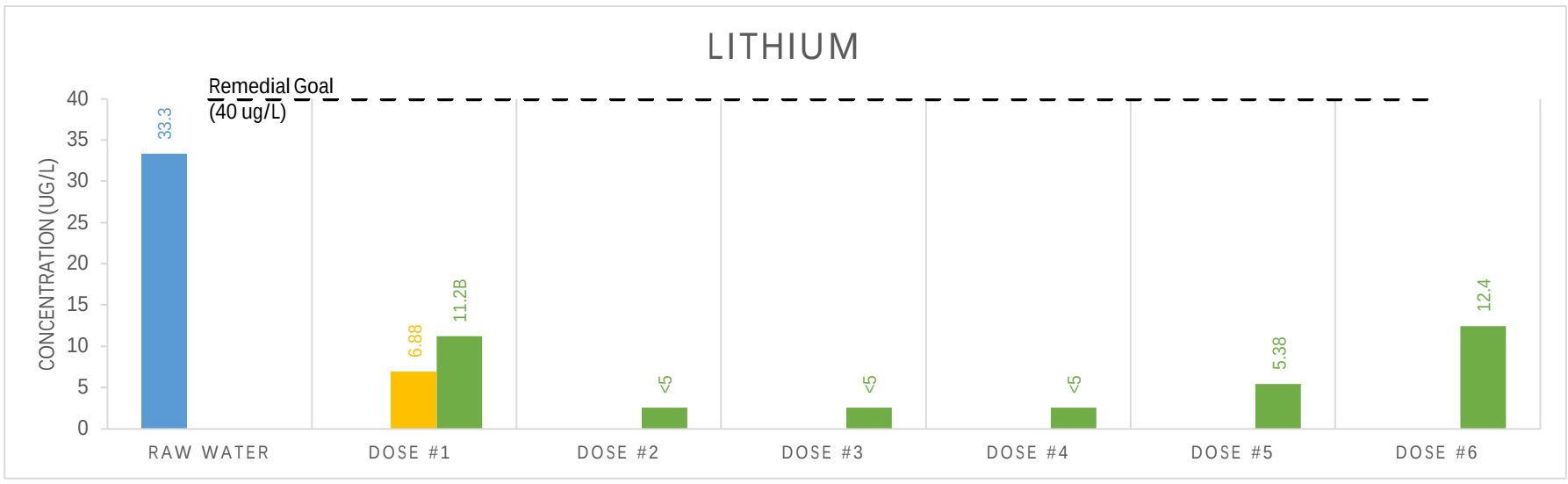
B = Analyte detected in blank and in sample.

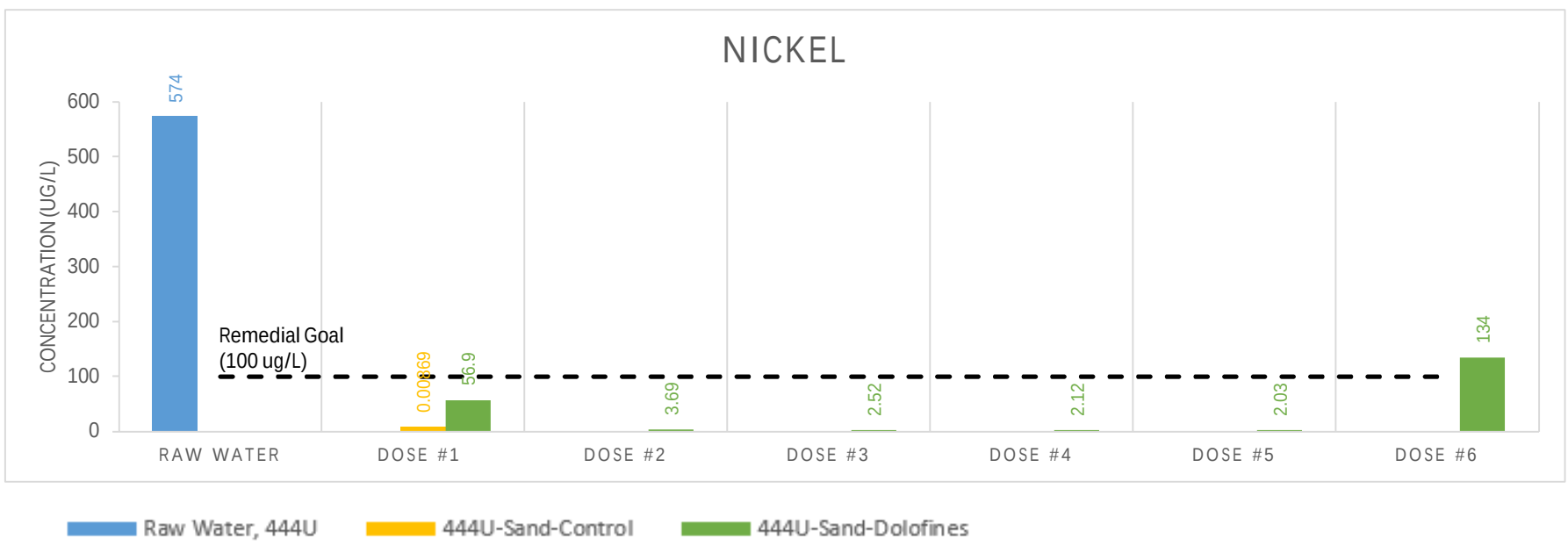
< = not detected at laboratory quantitation limit noted; graphed at half the quantitation limit

AECOM	Figure 3-3a
Phase I and II Microcosm Results Well 19R	
DRAWN BY: M FRIEDMAN	REVIEWED BY: P. HASKELL
APPROVED BY: C. MACPHEE	REVISION NUMBER: 1
GALLATIN FOSSIL PLANT TENNESSEE VALLEY AUTHORITY	
DATE: 1/26/2021	DEPT: FOSSIL AND HYDRO ENGINEERING









Microcosm nomenclature: Well Water-Solid Matrix-Treatment Reagent

Raw water concentration for monitoring well GAF-444U is an average of the "total metals" concentration over three groundwater sampling events (January 2020, April 2020, and June 2020) and is provided only for comparison purposes.

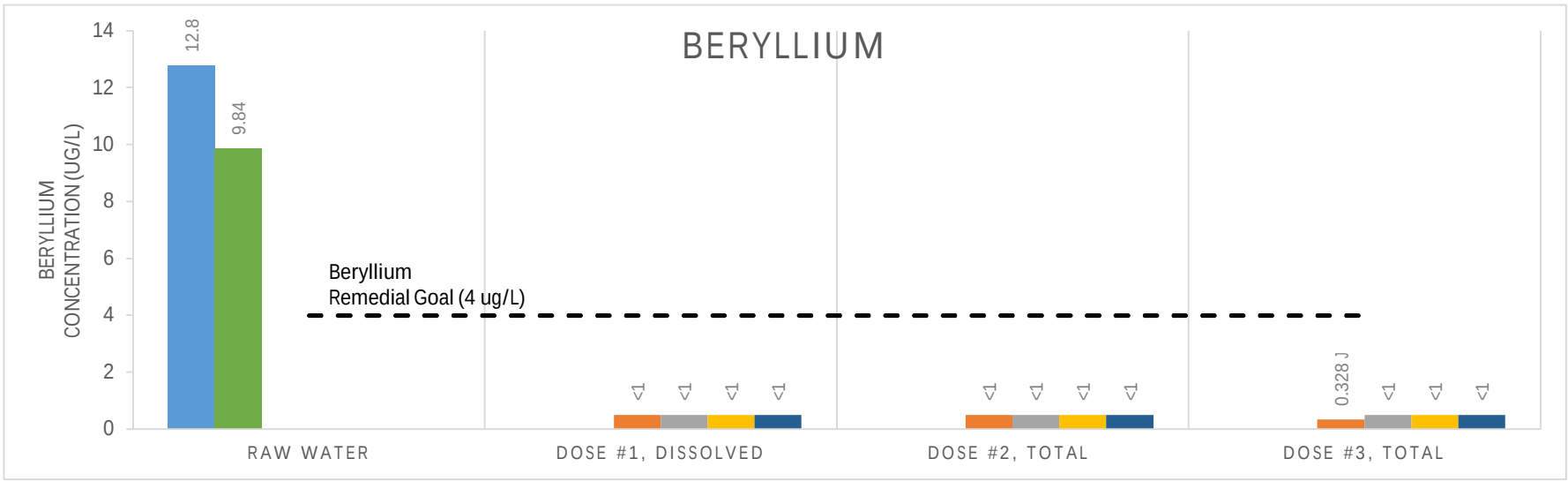
Total metals concentrations from the treatability testing were used.

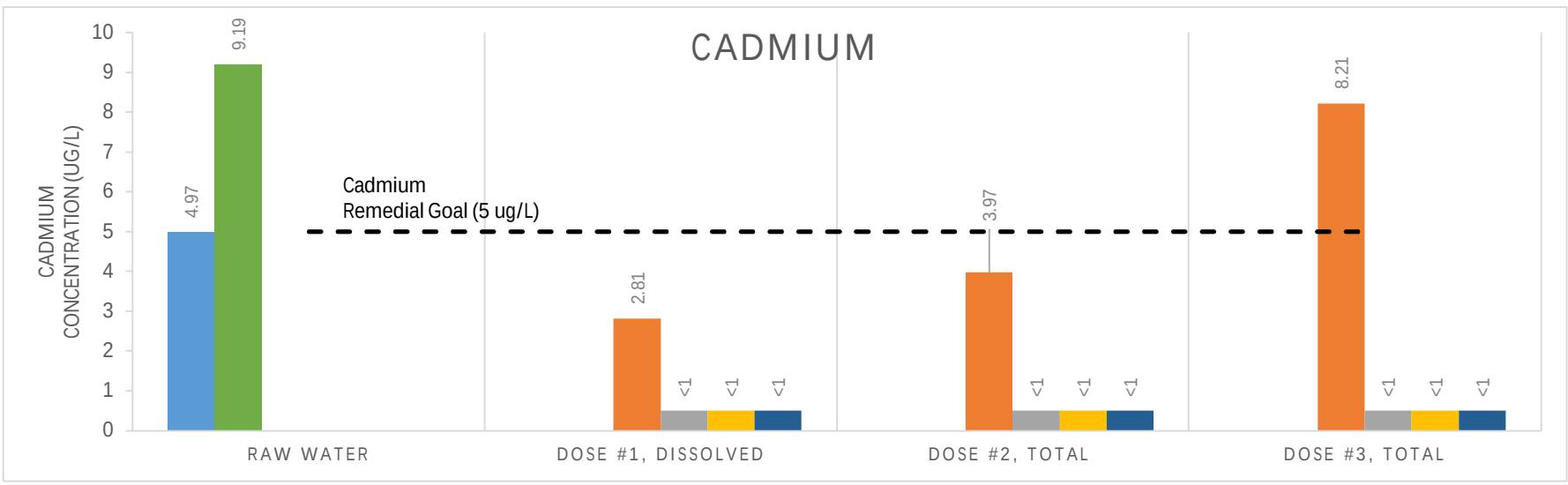
ug/L = micrograms per liter

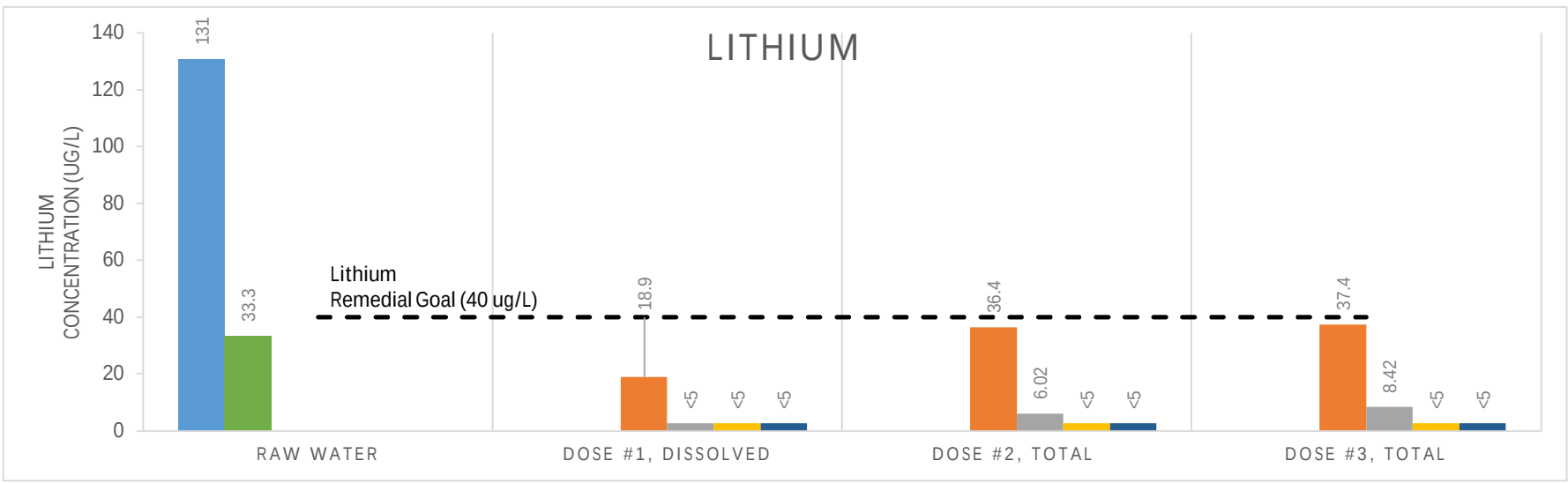
J = estimated concentration between reporting limit and method detection limit

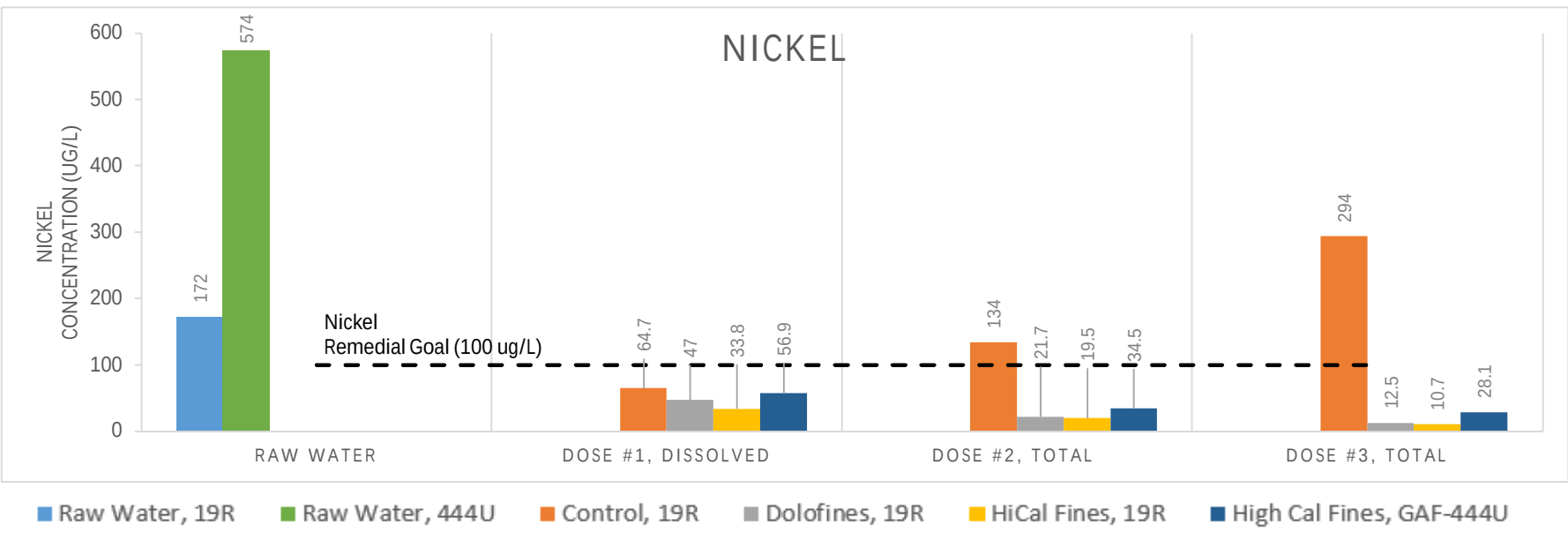
< = not detected at reporting limit noted; graphed at half the reporting limit

AECOM	Figure 3-3b
Phase I and II Microcosm Results Well GAF-444U	
DRAWN BY: M FRIEDMAN	REVIEWED BY: P. HASKELL
APPROVED BY: C. MACPHEE	REVISION NUMBER: 2
GALLATIN FOSSIL PLANT TENNESSEE VALLEY AUTHORITY	
DATE: 2/3/2021	DEPT: FOSSIL AND HYDRO ENGINEERING









Microcosm nomenclature: Treatment Reagent, source of groundwater. All tests run in sand.

Raw water concentration is the average of the "total metals" concentration for the respective monitoring wells (19R and GAF-444U) over three groundwater sampling events (January 2020, April 2020, and June 2020) and is shown for comparison purposes only.

ug/L = micrograms per liter

J = estimated concentration between reporting limit and method detection limit

< = not detected at reporting limit noted; graphed at half the reporting limit

AECOM

Figure 3-3c

Phase III Microcosm Results

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
M FRIEDMAN	P. HASKELL	C. MACPHEE	2

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
2/3/2021	FOSSIL AND HYDRO ENGINEERING

Tables

Table 2-1
Baseline Groundwater Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant, Gallatin, Tennessee

					Parameter	pH, Field	aerated pH	Dissolved Oxygen	ORP	Specific Conductance, Field	Temperature	Turbidity, field	Sulfide	Iron, Ferrous	Carbon Dioxide	Acidity		Alkalinity, Carbonate		Alkalinity, Hydroxide as		Alkalinity, Total as CaCO3		Alkalinity,Bicarbonate (CaCO3)	
					Unit	pH units	pH units	mg/L	MV	umhos/cm	deg c	NTU	mg/L	mg/L	mg/L	mg/L		mg/L		mg/L		mg/L		mg/L	
Location ID	Sample ID	Sample Depth	Sample Date	Sample Type	Total (T) or Dissolved (D)	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier
19R	GAF-GW-19R-01152020	39.5-49.5	1/15/2020	N	D																				
19R	GAF-GW-19R-01152020		1/15/2020	N	T	3.54	3.58	0.15	235.4	2326	16.1	17.1		7.0	100.0	1060		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
19R	GAF-GW-19R-03182020		3/18/2020	N	T	3.44	3.45	0.10	312.9	2679	15.5	55.2	0	6.5	30										
19R	GAF-GW-19R-04222020		4/22/2020	N	D																				
19R	GAF-GW-19R-04222020		4/22/2020	N	T	3.49	3.47	0.26	257.2	2970	15.8	12.5	10.0	7.5	> 100	1280		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
19R	GAF-GW-19R-06162020		6/16/2020	N	T	3.77		0.23	124.9	3259	16.2	3.98	0	3.6	>100	1070		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
19R	GAF-GW-19R-07142020		7/14/2020	N	D																				
19R	GAF-GW-19R-07142020		7/14/2020	N	T	4.12		1.10	231.0	3244	16.9	5.82						< 5.00	U			< 5.00	U	< 5.00	U
19R	GAF-GW-19R-08172020		8/17/2020	N	D																				
19R	GAF-GW-19R-08172020		8/17/2020	N	T	3.58	3.62	1.32	255.0	3164	17.5	29.2	0	5.5	>100	1120		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
19R	GAF-GW-19R-08182020		8/18/2020	N	T	5.21		0.31	262.9	3139	16.5	19.3													
19R	GAF-GW-19R-10212020		10/21/2020	N	D																				
19R	GAF-GW-19R-10212020		10/21/2020	N	T	3.59	3.59	5.97	238.6	3199	16.3	4.06	0	7.0	50	1050		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-440U	GAF-GW-440U-01172020	41-51	1/17/2020	N	D																				
GAF-440U	GAF-GW-440U-01172020		1/17/2020	N	T	6.70	6.78	1.27	141.9	1156	12.2	240		0.5	62.5	-503		< 5.00	U	< 5.00	U	563		563	
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	D																				
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	T	6.53	6.53	0.29	8.9	1879	16.6	56.4	>10	2.5	55	-754		< 5.00	U	< 5.00	U	559		559	
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	D																				
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	T	6.48	6.39	0.37	-21.9	1826	19.1	OR	0	1.0	>100	-369		< 5.00	U	< 5.00	U	575		575	
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	D																				
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	T	6.77	6.73	0.32	0.9	1821	19.3	139	0	1.5	72	-688		< 5.00	U	< 5.00	U	580		580	
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	D																				
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	T	6.67	6.67	0.89	103.7	1903	18.1	54.4	0	1.0	100	-523		< 5.00	U	< 5.00	U	580		580	
GAF-441U	GAF-GW-441U-01162020	40-50	1/16/2020	N	D																				
GAF-441U	GAF-GW-441U-01162020		1/16/2020	N	T	3.50	3.62	0.44	230.1	5546	18.5	149		7	100	1110		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-441U	GAF-GW-441U-03172020		3/17/2020	N	T	3.57	3.49	0.45	266.9	6442	15.3	470	0	>7	100										
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	D																				
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	T	3.29	3.29	0.39	286.1	7416	17.2	781	>10	6	80	1810		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	D																				
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	T	3.25	3.27	0.14	326.8	7103	20.6	570	0	6	60	1230		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	D																				
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	T	2.72	2.7	0.20	242.8	7124	21.0	240	0	5.5	>100	1840		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	D																				
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	T	3.74	3.76	0.18	198.8	6717	21.6	154	0	5.5	70	1010		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-444U	GAF-GW-444U-01202020	50-60	1/20/2020	N	D																				
GAF-444U	GAF-GW-444U-01202020		1/20/2020	N	T	4.13	4.13	0.43	292.6	1917	15.1	9.97		3	25	298		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-444U	GAF-GW-444U-02132020		2/13/2020	N	T	3.94		0.74	230.3	2261	14.2	10.6	>2	5.5	100										
GAF-444U	GAF-GW-444U-03172020		3/17/2020	N	T	3.86	3.81	7.37	259.2	2405	16.4	224	1	>7	25										
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	D																				
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	T	4.30	4.3	0.33	217.3	2610	17.5	23.7	3	3	30	406		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	D																				
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	T	4.47	4.51	0.30	190.2	2792	19.0	10.2	0	5.5	>100	364		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	D																				
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	T	6.53	6.52	0.32	224.9	2807	18.8	34.1	0	3	>100	369		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	D																				
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	T	4.17	4.2	2.64	222.1	2999	23.4	55.6	0	6	40	369		< 5.00	U	< 5.00	U	< 5.00	U	< 5.00	U

Notes:
mg/L = milligrams per liter
MV = millivolts
umhos/cm = MicroSiemens
deg C = degrees Celsius
NTU = nephelometric turbidity unit
µg/L = micrograms per liter
OR = Over range of turbidity meter
< = compound not detected above the value listed
J = Quantitation is approximate due to limitations identified during data validation
U = compound not detected above value reported
U* =This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level

GWPS: groundwater protection standard
GWPS of treatability test target metals:
Beryllium: 4 µg/L
Cadmium: 5 µg/L
Lithium: 40 µg/L
Nickel: 100 ug/L

Red = concentration of treatability test target metal (beryllium, cadmium, lithium, and nickel) exceeds standard

Table 2-1
Baseline Groundwater Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant, Gallatin, Tennessee

						Parameter	Aluminum		Antimony		Arsenic		Barium		Beryllium		Boron		Cadmium		Calcium		Chloride		Chromium		Cobalt		Copper	
						Unit	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		mg/L		µg/L		µg/L		µg/L	
Location ID	Sample ID	Sample Depth	Sample Date	Sample Type	Total (T) or Dissolved (D)		Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier
19R	GAF-GW-19R-01152020	39.5-49.5	1/15/2020	N	D		68700		< 0.378	U	< 1.86	U*	15.0		13.3		3880		4.65		443000				< 1.53	U	202		10.4	
19R	GAF-GW-19R-01152020		1/15/2020	N	T		69000		< 0.378	U	2.06		16.1		13.3		3950		6.07		434000		2.62		< 1.53	U	252		11.7	
19R	GAF-GW-19R-03182020		3/18/2020	N	T																										
19R	GAF-GW-19R-04222020		4/22/2020	N	D		57800		0.511	J	3.11		13.9		12.6		3750	J	4.89		436000				< 1.53	U	215		9.01	
19R	GAF-GW-19R-04222020		4/22/2020	N	T		65800		0.472	J	2.41		14.5		12.5		3610	J	4.45		452000		2.05	J	< 1.53	U	213		< 9.11	U*
19R	GAF-GW-19R-06162020		6/16/2020	N	T		55300		< 0.378	U	2.56		15.0		12.5		3390	J	4.40		417000		2.12	J	< 1.53	U	193		8.00	
19R	GAF-GW-19R-07142020		7/14/2020	N	D				< 0.756	U	2.84		13.6	J	13.5		3310	J	5.79		457000				< 3.06	U	276	J	9.37	
19R	GAF-GW-19R-07142020		7/14/2020	N	T				< 0.756	U	2.61		16.7	J	14.0		3440	J	4.10		473000		2.63		< 3.06	U	177	J	< 9.62	U*
19R	GAF-GW-19R-08172020		8/17/2020	N	D		59700		< 0.378	U	2.23		11.7	J	11.2		2980	J	3.71		441000				< 1.53	U	167		6.34	
19R	GAF-GW-19R-08172020		8/17/2020	N	T		60700		< 0.378	U	2.23		11.9		10.7		3390	J	4.67		467000		2.11	J	< 1.53	U	214		7.98	
19R	GAF-GW-19R-08182020		8/18/2020	N	T																										
19R	GAF-GW-19R-10212020		10/21/2020	N	D		57600		< 0.378	U	3.44		14.4	J	12.4		3490	J	4.54		415000				< 1.53	U	203		7.01	
19R	GAF-GW-19R-10212020		10/21/2020	N	T		56700		< 0.378	U	3.32		13.9	J	12.5		3320	J	4.14		422000		2.26	J	< 1.53	U	186		7.41	
GAF-440U	GAF-GW-440U-01172020	41-51	1/17/2020	N	D		2630	J	34.0	J	0.753	J	55.4		0.215	J	1810		< 0.217	U	342000				2.48		15.6		2.27	
GAF-440U	GAF-GW-440U-01172020		1/17/2020	N	T		3150	J	14.2	J	< 0.948	U*	53.8		< 0.287	U*	1880		< 0.217	U	345000		36.6		3.27		20.5		2.58	
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	D		< 16.3	U*	< 1.54	U*	< 0.640	U*	33.2		< 0.182	U	1860		< 0.217	U	324000				< 1.53	U	23.6		< 0.656	U*
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	T		566		< 2.22	U*	< 0.792	U*	39.3		< 0.182	U	1910		< 0.217	U	341000		41.3		< 1.53	U	24.6		< 1.21	U*
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	D		185		1.25	J	0.674	J	42.2		< 0.182	U	1800		< 0.217	U	340000				< 1.53	U	26.1		1.48	J
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	T		243		1.81	J	0.680	J	42.6		< 0.182	U	1730		< 0.217	U	340000		48.7		< 1.53	U	25.6		< 0.627	U
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	D		< 12.5	U	1.32	J	0.671	J	38.7		< 0.182	U	1960		< 0.217	U	339000				< 1.53	U	26.0		0.840	J
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	T		480		1.45	J	0.859	J	37.4		< 0.182	U	1790		< 0.217	U	326000		41.5		< 1.53	U	25.6		1.22	J
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	D		18.7	J	< 0.378	U	0.563	J	34.6		< 0.182	U	1950	J	< 0.217	U	347000				< 1.53	U	25.0		< 0.627	U
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	T		188		0.695	J	0.555	J	35.0		< 0.182	U	1930		< 0.217	U	337000		40.7		< 1.53	U	24.6		< 0.627	U
GAF-441U	GAF-GW-441U-01162020	40-50	1/16/2020	N	D		122000		< 0.905	U*	3.36		9.84	J	18.6		2960	J	11.8	J	426000				1.67	J	956	J	14.7	J
GAF-441U	GAF-GW-441U-01162020		1/16/2020	N	T		129000		< 2.57	U*	5.40		22.7		19.2		2970	J	11.6		437000		45.5		4.63		1100		53.5	
GAF-441U	GAF-GW-441U-03172020		3/17/2020	N	T																										
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	D		97100		< 1.89	U	19.5		11.5	J	17.2		2800		15.0		436000				< 7.65	U	1320		56.2	
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	T		106000		< 1.89	U	19.8		19.3	J	16.8		2930		15.7		457000		37.0		< 7.65	U	1350		69.9	
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	D		106000		< 1.89	U	16.1		14.5	J	14.8		2740		19.9		473000	J			15.1		1680		54.0	
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	T		109000		< 1.89	U	14.8		9.82	J	14.2		2520		19.1		457000		42.0		< 7.65	U	1680		46.1	
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	D		95400		< 0.378	U	13.2		< 16.0	U	12.4		2800		13.9		433000				2.02		1420		24.6	
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	T		101000		2.45		16.1		37.7	J	13.0		2850		12.8		423000		37.9		6.86		1280		34.3	
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	D		82500		< 0.756	U	16.5		11.5	J	13.1		< 2950	U*	8.23		440000				< 3.06	U	862		16.7	
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	T		85700		2.39	J	17.6		19.4	J	12.7		< 2940	U*	7.56		441000		41.5		4.05		845		18.7	
GAF-444U	GAF-GW-444U-01202020	50-60	1/20/2020	N	D		11000		0.554	J	3.60		16.2		11.7		3740		7.22		501000				< 1.91	U*	1430		< 0.809	U*
GAF-444U	GAF-GW-444U-01202020		1/20/2020	N	T		11400		1.57	J	4.21		19.4		12.8		3740		8.17		509000		6.33		1.60	J	1500		< 5.32	U*
GAF-444U	GAF-GW-444U-02132020		2/13/2020	N	T																										
GAF-444U	GAF-GW-444U-03172020		3/17/2020	N	T																										
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	D		13300	J	0.478	J	7.50	J	17.3		9.20		4080		9.79		507000				< 1.53	U	1430		4.54	
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	T		11400	J	0.919	J	6.56	J	17.7		8.77		4250		9.29		516000		6.73		< 1.53	U	1400		< 5.08	U*
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	D		9660		0.610	J	6.27		< 15.3	U*	7.58		4230		9.17		530000				< 1.53	U	1390		11.8	J
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	T		9610		0.692	J	5.67		15.1		7.96		4000	J	10.1		535000		7.01		< 1.53	U	1360		< 3.62	U*
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	D		10900		< 0.378	U	5.12		18.1		7.36		4590		9.60		517000				< 1.53	U	1320		5.34	
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	T		11600		0.989	J	5.16		19.1		7.24		4500		9.92		523000		6.38		1.53	J	1330		5.61	
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	D		10900		< 0.378	U	7.72		17.1		8.44		4520	J	9.26		484000				< 1.53	U	1330		< 1.31	U*
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	T		12400		0.717	J	8.14		20.2		8.42		< 4320	U*	9.40		464000		6.47		2.10		1280		4.44	

Notes:

mg/L = milligrams per liter
MV = millivolts
umhos/cm = MicroSiemens
deg C = degrees Celsius
NTU = nephelometric turbidity unit
µg/L = micrograms per liter
OR = Over range of turbidity meter
< = compound not detected above the value listed
J = Quantitation is approximate due to limitations identified during data validation
U = compound not detected above value reported
U* =This result should be considered "not detected" because it was detected in a rinsate blank or laboratory blank at a similar level

GWPS: groundwater protection standard
GWPS of treatability test target metals:
Beryllium: 4 µg/L
Cadmium: 5 µg/L
Lithium: 40 µg/L
Nickel: 100 ug/L

Red = concentration of treatability test target metal (beryllium, cadmium, lithium, and nickel) exceeds standard

Table 2-1
Baseline Groundwater Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant, Gallatin, Tennessee

					Parameter	Fluoride		Iron		Lead		Lithium		Magnesium		Manganese		Mercury		Molybdenum		Nickel		nitrate-nitrite nitrogen		Nitrogen, Kjeldahl, Total		Phosphate as PO4	
					Unit	µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		mg/L		mg/L		mg/L	
Location ID	Sample ID	Sample Depth	Sample Date	Sample Type	Total (T) or Dissolved (D)	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier
19R	GAF-GW-19R-01152020	39.5-49.5	1/15/2020	N	D			616000		2.28		146		25200		18100		< 0.101	U	< 0.610	U	191							
19R	GAF-GW-19R-01152020		1/15/2020	N	T	332		573000		2.22		137		26300		22300		< 0.101	U	< 0.610	U	197		< 0.0650	U	< 1.28	U*	< 0.114	U
19R	GAF-GW-19R-03182020		3/18/2020	N	T																								
19R	GAF-GW-19R-04222020		4/22/2020	N	D			520000		2.08		123		23900		18300		< 0.130	U	< 0.610	U	156							
19R	GAF-GW-19R-04222020		4/22/2020	N	T	368		520000		< 1.60	U*	125		25900		16800		< 0.130	U	< 0.610	U	160		< 0.0650	U	0.546		< 0.442	U*
19R	GAF-GW-19R-06162020		6/16/2020	N	T	289		481000		< 1.78	U*	130		21900		15100		< 0.130	U	< 0.610	U	159		< 0.0650	U	< 0.963	U*	0.155	J
19R	GAF-GW-19R-07142020		7/14/2020	N	D					1.74	J	126		25200				< 0.130	U	< 1.22	U	176	J						
19R	GAF-GW-19R-07142020		7/14/2020	N	T	498				1.87	J	140		23600				0.316		< 1.22	U	145	J						
19R	GAF-GW-19R-08172020		8/17/2020	N	D			523000		1.59		129		21500		14600	J	< 0.130	U	< 0.610	U	131							
19R	GAF-GW-19R-08172020		8/17/2020	N	T	< 167	U*	529000		1.61		130		24000		18700		< 0.130	U	< 0.610	U	150		< 0.0650	U	0.829		0.244	J
19R	GAF-GW-19R-08182020		8/18/2020	N	T																								
19R	GAF-GW-19R-10212020		10/21/2020	N	D			446000		1.50		131		22700		17800	J	< 0.130	U	< 0.610	U	140							
19R	GAF-GW-19R-10212020		10/21/2020	N	T	227	J	459000		1.50		133		22000		15800	J	< 0.130	UJ	< 0.610	U	135		< 0.0650	U	0.880		0.159	J
GAF-440U	GAF-GW-440U-01172020	41-51	1/17/2020	N	D			2750		< 1.16	U*	4.79	J	32200		4790		< 0.101	U	0.784	J	9.98							
GAF-440U	GAF-GW-440U-01172020		1/17/2020	N	T	203		3510		1.42		4.82	J	30400		5670		< 0.101	U	0.827	J	10.4		< 0.0650	U	< 0.531	U*	0.344	
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	D			788		< 0.128	U	< 6.91	U*	27100		5760		< 0.130	U	< 0.610	U	5.96							
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	T	270		1690		< 0.439	U*	< 6.91	U*	29600		6230		< 0.130	U	< 0.610	U	6.87		< 0.0650	U	< 0.816	U*	< 0.160	U*
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	D			1220		0.318	J	3.39	J	30600		6330		< 0.130	U	< 0.610	U	7.31							
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	T	299		1620		0.350	J	< 3.39	U	30000		6370		< 0.130	U	< 0.610	U	6.72		< 0.0650	U	< 0.519	U*	< 0.114	U
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	D			1060		< 0.128	U	< 3.39	U	29400		6490		< 0.130	U	0.623	J	6.64							
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	T	< 95.3	U*	1610		0.465	J	< 3.39	U	27600		6510		< 0.130	U	0.624	J	6.25		< 0.0650	U	< 0.260	U	0.273	J
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	D			1170		< 0.128	U	< 3.39	U	29200		6160		< 0.130	U	< 0.610	U	5.52							
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	T	206		1350		< 0.128	U	< 3.39	U	28700		6280		< 0.130	U	< 0.610	U	5.35		< 0.0650	U	0.403	J	< 0.114	U
GAF-441U	GAF-GW-441U-01162020	40-50	1/16/2020	N	D			2940000		1.35		16.4		139000		63600		< 0.101	U	< 0.610	U	705							
GAF-441U	GAF-GW-441U-01162020		1/16/2020	N	T	5840		3200000		3.85		21.6		143000		77500		< 0.101	U	< 0.610	U	769		1.94		2.42		0.387	
GAF-441U	GAF-GW-441U-03172020		3/17/2020	N	T																								
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	D			2660000		< 1.51	U*	< 17.0	U	126000		93700		< 0.130	U	< 3.05	U	771							
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	T	5160		2810000		< 3.37	U*	< 17.0	U	133000		90700		0.130	J	< 3.05	U	777		1.60		< 2.54	U*	2.66	J
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	D			2710000	J	2.43	J	< 17.0	U	135000	J	23500	J	< 0.130	U	< 3.05	U	887							
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	T	4750		2810000		< 2.02	U*	22.5	J	138000		107000		< 0.130	U	< 3.05	U	904		1.58		2.22		1.30	
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	D			2630000		1.17		< 33.9	U	124000		108000	J	< 0.130	U	< 0.610	U	762							
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	T	3920		2670000		5.59		< 33.9	U	123000		93100	J	< 0.130	U	< 0.610	U	730		1.40		1.73		0.329	
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	D			2240000		0.820	J	13.4		123000		51400		< 0.130	U	< 1.22	U	612							
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	T	3860		2280000		2.37		14.0		126000		49800		< 0.130	U	< 1.22	U	608		0.463		2.27		1.28	
GAF-444U	GAF-GW-444U-01202020	50-60	1/20/2020	N	D			71300		2.52		35.9		54000		112000		< 0.101	U	< 0.610	U	643							
GAF-444U	GAF-GW-444U-01202020		1/20/2020	N	T	732		68100		5.58		37.4		54800		111000		< 0.101	U	< 0.610	U	660		< 0.0650	U	1.22	J	< 0.114	U
GAF-444U	GAF-GW-444U-02132020		2/13/2020	N	T																								
GAF-444U	GAF-GW-444U-03172020		3/17/2020	N	T																								
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	D			122000		2.53		30.7		48300		82900		< 0.130	U	< 0.610	U	520							
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	T	879		113000		< 2.23	U*	31.2		51100		91800		< 0.130	U	< 0.610	U	527		< 0.0650	U	< 1.50	U*	< 0.155	U*
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	D			105000		2.14		31.5		51000		98000		< 0.130	U	< 0.610	U	552							
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	T	1050		108000		< 2.15	U*	31.2		51500		101000		< 0.130	U	< 0.610	U	534		< 0.0650	U	< 1.13	U*	< 0.114	U
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	D			95300		2.11		31.6		51200		86800		< 0.130	U	< 0.610	U	522							
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	T	220	J	104000		2.26		30.2		49800		89700		< 0.130	U	< 0.610	U	508		< 0.0650	U	0.341	J	< 0.114	U
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	D			88900		1.99		31.2		50400		93700		< 0.130	U	< 0.610	U	536							
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	T	810		91000		2.67		31.3		47800		87100		< 0.130	U	< 0.610	U	511		< 0.0650	U	0.890		< 0.114	U

Notes:

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GWPS: groundwater protection standard
GWPS of treatability test target metals:
Beryllium: 4 µg/L
Cadmium: 5 µg/L
Lithium: 40 µg/L
Nickel: 100 ug/L

Red = concentration of treatability test target metal (beryllium, cadmium, lithium, and nickel) exceeds standard

Table 2-1
Baseline Groundwater Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant, Gallatin, Tennessee

					Parameter	Phosphorus		Potassium		Selenium		Silicon		Silver		Sodium		Strontium		Sulfate		Sulfide		Thallium		Total Dissolved Solids		Total Organic Carbon	
					Unit	mg/L		µg/L		µg/L		µg/L		µg/L		µg/L		µg/L		mg/L		mg/L		µg/L		mg/L		mg/L	
Location ID	Sample ID	Sample Depth	Sample Date	Sample Type	Total (T) or Dissolved (D)	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier
19R	GAF-GW-19R-01152020	39.5-49.5	1/15/2020	N	D			17400		< 1.51	U	19100		< 0.177	U	8460		1180						1.45					
19R	GAF-GW-19R-01152020		1/15/2020	N	T	< 0.0320	U	16800		1.66	J	18600		< 0.177	U	8580		1160		2600		43.8		< 1.13	U*	4000	J	0.686	J
19R	GAF-GW-19R-03182020		3/18/2020	N	T																								
19R	GAF-GW-19R-04222020		4/22/2020	N	D			15900		< 1.51	U	17800		< 0.177	U	8860		1150						1.18					
19R	GAF-GW-19R-04222020		4/22/2020	N	T	< 0.0320	U	16100		< 1.51	U	18000		< 0.177	U	8780		1250		2430	J	59.8		0.676	J	3540	J	0.732	J
19R	GAF-GW-19R-06162020		6/16/2020	N	T	< 0.0320	U	15400		< 1.51	U	17400		< 0.177	U	7670		1200	J	2500		65.7		< 1.23	U*	2670		0.817	J
19R	GAF-GW-19R-07142020		7/14/2020	N	D			14900		< 3.02	U			< 0.354	U	8010								1.24	J				
19R	GAF-GW-19R-07142020		7/14/2020	N	T			16500		< 3.02	U			< 0.354	U	8030				2420				1.40	J	3830	J		
19R	GAF-GW-19R-08172020		8/17/2020	N	D			16100		< 1.51	U	18700		< 0.177	U	7710		966	J					< 0.947	U*				
19R	GAF-GW-19R-08172020		8/17/2020	N	T	< 0.0320	U	16600		< 1.51	U	19000		< 0.177	U	8390		970	J	2550		20.1		< 0.952	U*	2550		0.743	J
19R	GAF-GW-19R-08182020		8/18/2020	N	T																								
19R	GAF-GW-19R-10212020		10/21/2020	N	D			15500		< 1.51	U	18000		< 0.177	U	7620		1200						0.938	J				
19R	GAF-GW-19R-10212020		10/21/2020	N	T	< 0.0320	U	15500		< 1.51	U	18200		< 0.177	U	7470		1200		2360		< 6.70	U	1.14		3570		0.745	J
GAF-440U	GAF-GW-440U-01172020	41-51	1/17/2020	N	D			3450		< 1.51	U	9950		< 0.177	U	80000		561						< 0.148	U				
GAF-440U	GAF-GW-440U-01172020		1/17/2020	N	T	< 0.102	U*	4760		< 1.51	U	9980		< 0.177	U	84500		584		507		< 1.34	U	< 0.165	U*	1460		3.24	
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	D			4670		< 1.51	U	4800		< 0.177	U	86300		551						< 0.148	U				
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	T	0.190		5150		< 1.51	U	5700		< 0.177	U	93200		570		515		< 1.34	U	< 0.148	U	1360		3.17	
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	D			3980		< 1.51	U	6160		< 0.177	U	93300		580						< 0.148	U				
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	T	0.0966	J	4280		< 1.51	U	6150		< 0.177	U	93200		571		502		< 1.34	U	< 0.148	U	1360		3.00	
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	D			4150		< 1.51	U	5940		< 0.177	U	89000		591						< 0.178	U*				
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	T	< 0.0320	U	4740		< 1.51	U	6210		< 0.177	U	87300		576		580		< 1.34	U	0.430	J	1420		3.14	
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	D			4760		< 1.51	U	5450		< 0.177	U	92200		598						< 0.148	U				
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	T	< 0.0320	U	4990		< 1.51	U	5370		< 0.177	U	95200		575		563		6.19		< 0.148	U	1390		3.23	
GAF-441U	GAF-GW-441U-01162020	40-50	1/16/2020	N	D			18400		5.44		10400		< 0.177	U	97200		1000						3.69					
GAF-441U	GAF-GW-441U-01162020		1/16/2020	N	T	0.211		19500		7.15		20800		< 0.177	U	97500		1020		8440		45.3		3.87		11100		4.80	
GAF-441U	GAF-GW-441U-03172020		3/17/2020	N	T																								
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	D			16100		< 7.55	U	10200		< 0.885	U	84800		879						< 4.83	U*				
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	T	0.554		16900		< 7.55	U	14900		< 0.885	U	89900		964		7300		28.7		< 3.70	U*	5500		4.64	
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	D			16000	J	< 7.55	U	13500	J	< 0.885	U	94300	J	996	J					< 3.89	U*				
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	T	0.427		16100		< 7.55	U	12500		< 0.885	U	90600		940		7060		17.1	J	4.15	J	5360		4.55	
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	D			14500		4.13	J	11500		< 0.177	U	76300		842						3.29					
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	T	0.212		15200		4.30	J	19300		< 0.177	U	78400		869		7560		23.1		3.54		5290		5.09	
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	D			14400		< 3.02	U	9470		< 0.354	U	89100		981						3.47					
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	T	0.326		15200		< 3.02	U	12500		< 0.354	U	90200		982		6640		< 23.7	U*	3.44		5550	J	4.42	
GAF-444U	GAF-GW-444U-01202020	50-60	1/20/2020	N	D			9630		1.52	J	8760		< 0.177	U	52500		922						< 0.460	U*				
GAF-444U	GAF-GW-444U-01202020		1/20/2020	N	T	< 0.0320	U	9970		1.86	J	8900		< 0.177	U	53100		936		1570		< 6.70	U	< 0.587	U*	2820		5.31	
GAF-444U	GAF-GW-444U-02132020		2/13/2020	N	T																								
GAF-444U	GAF-GW-444U-03172020		3/17/2020	N	T																								
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	D			12300		< 1.51	U	9120		< 0.177	U	58400		1230						< 0.893	U*				
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	T	0.0994	J	12100		< 1.51	U	9070		< 0.177	U	68100		1500		1940		< 1.34	U	< 0.510	U*	2060		4.26	
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	D			11900		< 1.51	U	9290		< 0.177	U	65300		1430						< 0.997	U*				
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	T	< 0.0320	U	11800		< 1.51	U	9350		< 0.177	U	67600		1440	J	1870		< 6.70	U	< 0.544	U*	2060		6.51	
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	D			12300		1.79	J	8900		< 0.177	U	75200		1510						< 0.429	U*				
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	T	< 0.0320	U	12500		1.92	J	9290		< 0.177	U	69400		1460		2220		< 13.4	U	0.454	J	2080		2.77	
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	D			11500		< 1.51	U	8170		< 0.177	U	71800		1440						0.506	J				
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	T	0.0674	J	11400		< 1.51	U	9010		< 0.177	U	65500		1350		2010		< 13.4	U	0.490	J	2800		2.39	

Notes:

mg/L = milligrams per liter
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umhos/cm = MicroSiemens
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NTU = nephelometric turbidity unit
µg/L = micrograms per liter
OR = Over range of turbidity meter
< = compound not detected above the value listed
J = Quantitation is approximate due to limitations identified during data validation
U = compound not detected above value reported
U* =This result should be considered "not detected" because it was detected in a rinsate blank or laboratory blank at a similar level

GWPS: groundwater protection standard
GWPS of treatability test target metals:
Beryllium: 4 µg/L
Cadmium: 5 µg/L
Lithium: 40 µg/L
Nickel: 100 ug/L

Red = concentration of treatability test target metal (beryllium, cadmium, lithium, and nickel) exceeds standard

Table 2-1
Baseline Groundwater Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant, Gallatin, Tennessee

					Parameter	Total Suspended Solids		Vanadium		Zinc	
					Unit	mg/L		µg/L		µg/L	
Location ID	Sample ID	Sample Depth	Sample Date	Sample Type	Total (T) or Dissolved (D)	Result	Validator Qualifier	Result	Validator Qualifier	Result	Validator Qualifier
19R	GAF-GW-19R-01152020	39.5-49.5	1/15/2020	N	D			25.0		764	
19R	GAF-GW-19R-01152020		1/15/2020	N	T	6.00		22.9		727	
19R	GAF-GW-19R-03182020		3/18/2020	N	T						
19R	GAF-GW-19R-04222020		4/22/2020	N	D			20.7		601	
19R	GAF-GW-19R-04222020		4/22/2020	N	T	4.40		22.5		597	
19R	GAF-GW-19R-06162020		6/16/2020	N	T	1.50		21.7		636	
19R	GAF-GW-19R-07142020		7/14/2020	N	D			17.3		607	
19R	GAF-GW-19R-07142020		7/14/2020	N	T	1.40		20.2		620	
19R	GAF-GW-19R-08172020		8/17/2020	N	D			20.4		569	
19R	GAF-GW-19R-08172020		8/17/2020	N	T	1.20		20.4		594	
19R	GAF-GW-19R-08182020		8/18/2020	N	T						
19R	GAF-GW-19R-10212020		10/21/2020	N	D			18.7		552	
19R	GAF-GW-19R-10212020		10/21/2020	N	T	0.700		18.1		554	
GAF-440U	GAF-GW-440U-01172020	41-51	1/17/2020	N	D			3.52		36.0	J
GAF-440U	GAF-GW-440U-01172020		1/17/2020	N	T	62.8		4.05		16.6	J
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	D			< 0.991	U	< 7.77	U*
GAF-440U	GAF-GW-440U-04232020		4/23/2020	N	T	23.9		< 0.991	U	< 8.44	U*
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	D			< 0.991	U	8.47	
GAF-440U	GAF-GW-440U-06182020		6/18/2020	N	T	31.0		< 0.991	U	6.36	
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	D			< 0.991	U	4.69	J
GAF-440U	GAF-GW-440U-08192020		8/19/2020	N	T	26.6		< 0.991	U	6.58	
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	D			< 0.991	U	5.07	
GAF-440U	GAF-GW-440U-10202020		10/20/2020	N	T	12.9		< 0.991	U	6.37	
GAF-441U	GAF-GW-441U-01162020	40-50	1/16/2020	N	D			32.3		2760	
GAF-441U	GAF-GW-441U-01162020		1/16/2020	N	T	97.0		42.3		2930	
GAF-441U	GAF-GW-441U-03172020		3/17/2020	N	T						
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	D			28.3		2680	
GAF-441U	GAF-GW-441U-04242020		4/24/2020	N	T	486		37.1		2730	
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	D			34.7		2880	
GAF-441U	GAF-GW-441U-06172020		6/17/2020	N	T	306		34.3		2820	
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	D			27.2		2630	
GAF-441U	GAF-GW-441U-08182020		8/18/2020	N	T	152		37.5		2580	
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	D			24.7		2290	
GAF-441U	GAF-GW-441U-10222020		10/22/2020	N	T	148		29.5		2280	
GAF-444U	GAF-GW-444U-01202020	50-60	1/20/2020	N	D			< 0.991	U	677	
GAF-444U	GAF-GW-444U-01202020		1/20/2020	N	T	1.40		< 0.991	U	724	
GAF-444U	GAF-GW-444U-02132020		2/13/2020	N	T						
GAF-444U	GAF-GW-444U-03172020		3/17/2020	N	T						
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	D			< 0.991	U	788	J
GAF-444U	GAF-GW-444U-04242020		4/24/2020	N	T	< 13.2	U*	< 0.991	U	699	J
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	D			< 0.991	U	677	
GAF-444U	GAF-GW-444U-06162020		6/16/2020	N	T	7.00		< 0.991	U	649	
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	D			< 0.991	U	718	
GAF-444U	GAF-GW-444U-08192020		8/19/2020	N	T	10.0		< 0.991	U	734	
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	D			< 0.991	U	720	
GAF-444U	GAF-GW-444U-10222020		10/22/2020	N	T	4.10		2.31		713	

Notes:
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GWPS: groundwater protection standard
GWPS of treatability test target metals:
Beryllium: 4 µg/L
Cadmium: 5 µg/L
Lithium: 40 µg/L
Nickel: 100 ug/L

Red = concentration of treatability test target metal (beryllium, cadmium, lithium, and nickel) exceeds standard

Table 2-2
Baseline Soil Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Location ID	Adjacent to Well:	Sample ID	Sample Date	Sample Type	Aluminum mg/kg		Antimony mg/kg		Arsenic mg/kg		Barium mg/kg		Beryllium mg/kg		Boron mg/kg		Cadmium mg/kg		Calcium mg/kg	
					Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers
NRS 053	GAF-444U	GAF-SB-NRS053-45-50-01292020	1/29/2020	N	12400		0.351	J	20.0		41.6		1.64		8.44	J	0.113		771	
NRS 053	GAF-444U	GAF-SB-NRS053-70-72-01302020	1/30/2020	N	9340		0.149	J	5.33		93.8		1.24		10.0	J	0.557		16700	
NRS 054	GAF-444U	GAF-SB-NRS054-10-15-01282020	1/28/2020	N	13100		0.254	J	6.39		38.8		0.522		3.19	J	3.01		540	
NRS 054	GAF-444U	GAF-SB-NRS054-65-66-01292020	1/29/2020	N	12900		0.204	J	9.44		140		1.70		7.92	J	1.34		70400	
NRS 058	GAF-441U	GAF-SB-NRS058-10-15-02032020	2/3/2020	N	14400		0.652	J	27.7		151		1.14		24.3		0.138		16800	
NRS 058	GAF-441U	GAF-SB-NRS058-45-50-02032020	2/3/2020	N	16100		0.170	J	5.51		47.1		0.829		4.72	J	0.0206	J	359	
NRS 060	GAF-441U	GAF-SB-NRS060-5-10-01312020	1/31/2020	N	17900		1.16	J	14.3		158		1.95		32.3		3.16		4570	
NRS 060	GAF-441U	GAF-SB-NRS060-30-35-01312020	1/31/2020	N	17100		0.175	J	4.99		39.8		0.479		9.25		0.0510	J	580	
NRS 068	19R	GAF-SB-NRS068-40-58-03122020	3/12/2020	N	7020		0.207	J	5.58	J	43.6		0.516		8.83	J	0.0508	J	324	J
NRS 069	GAF-441U	GAF-SB-NRS069-40-50-03092020	3/9/2020	N	7430		0.202	J	4.77	J	40.7	J	0.420		< 7.45	U*	0.0399	J	617	J
NRS 069	GAF-441U	GAF-SO-903-03092020	3/9/2020	FD	6830		0.195	J	4.44	J	27.3	J	0.446		8.74	J	0.0446	J	181	J
NRS 070	GAF-444U	GAF-SB-NRS070-50-60-03102020	3/10/2020	N	5870		0.312	J	13.5	J	38.9		1.14		< 7.68	U*	0.191		591	J

Notes:
Gray shaded cells indicate that at least a portion of the sample interval was CCR.
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UJ = This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.
U* = This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
< = not detected at the reporting limit shown
mg/kg = milligrams per kilogram
Borings NRS053, NRS054, and NRS070 were installed within approximately 50 feet of monitoring well GAF-444U
Borings NRS060 and NRS069 were installed within approximately 50 feet of monitoring well GAF-441U, and boring NRS058 was installed within approximately 200 feet of monitoring well GAF-441U
Boring NRS068 was installed within approximately 50 feet of monitoring well 19R.

Table 2-2
Baseline Soil Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Location ID	Adjacent to Well:	Sample ID	Sample Date	Chromium mg/kg		Cobalt mg/kg		Copper mg/kg		Iron mg/kg		Lead mg/kg		Lithium mg/kg		Magnesium mg/kg		Manganese mg/kg		Mercury mg/kg	
				Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers
NRS 053	GAF-444U	GAF-SB-NRS053-45-50-01292020	1/29/2020	11.8		6.30		12.6		35000		17.8		6.42		540		272	J	< 0.0274	U
NRS 053	GAF-444U	GAF-SB-NRS053-70-72-01302020	1/30/2020	8.92		7.50		12.0		17900		11.3		10.8		1140		1150	J	0.0561	
NRS 054	GAF-444U	GAF-SB-NRS054-10-15-01282020	1/28/2020	12.6		1.49		15.6		18100		7.60		7.21		479		62.7	J	0.152	
NRS 054	GAF-444U	GAF-SB-NRS054-65-66-01292020	1/29/2020	12.8		9.42		13.2		29000		14.5		15.3		1570		2450	J	0.0707	
NRS 058	GAF-441U	GAF-SB-NRS058-10-15-02032020	2/3/2020	18.6	J	3.39	J	21.8	J	48000		24.1		7.43		580		48.7		0.144	
NRS 058	GAF-441U	GAF-SB-NRS058-45-50-02032020	2/3/2020	10.5	J	3.42	J	12.0	J	16800		10.3		13.6		793		176		0.0529	
NRS 060	GAF-441U	GAF-SB-NRS060-5-10-01312020	1/31/2020	36.2	J	7.94	J	15.7	J	42700		11.9		13.6		333		47.6		< 0.0289	U
NRS 060	GAF-441U	GAF-SB-NRS060-30-35-01312020	1/31/2020	12.1	J	4.77	J	7.59	J	19300		7.26		10.5		831		227		0.0610	
NRS 068	19R	GAF-SB-NRS068-40-58-03122020	3/12/2020	10.3		2.20	J	7.09		19300	J	7.81		4.46		311	J	95.5	J	< 0.0245	U
NRS 069	GAF-441U	GAF-SB-NRS069-40-50-03092020	3/9/2020	16.8	J	2.89	J	6.83		17600	J	5.96		3.95		443	J	175	J	< 0.0274	U
NRS 069	GAF-441U	GAF-SO-903-03092020	3/9/2020	6.45	J	17.3	J	8.95		16700	J	6.09		3.34		302	J	97.6	J	< 0.0272	
NRS 070	GAF-444U	GAF-SB-NRS070-50-60-03102020	3/10/2020	25.8		28.5	J	11.2		29000	J	9.72		3.90		366	J	1200	J	0.0309	J

Notes:

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U* = This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
< = not detected at the reporting limit shown
mg/kg = milligrams per kilogram
Borings NRS053, NRS054, and NRS070 were installed within approximately 50 feet of monitoring well GAF-444U
Borings NRS060 and NRS069 were installed within approximately 50 feet of monitoring well GAF-441U, and boring NRS058 was installed within approximately 200 feet of monitoring well GAF-441U
Boring NRS068 was installed within approximately 50 feet of monitoring well 19R.

Table 2-2
Baseline Soil Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Location ID	Adjacent to Well:	Sample ID	Sample Date	Molybdenum mg/kg		Nickel mg/kg		Phosphorus mg/kg		Potassium mg/kg		Selenium mg/kg		Silver mg/kg		Sodium mg/kg		Sulfur mg/kg		Thallium mg/kg	
				Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers
NRS 053	GAF-444U	GAF-SB-NRS053-45-50-01292020	1/29/2020	2.37		17.0		1490		1170		2.43		< 0.0303	U	33.0	J	835		0.241	
NRS 053	GAF-444U	GAF-SB-NRS053-70-72-01302020	1/30/2020	0.585	J	21.7		587		1300		2.45		< 0.0323	U	56.3	J	187	J	0.215	
NRS 054	GAF-444U	GAF-SB-NRS054-10-15-01282020	1/28/2020	1.48		5.37		456		602		0.972		< 0.0293	U	< 21.6	U	1960		0.220	
NRS 054	GAF-444U	GAF-SB-NRS054-65-66-01292020	1/29/2020	0.841		30.9		753		1430		2.17		< 0.0304	U	62.4		< 172	U	0.647	
NRS 058	GAF-441U	GAF-SB-NRS058-10-15-02032020	2/3/2020	7.02		11.2	J	467		1710		2.54	J	0.0429	J	228		16500		2.24	
NRS 058	GAF-441U	GAF-SB-NRS058-45-50-02032020	2/3/2020	1.45		9.79	J	663		1180		1.23	J	< 0.0325	U	< 24.0	U	< 179	U	0.240	
NRS 060	GAF-441U	GAF-SB-NRS060-5-10-01312020	1/31/2020	3.26		27.7	J	236		533		9.00	J	0.0487	J	128		18900		1.13	
NRS 060	GAF-441U	GAF-SB-NRS060-30-35-01312020	1/31/2020	1.58		7.44	J	506		870		0.759	J	< 0.0311	U	29.2	J	1510		0.262	
NRS 068	19R	GAF-SB-NRS068-40-58-03122020	3/12/2020	1.60		8.15	J	460		636		< 0.119	UJ	< 0.0262	U	< 19.3	UJ	553	J	0.201	
NRS 069	GAF-441U	GAF-SB-NRS069-40-50-03092020	3/9/2020	1.44		7.32	J	379		590		< 0.135	UJ	< 0.0298	U	27.5	J	867		0.380	
NRS 069	GAF-441U	GAF-SO-903-03092020	3/9/2020	1.36		17.2	J	510		604		< 0.0937	UJ	< 0.0207	U	28.5	J	1030		0.339	
NRS 070	GAF-444U	GAF-SB-NRS070-50-60-03102020	3/10/2020	2.12		25.2	J	659		672		< 0.0957	UJ	< 0.0212	U	26.3	J	< 175	U	0.226	

Notes:

Gray shaded cells indicate that at least a portion of the sample interval was CCR.
J = Quantitation is approximate due to limitations identified during data validation.
UJ = This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.
U* = This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
< = not detected at the reporting limit shown
mg/kg = milligrams per kilogram
Borings NRS053, NRS054, and NRS070 were installed within approximately 50 feet of monitoring well GAF-444U
Borings NRS060 and NRS069 were installed within approximately 50 feet of monitoring well GAF-441U, and boring NRS058 was installed within approximately 200 feet of monitoring well GAF-441U
Boring NRS068 was installed within approximately 50 feet of monitoring well 19R.

Table 2-2
Baseline Soil Analytical Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Location ID	Adjacent to Well:	Sample ID	Sample Date	Total Inorganic Carbon mg/kg		Total Organic Carbon mg/kg		Vanadium mg/kg		Zinc mg/kg	
				Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers	Result	Validator Qualifiers
NRS 053	GAF-444U	GAF-SB-NRS053-45-50-01292020	1/29/2020	< 684	U	< 684	UJ	26.3		46.5	J
NRS 053	GAF-444U	GAF-SB-NRS053-70-72-01302020	1/30/2020	15000		1170	J	12.0		66.6	J
NRS 054	GAF-444U	GAF-SB-NRS054-10-15-01282020	1/28/2020	< 684	U	1370	J	24.5		22.4	J
NRS 054	GAF-444U	GAF-SB-NRS054-65-66-01292020	1/29/2020	40700		11200	J	17.2		81.7	J
NRS 058	GAF-441U	GAF-SB-NRS058-10-15-02032020	2/3/2020	4780		21100		50.0	J	37.2	
NRS 058	GAF-441U	GAF-SB-NRS058-45-50-02032020	2/3/2020	< 684	U	1260		20.0	J	37.5	
NRS 060	GAF-441U	GAF-SB-NRS060-5-10-01312020	1/31/2020	7360		15100		86.2	J	61.3	
NRS 060	GAF-441U	GAF-SB-NRS060-30-35-01312020	1/31/2020	< 684	U	5190		23.6	J	26.9	
NRS 068	19R	GAF-SB-NRS068-40-58-03122020	3/12/2020	< 684	U			20.6		23.7	J
NRS 069	GAF-441U	GAF-SB-NRS069-40-50-03092020	3/9/2020	< 684	U			23.3		25.6	J
NRS 069	GAF-441U	GAF-SO-903-03092020	3/9/2020	< 684	U			16.9		45.4	J
NRS 070	GAF-444U	GAF-SB-NRS070-50-60-03102020	3/10/2020	< 684	U			22.9		60.7	J

Notes:
Gray shaded cells indicate that at least a portion of the sample interval was CCR.
J = Quantitation is approximate due to limitations identified during data validation.
UJ = This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.
U* = This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
< = not detected at the reporting limit shown
mg/kg = milligrams per kilogram
Borings NRS053, NRS054, and NRS070 were installed within approximately 50 feet of monitoring well GAF-444U
Borings NRS060 and NRS069 were installed within approximately 50 feet of monitoring well GAF-441U, and boring NRS058 was installed within approximately 200 feet of monitoring well GAF-441U
Boring NRS068 was installed within approximately 50 feet of monitoring well 19R.

Table 3-1
Titration Study Results - Target Metals
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Reagents Added	Raw Water Source	Total / Dissolved	Sample Type	pH (S.U.)	Beryllium, Be Goal 4 ug/L	Cadmium, Cd Goal 5 ug/L	Lithium, Li Goal 40 ug/L	Nickel, Ni Goal 100 ug/L	Observation	Recommendation
FerroBlack T22	19R	Total	N	7.97	<10/1.82 MDL	<10/2.17 MDL	<50/33.9 MDL	<10	No target analytes detected. MDLs below goals, but reporting limits for Be, Cd & Li elevated.	**Retain Ferroblack for microcosm.**
FerroBlack T22 (Repeat Test)	19R	Total	N	6.50	<1	<1	7.32	3.59	Met all goals.	
		Total	FD		<5/0.910 MDL	<5/1.09 MDL	36.9	16.6		
FerroBlack Plus	19R	Total	N	7.00	<10/1.82 MDL	<10/2.17 MDL	<50/33.9 MDL	<10	No target analytes detected. MDLs below goals, but reporting limits for Be, Cd & Li elevated.	
NaOH	19R	Total	N	7.22	<1	1.31	128	18.0 B	Effective for Be, Cd & Ni. No Li treatment.	**Retain as potential component of mixture in study.**
NaOH	444U	Total	N	6.72	4.32 B	6.56	33	590	No Ni treatment; poor Be & Cd treatment.	
KOH	19R	Total	N	7.30	<1	<1	128	17.7 B	Effective for Be, Cd & Ni; no Li treatment.	Drop from study.
KOH	444U	Total	N	7.01	0.252 J	3.43	29.0	218	Good Be and Cd results, but did not meet Ni goal.	
		Dissolved	N		<1.0	3.20	30.0	219	Note that Ni concentration in 444U is higher than in 19R.	
Enviroblend	19R	Total	N	6.22	2.14	1.67	150	83.7	Effective for Be, Cd & Ni, although Ni treatment limited; no Li treatment.	Not cost-effective. Drop from study.
MagOx	19R	Total	N	6.11	2.58	2.51	138	110	Did not meet Ni goals. No Li treatment.	Drop from study.
TN Valley Limestone	19R	Total	N	5.57	0.964 J	158 J	134	169 B	Increased Cd concentrations. No Li, Ni treatment. pH change limited.	Drop from study.
Hydroxyapatite	19R	Total	N	6.04	4.26 J	15.4	167	129 B	No treatment.	Drop from study.
Sodium carbonate/ bicarbonate	19R	Total	N	7.01	<10/1.82 MDL	<10/2.17 MDL	136	62.2 B	Effective for Ni, but treatment limited. Be & Cd not detected. MDLs below goals, but reporting limits for Be, Cd & Li elevated.	Hold for potential use later in study.
Potassium carbonate	19R	Total	N	6.98	0.236 J	1.47	118	74.8 B	Effective for Be, Cd & Ni, although Ni treatment limited; no Li treatment.	Hold for potential use later in study.
Potassium bicarbonate	19R	Total	N	6.92	1.28	0.979 J	122	90.8	Effective for Be, Cd & Ni, although Ni treatment limited; no Li treatment.	Hold for potential use later in study.
Provect IRM®	19R	Total	N	6.47	0.242 J	0.476 J	110	21.1 *	Effective for Be, Cd & Ni; no Li treatment. Hi dose required.	Not cost-effective. Drop from study.
PeroxyChem Geoform™	19R	Total	N	5.78	<100/18.2 MDL	<100/21.7 MDL	367 J	1,270 B	Be & Cd treatment unknown. Li & Ni worse. pH change limited.	Drop from study.
HiCalFines	19R	Total	N	7.59	<1	0.618 J	128	4.35 B	Effective for Be, Cd and Ni; no Li treatment.	**Retain HiCalFines for microcosm. Consider addition of $CaCl_2$.**
HiCalFines & $CaCl_2$	19R	Total	N	7.70	<10/1.82 MDL	<10/2.17 MDL	<50/33.9 MDL	<10	MDLs below goals, but reporting limits for Be, Cd & Li elevated.	
		Total	FD		<10/1.82 MDL	<10/2.17 MDL	141	3.78 J	Effective for Ni. Inconsistent Li results.	
HiCalFines & $CaCl_2$ (Repeat test)	19R	Total	N	7.07	<1.0	0.941 J	213	34.9	Effective for Be, Cd & Ni. No Li treatment.	
		Dissolved	N		<1.0	0.969 J	212	34.3		
HiCal Fines & $CaCl_2$ - 3 weeks reaction time	19R	Total	N	7.62	<1.0	<1.0	184 B	0.603 J	No Li treatment relative to raw water. Extended time provided some improvement in Ni treatment, but Li still 4x goal.	
		Dissolved	N		<1.0	<1.0	184 B	<1.0		
NaOH, Zeolite & $CaCl_2$	19R	Total	N	6.67	<10/1.82 MDL	<10/2.17 MDL	184	<10	No Li treatment. Cd & Ni goals achieved, but Ni results inconsistent.	Drop zeolite from study.
		Total	FD		<10/1.82 MDL	2.66 J	238	88.3	Be MDLs below goals, but reporting limits elevated.	
NaOH, zeolite & $CaCl_2$ - 3 weeks reaction time	19R	Total	N	9.98	<1.0	1.91	286	67.4	Higher Li concentrations than raw water.	
		Dissolved	N		<1.0	1.66	300	69.7		
DoloFines	19R	Total	N	7.68	0.187 J	0.258 J	128	2.91 B	Effective for Be, Cd and Ni; no Li treatment.	**Retain DoloFines for microcosm.**
DoloFines & $CaCl_2$	444U	Total	N	6.72	<10/1.82 MDL	<10/2.17 MDL	143	4.07 J	Be & Ni treated. Cd results inconsistent. No Li treatment. No short-term benefit to $CaCl_2$ noted.	
		Total	FD		2.91 JB	7.41 J	198	10.9		
Raw Water Data										
N/A	19R	Total	N	3.56	13.3	6.07	137	197	Analytical results from sample collected on 1/15/2020	
		Dissolved	N		13.3	4.65	146	191		
N/A	444U	Total	N	4.84	12.8	8.17	37.4	660	Analytical results from sample collected on 1/20/2020	
		Dissolved	N		11.7	7.22	35.9	643	No Li exceedance, but higher Ni concentrations. Similar to source area groundwater.	

Notes
All results presented in micrograms per liter (ug/L).
Concentrations in excess of cleanup goal presented in red text. Discussions of successful obtainment of cleanup goal in green text.
Sample type is either normal (N) or field duplicate (FD).
pH was measured at the treatability laboratory at the time of sample collection. Raw water pH may not match field-measured pH
Raw water analytical data presented here is from the January 2020 sampling event and was validated by Environmental Standards, Inc.
Analytical data for titration testing was not validated, and includes the laboratory qualifiers.
S.U. = Standard units
MDL = Method detection limit, provided when analytes is not detected but reporting limit is higher than the goal.
J = Estimated value between laboratory reporting limit and method detection limit.
* = Instrument-related QC outside acceptance limits.
< = Analyte not detected above the laboratory reporting quantitation limit shown.
B = Analyte was found in the laboratory method blank and associated sample.
TN = Tennessee
N/A = Not applicable

HiCalFines = Lime product derived from limestone and heated to drive off carbon dioxide to leave behind a mixture of CaO and $CaCO_3$.
CaO = Calcium oxide
$CaCl_2$ = Calcium chloride
$CaCO_3$ = Calcium carbonate
DoloFines = Lime derived from magnesium-rich limestone (dolomite)
KOH = Potassium hydroxide
MagOx = Magnesium oxide
NaOH = Sodium hydroxide
Be = Beryllium
Cd = Cadmium
Li = Lithium
Ni = Nickel
Provect IRM® = Solid, Antimethanogenic Reagent for ISCR and Heavy Metal Stabilization

Table 3-2
Titration Study Results - Additional Parameters
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Analyte	GWPS (ug/L)	Results (ug/L)			Notes
		GAF-GW-FerroBlack		GAF-GW-DOLO Fines-444U	
		Total	Total (Duplicate)	Total	
Aluminum	NE	320	--	1,910	
Antimony	6 (a,b)	<2.00	--	<2.00	
Arsenic	10 (a,b)	<1.00	--	1.12	
Barium	2,000 (a,b)	3.4 J	--	14.4	
Beryllium	4 (a,b)	<1.00	<5.00	1.76 B	
Boron	NE	682	--	4,040	
Cadmium	5 (a,b)	<1.00	<5.00	1.39	
Calcium	NE	107,000	--	628,000	
Chromium	100 (a,b)	<2.00	--	<2.00	
Cobalt	NE (c)	13.1	--	191	High levels of naturally occurring cobalt in soil preclude the use of cobalt as a detection monitoring constituent
Copper	NE	<2.00	--	1.62 J	
Fluoride	4,000 (a,b)	<1,000	--	612	
Iron	NE	75,800 B	--	10,300	
Lead	15 (a,b)	<1.00	--	0.602 J	
Lithium	40 (b)	7.32	36.9	34.2	
Magnesium	NE	4,700	--	97,400	
Manganese	NE	2,880 B	--	10,900 B	
Mercury	2 (a,b)	<0.200	--	<0.200	
Molybdenum	100 (b)	<5.00	--	<5.00	
Nickel	100 (a)	3.59	16.6	78.3	
Potassium	NE	20,300	--	85,100	
Selenium	50 (a,b)	<5.00	--	<5.00	
Silver	100 (a)	<1.00	--	10.2	
Sodium	NE	442,000	--	57,400	
Thallium	2 (a,b)	<1.00	--	0.185 J	
Vanadium	NE	<1.00	--	<1.00	
Zinc	NE	14.3	--	131	

Notes:
ug/L = micrograms per liter
-- = not analyzed. Only a subset of metals were analyzed in this sample.
NE = Not established at the Non-Registered Site
GWPS = Groundwater protection standard
DoloFines = lime derived from magnesium-rich limestone (dolomite)
B = Analyte was detected in the blank and sample
J = result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
< = Analyte not detected at the reporting quantitation limit shown
(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.
(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.
(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS established.

Table 3-3a
Phase I and II Microcosm Study Results - Target Metals
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Site Water Source	Media	Reagent Added and Dose	Dose	Total/ Dissolved	Sample Date	pH (S.U.)	Beryllium, Be Goal 4 ug/L	Cadmium, Cd Goal 5 ug/L	Lithium, Li Goal 40 ug/L	Nickel, Ni Goal 100 ug/L	Observation
19R	NA	NA - Raw water	NA	Total	1/15/2020	3.54	13.3	6.07	137	197	Concentrations in raw water used in microcosm tests.
				Dissolved			13.3	4.65	146	191	
				Total	4/22/2020	3.49	12.5	4.45	125	160	
				Dissolved			12.5	4.45	125	160	
				Total	6/16/2020	3.77	12.5	4.40	130	159	
444U	NA	NA - Raw water	NA	Total	1/20/2020	4.13	12.8	8.17	37.4	660	No lithium exceedance, but higher nickel concentrations.
				Dissolved			11.7	7.22	35.9	643	Similar to source area groundwater.
				Total	4/24/2020	4.30	8.77	9.29	31.2	527	
				Dissolved			9.20	9.79	30.7	520	
				Total	6/16/2020	4.47	7.96	10.1	31.2	534	
				Dissolved			7.58	9.17	31.5	552	
19R	Sand	Control	#1	Total	4/27/2020	7.80	0.597 J	2.57	21.9 B	83.4	Met goals. Clean sand (concrete sand) was enough to remove metals from solution on first dosing.
				Dissolved	4/27/2020		<1.00	2.16	18.4 B	63.9	
			#2	Total	5/28/2020	6.00	3.08	8.53	60.5	292	Breakthrough for cadmium, lithium, and nickel.
			#3	Total	6/4/2020	5.91	0.574 J	10.6	44.4	414	Breakthrough for cadmium, lithium, and nickel.
			#4	Total	6/24/2020	5.04	7.15	9.8	69.4	521	Breakthrough for all target metals.
			#5	Total	7/1/2020	5.44	5.49	8.63	50.9	502	Breakthrough for all target metals.
19R	Sand	FerroBlack "Plus"	#1	Total	4/27/2020	7.72	<5.00 / 0.91 MDL	2.63 J	47.5 B	54.4	Did not meet goal for lithium, but lithium also in QA/QC blank.
			#2	Total	5/28/2020	5.80	<1.00	<1.00	20.3	10.2	Met goals.
			#3	Total	6/4/2020	5.37	0.220 J	0.749 J	42.0	24.6	Did not meet goal for lithium.
			#4	Total	6/24/2020	6.21	<1.00	<1.00	46.0	30.1	Did not meet goal for lithium.
			#5	Total	7/1/2020	6.35	<1.00	<1.00	46.4	50.1	Did not meet goal for lithium.
19R	Sand	HiCal Fines (0.062% by weight)	#1	Total	4/27/2020	8.15	0.265 J	0.39 J	10.6 B	20.0	Met goals.
			#2	Total	5/28/2020	6.49	<1.00	0.344 J	13.3	10.4	Met goals.
			#3	Total	6/4/2020	6.34	<1.00	0.551 J	18.0	25.2	Met goals.
			#4	Total	6/24/2020	6.02	2.12	3.24	45.1	178	Breakthrough for lithium and nickel.
			#5	Total	7/1/2020	4.63	4.24	6.08	51.4	295	Breakthrough for all target metals.
19R	Sand	HiCal Fines/$CaCl_2$	#1	Total	4/27/2020	7.50	0.562 J	7.47	28.3	54.3	Did not meet goal for cadmium.
			#2	Total	5/28/2020	6.07	<1.00	1.38	13.4	8.44	Met goals.
			#3	Total	6/4/2020	6.00	<1.00	0.590 J	22.8	15.7	Met goals.
			#4	Total	6/24/2020	5.74	2.19	3.07	46.9	175	Breakthrough for lithium and nickel.
			#5	Total	7/1/2020	4.62	5.37	6.57	59.9	537	Breakthrough for all target metals.
19R	Sand	DoloFines (0.082%)	#1	Total	6/4/2020	6.88	1.09	1.95	18.5	56.2	Met goals.
			#2	Total	6/24/2020	4.79	<1.00	2.76	23.7	65.4	Met all goals, but performance diminishing.
			#3	Total	7/1/2020	5.85	7.63	9.25	56.8	345	Breakthrough for all target metals.
19R	Sand	NaOH	#1	Total	6/4/2020	6.82	1.09	1.36	13.1	51.8	Met goals.
			#2	Total	6/24/2020	5.93	<1.00	2.19	22.8	76.9	Met all goals, but performance diminishing.
			#3	Total	7/1/2020	5.34	<1.00	3.61	23.0	142	Did not meet goal for nickel.
444U	Sand	Control	#1	Total	6/4/2020	4.84	7.70	0.481 J	6.88	8.69	Did not meet goal for beryllium. No change to pH.
444U	Sand	DoloFines (0.1%)	#1	Total	4/27/2020	9.32	0.991 J	0.72 J	11.2	56.9	Met goals.
			#2	Total	5/28/2020	6.88	<1.00	<1.00	<5.00	3.69	Met goals.
			#2B	Total	6/4/2020	7.08	<1.00	0.256 J	<5.00	8.16	Same water, but longer time on soil.
			#3	Total	6/24/2020	6.35	<1.00	<1.00	<5.00	2.52	Met goals.
			#4	Total	7/1/2020	7.65	<1.00	<1.00	<5.00	2.12	Met goals.
			#5	Total	7/8/2020	7.23	<1.00	<1.00	5.38	2.03	Met goals.
			#6	Total	7/16/2020	7.65	0.558 J	2.84	12.4	134	Did not meet goal for nickel.

Notes
MDL = Method detection limit provided when analyte is not detected but reporting limit is higher than the goal.
J = Estimated value between laboratory reporting limit and method detection limit.
All results presented in micrograms per liter (ug/L).
Red text = Concentrations exceed cleanup goal, pH measurements <5 S.U.
B = Lithium detected in laboratory quality assurance blank at 4 ug/L. Thus, reported values may be biased high.
Analytical results obtained by USEPA SW-846 Method 6020A (ICP/MS), except where otherwise indicated.
< = analyte not detected above the reporting quantitation limit shown (MDL if limit exceeded goal).
S.U. = Standard pH units
pH values for raw water at 19R and GAF-444U is based on the field pH. The remaining pH values were measured in the treatability study laboratory.

HiCal Fines = lime product derived from limestone and heated to drive off carbon dioxide to leave behind a mixture of CaO and CaCO3.
CaO = Oxycalcium
$CaCl_2$ = calcium chloride
$CaCO_3$ = calcium carbonate
DoloFines = lime derived from magnesium-rich limestone (dolomite)
NaOH = sodium hydroxide
NA = not applicable
ug/L = micrograms per liter

Table 3-3b
Phase III Microcosm Study Results - Target Metals
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Site Water Source	Media	Reagent Added (Dose)	Dose	Total/ Dissolved	Sample Date	pH (S.U.)	Beryllium, Be Goal 4 ug/L	Cadmium, Cd Goal 5 ug/L	Lithium, Li Goal 40 ug/L	Nickel, Ni Goal 100 ug/L	Observation
19R	Sand	Control	#1	Total	7/23/2020	5.90	<1.00	2.12	16.0	58.3	Met goals.
				Dissolved			<1.00	2.81	18.9	64.7	Met goals.
			#2	Total	7/30/2020	7.80	<1.00	3.97	36.4	134	Did not meet goal for nickel.
				Dissolved			<1.00	5.67	45.0	170	Did not meet goal for cadmium, lithium and nickel.
			#3	Total	8/6/2020	6.88	0.328 J	8.21	37.4	294	Did not meet goal for cadmium and nickel.
19R	Sand	DoloFines (0.1%)	#1	Total	7/23/2020	9.32	1.50	2.26	5.26	71.5	Met goals.
				Dissolved			<1.00	<1.00	<5.00	47.0	Met goals.
			#2	Total	7/30/2020	9.41	<1.00	<1.00	6.02	21.7	Met goals.
				Dissolved			<1.00	<1.00	<5.00	28.2	Met goals.
			#3	Total	8/6/2020	10.65	<1.00	<1.00	8.42	12.5	Met goals.
19R	Sand	HiCal Fines (0.062% by weight)	#1	Total	7/23/2020	9.61	<1.00	<1.00	<5.00	42.9	Met goals.
				Dissolved			<1.00	<1.00	<5.00	33.8	Met goals.
			#2	Total	7/30/2020	9.36	<1.00	<1.00	<5.00	19.5	Met goals.
				Dissolved			<1.00	<1.00	<5.00	16.8	Met goals.
			#3	Total	8/6/2020	9.67	<1.00	<1.00	<5.00	10.7	Met goals.
GAF-444U	Sand	HiCal Fines (0.062% by weight)	#1	Total	7/23/2020	9.89	<1.00	<1.00	<5.00	62.7	Met goals.
				Dissolved			<1.00	<1.00	<5.00	56.9	Met goals.
			#2	Total	7/30/2020	9.87	<1.00	<1.00	<5.00	34.5	Met goals.
			#3	Total	8/6/2020	8.98	<1.00	<1.00	<5.00	28.1	Met goals.

Notes:

J = Estimated value between laboratory reporting limit and method detection limit.

ug/L = micrograms per liter

S.U. = Standard pH units

Red text = Concentrations exceed cleanup goal, pH measurements <5 S.U.

Analytical results obtained by USEPA SW-846 Method 6020A (ICP/MS), except where otherwise indicated.

pH measured at the treatability testing laboratory.

HiCal Fines = lime product derived from limestone and heated to drive off carbon dioxide to leave behind a mixture of CaO and CaCO3.

CaO = Oxycalcium

$CaCl_2$ = calcium chloride

$CaCO_3$ = calcium carbonate

DoloFines = lime derived from magnesium-rich limestone (dolomite)

< = analyte not detected above the reporting quantitation limit shown

Table 3-4a
Phase III Microcosm Study Results - Additional Parameters
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Compound	GWPS (ug/L)	Raw Water, Well 19R	Control, 19R					Dolofines, 19R					High Cal Fines, 19R					Notes
		6/16/2020	Dose #1		Dose #2		Dose #3	Dose #1		Dose #2		Dose #3	Dose #1		Dose #2		Dose #3	
		Total	Dissolved*	Total	Dissolved *	Total *	Total	Dissolved *	Total	Dissolved *	Total *	Total	Dissolved*	Total	Dissolved*	Total *	Total	
Aluminum	NE	55,300	27.1 J	NA	27.1 J	50.3	580	51.8	NA	179	<30.0	62.6	<30.0	NA	<30.0	103	52.6	No issue
Antimony	6 (a,b)	<0.378	<2.00	NA	<2.00	<2.00	<2.00	<2.00	NA	<2.00	<2.00	<2.00	<2.00	NA	<2.00	<2.00	<2.00	OK
Arsenic	10 (a,b)	2.56	0.608 J	NA	<1.00	0.378 J	0.635J	3.08	NA	2.98	1.39	1.92	3.65	NA	2.46	3.48	2.04	OK
Barium	2,000 (a,b)	15.0	64.9	NA	59.6	58.2	66.4	132	NA	162	165	156	104	NA	144	150	167	OK
Beryllium	4 (a,b)	12.5	<1.00	<1.00	<1.00	<1.00	0.328 J	<1.00	1.50	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	Beryllium goals met for both reagents and control sand for all three doses.
Boron	NE	3,390 J	2,680	NA	3,260	3,160	3,830	319	NA	592	815	1,500	687	NA	1,420	1,280	2,630	No issue
Cadmium	5 (a,b)	4.40	2.81	2.12	5.67 J	3.97	8.21	<1.00	2.26	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	Cadmium goal met with reagents for all three doses. Control fails on 2 of 3 samples.
Calcium	NE	417,000	760,000	NA	758,000	773,000	749,000	642,000	NA	811,000	790,000	803,000	655,000	NA	751,000	781,000	780,000	No issue; Note that control sand contains soluble calcium
Chromium	100 (a,b)	<1.53	<2.00	NA	<2.00	<2.00	<2.00	4.44	NA	1.72 J	<2.00	<2.00	2.58	NA	<2.00	<2.00	<2.00	OK. Standard based on total chromium.
Cobalt	NE (c)	193	1.63	NA	27.7	22.5	278	4.21	NA	2.61	2.44	1.51	4.30	NA	2.64	2.80	2.47	Reagents are removing cobalt
Copper	NE	8.00	0.713 J	NA	<2.00	0.659 J	1.33J	102	NA	43.1	33.6	18.5	52.2	NA	21.5	26.4	12.3	No issue
Iron	NE	481,000	<50.0	NA	<50.0	37.8 J	420	<50.0	NA	121	<50.0	35.3J	<50.0	NA	<50.0	<50.0	<50.0	No issue; iron is being removed by reagents.
Lead	15 (a,b)	<1.78 U*	0.290 J	NA	<1.00	0.197 J	0.606J	0.202 J	NA	0.349 J	<1.00	<1.00	<1.00	NA	<1.00	0.245 J	<1.00	OK
Lithium	40 (b)	130	18.9	16.0	45.0	36.4	37.4	<5.00	5.26	<5.00	6.02	8.42	<5.00	<5.00	<5.00	<5.00	<5.00	Lithium goals met for both reagents for all three doses. Control sand shows failure for lithium at Dose 2.
Magnesium	NE	21,900	88,700	NA	98,700	100,000	99,400	229 J	NA	17,500	12,600	45,300	901	NA	4,880	4,630	22,700	No issue
Manganese	NE	15,100	7,390	NA	22,000	17,600	43,500	3.02 J	NA	14.0	5.09	184	<5.00	NA	<5.00	6.49	7,000	No issue
Mercury	2 (a,b)	<0.13	<0.200	NA	<0.200	<0.200	<0.200	<0.200	NA	0.301	<0.200	<0.200	<0.200	NA	<0.200	<0.200	<0.200	OK
Molybdenum	100 (b)	<0.61	<5.00	NA	<5.00	<5.00	<5.00	24.2	NA	17.5	13.9	12.3	21.1	NA	12.5	14.9	8.74	OK
Nickel	100 (a)	159	64.7	58.3	170	134	294	47.0	71.5	28.2	21.7	12.5	33.8	42.9	16.8	19.5	10.7	Nickel goals met for both reagents at all three doses. Nickel treatment may be improving over time. Control sand fails at Dose 2.
Potassium	NE	15,400	20,500	NA	11,900	11,100	13,500	23,400	NA	10,300	11,000	12,700	5,160	NA	8,930	8,890	11,800	No issue
Selenium	50 (a,b)	<1.51	<5.00	NA	<5.00	<5.00	<5.00	4.62 J	NA	3.03 J	2.52 J	1.73J	3.22 J	NA	2.06 J	2.09 J	<5.00	OK
Silicon	NE	17,400	8,500	NA	13,100	12,100	12,200	2,060	NA	3,130	2,360	3,410	2,020	NA	2,740	2,760	3,480	No issue
Silver	100 (a,b)	<0.177	<1.00	NA	<1.00	<1.00	<1.00	<1.00	NA	0.370 J	<1.00	<1.00	<1.00	NA	<1.00	<1.00	<1.00	OK
Sodium	NE	7,670	12,700	NA	11,600	12,100	25,800	6,460	NA	9,180	8,990	25,900	12,700	NA	22,900	23,800	38,800	No issue
Strontium	NE	1,200 J	1,730	NA	1,730	1,720	1,680	977	NA	1,270	1,270	1,330	1,070	NA	1,270	1,320	1,440	No issue
Thallium	2 (a,b)	<1.23 U*	0.592 J	NA	0.264 J	0.223 J	0.451 J	0.199 J	NA	<1.00	<1.00	<1.00	<1.00	NA	<1.00	0.257 J	<1.00	OK
Vanadium	NE	21.7	<1.00	NA	<1.00	<1.00	<1.00	3.26	NA	4.73	3.43	4.76	3.70	NA	4.44	4.73	2.98	No issue
Zinc	NE	636	56.1	NA	139	96.0	302	3.94 J	NA	<5.00	3.46 J	<5.00	4.95 J	NA	<5.00	<5.00	<5.00	No issue

Notes:
The raw water used in the Phase III Microcosm tests was from the June 16, 2020 groundwater sampling event.
Results given in micrograms per liter (ug/L).
Target metals for treatment (Be, Cd, Li and Ni) are highlighted in green.
Red = Concentration exceeds the GWPS.
NE = No established standard for the Non-Registered Site.
NA = Not analyzed for this parameter.
<= Analyte not detected above laboratory quantitation limit shown.
J = Quantitation is approximate due to limitations identified during data validation (19R data only), or reported value is between the reporting limit and the method detection limit (remaining samples).
U* =This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
* Coolers outside of temperature upon receipt at the lab.
"OK" means that a criteria exists for a non-target metal and is not exceeded.
"No issue" means a standard for that metal does not exist, and treatment has no adverse effect.
GWPS = groundwater protection standard
(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.
(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default G
(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS calculated.
(d) Site-specific GWPS for lithium has been calculated for bedrock wells based on background under the CCR Rule monitoring (2018 Annual Report; AECOM, 2019). 0.045 mg/L is used for Carters Limestone and 0.189 mg/L for Lebanon Limestone (L1).

Table 3-4b
Phase III Microcosm Study Results - Additional Parameters
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Compound or Parameter (units)	GWPS	Raw Water, 19R	Control, 19R			Dolofines, 19R			High Cal Fines, 19R			Notes
		6/16/2020	Dose #1	Dose #2	Dose #3	Dose #1	Dose #2	Dose #3	Dose #1	Dose #2	Dose #3	
		Total	Total *	Total *	Total	Total *	Total *	Total	Total *	Total *	Total	
Chloride (mg/L)	NE	2.12 J	NA	NA	4.6	NA	NA	6.21	NA	NA	5.39	No issue
Fluoride (mg/L)	4 (a,b)	0.289	NA	NA	0.230 J	NA	NA	0.134 J	NA	NA	0.182	OK
Sulfate (mg/L)	NE	2500	NA	NA	2240	NA	NA	2100	NA	NA	2040	No issue, same in all conditions
Nitrogen, Kjeldahl (mg/L)	NE	< 0.963 U*	NA	NA	1.02 B	NA	NA	2.46 B	NA	NA	1.88	No issue
Nitrate Nitrite Nitrogen (mg/L)	NE	< 0.065	NA	NA	2.89	NA	NA	3.91	NA	NA	1.01	No issue
Phosphate as PO_4 (mg/L)	NE	0.155 J	NA	NA	<0.307	NA	NA	<0.307	NA	NA	<0.307	No issue
Sulfide (mg/L)	NE	65.7	NA	NA	<15.0	NA	NA	<15.0	NA	NA	<15.0	No issue
Total Dissolved Solids (mg/L)	NE	2670	NA	NA	2180	NA	NA	2840	NA	NA	2010	No issue, similar in all conditions
Total Organic Carbon (mg/L)	NE	0.817 J	NA	NA	2.58	NA	NA	5.34	NA	NA	3.94	No issue
Total Alkalinity as CaCO3 to pH 4.5 (mg/L)	NE	< 5.00	176	151	99.8	234	95.4	57.2	164	100	33.4	No issue, higher with control and reagents compared to raw water. Decreasing alkalinity indicates gradual consumption of treatment capacity.
Bicarbonate Alkalinity as $CaCO_3$ (mg/L)	NE	< 5.00	176	151	99.8	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	6.49	No issue, control adds bicarbonate alkalinity.
Carbonate Alkalinity as $CaCO_3$ (mg/L)	NE	< 5.00	< 5.00	< 5.00	< 5.00	61.6	55.1	36.6	45.9	35.7	26.9	No issue. Fines > raw water, decreasing with time
Hydroxide Alkalinity (mg/L)	NE	< 5.00	< 5.00	< 5.00	< 5.00	172	40.3	20.6	118	64.3	< 5.00	No issue. Fines > raw water, decreasing with time
pH (standard units)	NE	3.77	5.90	7.80	6.88	9.32	9.41	10.65	9.61	9.36	9.67	No issue

Notes:
The raw water used in the Phase III Microcosm tests was from the June 16, 2020 groundwater sampling event.
pH values for raw water is based on the field pH. The remaining pH values were measured in the treatability study laboratory.
mg/L = milligrams per liter.
Red = Concentration exceeds the GWPS.
NE = No established standard for the Non-Registered Site.
NA = Not analyzed for this parameter.
< = Analyte not detected above laboratory quantitation limit shown.
B = Analyte was found in associated blank sample.
J = Quantitation is approximate due to limitations identified during data validation (19R data only), or reported value is between the reporting limit and the method detection limit (remaining samples).
U* =This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
* Coolers outside of temperature upon receipt at the lab.
"OK" means that a criteria exists for a non-target metal and is not exceeded.
"No issue" means a standard for that metal does not exist, and treatment has no adverse effect.
GWPS = groundwater protection standard
(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.
(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.
pH for well 19R was measured during the field investigation. The remaining pH values were measured at treatability laboratory.

Table 3-5a
Sequential Extraction Laboratory Results - Sand From Microcosm Studies
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

			Extraction Reagent	Exchangeable $MgSO_4$		Carbonate Fraction NaOAc/HOAc pH 5		Non-crystalline NH_4oxalate, pH3		Metal Hydroxide had/hdc/acetic acid		Organic Bound NaClO, pH 9.5		Acid/Sulfide Fraction HCl-HNO_3-H_20		Residual $HF/HNO_3/H_3BO_3$	
Soil Sample - Description	**Metal**	**6010B Total Metals**	**Sum Total of All Extractions**	**Step 1 Result**	**Step 1 Percent**	**Step 2 Result**	**Step 2 Percent**	**Step 3 Result**	**Step 3 Percent**	**Step 4 Result**	**Step 4 Percent**	**Step 5 Result**	**Step 5 Percent**	**Step 6 Result**	**Step 6 Percent**	**Step 7 Result**	**Step 7 Percent**
Sand, no exposure to site groundwater	Be	0.463	0.466	<1.03	NC	<0.770	NC	0.0416J	9%J	0.0765J	16%J	<3.85	NC	0.0426J	9%J	0.305	65%
Sand with 3 doses of 19R GW	Be	0.504	0.610	<1.19	NC	<0.890	NC	0.0374J	6%J	0.0801J	13%J	<4.45	NC	0.0404J	7%J	0.346	57%
DoloFines/Sand with 3 doses 19R GW	Be	0.545	0.506	<1.18	NC	<0.885	NC	0.0484J	10%J	0.0803J	16%J	<4.43	NC	0.0531J	10%J	0.324	64%
HiCalFines/Sand with 3 doses 19R GW	Be	0.569	0.518	<1.18	NC	<0.884	NC	0.0519J	10%J	0.0872J	17%J	<4.42	NC	0.0495J	10%J	0.329	64%
Sand, no exposure to site groundwater	Cd	0.0539	0.222	<1.03	NC	0.0431J	19%J	0.0549JB	25%JB	0.0719J	32%J	<3.85	NC	<0.257	NC	0.0524J	24%J
Sand with 3 doses of 19R GW	Cd	0.0344J	0.170J	<1.19	NC	<0.890	NC	0.0795JB	47%JB	0.0594J	35%J	<4.45	NC	<0.297	NC	0.0315J	19%J
DoloFines/Sand with 3 doses 19R GW	Cd	0.0832J	0.232J	<1.18	NC	0.0584J	25%J	0.0744JB	32%JB	0.0744J	32%J	<4.43	NC	<0.292	NC	0.0248J	11%J
HiCalFines/Sand with 3 doses 19R GW	Cd	0.0696J	0.240J	<1.18	NC	0.0442J	18%J	0.0778JB	32%JB	0.0796J	33%J	<4.42	NC	<0.295	NC	0.0383J	16%J
Sand, no exposure to site groundwater	Li	5.42	5.31	<10.3	NC	<7.70	NC	<2.57	NC	0.949J	18%J	<38.5	NC	1.02J	19%J	3.34	63%
Sand with 3 doses of 19R GW	Li	8.60	5.77	<11.9	NC	<8.90	NC	<2.97	NC	1.02J	18%J	<44.5	NC	1.06J	18%J	3.68	64%
DoloFines/Sand with 3 doses 19R GW	Li	6.69	5.43	<11.8	NC	<8.85	NC	<2.95	NC	0.92J	17%J	<44.3	NC	1.05J	19%J	3.46	64%
HiCalFines/Sand with 3 doses 19R GW	Li	6.01	6.98	<11.8	NC	<8.84	NC	<2.95	NC	1.09J	16%J	<44.2	NC	1.51J	22%J	4.38	63%
Sand, no exposure to site groundwater	Ni	10.0	12.0	<8.22	NC	0.337 J	3% J	1.66 J	14% J	5.43	45%	1.36 J	11% J	2.34	20%	0.912 J	8% J
Sand with 3 doses of 19R GW	Ni	18.2	11.4	0.351 J	3% J	0.191 J	2% J	0.807 J	7% J	5.77	51%	1.13J	10% J	2.19 J	19% J	0.966 J	8% J
DoloFines/Sand with 3 doses 19R GW	Ni	12.6	12.2	<9.44	NC	0.666 J	5% J	1.58 J	13% J	5.40	44%	1.33J	11% J	2.43	20%	0.821 J	7% J
HiCalFines/Sand with 3 doses 19R GW	Ni	12.8	15.3 J	<9.43	NC	0.624 J	4% J	1.85 J	12% J	6.79	44% J	1.42J	9% J	2.94	19%	1.63 J	11% J
Sand, no exposure to site groundwater	Fe	8,570	8,150	<20.5	NC	18.7 JB	0.2% J	405	5%	2,520	31%	<77.0	NC	2,990	37%	2,220	27%
Sand with 3 doses of 19R GW	Fe	18,400	8,480	<23.7	NC	25.8 JB	0.3% J	675	8%	2,820	33%	<89.0	NC	2,780	33%	2,180	26%
DoloFines/Sand with 3 doses 19R GW	Fe	10,500	8,590	<23.6	NC	138 JB	2% J	736	9%	2,740	32%	<88.5	NC	3,090	36%	1,880	22%
HiCalFines/Sand with 3 doses 19R GW	Fe	10,800	10,700	<23.6	NC	69.7 JB	0.7% J	733	7%	2,950	28%	104 JB	1% J	3,570	33%	3,300	31%
Sand, no exposure to site groundwater	Al	20,200	16,300	<41.1	NC	6.45 J	0.04% J	57.2	0.4%	435	3%	102	0.6%	591	4%	15,100	93%
Sand with 3 doses of 19R GW	Al	18,700	19,900	<47.5	NC	14.1	0.1%	86.2	0.4%	521	3%	101	0.5%	627	3%	18,500	93%
DoloFines/Sand with 3 doses 19R GW	Al	21,300	20,000	<47.2	NC	49.6	0.2%	101	0.5%	450	2%	106	0.5%	631	3%	18,600	93%
HiCalFines/Sand with 3 doses 19R GW	Al	22,600	20,200	<47.2	NC	30.7	0.2%	102	0.5%	515	3%	101	0.5%	832	4%	18,600	92%

Notes:
Results given in milligrams per kilogram (analyte mass extracted by given method per total sample mass).
Fractional percentages based on the sum total of extractions.
B = One of the conditions applies: compound was found in the blank; laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) outside acceptance limits; and/or LCS/LCSD relative percent difference exceeds control limits.
J = Result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an estimated value.
< = Not detected above reporting quantitation limit shown
NC = Not calculated
GW = Groundwater
DoloFines = Dolomitic fines
HiCalFines = High calcium fines
Blue = percent extracted at the step was between 25 to 50 percent of the sum total of all extractions.
Red = percent extracted was 50 percent or greater of the sum total of all extractions.

Be = Beryllium
Cd = Cadmium
had/hdc = Hydroxylamine hydrochloride
H_20 = Water
H_3BO_3 = Boric acid
HCl = Hydrochloric acid
HF = Hydrofluoric acid
HNO_3 = Nitric acid
HOAc = Acetic acid
Li = Lithium
$MgSO_4$ = Magnesium sulfate
NaClO = Sodium hypochlorite
NaOAc = Sodium acetate
NC = Not calculated
NH_4 oxalate = Ammonium oxalate
Ni = Nickel
Al = Aluminum

Table 3-5b
Sequential Extraction Laboratory Results - Untreated Site Soil
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

			Extraction Reagent	Exchangeable $MgSO_4$		Carbonate Fraction NaOAc/HOAc pH 5		Non-crystalline NH_4oxalate, pH3		Metal Hydroxide had/hdc/acetic acid		Organic Bound $NaClO$, pH 9.5		Acid/Sulfide Fraction HCl-HNO_3-H_20		Residual $HF/HNO_3/H_3BO_3$	
Soil Sample Location (Depth Range) Date	**Metal**	**6010B Total Metals**	**Sum Total of All Extractions**	**Step 1 Result**	**Step 1 Percent**	**Step 2 Result**	**Step 2 Percent**	**Step 3 Result**	**Step 3 Percent**	**Step 4 Result**	**Step 4 Percent**	**Step 5 Result**	**Step 5 Percent**	**Step 6 Result**	**Step 6 Percent**	**Step 7 Result**	**Step 7 Percent**
NRS068 (40-58) 03122020	Be	1.01	1.03	<1.20	NC	<0.897*	NC	0.0640J	6% J	0.299	29%	<4.48*	NC	0.105 J	10% J	0.566	55%
NRS069 (40-50) 03092020	Be	1.04	1.04	<1.23	NC	<0.920	NC	0.0533J	5% J	0.278J	27% J	<4.60	NC	0.128 J	12% J	0.586	56%
NRS070 (50-60) 03102020	Be	1.21	1.08	<1.23	NC	<0.924*	NC	0.0727 J	7% J	0.278J	26% J	<4.62*	NC	0.109 J	10% J	0.615	57%
NRS068 (40-58) 03122020	Cd	0.444	0.0640 J	<1.20	NC	<0.897	NC	0.0442JB*	69% JB	0.0197J	31% J	<4.48	NC	<0.299	NC	<0.299	NC
NRS069 (40-50) 03092020	Cd	0.441	0.0662 J	<1.23	NC	<0.920	NC	0.0454JB*	69% JB	0.0208J	31% J	<4.60	NC	<0.307	NC	<0.307	NC
NRS070 (50-60) 03102020	Cd	0.506	0.115 J	<1.23	NC	<0.924	NC	0.0875JB*	76% JB	0.0271J	24% J	<4.62	NC	<0.308	NC	<0.308	NC
NRS068 (40-58) 03122020	Li	22.3	21.1	<12.0	NC	<8.97	NC	<2.99	NC	1.57J	7% J	2.81J	13%J	2.43 J	12% J	14.3	68%
NRS069 (40-50) 03092020	Li	18.3	17.5	<12.3	NC	<9.20	NC	<3.07	NC	0.917J	5% J	<46.0	NC	2.91 J	17% J	13.7	78%
NRS070 (50-60) 03102020	Li	18.9	22.8	<12.3	NC	<9.24	NC	<3.08	NC	1.22J	5% J	<46.2	NC	1.98 J	9% J	19.6	86%
NRS068 (40-58) 03122020	Ni	21.9	21.0	<9.56	NC	<7.17	NC	<2.39	NC	6.26	30%	<35.9	NC	4.00	19%	10.7	51%
NRS069 (40-50) 03092020	Ni	15.1	15.2	0.365J	2%J	<7.36	NC	<2.45	NC	4.50	30%	<36.8	NC	3.30	22%	7.02	46%
NRS070 (50-60) 03102020	Ni	20.3	17.7	<9.86	NC	<7.39	NC	0.271J	2% J	4.79	27%	<37.0	NC	2.63	15%	10.0	56%
NRS068 (40-58) 03122020	Fe	21,400	25,000	265	1%	28.9*	0.1%*	1,940	8%	15,100	60%	<89.7 **1	NC	4,240	17%	3,470	14%
NRS069 (40-50) 03092020	Fe	23,200	23,800	999	4%	91.6*	0.4%*	993	4%	12,900	54%	<92.0 **1	NC	5,130	22%	3,700	16%
NRS070 (50-60) 03102020	Fe	19,400	14,200	<24.6	NC	<18.5*	NC	509	4%	7,700	54%	<92.4 **1	NC	2,680	19%	3,340	23%

Notes:

Boring NRS068 was located within approximately 50 feet of well 19R. Soil was sampled from 40 to 58 feet below ground surface (bgs)
Boring NRS069 was located within approximately 50 feet of well GAF-441U. Soil was sampled from 40 to 50 feet bgs
Boring NRS070 was located within approximately 50 feet of well GAF-444U. Soil was sampled from 50 to 60 feet bgs
Results given in milligrams per kilogram (analyte mass extracted by given method per total sample mass.)
Fractional percentages based on the sum total of extractions.
B = Analyte detected in laboratory blank
J = result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value
< = Not detected above reporting quantitation limit shown
* = Laboratory control sample (LCS) or LCS duplicate (LCSD) is outside of acceptance limits
*1 = LCS/LCSD relative percent difference exceeds control limits
NC = Not calculated
Blue = percent extracted at the step was between 25 to 50 percent of the sum total of all extractions.
Red = percent extracted was 50 percent or greater of the sum total of all extractions.

Be = Beryllium
Cd = Cadmium
had/hdc = Hydroxylamine hydrochloride
H_20 = Water
H_3BO_3 = Boric acid
HCl = Hydrochloric acid
HF = Hydrofluoric acid
HNO_3 = Nitric acid
HOAc = Acetic acid
Li = Lithium
$MgSO_4$ = Magnesium sulfate
NaClO = Sodium hypochlorite
NaOAc = Sodium acetate
NH_4 oxalate = Ammonium oxalate
Ni = Nickel
Fe = Iron

Table 3-6
Target Metals Analytical Results - Sand from Microcosm Studies
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample ID	Soil Source	Water Source	Reagent	Trial	Date Collected	Beryllium	Cadmium	Lithium	Nickel
GAF-GW-PHIII-BKT-SAND	Sand	none	none	NA	7/30/2020	0.129	0.110 B	1.69	7.68
GAF-GW-PHIII-BKT-SAND-T3	Sand	none	none	#3	8/6/2020	0.150	0.0930	2.05	9.37
GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2	Sand	19R	None	#2	7/30/2020	0.155	0.102 B	2.24	9.91
GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Sand	19R	None	#3	8/6/2020	0.177	0.0429 J	2.38	10.3
GAF-GW-PHIII-BKT-DOLO-SAND-19R-T2	Sand	19R	DoloFines	#2	7/30/2020	0.168	0.120 B	2.08	9.40
GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Sand	19R	DoloFines	#3	8/6/2020	0.181	0.0884	2.57	11.5
GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T2	Sand	19R	HiCal™	#2	7/30/2020	0.170	0.127 B	2.41	11.7
GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Sand	19R	HiCal™	#3	8/6/2020	0.161	0.0832	2.28	10.0

Notes:
Analytical method used was SW846 6020A.
B = Analyte was found in the blank and sample
J = Estimated value between laboratory reporting limit and method detection limit.
Results in milligrams per kilogram (mg/kg)
Dolofines = dolomitic lime fines
HiCal™ = high purity, fine particle, calcium carbonate

Table 3-7a
Column Test Results, Stage 1a
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample ID	Pore Volumes	Liters Added	pH	Beryllium Goal 4 ug/L	Cadmium Goal 5 ug/L	Lithium Goal 40 ug/L	Nickel Goal 100 ug/L	Observations
Hi Cal Fines - 0.1% by Weight Dose								
GAF-GW-HICAL-STAGE1-PV1-18HRS	2.4	1.2	11.81	< 1.00	< 1.00	< 5.00	15.1	Analytes met goals.
GAF-GW-HICAL-STAGE1-PV4-54HR	4.7	2.4	11.71	< 1.00	< 1.00	< 5.00	8.37	Analytes met goals.
GAF-GW-HICAL-STAGE 1-PV4-68-70HRS	5.5	2.9	11.28	0.280 J	0.362 J	15.1	5.89	Analytes met goals; 0.7 liters treated per gram of reagent.
GAF-GW-HICAL-STAGE1-PV8-120HR	8.6	4.5	8.18	< 1.00	< 1.00	110	4.52	Failed for Li, other goals met.
GAF-GW-HICAL-STAGE1-PV10-160HR	10.9	5.7	7.34	< 1.00	4.05	138	401	Failed for Li & Ni; Ni higher than raw groundwater.
GAF-GW-HICAL-STAGE1-PV13-202HR	13.4	6.9	7.05	< 1.00	12.4	123	594	Failed for Cd, Li & Ni; Cd & Ni higher than raw groundwater.
GAF-GW-HICAL-STAGE1-PV18-294HR	18.7	9.7	6.82	1.54	20.0	115	746	Failed for Cd, Li & Ni; Cd & Ni higher than raw groundwater.
GAF-GW-HICAL-STAGE1-PV21-342HR	21.6	11.2	6.36	10.8	33.6	143	928	Failed for all analytes; Be, Cd & Ni higher than raw groundwater.
Sand Control								
GAF-GW-CON-STAGE1-PV2-21HR	2.6	1.4	7.91	< 1.00	0.479 J	14.5	6.11	Analytes met goals.
GAF-GW-CON-STAGE1-PV4-45HR	4.0	2.1	7.18	< 1.00	8.31	137	157	Failed for Cd, Li & Ni; Cd & Ni higher than raw groundwater.
GAF-GW-CON-STAGE1-PV5-72HR	5.7	3.0	6.80	0.824 J	16.0	140	725	Failed for Cd, Li & Ni; Cd & Ni higher than raw groundwater.
GAF-GW-CON-STAGE1-PV10-144HR	10.1	5.3	5.13	15.2	56.1	135	1,060	Failed for all analytes; Cd & Ni higher than raw groundwater.
GAF-GW-CON-STAGE1-PV11-168HR	11.5	6.1	4.67	26.1	30.1	125	721	Failed for all analytes; Be, Cd & Ni higher than raw groundwater.
GAF-GW-CON-STAGE1-PV14-216HR	14.4	7.5	4.62	28.0	23.0	147	748	Failed for all analytes; Be, Cd & Ni higher than raw groundwater.
19R Influent Water								
GAF-GW-COL1-GW-BL	NA	NA	2.87	12.5	4.19	131	148	Influent water used for each column.

Notes:
Metal/metalloid concentrations presented in micrograms per liter (ug/L).
pH was measured at the treatability laboratory at the time of sample collection and is presented in standard units.
Flow rates for the test were approximately 0.5 milliliters per minute.
< = Analyte not detected above the laboratory reporting limit shown.
Red = pH value is less than 5 standard units; analyte concentration exceeds its groundwater protection standard (goal)
Be = beryllium
Cd = cadmium
Li = lithium
Ni = nickel
J = Estimated value between laboratory reporting limit and method detection limit.
NA = not applicable

Table 3-7b
Column Test Results, Stage 1b and 2
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample ID	Pore Volumes	Liters Added	pH	Beryllium Goal 4 ug/L	Cadmium Goal 5 ug/L	Lithium Goal 40 ug/L	Nickel Goal 100 ug/L	Observations
DoloFines - 0.2% by Weight Dose								
GAF-GW-COL1-PV0	1.0	0.49	NM	0.659 J	0.289 J	<5.00	6.79	Analytes met goals.
GAF-GW-COL1-PV1	2.0	0.96	NM	0.362 J	0.219 J	<5.00	13.0	Analytes met goals.
GAF-GW-COL1-PV2	3.0	1.45	NM	<1.00	<1.00	<5.00	7.07	Analytes met goals.
GAF-GW-COL1-PV3.2	4.2	2.06	12.35	<1.00	<1.00	<5.00	4.40	Analytes met goals.
GAF-GW-COL1-4.6PV	5.6	2.74	10.13	<1.00	<1.00	<5.00	2.63	Analytes met goals.
GAF-GW-COL1-5.8PV	6.8	3.33	8.81	<1.00	<1.00	<5.00	1.74	Analytes met goals.
GAF-GW-COL1-6.9	7.9	3.85	7.88	<1.00	<1.00	11.5	1.28	Analytes met goals; 0.45 liters treated per gram of reagent.
GAF-GW-COL1-PV8.0	9.0	4.40	6.36	<1.00	<1.00	43.4	1.38	Fail for Li, other goals met.
GAF-GW-COL1-9.2PV	10.2	4.96	7.10	<1.00	<1.00	79.5	0.877 J	Fail for Li, other goals met.
GAF-GW-COL1-PV10	10.8	5.27	7.57	<1.00	<1.00	95.1	0.985 J	Fail for Li, other goals met.
GAF-GW-COL1-10.3PV	11.3	5.51	6.49	<1.00	<1.00	108	0.931 J	Fail for Li, other goals met.
GAF-GW-COL1-10.8PV	11.8	5.76	8.21	<1.00	<1.00	125	0.727 J	Fail for Li, other goals met.
GAF-GW-COL1-11.4PV	12.4	6.08	7.32	<1.00	<1.00	127	0.676 J	Fail for Li, other goals met.
GAF-GW-COL1-11.9PV	12.9	6.32	7.94	<1.00	<1.00	132	0.477 J	Fail for Li, other goals met.
Layered Column - Ferroblack 0.2% by Weight Upstream / Hi Cal Fines 0.2% By Weight Downstream								
GAF-GW-COL2-PV0	1.0	0.48	NM	<1.00	<1.00	<5.00	9.92	Analytes met goals.
GAF-GW-COL2-PV1	1.9	0.92	NM	<1.00	<1.00	<5.00	25.7	Analytes met goals.
GAF-GW-COL2-PV2	3.0	1.46	NM	0.563 J	0.314 J	<5.00	9.36	Analytes met goals.
GAF-GW-COL2-PV3	4.1	1.99	12.41	0.214 J	<1.00	<5.00	3.26	Analytes met goals.
GAF-GW-COL2-PV4.6	5.5	2.63	10.23	0.492 J	0.296 J	54.2	2.31	Fail for Li, other goals met.
GAF-GW-COL2-PV5.6	6.6	3.19	7.85	<1.00	0.248 J	104	37.5	Fail for Li, other goals met.
GAF-GW-COL2-PV6.6	7.6	3.65	5.79	<1.00	1.89	184	123	Fail Ni & Li.
GAF-GW-COL2-PV8	8.7	4.18	5.55	<1.00	3.21	283	128	Fail Ni & Li: Ni higher that raw groundwater.
GAF-GW-COL2-PV8.7	9.7	4.67	6.21	<1.00	3.68	116	339	Fail Ni & Li: Ni higher that raw groundwater.
GAF-GW-COL2-PV9.8	10.3	4.95	6.20	<1.00	3.40	110	349	Fail Ni & Li: Ni higher that raw groundwater.
GAF-GW-COL2-PV10	10.8	5.19	5.42	<1.00	3.60	111	349	Fail Ni & Li: Ni higher that raw groundwater.
GAF-GW-COL2-PV10.3	11.3	5.46	6.20	<1.00	3.63	109	376	Fail Ni & Li: Ni higher that raw groundwater.
GAF-GW-COL2-PV11	12.0	5.77	6.12	<1.00	3.06	108	373	Fail Ni & Li: Ni higher that raw groundwater.
GAF-GW-COL2-PV11.9	12.4	5.98	6.23	<1.00	3.04	107	395	Fail Ni & Li: Ni higher that raw groundwater.
19R Influent Water								
GAF-GW-COL1-BL	NA	NA	2.31	11.8	4.34	119	137	Dolofines column
GAF-GW-COL2-BL	NA	NA	3.12	10.9	3.77	123	121	Layered column

Notes:
Metal/metalloid concentrations presented in micrograms per liter (ug/L).
pH was measured at the treatability laboratory at the time of sample collection and is presented in standard units.
Flow rates for the test were approximately 0.5 milliliters per minute.
< = Analyte not detected above the laboratory reporting limit shown.
Red = pH value is less than 5 standard units; analyte concentration exceeds its groundwater protection standard (goal)
J = Estimated value between laboratory reporting limit and method detection limit.

Be = beryllium
Cd = cadmium
Li = lithium
Ni = nickel
NA = not applicable
NM = not measured

Table 3-7c
Column Test Results, Stage 3
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample ID	Pore Volumes	Liters Added	pH	Beryllium Goal 4 ug/L	Cadmium Goal 5 ug/L	Lithium Goal 40 ug/L	Nickel Goal 100 ug/L	Observations
Hi Cal Fines - 0.2% by Weight Dose								
GAF-GW-COL3-PV0	1.0	0.42	10.62	<1.00	<1.00	<5.00	67.6	Nickel did not meet goals initially. Other analytes met goals.
GAF-GW-COL3-PV2	2.0	0.85	12.33	<1.00	<1.00	<5.00	102	Nickel did not meet goals initially. Other analytes met goals.
GAF-GW-COL3-PV3	3.2	1.33	12.35	<1.00	<1.00	<5.00	31.1	Analytes met goals.
GAF-GW-COL3-PV4	4.2	1.76	11.81	<1.00	<1.00	8.88	8.80	Analytes met goals.
GAF-GW-COL3-PV5	5.2	2.19	11.32	<1.00	<1.00	17.4	8.62	Analytes met goals. 0.25 liters treated per gram of reagents.
GAF-GW-COL3-PV6	6.3	2.64	10.37	<1.00	<1.00	43.2	5.86	Lithium exceeds goals. Other analytes met goals.
GAF-GW-COL3-PV7	7.4	3.12	8.47	<1.00	<1.00	71.7	4.61	Lithium exceeds goals. Other analytes met goals.
GAF-GW-COL3-PV8	8.0	3.37	8.46	<1.00	<1.00	93.3	5.43	Lithium exceeds goals. Other analytes met goals.
19R Influent Water								
GAF-GW-COL3-BL	NA	NA	2.44	12.8	3.99 J	122	131	

Notes:
Metal/metalloid concentrations presented in micrograms per liter (ug/L).
pH was measured at the treatability laboratory at the time of sample collection and is presented in standard units.
Flow rates for the test were approximately 0.5 milliliters per minute.
< = Analyte not detected above the laboratory reporting limit shown.
Red = pH value is less than 5 standard units; analyte concentration exceeds its groundwater protection standard (goal)
J = Estimated value between laboratory reporting limit and method detection limit.
NA = not applicable

Table 3-7d
Column Test Results, Column Regeneration
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Sample ID	Pore Volumes	Liters Added	pH	Beryllium Goal 4 ug/L	Cadmium Goal 5 ug/L	Lithium Goal 40 ug/L	Nickel Goal 100 ug/L	Observations
DoloFines Column Regeneration								
GAF-GW-COL1 Redose-PV0.5	0.5	0.53	12.68	<1.00	<1.00	3.64J	9.55	Analytes met goals.
GAF-GW-COL 1 Redose-PV1	1	1.02	12.49	<1.00	<1.00	<5.00	17.8	Analytes met goals.

Notes:
Metal/metalloid concentrations presented in micrograms per liter (ug/L).
pH was measured at the treatability laboratory at the time of sample collection and is presented in standard units.
Flow rates for the test were approximately 0.5 milliliters per minute.
< = Analyte not detected above the laboratory reporting limit shown.
Red = pH value is less than 5 standard units; analyte concentration exceeds its groundwater protection standard (goal)
J = Estimated value between laboratory reporting limit and method detection limit.

Table 4-1a
Direct Soil Treatment Microcosm Study Results - Target Metals
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Water Source	Media	Reagent Added	Dosage	Trial	Total/ Dissolved	pH (SU)	Beryllium, Be Goal 4 ug/L	Cadmium, Cd Goal 5 ug/L	Lithium, Li Goal 40 ug/L	Nickel, Ni Goal 100 ug/L	Observations
19R	NA	Raw Water	NA	NA	Total	3.56	13.3	6.07	137	197	Water collected 1/15/2020. Concentrations in raw water used in microcosm tests.
					Dissolved		13.3	4.65	146	191	
GAF-444U	NA	Raw Water	NA	NA	Total	4.84	12.8	8.17	37.4	660	Water collected 1/20/2020. No lithium exceedance, but higher nickel concentrations. Similar to source area groundwater.
					Dissolved		11.7	7.22	35.9	643	
19R	19R soil	Control	NA	T1	Total	7.06	8.08	12.8	89.7 B	323	Control failed; not centrifuged.
					Dissolved		<1.00	<1.00	11.2 B	0.545 J	Filtered sample met goals; not centrifuged.
19R	19R soil	Ferroblack Plus 22	69.4 g/kg	T1	Total	6.86	10.5	31.4	127 B	1,020	Fails for all metals; not centrifuged.
					Dissolved		14.5	78.5	150 B	1,930	Fails for all metals; not centrifuged.
19R	441U Soil	Control	NA	T1	Total	2.13	53.9	17.8J	113J*	1,470	Acidific water leaches metals off source area soils at higher concentrations than detected in well 441U water.
					Dissolved		48.0 J	15.4J	105J*	1,390	
				T2	Total	2.31	80.2	15.2	118	1,500	No improvement at T2.
					Dissolved		81.7	14.7	117	1,470	
				T3	Total	2.24	84.3	14.6	116	1,480	No improvement at T3.
					Dissolved		NA	NA	NA	NA	NA
19R	441U Soil	HiCalFines	4.48 g/kg	T1	Total	6.71	<4.00*	0.460 J*	10.9 J*	5.11 J*	
					Dissolved		<4.00*	0.300 J*	10.7 J*	3.76 J*	Met goals
				T2	Total	7.10	<1.00	<1.00	<5.00	0.929 J	Met goals
					Dissolved		<1.00	<1.00	<5.00	0.703 J	Met goals
				T3	Total	6.93	0.461 J	<1.00	5.41	5.86	Met goals
					Dissolved		NA	NA	NA	NA	NA

Notes:
PH was measured at the treatability laboratory at the time of sample collection. Raw water pH may not match field-measured pH.
Raw water analytical data presented here is from the January 2020 sampling event and was validated by Environmental Standards, Inc.
Analytical data for microcosm testing was not validated, and includes the laboratory qualifiers.
441U soil = Soil collected from between 40 to 50 feet below ground surface (bgs) at boring NRS069, located near monitoring well GAF-441U.
19R soil = Soil collected from between 40 to 58 feet bgs at boring NRS068, located near monitoring well 19R.
HiCalFines = High purity, fine particle, calcium carbonate.
g/kg = Grams reagent per kilogram of soil.
ug/L = Micrograms per liter.
J = Estimated value between laboratory reporting limit and method detection limit.
B = Analyte was detected in the laboratory method blank and associated sample.
< = Analyte note detected above the laboratory reporting limit shown.
Red = pH value is less than 5 standard units; analyte concentration exceeds its groundwater protection standard (goal)
* = Due to matrix interference, the method detection limit for EPA Method 6020A (ICP/MS) exceeded the groundwater protection standard (goal), to which results are being compared for screening purposes. The concentration reported was obtained via EPA Method 6010D (ICP).
SU = standard units
NA = Not analyzed. Total and dissolved concentrations were similar in previous trials; dissolved removed from the analytical parameters for this trial.

Table 4-1b
Direct Soil Treatment Microcosm Study Results - Additional Parameters
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Compound	GWPS (ug/L)	Hi Cal Fines, 441U Soil & Water	
		Dose #2	Dose #3
		Total	Total
Aluminum	NE	530	7,820
Antimony	6 (a,b)	0.517 J	0.826 J
Arsenic	10 (a,b)	0.706 J	4.45
Barium	2,000 (a,b)	11.6	26.7
Beryllium	4 (a,b)	<1.00	0.461 J
Cadmium	5 (a,b)	<1.00	<1.00
Calcium	NE	630,000	688,000
Chromium	100 (a,b)	<2.00	5.44
Cobalt	NE (c)	1.06	3.45
Copper	NE	1.50 J	5.22
Iron	NE	674	13,800
Lead	15 (a,b)	0.377 J	4.05
Lithium	40 (b)	<5.00	5.41
Magnesium	NE	4,690	2,280
Molybdenum	100 (b)	8.09	36.2
Nickel	100 (a)	0.929 J	5.86
Potassium	NE	3,530	3,740
Selenium	50 (a,b)	<5.00	<5.00
Silicon	NE	502	6,730
Silver	100 (a)	<1.00	<1.00
Sodium	NE	17,200	17,300
Strontium	NE	610	641
Thallium	2 (a,b)	0.469 J	0.313 J
Vanadium	NE	<1.00	14.2
Zinc	NE	4.47	18.8 J

Notes

Target metals for treatment (Be, Cd, Li and Ni) are highlighted in green.

Results given in milligrams per liter (mg/L).

NE - No established standard

< = Analyte not detected above the laboratory reporting quantitation limit shown.

J = Estimated value between laboratory reporting limit and method detection limit.

GWPS = Groundwater protection standard

(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.

(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.

(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS calculated.

Table 5-1
Stage I In-Situ Stabilization Testing Results
NRS Treatability Study Report
TVA Gallatin Fossil Plant
Gallatin, Tennessee

Test	7 Day	14 Day	28 Day	Goal
Paint Filter Lean (3%)	Pass			Pass
Paint Filter Rich (6%)	Pass			Pass
Unconfined Strength (psi) Lean (3%)	34.2	33.4	51.9	no specific goal, >30 psi is OK
Unconfined Strength (psi) Rich (6%)	64.5	100.1	105.8	>50 psi
Permeability (cm/sec) Lean (3%)	5.60E-08			<1.0E-5
Permeability (cm/sec) Rich (6%)	1.00E07			<1.0E-6

Notes:
Both lean and rich mixes met goals. Recommend both be carried into next stage (1315 and 1316 leaching tests) to allow comparison.
Tests were conducted with Type II cement Portland Cement. Next Trials will use Type V Portland Cement. UCS and permeability will be repeated if adequate soil volume remains.

Appendix A NRS Treatability Test Report Addendum 1



Non-Registered Site Treatability Test Report Addendum I

TVA Gallatin Fossil Plant
Summer County, Tennessee

Tennessee Valley Authority

Revision 0

March 25, 2021

Quality Information

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Revision History

Revision	Date	Description
0	3/25/2021	Submittal to TDEC

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Appendices

Appendix A Treatability Laboratory Procedures for EPA Methods 1315 and 1316
Appendix B Method 1315 and 1316 Analytical Results Tables
Appendix C Analytical Laboratory Reports

1. Introduction

The purpose of this report addendum is to provide results of United States Environmental Protection Agency (EPA) Methods 1315 and 1316 leaching tests for Direct Soil Treatment and In-Situ Stabilization (ISS), which are technologies being considered to address upgradient areas at the Non-Registered Site (NRS) to augment the planned Field Demonstration of a permeable reactive barrier (PRB) at the downgradient boundary of the NRS. These tests were conducted in accordance with recommendations provided in NRS Treatability Test Report, TVA Gallatin Fossil Plant, Summer County, Tennessee (Treatability Test Report, AECOM, 2021). Soil for these trials was obtained from the area and at the depth of the screened interval of well GAF-441U, which is located in an area with low pH and target metals above the groundwater protection standards (GWPS). Groundwater for these trials was obtained from well GAF-440U (a nearby area with neutral pH and target metals below the GWPS).

Sections 2 and 3 provide a discussion of results for Direct Soil Treatment and ISS, respectively. Conclusions and recommended next steps are provided in Section 4. Appendix A provides details of the sample preparation and testing procedures. Appendix B provides tables of the analytical laboratory results. Appendix C provides the laboratory reports.

2. Direct Soil Treatment Results

To assess the potential effectiveness of direct soil treatment for immobilizing metals in the upgradient area, AECOM performed leachability testing of soil, groundwater, and remedial amendments using EPA Test Methods 1315 and 1316.

2.1 EPA Method 1316 Results for Direct Soil Treatment

To conduct the 1316 tests, site soil and site groundwater were blended in various liquid to solid (L/S) ratios. For these trials, one set of samples was mixed for 24 hours and a second set was mixed for 48 hours. A sample of the water from each mixture was then extracted and tested for pH and metals.

Table 1 provides a qualitative summary of the 1316 leaching results. Data tables are provided in Appendix B. For the Control (soil with no remedial amendments), the pH of the leachate consistently decreased with decreased L/S ratio. When the pH dropped to approximately 4, target metals began to be detected in the leachate at concentrations above the GWPS. At the lowest L/S ratio, the pH was approximately 3 and the GWPS was exceeded for all four target metals (beryllium [Be], cadmium [Cd], lithium [Li] and nickel [Ni]). In some of the lower L/S ratio trials, the GWPS for arsenic (As) was also exceeded (maximum dissolved result of 19.6 micrograms per liter (µg/L), compared to the GWPS of 10.0 µg/L). These results indicate that the saturated soil at the GAF-441U location has the capability of lowering the groundwater pH and creating conditions where the GWPS may be exceeded. The aggressive mixing and low L/S ratio in some trials is likely to exaggerate natural conditions. However, this extreme mixing and low L/S ratio testing provides a useful tool for comparing treated and untreated samples.

The treated samples were High Calcium Fines (HiCalFines) at a dose of 0.5 percent, Dolomitic Fines (DoloFines) at a dose of 0.5 percent and DoloFines at a dose of 1.0 percent. These reagents and doses were selected based on previous studies with site soil and site groundwater and with sand and site groundwater, as described in the Treatability Test Report (AECOM, 2021). The primary measures of effectiveness for the amendments are achieving the GWPS for target metals while maintaining GWPS compliance for all other metals. All three remedial amendment trials achieved the GWPS (in dissolved samples) for all metals through all L/S ratios for both the 24- and 48-hour contact times. Total metals exceeded the GWPS in a few instances, but the matching dissolved metals samples were below the GWPS. Because the target metals results were very low (below detection limits for Be, Cd, and Li and maximum of 2.64 µg/L for Ni, compared to a GWPS of 100 µg/L), all three performed equally for target metals treatment. No trends toward higher metals were observed with changes in L/S or contact time.

A secondary indicator to consider in selecting a reagent and dose is pH, as trends in pH can provide an indication of the longevity of treatment. While low pH has been associated with target metals concentrations above GWPS, high pH (over 10 or 11, for example) can also increase the solubility of certain metals. Therefore, extreme values of pH, should be avoided, if possible.

A comparison of pH for the Control and treated samples is provided in **Figure 1**. Ideally, the treated samples would remain above pH of 4 (the point where metals typically exceed the GWPS). All the amendments maintained a pH above 4 through the tested L/S ratios. DoloFines at a 1 percent dose showed some elevated pH (9 and 10) in the longer-term contact time (48 hours) at L/S ratios 1 and 2 but dropped to near neutral at a L/S ratio of 0.5. This may indicate that the 1.0 percent DoloFines dose is near the ideal of treating the acidic material without overshooting the pH. HiCalFines (0.5 percent) and DoloFines (0.5 percent) showed pH was in the range of 5 to 6 for the low L/S ratios, suggesting that a higher dose of reagent may be appropriate.

2.2 EPA Method 1315 Results for Direct Soil Treatment

For the 1315 tests, the Control and test samples are placed in a vessel filled with site groundwater (bathwater) at an approximate ratio of 9 milliliters water per cubic centimeter of test sample. The bathwater is periodically sampled over a 63-day period. No forced mixing is conducted. Changes in water chemistry are caused by diffusion of constituents from the test material.

As shown in **Table 2** and in more detail in **Appendix B**, neither the Control sample nor any of the test samples showed metals concentrations above the GWPS at any time interval. These results suggest that groundwater flowing around an area of low pH (the Control) or an area where the saturated soil has been treated is not significantly impacted in a 63-day timeframe. Results may be different if the time period is extended to a year or multiple years. The 1315 test does not simulate the downgradient flow of groundwater.

As shown in **Figure 2**, there is an early indication of some pH drop in the bathwater for the Control, but the pH returns to near natural (6.93) at day 63. With the HiCalFines and DoloFines amendments bathwater pH changes stay within a relative tight range (6.42 to 7.46). In the shorter time periods, there is some indication of higher pH with the DoloFines 1.0 percent but by day 63, the DoloFines 1.0 percent pH is similar to the other treated samples.

The 1315 tests indicate that metals are not diffusing out of the Control or the test samples to a significant degree in a 63-day time period.

3. In-Situ Stabilization Results

To assess the potential applicability of ISS to upgradient area treatment, Type V Portland cement was used to create a Lean mix (3 percent cement by weight) and a Rich mix (6 percent cement). The samples were cured for 28 days. These cured mixes were then tested to evaluate permeability, unconfined compressive strength, and metals leachability.

3.1 EPA Method 1316 Results for ISS

For the EPA Method 1316 testing, the cured samples were crushed prior to blending with site groundwater to create the various L/S ratios.

Table 3 provides a qualitative summary of the 1316 testing for the ISS samples. The full results are provided in Appendix B. Both the Lean and Rich mixes met all the GWPS for the target metals in all the L/S trials. Both the Lean mix and Rich mix exceeded the Chromium (Cr) GWPS of 100 µg/L for several L/S ratios and contact times. The maximum dissolved phase Cr result was 330 µg/L for the Lean mix, L/S of 1, 24-hour contact time. For total metal analysis, the highest Cr was 504 µg/L with L/S of 0.5 and 24-hour contact time. Due to limited water volume, it was not always possible to run both total and dissolved metals analyses on all trials. Dissolved molybdenum exceeded the GWPS of 100 µg/L in two trials (Lean mix, L/S 1, 24-hour contact time, and Lean mix, L/S 1, 48-hour contact time at a maximum dissolved result of 167 µg/L). Both total and dissolved As concentrations were below the GWPS of 10 µg/L in all trials for both the Lean and Rich mixes. As was frequently detected, with a maximum dissolved phase concentration of 6.51 µg/L and a maximum total concentration of 9.71 µg/L. While As results were below the GWPS, As results for the Lean and Rich mixes were slightly higher than the control and higher than the DoloFines and HiCalFines trials.

Figure 3 depicts the pH as a function of L/S ratio. Note that the Control is the same Control (soil with no amendment) used for the Direct Soil Treatment comparisons. Compared to the Control, the Lean and Rich mixes produced leachates with much higher pH. The Rich mix showed a pH in the range of 11 to 12 throughout the different L/S mixtures. A slight pH increase was observed at the lower L/S ratios for the Rich mix. For the Lean mix, the pH range was 10 to 11 with a similar increase at the lower L/S ratios.

3.2 EPA Method 1315 Results for ISS

For these trials, the Lean and Rich mixes were blended and allowed 28 days to cure. The ISS material was removed from the forms and the cylinders placed in the bathwater. After the 1315 trials were started, the permeability and unconfined strength result were received. For both the Lean and Rich mixes, the permeability goals were not met. For the lean mix the permeability was 1.90x10-04 centimeters per second (cm/sec) verses a goal of <1.0x10-5 cm/sec. For the rich mix the permeability was 1.00x10-3 cm/sec verses a goal of <1.0x10-6 cm/sec. Due to the permeability failures, the ISS samples were considered unacceptable for a full-scale application and the 1315 laboratory testing was suspended at day 14. The day 28 bathwater was available at the end of the test and was tested for pH only. Probable causes for the poor permeability results and corrective actions are discussed in Section 4.

For both the Lean and Rich mixes, the GWPS was met for the target metals through the end of the test at day 14. Additional metals were only tested at the end of the testing on day 14. GWPS were met for all other metals at day 14. Cr was present in the bathwater at day 14 (50.8 µg/L dissolved for Lean mix and 6.49 µg/L dissolved for Rich mix). While the Cr results are below the GWPS, they are higher than the Control (<2 µg/L at day 63) and the DoloFines and HiCalFines trials (all <2.0 µg/L at day 63). As levels were very low (<1.0 µg/L) in both the Lean and Rich mixes at day 14.

As shown in **Figure 4**, pH for both the Lean and Rich mixes remained between 7 and 8 with a possible slight upward trend with increased time. The pH of both Lean and Rich mixes was higher than the Control.

4. Recommended Next Steps

The following sections describe activities recommended to further evaluate direct soil treatment and ISS in the upgradient area at the NRS.

4.1 Direct Soil Treatment

Development of a Field Demonstration Work Plan for use of DoloFines would be the next step in developing a source area treatment for saturated soils. The recommendation is based on the following:

- GWPS for target metals were met in all 1316 trials. Further, no trends towards higher levels of target metals were observed as the L/S ratio was decreased.
- GWPS for all other metals were also met in all 1316 trials.
- 1315 trials showed no significant diffusion of metals out of the treated soil matrix over the 63-day testing period.
- In addition to the testing discussed in this Report, DoloFines and HiCalFines consistently demonstrated an ability to treat the target metals without mobilizing other metals in previous soil treatment and PRB trials (AECOM, 2021).
- Both the DoloFines and HiCalFines amendments met the goals for metals treatment, and both are viable amendments for the field demonstration of direct soil treatment. DoloFines are preferred because it appeared to provide the best neutralization of acidic material in laboratory testing, while not causing an excessively high pH. In previous trials, DoloFines were selected for the PRB due to slightly better performance (slightly better Ni treatment and slightly more impacted groundwater treated per gram of amendment [AECOM, 2021]).
- Use of DoloFines for saturated soil presents some advantages compared to ISS. ISS will cause a much higher pH, which could cause other metals to be more soluble, and may introduce additional metals to solution, such as Cr, which was detected above the GWPS in the ISS trials. ISS, by design, will reduce permeability of saturated soils to the point where changes in groundwater flow would have to be addressed in the design.

The 1.0 percent dose of DoloFines used in the treatability laboratory tests did not cause any adverse effects, although some limited indication of overshooting the target pH range was observed in the 1316 trials. Because conditions will vary in the field, the DoloFines dose might be adjusted (within a set range, 0.5 percent to 2 percent, for example) for each area and depth interval treated. Dose adjustment would be estimated by running a modified 1316 test (0.5 L/S, 24-hour contact only, for example) to determine the dose and then collecting an in-situ sample after blending to confirm pH neutralization. The modified 1316 test could be conducted on-site or sent off-site for rapid turn-around.

For direct soil treatment, the proposed next steps are to conduct a focused field investigation to define an appropriate area for pilot testing and to develop field demonstration design parameters and to prepare a Field Demonstration Work Plan for pilot testing. Pilot testing would be conducted to determine if the successful bench-scale studies can be repeated in the field. A decision to further develop the source area treatment option has not been made at this time.

4.2 In-Situ Stabilization

As discussed in Section 4.1, Direct Soil Treatment by DoloFines has advantages over ISS for treatment of saturated soil. However, there may be other applications to consider for ISS, such as treatment of soil above the seasonal low water table. ISS could be used to prevent surface water infiltration or to directly immobilize acid generating materials. ISS may also have applications downgradient as part of a funnel and gate arrangement for the PRB.

In prior testing, the ISS blends with Type V cement did not meet the permeability and unconfined strength goals established in the NRS Treatability Test Work Plan (AECOM, 2019). Additionally, the 1316 and 1315 testing indicate a possible issue with Cr levels exceeding the GWPS. Additional treatability testing is recommended before a demonstration test of ISS is undertaken. Recommended steps are as follows:

1. Evaluate the source of Cr in the leachate samples and take corrective action. A potential cause for Cr in leachate is the presence of Cr in the cement, possibly in the more mobile hexavalent form. Laboratory analysis of different cements (Type I/II and V) may provide an indication of the Cr source. It may be necessary to evaluate other additives to the cement mix to better bind the Cr. Success in resolving the Cr issue can be determined by conducting a limited number of 1316 trials (3 or 4).
2. Future trials should be conducted with the specific types of soil that ISS treatment is targeting. This would require obtaining additional site soil from specific locations and depths. Obtaining additional soil could be done during the focused field investigation referenced in Section 4.1, while step 1 above is conducted.
3. Once the Cr issue is resolved, it is recommended to conduct a series of tests to confirm that permeability and unconfined strength requirements are met with the selected cement before proceeding to additional trials. Previously, AECOM used Type I/II cement and met the permeability and unconfined strength requirements (Treatability Test Report, AECOM 2021). The Type V cement was later used in those trials. Unfortunately, the Type V cement resulted in significant macropores which lead to the permeability failure. While it may be possible to optimize the water content and mixing to make the Type V cement viable, a considerable effort would be required, and the theoretical advantage of using Type V cement is not considered commensurate to the practical challenges that working with this material for ISS presents. In future trials, returning to the use of Type I/II cement is recommended. Sulfate resistance testing is recommended for the cured samples.
4. When an ISS blend that meets the Cr leaching, permeability and unconfined strength requirement is developed, the 1316 and 1315 trials can be repeated. Based on results of prior testing, the 1316 and 1315 testing can be streamlined to focus on the higher L/S ratios for the 1316 test and longer soaking times for the 1315 test.

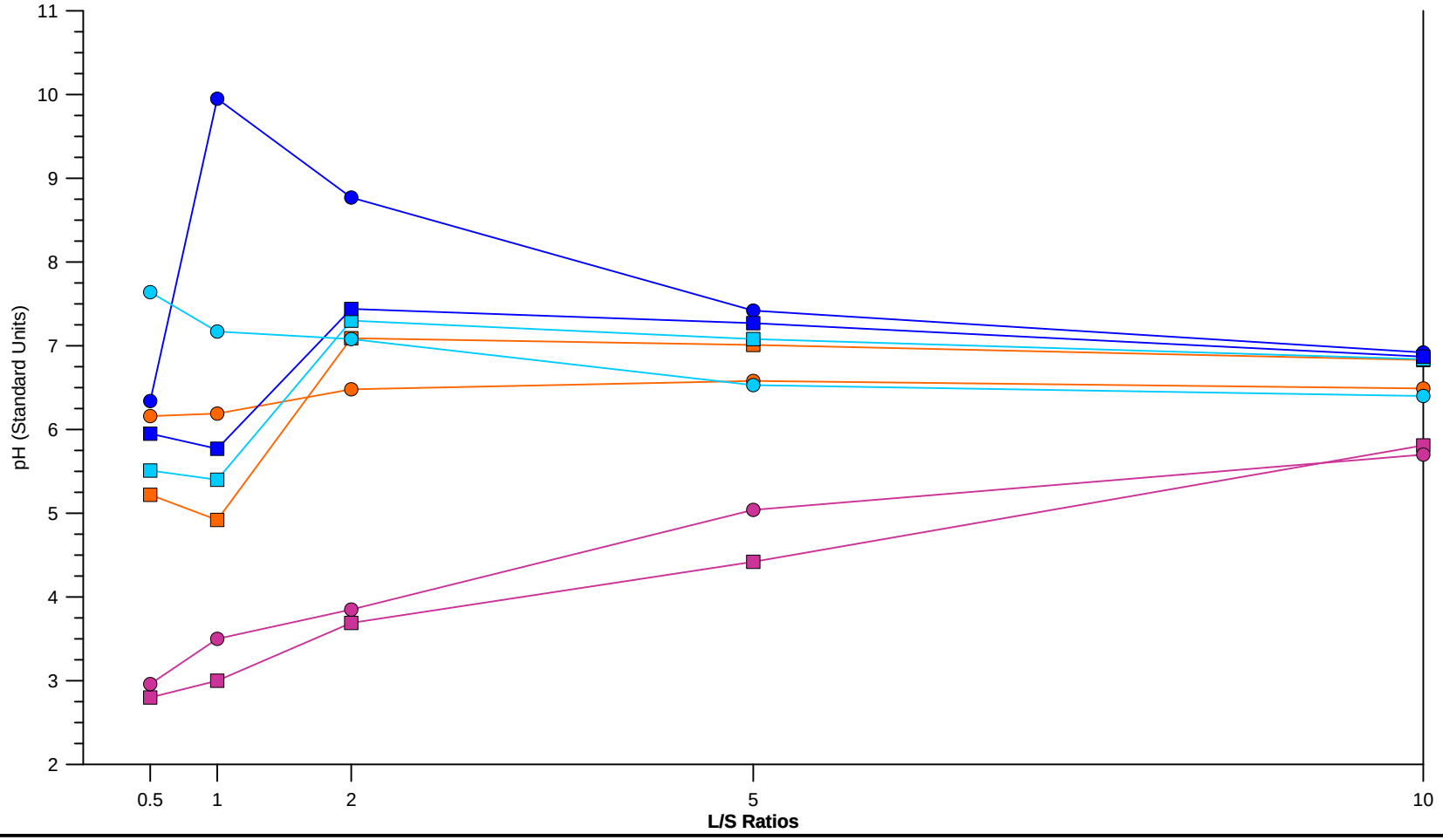
As presented above, several steps and more testing are necessary to develop a viable ISS blend for upgradient area soil treatment. The time required for this testing is approximately 6 months, with 3 months of that time waiting on final 1315 results. While the timeframe would be shorter if the 1315 testing was not repeated or if the soak time was shortened, it is recommended that application of ISS material be conducted only after a full set of 1315 data has been obtained. At this time a decision to further develop an ISS option has not been made. If further ISS trials are conducted, those results will be reported in a second addendum to the Treatability Test Report.

5. References

AECOM, 2019. NRS Treatability Test Work Plan, TVA Gallatin Fossil Plant, Revision 0. September 27, 2019.

AECOM. 2021. Non-Registered Site Treatability Test Report, TVA Gallatin Fossil Plant, Revision 0. February 4, 2021.

Figures



LEGEND

Symbol Key

- pH results at 24 hours
- pH results at 48 hours

Color Key

DOLO 0.5
DOLO 1.0
HiCal
Control

AECOM

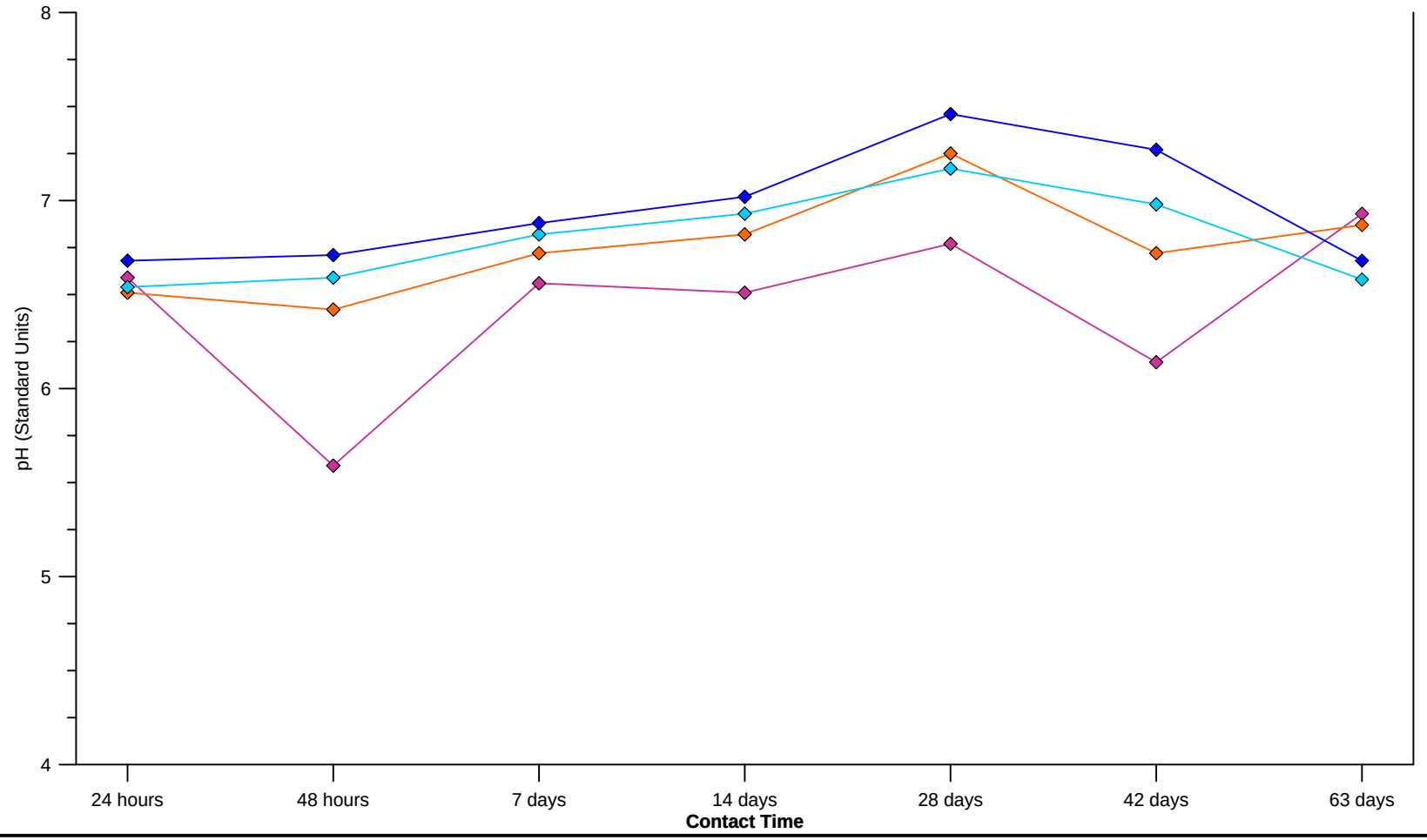
Figure 1

1316 Direct Soil Treatment

DRAWN BY:	REVIEWED BY:	APPROVED BY:	REVISION NUMBER:
D. SCOTT	M. FRIEDMAN	M. STAUFFER	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
3/26/2021	FOSSIL AND HYDRO ENGINEERING



LEGEND

Symbol Key

◆ pH results for indicated test

Color Key

DOLO 0.5
DOLO 1.0
HiCal
Control

AECOM

Figure 2

1315 Direct Soil Treatment

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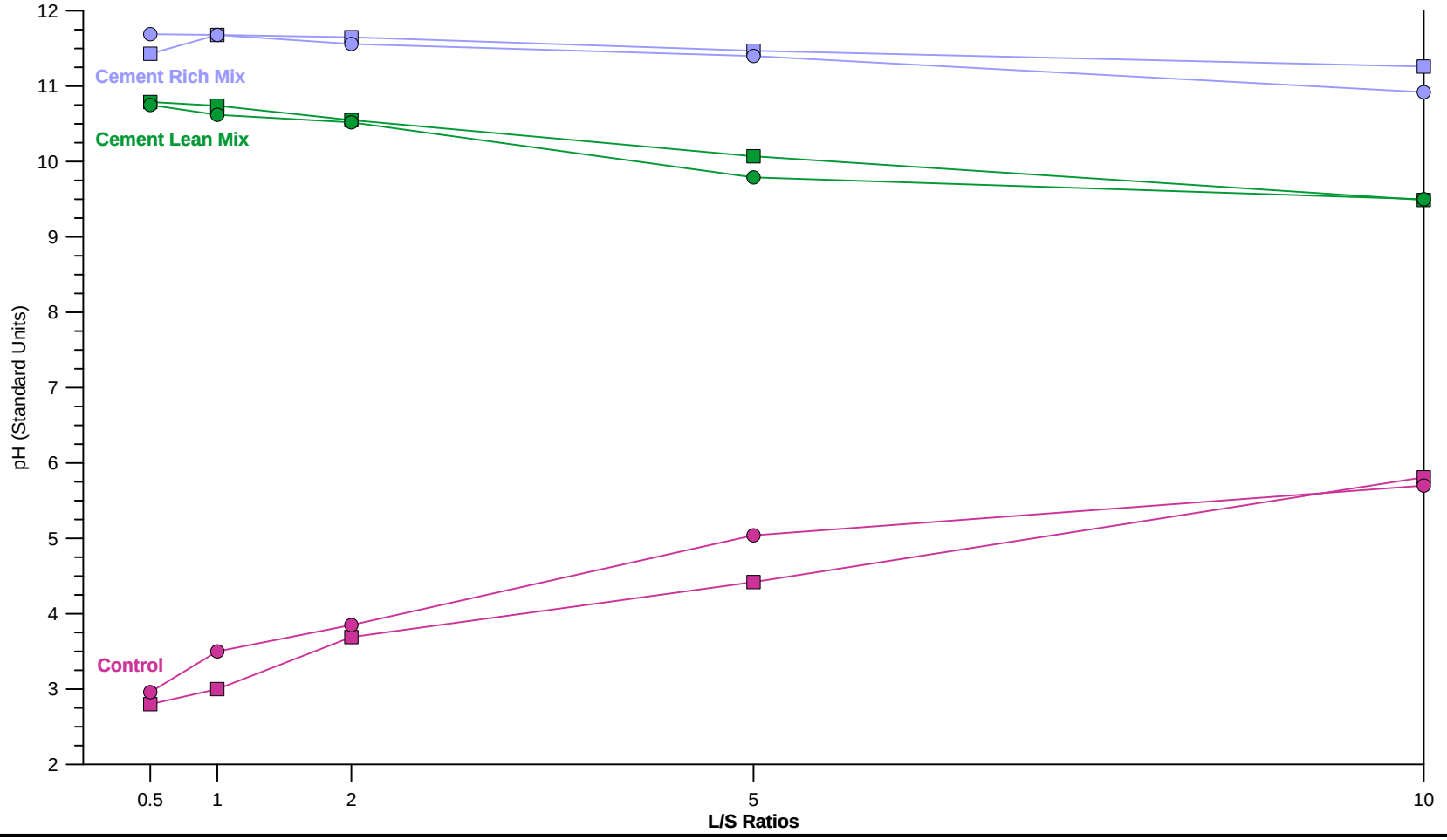
D. SCOTT	M. FRIEDMAN	M. STAUFFER	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
3/26/2021	FOSSIL AND HYDRO ENGINEERING



LEGEND

- pH results at 24 hours
- pH results at 48 hours

AECOM

Figure 3

1316 In-Situ Stabilization

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D. SCOTT	M. FRIEDMAN	M. STAUFFER	REV. 0

GALLATIN FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
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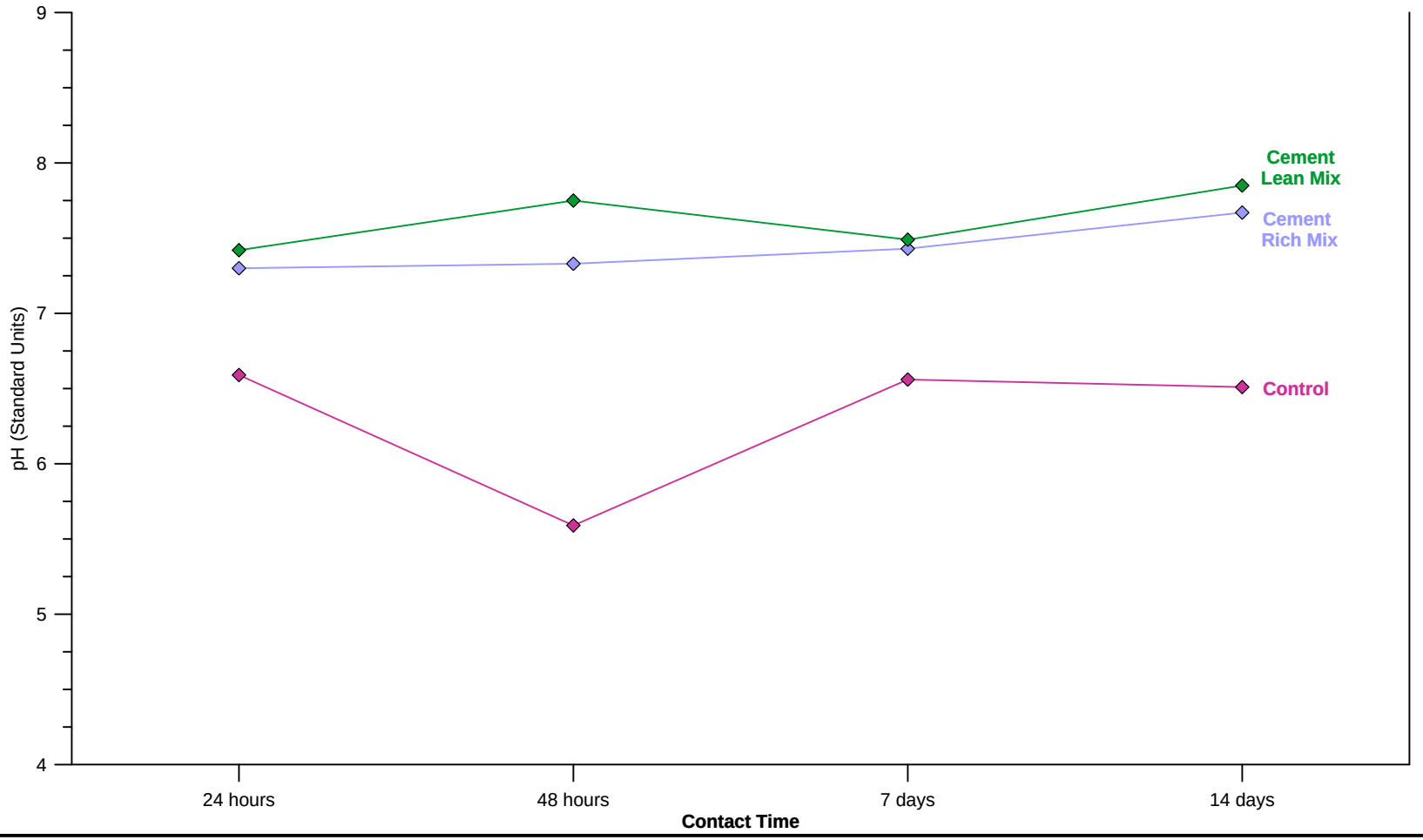

LEGEND

◆ pH results for indicated test

AECOM

Figure 4

1315 In-Situ Stabilization

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TENNESSEE VALLEY AUTHORITY

DATE:	DEPT:
3/26/2021	FOSSIL AND HYDRO ENGINEERING

Tables

Table 1
Direct Soil Treatment - Qualitative 1316 Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Soil samples (collected from the depth of well GAF-441U screened interval) and neutral pH Site groundwater (collected from well GAF-440U) mixed at varying liquid to solid ratios

One set of samples mixed for 24 hours; second set mixed for 48 hours.

CONTROL - No Amendment

Stage/Liquid-Solid Ratio	pH -24 hr	pH-48 hr	Target Metals- 24 hrs	Target Metals- 48 hrs	Other Metals - 24 hrs	Other Metals - 48 hrs
T01/10	5.70	5.81	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T02/5	5.04	4.42	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T03/2	3.85	3.69	Be and Ni exceed GWPS	Be and Ni exceed GWPS	below all GWPS	Total As exceeds GWPS
T04/1	3.50	3.0	Be, Cd and Ni exceed GWPS Total Li exceeds GWPS	Be, Cd and Ni exceed GWPS	As exceeds GWPS Total Pb and Total Tl exceed GWPS	Total As exceeds GWPS
T05/0.5	2.96	2.8	Be, Cd, Li & Ni exceed GWPS	Be, Cd, Li & Ni exceed GWPS	As exceeds GWPS Total Pb and Total Tl exceed GWPS	As exceeds GWPS Total Cr, Pb & Tl exceeds GWPS

Observations/Conclusions

24-hour and 48-hour contact time results are similar.

pH decreases with lower liquid to solid ratio.

Target metals appear in leachate above GWPS at approximately pH <4.

In addition to target metals, dissolved As exceeds GWPS in two lowest liquid to solid ratios.

Because low pH and metals leaching was observed in the Control, it provides a good comparison for the HiCal and Dolo Fine Tests

HiCalFines - 0.5% by Weight of Soil

Stage/Liquid-Solid Ratio	pH -24 hr	pH-48 hr	Target Metals- 24 hrs	Target Metals- 48 hrs	Other Metals - 24 hrs	Other Metals - 48 hrs
T01/10	6.49	6.83	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T02/5	6.58	7.01	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T03/2	6.48	7.09	Total Be and Total Li exceed GWPS	Below GWPS	Total As, Cr, Pb & Tl exceed GWPS	Below GWPS
T04/1	6.19	4.92	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T05/0.5	6.16	5.22	Below GWPS	Below GWPS	Below GWPS	Below GWPS

Observations/Conclusions

HiCalFines maintained pH above 4 for all trials.

pH trending down with decreased liquid to solid ratio.

Longer contact time appears to result in lower pH, but metals goals are still met.

Goals for target metals were met without mobilizing other metals.

DoloFines - 0.5% by Weight of Soil

Stage/Liquid-Solid Ratio	pH -24 hr	pH-48 hr	Target Metals- 24 hrs	Target Metals- 48 hrs	Other Metals - 24 hrs	Other Metals - 48 hrs
T01/10	6.40	6.84	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T02/5	6.53	7.08	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T03/2	7.08	7.30	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T04/1	7.17	5.40	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T05/0.5	7.64	5.51	Below GWPS	Below GWPS	Below GWPS	Below GWPS

Observations/Conclusions

Similar results as HiCalFines, slightly higher pH at lowest liquid to solid ratio.

DoloFines - 1.0% by Weight of Soil

Stage/Liquid-Solid Ratio	pH -24 hr	pH-48 hr	Target Metals- 24 hrs	Target Metals- 48 hrs	Other Metals - 24 hrs	Other Metals - 48 hrs
T01/10	6.92	6.87	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T02/5	7.42	7.27	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T03/2	8.77	7.44	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T04/1	9.95	5.77	Below GWPS	Below GWPS	Total As and total Pb exceed GWPS	Below GWPS
T05/0.5	6.34	5.95	Below GWPS	Below GWPS	Below GWPS	Below GWPS

Observations/Conclusions

Similar results as HiCalFines and 0.5% DoloFines.

pH appears higher with increased DoloFines dose at liquid to solid ratio of 2 and 1 but similar at liquid to solid ratio of 0.5.

Notes:

GWPS = Groundwater protection standard

Be = Beryllium
Cd = Cadmium
Li = Lithium
Ni = Nickel
Pb = Lead
Tl = Thallium

Cases where one or more analytes exceed the GWPS for dissolved metals are shown in red

Cases where one or more analytes exceed the GWPS for total metals, but not dissolved metals, are shown in blue

Table 2
Direct Soil Treatment - 1315 Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Soil samples (collected from the depth of well GAF-441U screened interval) and neutral pH Site groundwater (collected from well GAF-440U) mixed at varying liquid to solid ratios
Samples are placed in bath of site groundwater, collected from well GAF-440U, and the water bath is tested at set time intervals

Control - No Amendment

Contact Time	pH	Total Be	Dissolved Be	Total Cd	Dissolved Cd	Total Li	Dissolved Li	Total Ni	Dissolved Ni	Other Metals
2 hours	7.65	0.000264 J	<0.0010	0.000321 J	0.000230 J	<0.0050	<0.0050	0.0144 B	0.0143 B	NT
24 hours	6.59	<0.0010	<0.0010	0.000299 J	0.000275 J	<0.0050	<0.0050	0.0234 B	0.0230 B	NT
48 hours	5.59	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.0121 B	0.0117 B	NT
7 days	6.56	<0.0010	<0.0010	0.000344 J	0.000364 J	<0.0050	<0.0050	0.0128	0.0129	NT
14 days	6.51	<0.0010	<0.0010	0.000326J	0.000340 J	<0.0050	<0.0050	0.00706	0.00626	below GWPS
28 days	6.77	<0.0010	<0.0010	0.000440 J	0.000476 J	<0.0050	<0.0050	0.00801	0.00760	NT
42 days	6.14	<0.0010	<0.0010	0.000466 J	0.000396 J	<0.0050	<0.0050	0.00476	0.00488	NT
63 days										

Observations:
Minimal metals detected; no obvious increasing trend over time.
Possible downward trend in pH over time.

Hi Cal Fines 0.5% by Weight of Soil

Contact Time	pH	Total Be	Dissolved Be	Total Cd	Dissolved Cd	Total Li	Dissolved Li	Total Ni	Dissolved Ni	Other Metals
2 hours	7.39	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00548 B	0.00474 B	NT
24 hours	6.51	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00397 B	0.00349 B	NT
48 hours	6.42	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00379 B	0.00372 B	NT
7 days	6.72	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00223	0.00269	NT
14 days	6.82	<0.0010	<0.0010	<0.00100	<0.0010	<0.0050	<0.0050	0.00104	0.000816 J	below GWPS
28 days	7.25	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.000808J	0.000573 J	NT
42 days	6.72	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00111	0.00113	NT
63 days										

Observations:
No obvious trend; metal concentrations low for all time periods.

DoloFines 0.5% by Weight of Soil

Contact Time	pH	Total Be	Dissolved Be	Total Cd	Dissolved Cd	Total Li	Dissolved Li	Total Ni	Dissolved Ni	Other Metals
2 hours	7.23	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00534 B	0.00501 B	NT
24 hours	6.54	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00457 B	0.00430 B	NT
48 hours	6.59	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00431 B	0.00418 B	NT
7 days	6.82	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00301	0.00302	NT
14 days	6.93	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00269	0.0026	below GWPS
28 days	7.17	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00251	0.00225	NT
42 days	6.98	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00232	0.00216	NT
63 days										

Observations:
No obvious trend; metal concentrations low for all time periods.

DoloFines 1.0% by Weight of Soil

Contact Time	pH	Total Be	Dissolved Be	Total Cd	Dissolved Cd	Total Li	Dissolved Li	Total Ni	Dissolved Ni	Other Metals
2 hours	7.01	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00575 B	0.00486 B	NT
24 hours	6.68	0.000319 J	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00424	0.00459	NT
48 hours	6.71	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00403	0.00383	NT
7 days	6.88	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00271	0.00249	NT
14 days	7.02	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00228	0.00175	below GWPS
28 days	7.46	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00141	0.00118	NT
42 days	7.27	<0.0010	<0.0010	<0.0010	<0.0010	<0.0050	<0.0050	0.00190	0.00134	NT
63 days										

Observations:
No obvious trend; metal concentrations low for all time periods.
pH at day 42 higher compared to Control and both low dose DoloFines and HiCalFines.

Notes:
Results are presented in milligrams per liter (mg/L)
B = Analyte detected in laboratory blank sample analysis
Be = Beryllium
Cd = Cadmium
GWPS = Groundwater protection standard
J = Estimated value below laboratory quantitation limit
Li = Lithium
Ni = Nickel
NT = Not tested for these analytes

Table 3
In-Situ Stabilization - Qualitative 1316 Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Lean Mix (3% Type V cement by weight) and Rich Mix (6% Type V cement by weight) and neutral pH Site groundwater (collected from well GAF-440U) mixed at varying liquid to solid ratios
One set of samples mixed for 24 hours; second set mixed for 48 hours.

These results can be compared to the same Control used for the Direct Soil Mixing.

Lean Mix						
Stage/Liquid-Solid Ratio	**pH -24 hr**	**pH-48 hr**	**Target Metals- 24 hrs**	**Target Metals- 48 hrs**	**Other Metals - 24 hrs**	**Other Metals - 48 hrs**
T01/10	9.5	9.49	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T02/5	10.07	9.79	Below GWPS	Below GWPS	Cr exceeds GWPS	Below GWPS
T03/2	10.52	10.55	Below GWPS	Below GWPS	Cr exceeds GWPS	Cr exceeds GWPS
T04/1	10.62	10.74	Below GWPS	Below GWPS	Cr and Mo exceeds GWPS	Cr and Mo exceeds GWPS
T05/0.5	10.75	10.79	Below GWPS	Below GWPS	Total Cr exceeds GWPS (0.540 v 0.100 mg/L GWPS) and Total Mo exceeds GWPS; dissolved not tested	Total Cr exceeds GWPS (0.430 v 0.100 GWPS) and Total Mo exceeds GWPS; dissolved not tested
Observations/Conclusions 24-hour vs 48-hour contact time had little effect. pH remained high (above 9) through the trials. Minimal leaching of target metals (below GWPS). Cr leaching above GWPS in several trials, more than observed in Control. Possible causes are higher pH and presence of Cr in cement.						

Rich Mix						
Stage/Liquid-Solid Ratio	**pH -24 hr**	**pH-48 hr**	**Target Metals- 24 hrs**	**Target Metals- 48 hrs**	**Other Metals - 24 hrs**	**Other Metals - 48 hrs**
T01/10	10.92	11.26	Below GWPS	Below GWPS	Cr exceeds GWPS	Cr exceeds GWPS
T02/5	11.4	11.47	Below GWPS	Below GWPS	Cr exceeds GWPS; only dissolved tested	Cr exceeds GWPS; only dissolved tested
T03/2	11.56	11.65	Below GWPS	Below GWPS	Cr exceeds GWPS	Cr exceeds GWPS
T04/1	11.68	11.68	Below GWPS	Below GWPS	Below GWPS	Below GWPS
T05/0.5	11.69	11.43	Below GWPS	Below GWPS	Below GWPS	Total Cr exceeds GWPS; dissolved not tested
Observations/Conclusions Similar to lean mix but subtle difference discussed below. pH remained high and was higher than Lean mix, due to increased amount of Portland cement. Minimal leaching of target metals (below GWPS). As with lean mix, rich mix shows leaching of Cr.						

Notes:
Cases where one or more analytes exceed the GWPS for dissolved metals are shown in red
Cases where one or more analytes exceed the GWPS for total metals, but not dissolved metals, are shown in blue
GWPS = Groundwater protection standard
As = Arsenic
Be = Beryllium
Cd = Cadmium
Cr = Chromium
Mo = Molybdenum
Li = Lithium
Ni = Nickel
Pb = Lead
Tl = Thallium

Table 4
In-Situ Stabilization - 1315 Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Lean Mix (3% Type V cement by weight) and Rich Mix (6% Type V cement by weight) and neutral pH Site groundwater (collected from well GAF-440U) mixed at varying liquid to solid ratios
Samples are placed in bath of site groundwater, collected from well GAF-440U, and the water bath is tested at set time intervals

These results can be compared to the same Control used for the Direct Soil Mixing.

Lean Mix

Contact Time	pH	Total Be	Dissovled Be	Total Cd	Dissolved Cd	Total Li	Dissovled Li	Total Ni	Dissolved Ni	Other Metals
2 hours	8.15	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00458	0.00451	NT
24 hours	7.42	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00386	0.00354	NT
48 hours	7.75	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00515	0.00431	NT
7 days	7.49	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00292	0.00235	NT
14 days	7.85	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00270	0.00104	Below GWPS Dissolved Cr 0.0508
28 days	7.95	test ended - not sampled								

Observations:
Metal concentrations remained low for sampled time periods.
pH lacks trend, and higher compared to Control.
Dissolved Cr is below GWPS but higher than Control (Control Cr was <0.002 mg/L)

Rich Mix

Contact Time	pH	Total Be	Dissovled Be	Total Cd	Dissolved Cd	Total Li	Dissovled Li	Total Ni	Dissolved Ni	Other Metals
2 hours	7.76	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00443	0.00422	NT
24 hours	7.30	<0.00100	<0.00100	<0.00100	<0.00100	0.00388 J	0.00366 J	0.00325	0.00306	NT
48 hours	7.33	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00532	0.00490	NT
7 days	7.43	<0.00100	<0.00100	<0.00100	<0.00100	0.00417 J	0.00416 J	0.00348	0.00305	NT
14 days	7.67	<0.00100	<0.00100	<0.00100	<0.00100	<0.00500	<0.00500	0.00243	0.00222	Below GWPS. Dissolved Cr 0.00649
28 days	7.50	test ended - not sampled								

Observations:
No obvious trend; metal concentrations low for all time periods.
pH not obviously trending downward, and higher compared to Control.

Notes:
Results are presented in milligrams per liter (mg/L)
B = Analyte detected in laboratory blank sample analysis
Be = Beryllium
Cd = Cadmium
GWPS = Groundwater protection standard
J = Estimated value below laboratory quantitation limit
Li = Lithium
Ni = Nickel
NT = Not tested for these analytes

Appendix A Treatability Laboratory Procedures for EPA Methods 1315 and 1316

Method 1315 and 1316 Procedures

Direct Soil Leaching Preparation

For the direct soil leaching tests, three amendments, plus a control, were tested separately by EPA methods 1315 and 1316. The three amendments were 0.5% Hi-Cal Fines, 0.5% Dolo Fines and 1% Dolo Fines on a weight by weight basis.

Soil for the trials was obtained from the area and at the depth of the screened interval of well GAF-441U and is referred to as the "GAF-441U soil." The GAF-441U soil was homogenized thoroughly in a plastic bowl with a plastic spoon. The appropriate amount of each amendment was weighed out. Each amendment was added to the soil in three increments to ensure adequate homogenization. Then, once all of the amendment was added, the soil mixtures were stirred for an additional five minutes.

In-Situ Stabilization (ISS) Leaching Preparation

GAF-441U soil was blended with two different dosage levels, 3% and 6%, of Type V cement and water. The Type V cement was mixed at a ratio of 1:1 with water collected from well GAF-440UP. The cement and water mixtures were added to the soil in three increments to ensure adequate homogenization. After all of the cement was added, the mixtures were stirred for an additional five minutes.

The mixes were added to cylinder molds and compacted in five layers using a compactor with twenty-five blows per layer. The molds were covered and left undisturbed for 28 days.

1315 Direct Soil

The amended mixtures were added to cylinder molds and compacted in five layers using a compactor with twenty-five blows per layer. GAF-440U water was added to larger high-density polyethylene (HDPE) containers. The molds containing the mixes were gently lowered into the water as to not disturb the compacted material.

In pre-determined time intervals by the method, the molds were gently pulled out of the water. Weights were taken of both the water remaining in the container and the molds to determine how much water was absorbed into the molds. The leachate water was measured for pH, oxidation-reduction potential (ORP) and conductivity. An aliquot of the leachate in a polypropylene centrifuge vial was centrifuged and decanted into a pre-preserved HDPE container, provided by Eurofins, for the analysis of total metals. The remaining leachate was filtered through a polypropylene disposable filtration unit containing a polyethersulfone 0.45µm filter. The filtrate was poured into a pre-preserved HDPE container for dissolved metals bottles. Sample splits were refrigerated immediately until they were shipped to Eurofins for analysis.

1315 ISS

After 28 days of curing, the direct soil 1315 leaching procedure was followed on the undisturbed molds.

1316 Direct Soil

For each amendment mixture, five different masses of mix were weighed directly into amber glass bottles, in order to achieve five liquid to solid (L/S) ratios of 10, 5, 2, 1 and 0.5. Each L/S ratio was set up

in duplicate in order to sample at both the mid-point and endpoint without altering the L/S ratio. Various volumes of GAF-440U water were measured with HDPE graduated cylinders and added into the amber glass bottles. The bottles were tightly capped and sealed with tape.

The bottles were placed in an end-over-end tumbler and turned on at 28 revolutions per minute (RPMs). At 24 hours of tumbling, the mid-point sample bottles were removed. The endpoint samples were removed after 48 hours of tumbling. The samples were allowed to settle for 30 minutes and pH, ORP and conductivity measurements were performed. A split of each sample was decanted into polypropylene centrifuge vials and centrifuged for 30 minutes. The decant was poured into the total metals and anion bottles. The remaining sample aliquot was filtered through a polypropylene disposable filtration unit containing a polyethersulfone 0.45µm filter. The filtrate was poured into the dissolved metals bottles. Sample splits were refrigerated immediately until they were shipped to Eurofins for analysis.

1316 ISS

After 28 days of curing, the sample was broken up with a mortar and pestle. The direct soil 1316 leaching procedure was followed.

Anaerobic

The Plas Labs model 855 series anaerobic chamber is available to perform this work. The following steps may be done in the chamber:

- soil homogenization
- soil/amendment weighing
- curing, if applicable
- breaking up cured molds

Bottles will be opened in the chamber and the chamber will be immediately purged 5 times with nitrogen gas to remove the oxygen that was in the bottles. When the chamber is purged, the atmosphere will be replenished with a 95% nitrogen/ 5% hydrogen (H_2) balance gas. For the addition of the groundwater, we suggest adding the ORP indicator dye resazurin to monitor the oxygenation of the environment.

Once the bottles are filled with soil and water, they will be capped and removed from the anaerobic chamber. Tumbling will be performed in normal atmospheric conditions (outside of the anaerobic chamber). Any leakages after tumbling will be noted to monitor for potential introduction of oxygen.

pH/ORP/conductivity will be measured in the anaerobic chamber. Total splits will be placed into centrifuge vials, centrifuged outside of the chamber, and pour into the preserved bottles back in the chamber. The dissolved metals fraction will be filtered in the chamber as well.

Appendix B Method 1315 and 1316 Analytical Results Tables

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		11/23/2020		11/23/2020		11/23/2020		11/23/2020		11/23/2020		11/23/2020		11/23/2020		11/23/2020		11/24/2020	
		Sample ID		GAF-1315-CONTROL-T2-D		GAF-1315-CONTROL-T2-T		GAF-1315-DOLO 0.5-T2-D		GAF-1315-DOLO 0.5-T2-T		GAF-1315-DOLO 1.0-T2-D		GAF-1315-DOLO 1.0-T2-T		GAF-1315-HICAL 0.5-T2-D		GAF-1315-HICAL 0.5-T2-T		GAF-1315-CONTROL-T24-D	
		Lab Sample ID		180-114256-2		180-114256-1		180-114256-14		180-114256-13		180-114256-20		180-114256-19		180-114256-8		180-114256-7		180-114256-4	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	7.65		7.65		7.23		7.23		7.01		7.01		7.39		7.39		6.59	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	0.23 J		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		0.275 J	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	7440-02-0	ug/L	100 (a)	14.3		N/A		5.01		N/A		4.86		N/A		4.74		N/A		23	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	N/A		0.264 J		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	N/A		0.321 J		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lithium	7439-93-2	ug/L	40 (b)	N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	7440-02-0	ug/L	100 (a)	N/A		14.4		N/A		5.34		N/A		5.75		N/A		5.48		N/A	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		11/24/2020		11/24/2020		11/24/2020		11/24/2020		11/24/2020		11/24/2020		11/24/2020		11/25/2020		11/25/2020	
		Sample ID		GAF-1315-CONTROL-T24-T		GAF-1315-DOLO 0.5-T24-D		GAF-1315-DOLO 0.5-T24-T		GAF-1315-DOLO 1.0-T24-D		GAF-1315-DOLO 1.0-T24-T		GAF-1315-HICAL 0.5-T24-D		GAF-1315-HICAL 0.5-T24-T		GAF-1315-CONTROL-T48-D		GAF-1315-CONTROL-T48-T	
		Lab Sample ID		180-114256-3		180-114256-16		180-114256-15		180-114256-22		180-114256-21		180-114256-10		180-114256-9		180-114256-6		180-114256-5	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	6.59		6.54		6.54		6.68		6.68		6.51		6.51		5.59		5.59	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lithium	7439-93-2	ug/L	40 (b)	N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	7440-02-0	ug/L	100 (a)	N/A		4.3		N/A		4.59		N/A		3.49		N/A		11.7		N/A	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A		< 1 U		N/A		0.319 J		N/A		< 1 U		N/A		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	0.299 J		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	7440-02-0	ug/L	100 (a)	23.4		N/A		4.57		N/A		4.24		N/A		3.97		N/A		12.1	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		11/25/2020		11/25/2020		11/25/2020		11/25/2020		11/25/2020		11/25/2020		11/30/2020		11/30/2020		11/30/2020	
		Sample ID		GAF-1315-DOLO 0.5-T48-D		GAF-1315-DOLO 0.5-T48-T		GAF-1315-DOLO 1.0-T48-D		GAF-1315-DOLO 1.0-T48-T		GAF-1315-HICAL 0.5-T48-D		GAF-1315-HICAL 0.5-T48-T		GAF-1315-CONTROL-T7DAY-D		GAF-1315-CONTROL-T7DAY-T		GAF-1315-DOLO 0.5-T7DAY-D	
		Lab Sample ID		180-114256-18		180-114256-17		180-114256-24		180-114256-23		180-114256-12		180-114256-11		180-114256-26		180-114256-25		180-114256-30	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	6.59		6.59		6.71		6.71		6.42		6.42		6.56		6.56		6.82	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		0.364 J		N/A		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	7440-02-0	ug/L	100 (a)	4.18		N/A		3.83		N/A		3.72		N/A		12.9		N/A		3.02	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		N/A		0.344 J		N/A	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Lithium	7439-93-2	ug/L	40 (b)	N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		N/A	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Nickel	7440-02-0	ug/L	100 (a)	N/A		4.31		N/A		4.03		N/A		3.79		N/A		12.8		N/A	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A	

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		11/30/2020		11/30/2020		11/30/2020		11/30/2020		11/30/2020		12/7/2020		12/7/2020		12/7/2020		12/7/2020	
		Sample ID		GAF-1315-DOLO 0.5-T7DAY-T		GAF-1315-DOLO 1.0-T7DAY-D		GAF-1315-DOLO 1.0-T7DAY-T		GAF-1315-HICAL 0.5-T7DAY-D		GAF-1315-HICAL 0.5-T7DAY-T		GAF-GW-1315-CONTROL-T14		GAF-GW-1315-DOLO 0.5-T14		GAF-GW-1315-DOLO 1.0-T14		GAF-GW-1315-HI CAL 0.5-T14	
		Lab Sample ID		180-114256-29		180-114256-32		180-114256-31		180-114256-28		180-114256-27		180-115017-21		180-115017-23		180-115017-24		180-115017-22	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	6.82		6.88		6.88		6.72		6.72		6.51		6.93		7.02		6.82	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		N/A		42.1		42.6		41.3		41.1	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		N/A		0.212		0.203		0.192		0.215	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		N/A		752		677		642		534	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		N/A		312		397		345		381	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		N/A		312		397		345		381	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		13.7 J		< 30 U		< 30 U		< 30 U	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		0.781 J		0.628 J		1.43 J		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		< 1 U		0.318 J		0.355 J		0.346 J	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		21		18.3		20.7		21.8	
Beryllium	7440-41-7	ug/L	4 (a,b)	N/A		< 1 U		N/A		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		1930		1750		1740		1800	
Cadmium	7440-43-9	ug/L	5 (a,b)	N/A		< 1 U		N/A		< 1 U		N/A		0.34 J		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		294000		279000		267000		283000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		< 2 U		< 2 U		< 2 U		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		11.3		8.17		5.14		3.13	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		< 2 U		< 2 U		< 2 U		0.74 J	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		< 50 U		< 50 U		< 50 U		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	N/A		< 5 U		N/A		< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		33500		54300		46900		25400	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		7450		2620		2180		1600	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		< 0.2 U		< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		< 5 U		0.618 J		1.24 J		1.16 J	
Nickel	7440-02-0	ug/L	100 (a)	N/A		2.49		N/A		2.69		N/A		6.26		2.6		1.75		0.816 J	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		5940 J	FG	4340		4730		4790	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		91900		90400		88600		92500	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		0.789 J		0.185 J		0.228 J		0.177 J	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		3.72 J		< 5 U		< 5 U		< 5 U	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		458		77.8		236		48.7	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		0.858 J		0.603 J		1.56 J		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		0.335 J		0.475 J		0.484 J		0.465 J	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		24.1		19.2		22.4		23.1	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		1900		1690		1740		1820	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		N/A		< 1 U		N/A		< 1 U		0.326 J		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		303000		295000		278000		293000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		< 2 U		< 2 U		< 2 U		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		11.9		9.51		6.15		3.49	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		< 2 U		< 2 U		< 2 U		< 2 U	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		559		330		405		154	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		0.19 J		< 1 U		0.136 J		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A		< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		34200		55500		46700		25800	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		7770		3110		2570		2010	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		< 0.2 U		< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		< 5 U		< 5 U		1.2 J		1.19 J	
Nickel	7440-02-0	ug/L	100 (a)	3.01		N/A		2.71		N/A		2.23		7.06		2.69		2.28		1.04	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		5260 J	FG	4410		4750		4790	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		94800		92000		88500		93500	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		0.856 J		0.173 J		0.234 J		0.195 J	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		4.32 J		3.83 J		< 5 U		< 5 U	

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/21/2020		12/21/2020		12/21/2020		12/21/2020		1/4/2021		1/4/2021		1/4/2021		1/4/2021		1/25/2021	
		Sample ID		GAF-GW-1315-Control-t28		GAF-GW-1315-Dolo 0.5-t28		GAF-GW-1315-Dolo 1.0-t28		GAF-GW-1315-Hi Cal 0.5-t28		GAF-GW-1315-Control-t42		GAF-GW-1315-Dolo 0.5-t42		GAF-GW-1315-Dolo 1.0-t42		GAF-GW-1315-Hi Cal 0.5-t42		GAF-GW-1315-CONTROL-T63	
		Lab Sample ID		180-115551-21		180-115551-23		180-115551-24		180-115551-22		180-115551-25		180-115551-27		180-115551-28		180-115551-26		180-116485-1	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	6.77		7.17		7.46		7.25		6.14		6.98		7.27		6.72		6.93	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		41.9	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.228	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		770	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		262	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		262	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 30 U	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		19.8	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1540	
Cadmium	7440-43-9	ug/L	5 (a,b)	0.476 J		< 1 U		< 1 U		< 1 U		0.396 J		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		246000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5.74	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		30800	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5050	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.161 J	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Nickel	7440-02-0	ug/L	100 (a)	7.6		2.25		1.18		0.573 J		4.88		2.16		1.9		1.13		2.13	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5320	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		96300	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.757 J	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		273	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		21.5	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1520	
Cadmium	7440-43-9	ug/L	5 (a,b)	0.44 J		< 1 U		< 1 U		< 1 U		0.466 J		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		268000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		7.30	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		530	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.169 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		31900	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5900	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.198 J	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Nickel	7440-02-0	ug/L	100 (a)	8.01		2.51		1.41		0.808 J		4.76		2.32		1.34		1.11		2.72	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5490	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		98000	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.846 J	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		4.1 J	

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		1/25/2021		1/25/2021		1/25/2021	
		Sample ID		GAF-GW-1315-DOLO 0.5-T63		GAF-GW-1315-DOLO 1.0-T63		GAF-GW-1315-HI CAL 0.5-T63	
		Lab Sample ID		180-116485-3		180-116485-4		180-116485-2	
		Sample Type		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH									
Laboratory pH	--	SU	--	6.58		6.68		6.87	
Anions									
Chloride	16887-00-6	MG/L	NE	46.3		44.6		46.2	
Fluoride	16984-48-8	MG/L	4 (a,b)	0.190		0.195		0.215	
Sulfate	14808-79-8	MG/L	NE	810		746 F1		628	
General Chemistry									
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	< 5 U		< 5 U		< 5 U	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	< 5 U		< 5 U		< 5 U	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	496		269		367	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	496		269		367	
Metals, Dissolved									
Aluminum	7429-90-5	ug/L	NE	< 30 U		17.4 J		< 30 U	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		0.482 J		0.396 J	
Arsenic	7440-38-2	ug/L	10 (a,b)	< 1 U		< 1 U		< 1 U	
Barium	7440-39-3	ug/L	2000 (a,b)	18.1		13.1		22.0	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	1480		1300		1430	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	318000		210000		294000	
Chromium	7440-47-3	ug/L	100 (a,b)	< 2 U		< 2 U		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	3.49		0.758		2.02	
Copper	7440-50-8	ug/L	NE	< 2 U		< 2 U		< 2 U	
Iron	7439-89-6	ug/L	NE	< 50 U		< 50 U		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	64100		47500		24600	
Manganese	7439-96-5	ug/L	NE	3090		595		2010	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	< 5 U		1.4 J		1.10 J	
Nickel	7440-02-0	ug/L	100 (a)	1.35		0.736 J		0.922 J	
Potassium	7440-09-7	ug/L	NE	7520		6250		6030	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	95700		92300		92700	
Thallium	7440-28-0	ug/L	2 (a,b)	0.261 J		0.197 J		0.197 J	
Vanadium	7440-62-2	ug/L	NE	< 1 U		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	< 5 U		< 5 U		< 5 U	
Metals, Total									
Aluminum	7429-90-5	ug/L	NE	422		241		344	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		0.486 J		0.457 J	
Arsenic	7440-38-2	ug/L	10 (a,b)	0.454 J		0.549 J		0.444 J	
Barium	7440-39-3	ug/L	2000 (a,b)	19.8		14.4		25.4	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	1470		1330		1480	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	319000		214000		307000	
Chromium	7440-47-3	ug/L	100 (a,b)	< 2 U		< 2 U		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	4.76		1.90		3.86	
Copper	7440-50-8	ug/L	NE	< 2 U		< 2 U		< 2 U	
Iron	7439-89-6	ug/L	NE	854		821		1050	
Lead	7439-92-1	ug/L	15 (a,b)	0.302 J		0.186 J		0.245 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	62700		43900		24400	
Manganese	7439-96-5	ug/L	NE	3290		1010		2700	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	< 5 U		1.39 J		1.16 J	
Nickel	7440-02-0	ug/L	100 (a)	1.75		1.09		1.44	
Potassium	7440-09-7	ug/L	NE	7550		6010		6120	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		0.574 J	
Sodium	7440-23-5	ug/L	NE	94700		86500		92600	
Thallium	7440-28-0	ug/L	2 (a,b)	0.273 J		0.181 J		0.211 J	
Vanadium	7440-62-2	ug/L	NE	1.06		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	3.56 J		< 5 U		4.39 J	

Table B-1
Direct Soil Treatment
Method 1315 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Notes and Acronymns

< - analyte not detected at the reporting quantitation limit shown

MG/L - miligrams per liter

F1 - MS and/or MSD recovery exceeds control limits. (Lab Qualifier)

N - primary sample

N/A - not analyzed

NE - not established at the Non-Registered Site

ug/L - micrograms per liter

(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.

(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.

(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS established.

Qualifier Definitions

U	The analyte was analyzed for but not detected. The associated numerical value is at or below the reporting limit.
U*	This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
UR	Unreliable reporting limit; analyte may or may not be present in sample.
R	Unreliable positive result; analyte may or may not be present in sample.
R*	This result has been rejected following data user review.
J	Quantitation is approximate due to limitations identified during data validation.
UJ	This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.

Reason Code Definitions

BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
BN	Negative laboratory blank contamination.
C	Initial and/or continuing calibration issue, indeterminate bias.
C+	Initial and/or continuing calibration issue. The result may be biased high.
C-	Initial and/or continuing calibration issue. The result may be biased low.
DQ	Data user qualification.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
S	Radium-226+228 flagged due to reporting protocol for combined results.
SD	Serial dilution imprecision.
T	Temperature preservation issue.
X	Percent solids < 50%.
Y+	Chemical yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.
Z	ICP/MS interference.
ZZ	Other.

Table B-2
Direct Soil Treatment
Method 1316 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020	
		Sample ID		GAF-GW-1316-CONTROL-T1-		GAF-GW-1316-CONTROL-T2-		GAF-GW-1316-CONTROL-T3-		GAF-GW-1316-CONTROL-T4-		GAF-GW-1316-CONTROL-T5-		GAF-GW-1316-DOLO 0.5-T1-		GAF-GW-1316-DOLO 0.5-T2-		GAF-GW-1316-DOLO 0.5-T3-	
		Lab Sample ID		180-114632-1		180-114632-2		180-114632-3		180-114632-4		180-114632-5		180-114632-11		180-114632-12		180-114632-13	
		Sample Type		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																			
Laboratory pH	--	SU	--	5.70		5.04		3.85		3.50		2.96		6.40		6.53		7.08	
Anions																			
Chloride	16887-00-6	MG/L	NE	N/A		40.5		N/A		N/A		N/A		N/A		41.2		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		0.316		N/A		N/A		N/A		N/A		0.139		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		1610		N/A		N/A		N/A		N/A		1570		N/A	
General Chemistry																			
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		< 5 U		N/A		N/A		N/A		N/A		< 5 U		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		< 5 U		N/A		N/A		N/A		N/A		< 5 U		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		66.6		N/A		N/A		N/A		N/A		359		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		66.6		N/A		N/A		N/A		N/A		359		N/A	
Metals, Dissolved																			
Aluminum	7429-90-5	ug/L	NE	25.7 J		1380		59500		125000		206000		< 30 U		1370		42.6	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 20 U		< 20 U		< 20 U		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	< 1 U		0.592 J		6.91		13.7		19.6		< 1 U		0.425 J		< 1 U	
Barium	7440-39-3	ug/L	2000 (a,b)	7.7 J		11.2		16.8 J		17 J		< 100 U		6.31 J		7.97 J		5.88 J	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		0.499 J		11.7		33.5		63.9		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	1630		1580		1430		2200 J	FG	1920		1480		1360		389	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		1.14		3.7		7.15		9.78		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	246000		242000		347000		372000		396000 J	FG	303000		371000		480000	
Chromium	7440-47-3	ug/L	100 (a,b)	3.43		4.17		5.04 J	FG	5.61		9.56		< 2 U		< 2 U		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	19		157		469		979		1400		7.98		2.14		0.479 J	
Copper	7440-50-8	ug/L	NE	0.796 J		0.839 J		11.5		35.5		77.7		< 2 U		< 2 U		< 2 U	
Iron	7439-89-6	ug/L	NE	< 50 U		< 50 U		96.4		2300		14800		< 50 U		1440		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		< 1 U		< 1 U		0.136 J		0.242 J		< 1 U		0.566 J		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		4.47 J		17.4		36.3		46.1		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	26500		31100		53800		63500		90100		71300		150000		147000	
Manganese	7439-96-5	ug/L	NE	7190		13000		29600		59000 J	FG	76900 J	FG	6190		3090		45.7 J	FG
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.25 U		< 0.25 U		< 0.25 U		< 0.25 U		< 0.2 U		< 0.25 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		0.656 J		8.1	
Nickel	7440-02-0	ug/L	100 (a)	11.9		79.9		249		392		493		2.64		1.14		< 1 U	
Potassium	7440-09-7	ug/L	NE	4830		3780		3760		3690		7040		4860		3810		2920	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		< 5 U		< 50 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	86600		87700		88400		83000		73200		94400		90600		87200	
Thallium	7440-28-0	ug/L	2 (a,b)	0.454 J		0.747 J		0.72 J		1.23		1.71		0.213 J		0.462 J		0.297 J	
Vanadium	7440-62-2	ug/L	NE	< 1 U		< 1 U		< 1 U		< 1 U		1.08		< 1 U		3.09		< 1 U	
Zinc	7440-66-6	ug/L	NE	5.47		127		636		1090		1570		< 5 U		< 5 U		< 5 U	
Metals, Total																			
Aluminum	7429-90-5	ug/L	NE	776		N/A		58800		228000		218000		1090		N/A		1420	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		N/A		< 20 U		< 10 U		< 10 U		< 2 U		N/A		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	0.672 J		N/A		7.47		50.2		50.4		0.408 J		N/A		0.755 J	
Barium	7440-39-3	ug/L	2000 (a,b)	9.36 J		N/A		22.6 J		119		91.6		9.13 J		N/A		7.23 J	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A		11.9		40.9		66.3		< 1 U		N/A		< 1 U	
Boron	7440-42-8	ug/L	NE	1630		N/A		1460		1670 J	FG	2110		1450		N/A		349	
Cadmium	7440-43-9	ug/L	5 (a,b)	0.242 J		N/A		3.77		6.99		9.99		< 1 U		N/A		< 1 U	
Calcium	7440-70-2	ug/L	NE	248000		N/A		339000		407000		333000 J	FG	305000		N/A		462000	
Chromium	7440-47-3	ug/L	100 (a,b)	< 2 U		N/A		2.22 J	FG	48.3		54.8		< 2 U		N/A		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	23.5		N/A		465		927		1340		8.65		N/A		0.629	
Copper	7440-50-8	ug/L	NE	< 2 U		N/A		12		75		107		0.801 J		N/A		0.76 J	
Iron	7439-89-6	ug/L	NE	1170		N/A		1750		118000		132000		1250		N/A		1550	
Lead	7439-92-1	ug/L	15 (a,b)	0.634 J		N/A		0.605 J		36.8		30.3		0.5 J		N/A		0.648 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A		17.9		56.4		64.6		< 5 U		N/A		< 5 U	
Magnesium	7439-95-4	ug/L	NE	27000		N/A		52400		85500		82400		72100		N/A		144000	
Manganese	7439-96-5	ug/L	NE	7500		N/A		29300		52300 J	FG	68000 J	FG	6330		N/A		29.6 J	FG
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		N/A		< 0.2 U		0.306		0.717		< 0.2 U		N/A		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	< 5 U		N/A		< 5 U		7.46 J		7.99 J		< 5 U		N/A		8.42	
Nickel	7440-02-0	ug/L	100 (a)	14.6		N/A		245		430		523		3.38		N/A		0.78 J	
Potassium	7440-09-7	ug/L	NE	6410		N/A		4130		9530		10900		5210		N/A		2800	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		N/A		< 5 U		< 25 U		< 25 U		< 5 U		N/A		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	0.399 J		N/A		< 1 U		< 5 U		< 5 U		< 1 U		N/A		< 1 U	
Sodium	7440-23-5	ug/L	NE	86000		N/A		85300		98100		73600		93700		N/A		84200	
Thallium	7440-28-0	ug/L	2 (a,b)	0.624 J		N/A		0.853 J		2.86 J		3.48 J		0.265 J		N/A		0.39 J	
Vanadium	7440-62-2	ug/L	NE	1.76		N/A		2.24		123		123		2.58		N/A		2.89	
Zinc	7440-66-6	ug/L	NE	5.94		N/A		641		1420		1690		< 5 U		N/A		< 5 U	

Table B-2
Direct Soil Treatment
Method 1316 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/2/2020	
		Sample ID		GAF-GW-1316-DOLO 0.5-T4-		GAF-GW-1316-DOLO 0.5-T5-		GAF-GW-1316-DOLO 1.0-T1-		GAF-GW-1316-DOLO 1.0-T2-		GAF-GW-1316-DOLO 1.0-T3-		GAF-GW-1316-DOLO 1.0-T4-		GAF-GW-1316-DOLO 1.0-T5-		GAF-GW-1316-HI-CAL-T1-MID	
		Lab Sample ID		180-114632-14		180-114632-15		180-114632-16		180-114632-17		180-114632-18		180-114632-19		180-114632-20		180-114632-6	
		Sample Type		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																			
Laboratory pH	--	SU	--	7.17		7.64		6.92		7.42		8.77		9.95		6.34		6.49	
Anions																			
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		41.2		N/A		N/A		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		0.478		N/A		N/A		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		1010		N/A		N/A		N/A		N/A	
General Chemistry																			
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		< 5 U		N/A		N/A		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		< 5 U		N/A		N/A		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		5.57		N/A		N/A		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		5.57		N/A		N/A		N/A		N/A	
Metals, Dissolved																			
Aluminum	7429-90-5	ug/L	NE	21.1 J		30.2		41.8		42		59 J		189		152		< 30 U	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 2 U		< 2 U		< 5 U		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		0.943 J		2.8		0.577 J		< 1 U	
Barium	7440-39-3	ug/L	2000 (a,b)	7.92 J		5.71 J		5.16 J		4.66 J		8.9 J		4.82 J		7.2 J		16.8	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 2.5 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	208		230		1170		855		483		185		1090		1580	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 2.5 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	566000		541000 J	FG	111000		223000		601000		706000		737000		387000	
Chromium	7440-47-3	ug/L	100 (a,b)	< 2 U		1.84 J		< 2 U		< 2 U		< 5 U		< 2 U		< 2 U		1.54 J	
Cobalt	7440-48-4	ug/L	NE (c)	1.06		2.16		0.237 J		0.35 J		2.04		6.43		2.7		2.41	
Copper	7440-50-8	ug/L	NE	0.836 J		< 2 U		< 2 U		< 2 U		< 5 U		1.95 J		< 2 U		< 2 U	
Iron	7439-89-6	ug/L	NE	390		456		< 50 U		< 50 U		< 125 U		< 50 U		52.9		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 2.5 U		< 1 U		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 12.5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	244000 J	FG	180000 J	FG	143000		189000		6380		1610		23500		31900	
Manganese	7439-96-5	ug/L	NE	318 R	FG	810		38.5		160		< 12.5 U		< 5 U		239		3370	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.25 U		< 0.25 U		< 0.2 U		< 0.25 U		< 0.5 U		< 0.2 U		< 0.25 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	3.91 J		2.97 J		6.43		4.15 J		31.9		56.7		22.7 J	FG	< 5 U	
Nickel	7440-02-0	ug/L	100 (a)	0.372 J		0.733 J		< 1 U		< 1 U		< 2.5 U		< 1 U		0.499 J		1.09	
Potassium	7440-09-7	ug/L	NE	3010		3050		3580		3140		2670		2230		4810		8220	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		< 5 U		< 12.5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		< 1 U		< 2.5 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	76600		70200		99500		95200		80000		63800		60500		94600	
Thallium	7440-28-0	ug/L	2 (a,b)	0.267 J		0.226 J		0.182 J		0.15 J		< 2.5 U		< 1 U		0.173 J		0.237 J	
Vanadium	7440-62-2	ug/L	NE	< 1 U		< 1 U		< 1 U		< 1 U		< 2.5 U		2.07		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	< 5 U		3.62 J		< 5 U		< 5 U		< 12.5 U		< 5 U		5.37		< 5 U	
Metals, Total																			
Aluminum	7429-90-5	ug/L	NE	3540		4670		912		N/A		9270		63700		4760		225	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 2 U		N/A		1.08 J		3.95 J		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	1.84		2.46		0.435 J		N/A		4.91		30.9		1.98		< 1 U	
Barium	7440-39-3	ug/L	2000 (a,b)	14.9		14.7		7.47 J		N/A		27		137		19.6		15.7	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		N/A		0.269 J		2.65 J		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	210		743		1100		N/A		467		1750		2340		1610	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 5 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	585000		461000 J	FG	109000		N/A		626000		902000		690000		401000	
Chromium	7440-47-3	ug/L	100 (a,b)	2.77		4.11		2.76		N/A		8.32		52.7		3.52		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	2.2		1.91		0.438 J		N/A		3.92		49.1		24.1		4.8	
Copper	7440-50-8	ug/L	NE	1.72 J		2.34		0.644 J		N/A		5.2		38.8		1.95 J		< 2 U	
Iron	7439-89-6	ug/L	NE	3480		6360		2060		N/A		13200		109000		5830		153	
Lead	7439-92-1	ug/L	15 (a,b)	1.35		2		0.587 J		N/A		4.27		30.5		1.98		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		N/A		3.56 J		22.4 J		5.2		< 5 U	
Magnesium	7439-95-4	ug/L	NE	186000 J	FG	117000 J	FG	139000		N/A		9080		40800		48900		32900	
Manganese	7439-96-5	ug/L	NE	131 R	FG	931		50.6		N/A		93.9		2710		10000		4660	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.5 U		< 0.5 U		< 0.2 U		N/A		< 0.25 U		0.175 J		< 0.25 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	16.2		1.68 J		6.01		N/A		35.4		37.8		7.37 J	FG	< 5 U	
Nickel	7440-02-0	ug/L	100 (a)	1.52		2.69		0.594 J		N/A		4.29		41.3		18.9		1.83	
Potassium	7440-09-7	ug/L	NE	3260		4120		3440		N/A		3520		11700		7020		11700	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 25 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 5 U		< 1 U		0.752 J	
Sodium	7440-23-5	ug/L	NE	71900		81600		96100		N/A		80200		74400		62100		94300	
Thallium	7440-28-0	ug/L	2 (a,b)	0.283 J		0.389 J		0.25 J		N/A		0.272 J		1.81 J		0.463 J		0.219 J	
Vanadium	7440-62-2	ug/L	NE	7.08		10.1		4.16		N/A		19.7		147		9.45		< 1 U	
Zinc	7440-66-6	ug/L	NE	4.46 J		7.95		< 5 U		N/A		16.3		141		8.26		< 5 U	

Table B-2
Direct Soil Treatment
Method 1316 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/2/2020		12/2/2020		12/2/2020		12/2/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020	
		Sample ID		GAF-GW-1316-HI-CAL-T2-MID		GAF-GW-1316-HI-CAL-T3-MID		GAF-GW-1316-HI-CAL-T4-MID		GAF-GW-1316-HI-CAL-T5-MID		GAF-GW-1316-CONTROL-T1-		GAF-GW-1316-CONTROL-T2-		GAF-GW-1316-CONTROL-T3-		GAF-GW-1316-CONTROL-T4-	
		Lab Sample ID		180-114632-7		180-114632-8		180-114632-9		180-114632-10		180-115017-1		180-115017-2		180-115017-3		180-115017-4	
		Sample Type		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																			
Laboratory pH	--	SU	--	6.58		6.48		6.19		6.16		5.81		4.42		3.69		3.00	
Anions																			
Chloride	16887-00-6	MG/L	NE	40.4		N/A		N/A		N/A		N/A		41.6		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	0.166		N/A		N/A		N/A		N/A		0.304		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	1460		N/A		N/A		N/A		N/A		877		N/A		N/A	
General Chemistry																			
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	< 5 U		N/A		N/A		N/A		N/A		< 5 U		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	< 5 U		N/A		N/A		N/A		N/A		< 5 U		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	188		N/A		N/A		N/A		N/A		67.5		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	188		N/A		N/A		N/A		N/A		67.5		N/A		N/A	
Metals, Dissolved																			
Aluminum	7429-90-5	ug/L	NE	16.7 J		17.6 J		30.7		290		16.2 J		3070		68700		106000	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	< 1 U		< 1 U		< 1 U		1.13		< 1 U		0.894 J		6.27		8.53	
Barium	7440-39-3	ug/L	2000 (a,b)	7.53 J		4.79 J		5.32 J		4.33 J		10.8		13.3		17.4		14.6	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		1.01		14.1		29.4	
Boron	7440-42-8	ug/L	NE	1060		514		210		315 J	FG	1740		1820		2290		2930 J	FG
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		1.37		4.03		6.84 J	FG
Calcium	7440-70-2	ug/L	NE	459000		659000		616000		613000		296000		256000		459000		402000	
Chromium	7440-47-3	ug/L	100 (a,b)	3.97		2.09		4.17 J	FG	< 2 U		< 2 U		< 2 U		2.06		5.19	
Cobalt	7440-48-4	ug/L	NE (c)	0.545		0.416 J		0.145 J		1.16		5.35		180		510		958 J	FG
Copper	7440-50-8	ug/L	NE	< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		0.848 J		10.1		30.2	
Iron	7439-89-6	ug/L	NE	< 50 U		< 50 U		< 50 U		< 50 U		< 50 U		< 50 U		105		2170	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		0.13 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		4.14 J		18.8		33.1	
Magnesium	7439-95-4	ug/L	NE	34600		36200		18600		3920 R	FG	29200		34000		60800		59600	
Manganese	7439-96-5	ug/L	NE	668		645		80.5		5.39		5660		13400		30300		57600 J	FG
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.2 U		< 0.5 U		< 0.25 U		< 0.2 U		< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	< 5 U		0.782 J		2.31 J		28.3		< 5 U		< 5 U		< 5 U		< 5 U	
Nickel	7440-02-0	ug/L	100 (a)	0.358 J		< 1 U		< 1 U		< 1 U		2.48		86.9		279		370 J	FG
Potassium	7440-09-7	ug/L	NE	3370		3340		2660		7330 R	FG	3750		4090		5180		4760	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		1.78 J		< 5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	89100		79400		72500		68800 J	FG	98300		93200		97800		77900	
Thallium	7440-28-0	ug/L	2 (a,b)	0.176 J		< 1 U		< 1 U		0.148 J		0.453 J		0.624 J		0.976 J		1.13	
Vanadium	7440-62-2	ug/L	NE	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		148		699		965	
Metals, Total																			
Aluminum	7429-90-5	ug/L	NE	N/A		192000		1530		613		6740		N/A		74700		128000	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		< 20 U		< 2 U		< 2 U		1.2 J		N/A		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		77.8		0.67 J		1.95		4.01		N/A		11		12.1	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		411		8.02 J		2.74 J		39.8		N/A		39.7		28.2	
Beryllium	7440-41-7	ug/L	4 (a,b)	N/A		8.05 J		< 1 U		< 1 U		0.524 J		N/A		13.5		31.5	
Boron	7440-42-8	ug/L	NE	N/A		1260		209		195 J	FG	1720		N/A		2720		1840 J	FG
Cadmium	7440-43-9	ug/L	5 (a,b)	N/A		< 10 U		< 1 U		< 1 U		0.316 J		N/A		3.99		5.44 J	FG
Calcium	7440-70-2	ug/L	NE	N/A		759000		664000		693000		298000		N/A		446000		415000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		175		< 2 UJ	FG	< 2 U		5.9		N/A		8.8		8.46	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		52.2		0.423 J		1.63		16.5		N/A		505		713 J	FG
Copper	7440-50-8	ug/L	NE	N/A		102		0.688 J		1.04 J		4.17		N/A		15.3		34.2	
Iron	7439-89-6	ug/L	NE	N/A		311000		1580		154		14100		N/A		18700		10200	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		93.8		0.596 J		< 1 U		3.7		N/A		5.13		4.8	
Lithium	7439-93-2	ug/L	40 (b)	N/A		71.4		< 5 U		< 5 U		< 5 U		N/A		20.3		32.1	
Magnesium	7439-95-4	ug/L	NE	N/A		47700		19500		1410 R	FG	29700		N/A		59100		64400	
Manganese	7439-96-5	ug/L	NE	N/A		3000		103		2.21 J		7100		N/A		29600		42000 J	FG
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		0.488		< 0.2 U		< 0.25 U		< 0.2 U		N/A		< 0.2 U		0.146 J	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		14.6 J		2.24 J		47.8		0.888 J		N/A		1.34 J		2.13 J	
Nickel	7440-02-0	ug/L	100 (a)	N/A		94.9		0.82 J		< 1 U		11.3		N/A		280		302 J	FG
Potassium	7440-09-7	ug/L	NE	N/A		17500		2770		1870 R	FG	4560		N/A		6670		4640	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		< 50 U		< 5 U		2.84 J		< 5 U		N/A		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		< 10 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		83500		70700		49700 J	FG	98800		N/A		94900		86900	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		3.99 J		< 1 U		< 1 U		0.727 J		N/A		1.2		0.97 J	
Vanadium	7440-62-2	ug/L	NE	N/A		463		3.16		< 1 U		17.8		N/A		18.1		9.42	
Zinc	7440-66-6	ug/L	NE	N/A		330		< 5 U		< 5 U		23.8		N/A		706		1030	

Table B-2
Direct Soil Treatment
Method 1316 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020	
		Sample ID		GAF-GW-1316-CONTROL-T5-		GAF-GW-1316-DOLO 0.5-T1-		GAF-GW-1316-DOLO 0.5-T2-		GAF-GW-1316-DOLO 0.5-T3-		GAF-GW-1316-DOLO 0.5-T4-		GAF-GW-1316-DOLO 0.5-T5-		GAF-GW-1316-DOLO 1.0-T1-		GAF-GW-1316-DOLO 1.0-T2-	
		Lab Sample ID		180-115017-5		180-115017-11		180-115017-12		180-115017-13		180-115017-14		180-115017-15		180-115017-16		180-115017-17	
		Sample Type		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																			
Laboratory pH	--	SU	--	2.80		6.84		7.08		7.30		5.40		5.51		6.87		7.27	
Anions																			
Chloride	16887-00-6	MG/L	NE	N/A		N/A		41.4		N/A		N/A		N/A		N/A		40.3	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		0.160		N/A		N/A		N/A		N/A		0.274	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		1030		N/A		N/A		N/A		N/A		1110	
General Chemistry																			
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		< 5 U		N/A		N/A		N/A		N/A		< 5 U	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		< 5 U		N/A		N/A		N/A		N/A		< 5 U	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		309		N/A		N/A		N/A		N/A		25.1	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		309		N/A		N/A		N/A		N/A		25.1	
Metals, Dissolved																			
Aluminum	7429-90-5	ug/L	NE	207000		< 30 U		< 30 U		18.3 J		22.9 J		398		< 30 U		22.7 J	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	14.8		< 1 U		< 1 U		0.426 J		0.423 J		0.6 J		0.421 J		0.465 J	
Barium	7440-39-3	ug/L	2000 (a,b)	15.5		8.44 J		11		9.77 J		9.64 J		10.8		10		8.57 J	
Beryllium	7440-41-7	ug/L	4 (a,b)	66.6		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	1630		1560		1340		494		316		284		875		723	
Cadmium	7440-43-9	ug/L	5 (a,b)	9.36		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	402000 J	FG	279000		372000		468000		594000		586000		308000		243000	
Chromium	7440-47-3	ug/L	100 (a,b)	11.8		2.46		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	1300		0.646		0.901		0.569		0.617		0.727		0.87		0.555	
Copper	7440-50-8	ug/L	NE	72.1		0.691 J		< 2 U		0.642 J		< 2 U		0.688 J		< 2 U		< 2 U	
Iron	7439-89-6	ug/L	NE	5410		< 50 U		< 50 U		< 50 U		< 50 U		451		< 50 U		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	0.217 J		< 1 U		< 1 U		< 1 U		< 1 U		0.184 J		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	52.4		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	93800		106000		169000		210000		237000 J	FG	192000		60800		97100	
Manganese	7439-96-5	ug/L	NE	65900 J	FG	703		918		132		83.7		102		1.82 J		9.15	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		0.251		0.156 J		< 0.2 U		< 0.2 U		< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	< 5 U		1.12 J		1.04 J		2.54 J		4.66 J		6.13		9.57		8.27	
Nickel	7440-02-0	ug/L	100 (a)	463		1.01		< 1 U		< 1 U		< 1 U		0.449 J		< 1 U		< 1 U	
Potassium	7440-09-7	ug/L	NE	6350		4170		4050		5170		3500		3570		4050		3240	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	84500 J	FG	92800		88700		77900		77300		75600		90500		84300	
Thallium	7440-28-0	ug/L	2 (a,b)	1.49		0.211 J		0.175 J		0.237 J		0.179 J		0.226 J		< 1 U		< 1 U	
Vanadium	7440-62-2	ug/L	NE	< 5 U		< 1 U		< 1 U		< 1 U		< 1 U		1.06		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	1680		3.56 J		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Metals, Total																			
Aluminum	7429-90-5	ug/L	NE	283000		290		N/A		12600		1040		4370		979		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	2.44 J		< 2 U		N/A		0.958 J		< 2 U		< 2 U		< 2 U		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	78.6		0.329 J		N/A		5.93		0.728 J		2.66		0.94 J		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	311		9.4 J		N/A		37.2		13.2		18		12.8		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	64		< 1 U		N/A		0.577 J		< 1 U		0.243 J		< 1 U		N/A	
Boron	7440-42-8	ug/L	NE	2330		1440		N/A		630		1170		601		836		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	8.75		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A	
Calcium	7440-70-2	ug/L	NE	326000 J	FG	294000		N/A		478000		581000		585000		309000		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	101		< 2 U		N/A		10.3		< 2 U		3.92		2.3		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	1180		1		N/A		3.82		4.73		3.19		1.25		N/A	
Copper	7440-50-8	ug/L	NE	137		1.47 J		N/A		6.81		1.46 J		3.64		1.6 J		N/A	
Iron	7439-89-6	ug/L	NE	244000		324		N/A		20400		1500		8120		1740		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	73.3		< 1 U		N/A		5.35		0.433 J		1.96		0.391 J		N/A	
Lithium	7439-93-2	ug/L	40 (b)	84		< 5 U		N/A		4.67 J		< 5 U		< 5 U		< 5 U		N/A	
Magnesium	7439-95-4	ug/L	NE	86500		101000		N/A		219000		201000 J	FG	185000		63900		N/A	
Manganese	7439-96-5	ug/L	NE	58300 J	FG	1200		N/A		264		2780		477		28.7		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	0.549		0.313		N/A		< 0.2 U		< 0.4 U		< 0.2 U		< 0.2 U		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	16 J		0.807 J		N/A		4.13 J		3.19 J		6		8.45		N/A	
Nickel	7440-02-0	ug/L	100 (a)	488		0.623 J		N/A		7.05		3.42		3.52		0.632 J		N/A	
Potassium	7440-09-7	ug/L	NE	15400		4040		N/A		4860		5000		8400		4180		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	< 25 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U		N/A	
Silver	7440-22-4	ug/L	100 (a)	< 5 U		< 1 U		N/A		< 1 U		< 1 U		0.239 J		< 1 U		N/A	
Sodium	7440-23-5	ug/L	NE	74900 J	FG	89600		N/A		81400		71100		73500		91300		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	5.31		0.185 J		N/A		0.521 J		0.305 J		0.432 J		< 1 U		N/A	
Vanadium	7440-62-2	ug/L	NE	236		< 1 U		N/A		25.3		2.75		9.41		4.62		N/A	
Zinc	7440-66-6	ug/L	NE	1750		< 5 U		N/A		26.4		< 5 U		17.7		< 5 U		N/A	

Table B-2
Direct Soil Treatment
Method 1316 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020		12/4/2020	
		Sample ID		GAF-GW-1316-DOLO 1.0-T3-		GAF-GW-1316-DOLO 1.0-T4-		GAF-GW-1316-DOLO 1.0-T5-		GAF-GW-1316-HI-CAL-T1-END		GAF-GW-1316-HI-CAL-T2-END		GAF-GW-1316-HI-CAL-T3-END		GAF-GW-1316-HI-CAL-T4-END		GAF-GW-1316-HI-CAL-T5-END	
		Lab Sample ID		180-115017-18		180-115017-19		180-115017-20		180-115017-6		180-115017-7		180-115017-8		180-115017-9		180-115017-10	
		Sample Type		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																			
Laboratory pH	--	SU	--	7.44		5.77		5.95		6.83		7.01		7.09		4.92		5.22	
Anions																			
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		40.1		N/A		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		0.271		N/A		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		960		N/A		N/A		N/A	
General Chemistry																			
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		< 5 U		N/A		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		< 5 U		N/A		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		165		N/A		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		165		N/A		N/A		N/A	
Metals, Dissolved																			
Aluminum	7429-90-5	ug/L	NE	24.9 J		109		57.6		18.4 J		66.7		14 J		648		208	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	0.395 J		1.48		0.9 J		< 1 U		< 1 U		< 1 U		1.82		1.22	
Barium	7440-39-3	ug/L	2000 (a,b)	10.2		8 J		9.26 J		8.68 J		7.65 J		9.73 J		5.6 J		8.99 J	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	420		188		263		1650		999		786		460 J	FG	351	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	545000		653000		610000		356000		386000		622000		666000		656000	
Chromium	7440-47-3	ug/L	100 (a,b)	1.64 J		1.55 J		1.94 J		< 2 U		< 2 U		< 2 U		2.22		< 2 U	
Cobalt	7440-48-4	ug/L	NE (c)	0.507		4.29		2.47		0.527		0.336 J		0.412 J		2.85		1.51	
Copper	7440-50-8	ug/L	NE	< 2 U		1.04 J		0.779 J		< 2 U		< 2 U		< 2 U		1.26 J		0.905 J	
Iron	7439-89-6	ug/L	NE	< 50 U		< 50 U		< 50 U		< 50 U		< 50 U		< 50 U		26 J		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	190000		7500		109000 R	FG	31500		12100		35200		652		2070	
Manganese	7439-96-5	ug/L	NE	61.1		< 5 U		41.7		529		20		510		2.03 J		11.1	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.4 U		< 0.2 U		0.291		< 0.2 U		< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	5.57		24.5 J	FG	12.8		0.706 J		6.39		0.849 J		56.2		27.3	
Nickel	7440-02-0	ug/L	100 (a)	< 1 U		< 1 U		0.417 J		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Potassium	7440-09-7	ug/L	NE	3420		2990		3230		4160		3140		3520		2480		3010	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	82400		65300		62800 J	FG	94300		84400		79900		61600		52700	
Thallium	7440-28-0	ug/L	2 (a,b)	< 1 U		< 1 U		0.298 J		< 1 U		< 1 U		< 1 U		< 1 U		0.183 J	
Vanadium	7440-62-2	ug/L	NE	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Zinc	7440-66-6	ug/L	NE	< 5 U		< 5 U		4.2 J		< 5 U		< 5 U		< 5 U		< 5 U		< 5 U	
Metals, Total																			
Aluminum	7429-90-5	ug/L	NE	2020		16200		9540		65.7		N/A		4410		692		4280	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		0.825 J		< 2 U		< 2 U		N/A		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	1.15		8.02		5.05		< 1 U		N/A		1.43		2.12		2.98	
Barium	7440-39-3	ug/L	2000 (a,b)	14.2		38.5		27.5		11		N/A		19		5.93 J		17.7	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		0.936 J		0.427 J		< 1 U		N/A		< 1 U		< 1 U		0.286 J	
Boron	7440-42-8	ug/L	NE	440		679		321		1620		N/A		868		413 J	FG	332	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	536000		657000		631000		437000		N/A		643000		688000		640000	
Chromium	7440-47-3	ug/L	100 (a,b)	1.73 J		13.5		8.35		< 2 U		N/A		3.88		< 2 U		4.03	
Cobalt	7440-48-4	ug/L	NE (c)	0.938		8.97		7.14		0.987		N/A		1.06		2.36		2.68	
Copper	7440-50-8	ug/L	NE	1.35 J		9.02		6.24		< 2 U		N/A		1.82 J		1.46 J		3.52	
Iron	7439-89-6	ug/L	NE	2670		29200		14200		67.6		N/A		4320		217		6690	
Lead	7439-92-1	ug/L	15 (a,b)	0.708 J		6.02		4.1		< 1 U		N/A		1.75		< 1 U		1.83	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		4.86 J		3.53 J		< 5 U		N/A		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	184000		25500		11700 R	FG	32800		N/A		35000		779		2110	
Manganese	7439-96-5	ug/L	NE	72.2		373		102		1410		N/A		508		6.78		66.5	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.2 U		< 0.2 U		0.216		N/A		0.273		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	5.55		15.9 J	FG	21.8		0.629 J		N/A		1.06 J		57.7		30.2	
Nickel	7440-02-0	ug/L	100 (a)	1.16		8.7		5.02		0.561 J		N/A		2.05		< 1 U		2.41	
Potassium	7440-09-7	ug/L	NE	4550		5090		4930		4260		N/A		5700		3470		3470	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		0.184 J		< 1 U		N/A		0.223 J		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	80500		67300		49200 J	FG	96300		N/A		77100		62200		48900	
Thallium	7440-28-0	ug/L	2 (a,b)	0.183 J		0.456 J		0.604 J		< 1 U		N/A		0.185 J		< 1 U		0.413 J	
Vanadium	7440-62-2	ug/L	NE	4.05		34		19		< 1 U		N/A		7.45		< 1 U		9.15	
Zinc	7440-66-6	ug/L	NE	3.57 J		36.4		16.2		< 5 U		N/A		5.81		< 5 U		7.89	

Table B-2
Direct Soil Treatment
Method 1316 Whole Sampling Leaching Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Notes and Acronymns

< - analyte not detected at the reporting quantitation limit shown

MG/L - miligrams per liter

N - primary sample

N/A - not analyzed

NE - not established at the Non-Registered Site

ug/L - micrograms per liter

(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.

(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.

(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS established.

Red text - value exceeds GWPS

Qualifier Definitions

U	The analyte was analyzed for but not detected. The associated numerical value is at or below the reporting limit.
U*	This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
UR	Unreliable reporting limit; analyte may or may not be present in sample.
R	Unreliable positive result; analyte may or may not be present in sample.
R*	This result has been rejected following data user review.
J	Quantitation is approximate due to limitations identified during data validation.
UJ	This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.

Reason Code Definitions

BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
BN	Negative laboratory blank contamination.
C	Initial and/or continuing calibration issue, indeterminate bias.
C+	Initial and/or continuing calibration issue. The result may be biased high.
C-	Initial and/or continuing calibration issue. The result may be biased low.
DQ	Data user qualification.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
S	Radium-226+228 flagged due to reporting protocol for combined results.
SD	Serial dilution imprecision.
T	Temperature preservation issue.
X	Percent solids < 50%.
Y+	Chemical yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.
Z	ICP/MS interference.
ZZ	Other.

Table B-3
In-Situ Stabilization
Method 1315 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/16/2020		12/16/2020		12/17/2020		12/17/2020		12/18/2020		12/18/2020		12/23/2020		12/23/2020		12/30/2020	
		Sample ID		GAF-GW-1315-Lean-t2hr		GAF-GW-1315-Rich-t2hr		GAF-GW-1315-Lean-t48hr		GAF-GW-1315-Rich-t48hr		GAF-GW-1315-Lean-t 1day		GAF-GW-1315-Rich-t 1day		GAF-GW-1315-Lean-t7		GAF-GW-1315-Rich-t7		GAF-GW-1315-Lean-t14	
		Lab Sample ID		180-115551-29		180-115551-30		180-115551-31		180-115551-32		180-115551-33		180-115551-34		180-115551-35		180-115551-36		180-115551-37	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	8.15		7.76		7.75		7.33		7.42		7.30		7.49		7.43		7.85	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		43.2	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.299	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		559	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		264	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		264	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		22.6 J	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.524 J	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.847 J	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		29.4	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1580	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		247000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		50.8	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		2.46	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 2 U	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		30.5 J	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		3.66 J		< 5 U		4.16 J		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		15800	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1180	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		18	
Nickel	7440-02-0	ug/L	100 (a)	4.51		4.22		4.31		4.9		3.54		3.06		2.35		3.05		1.04	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5100	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		97000	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		2.11	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1400	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.827 J	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1.53	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		36.9	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1510	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		251000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		52.1	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		3.84	
Copper	7440-50-8	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1.02 J	
Iron	7439-89-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		2780	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.875 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		< 5 U		3.88 J		< 5 U		4.17 J		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		15900	
Manganese	7439-96-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		1350	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		17.7	
Nickel	7440-02-0	ug/L	100 (a)	4.58		4.43		5.15		5.32		3.86		3.25		2.92		3.48		2.7	
Potassium	7440-09-7	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		5330	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		96500	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		0.201 J	
Vanadium	7440-62-2	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		4.48	
Zinc	7440-66-6	ug/L	NE	N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		7.12	

Table B-3
In-Situ Stabilization
Method 1315 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/30/2020	
		Sample ID		GAF-GW-1315-Rich-t14	
		Lab Sample ID		180-115551-38	
		Sample Type		N	
Analyte	CASNO	Units	MCL	Result	Reason Code
Treatability Laboratory pH					
Laboratory pH	--	SU	--	7.67	
Anions					
Chloride	16887-00-6	MG/L	NE	40.2	
Fluoride	16984-48-8	MG/L	4 (a,b)	0.211	
Sulfate	14808-79-8	MG/L	NE	494	
General Chemistry					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	< 5 U	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	< 5 U	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	336	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	336	
Metals, Dissolved					
Aluminum	7429-90-5	ug/L	NE	17.5 J	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	0.844 J	
Barium	7440-39-3	ug/L	2000 (a,b)	39.3	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U	
Boron	7440-42-8	ug/L	NE	1900	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U	
Calcium	7440-70-2	ug/L	NE	233000	
Chromium	7440-47-3	ug/L	100 (a,b)	6.49	
Cobalt	7440-48-4	ug/L	NE (c)	2.84	
Copper	7440-50-8	ug/L	NE	< 2 U	
Iron	7439-89-6	ug/L	NE	< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U	
Magnesium	7439-95-4	ug/L	NE	28300	
Manganese	7439-96-5	ug/L	NE	956	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	1.98 J	
Nickel	7440-02-0	ug/L	100 (a)	2.22	
Potassium	7440-09-7	ug/L	NE	7410	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U	
Sodium	7440-23-5	ug/L	NE	103000	
Thallium	7440-28-0	ug/L	2 (a,b)	< 1 U	
Vanadium	7440-62-2	ug/L	NE	3	
Zinc	7440-66-6	ug/L	NE	< 5 U	
Metals, Total					
Aluminum	7429-90-5	ug/L	NE	167	
Antimony	7440-36-0	ug/L	6 (a,b)	0.541 J	
Arsenic	7440-38-2	ug/L	10 (a,b)	0.964 J	
Barium	7440-39-3	ug/L	2000 (a,b)	43.3	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U	
Boron	7440-42-8	ug/L	NE	1930	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U	
Calcium	7440-70-2	ug/L	NE	248000	
Chromium	7440-47-3	ug/L	100 (a,b)	6.56	
Cobalt	7440-48-4	ug/L	NE (c)	3.72	
Copper	7440-50-8	ug/L	NE	< 2 U	
Iron	7439-89-6	ug/L	NE	827	
Lead	7439-92-1	ug/L	15 (a,b)	0.142 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U	
Magnesium	7439-95-4	ug/L	NE	28900	
Manganese	7439-96-5	ug/L	NE	1230	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	2.06 J	
Nickel	7440-02-0	ug/L	100 (a)	2.43	
Potassium	7440-09-7	ug/L	NE	7520	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U	
Sodium	7440-23-5	ug/L	NE	105000	
Thallium	7440-28-0	ug/L	2 (a,b)	0.167 J	
Vanadium	7440-62-2	ug/L	NE	4.18	
Zinc	7440-66-6	ug/L	NE	< 5 U	

Table B-3
In-Situ Stabilization
Method 1315 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Notes and Acronymns

< - analyte not detected at the reporting quantitation limit shown

MG/L - miligrams per liter

N - primary sample

N/A - not analyzed

NE - not established at the Non-Registered Site

ug/L - micrograms per liter

(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.

(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.

(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS established.

Qualifier Definitions

U	The analyte was analyzed for but not detected. The associated numerical value is at or below the reporting limit.
U*	This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
UR	Unreliable reporting limit; analyte may or may not be present in sample.
R	Unreliable positive result; analyte may or may not be present in sample.
R*	This result has been rejected following data user review.
J	Quantitation is approximate due to limitations identified during data validation.
UJ	This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.

Reason Code Definitions

BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
BN	Negative laboratory blank contamination.
C	Initial and/or continuing calibration issue, indeterminate bias.
C+	Initial and/or continuing calibration issue. The result may be biased high.
C-	Initial and/or continuing calibration issue. The result may be biased low.
DQ	Data user qualification.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
S	Radium-226+228 flagged due to reporting protocol for combined results.
SD	Serial dilution imprecision.
T	Temperature preservation issue.
X	Percent solids < 50%.
Y+	Chemical yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.
Z	ICP/MS interference.
ZZ	Other.

Table B-4
In-Situ Stabilization
Method 1316 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/29/2020		12/29/2020		12/29/2020		12/29/2020		12/29/2020		12/29/2020		12/29/2020		12/29/2020		12/29/2020	
		Sample ID		GAF-GW-1316-Lean-T1-Mid		GAF-GW-1316-Lean-T2-Mid		GAF-GW-1316-Lean-T3-Mid		GAF-GW-1316-Lean-T4-Mid		GAF-GW-1316-Lean-T5-Mid		GAF-GW-1316-Rich-T1-Mid		GAF-GW-1316-Rich-T2-Mid		GAF-GW-1316-Rich-T3-Mid		GAF-GW-1316-Rich-T4-Mid	
		Lab Sample ID		180-115551-1		180-115551-2		180-115551-3		180-115551-4		180-115551-5		180-115551-6		180-115551-7		180-115551-8		180-115551-9	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	9.50		10.07		10.52		10.62		10.75		10.92		11.40		11.56		11.68	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		41.2		N/A		N/A		N/A		N/A		40.0		N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		0.347		N/A		N/A		N/A		N/A		0.434		N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		387		N/A		N/A		N/A		N/A		170		N/A		N/A	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		32.5		N/A		N/A		N/A		N/A		51.0		N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		32.5		N/A		N/A		N/A		N/A		230		N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		64.9		N/A		N/A		N/A		N/A		281		N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		< 5 U		N/A		N/A		N/A		N/A		< 5 U		N/A		N/A	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	365		567		706		775		N/A		1240		1380		2500		3670	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U		< 2 U		< 2 U		N/A		< 2 U		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	2.54		3.6		5.14		6.51		N/A		2.03		1.65		1.99		2.37	
Barium	7440-39-3	ug/L	2000 (a,b)	25		27.1		22.9		24.3		N/A		36.4		39.7		37.8		50.7	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	895		578		175		59.6 J		N/A		618		< 80 U		< 80 U		< 80 U	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	253000		254000		235000		272000		N/A		243000		157000		151000		178000	
Chromium	7440-47-3	ug/L	100 (a,b)	78.7		118		189		330		N/A		114		184		178		89.4	
Cobalt	7440-48-4	ug/L	NE (c)	2.14		3.6		7.19		12.5		N/A		1.67		3.67		6.65		10	
Copper	7440-50-8	ug/L	NE	1.6 J		2.2		2.97		4.21		N/A		1.61 J		1.99 J		2.91		3.17	
Iron	7439-89-6	ug/L	NE	< 50 U		< 50 U		< 50 U		< 50 U		N/A		< 50 U		< 50 U		< 50 U		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	185 J		< 500 U		< 500 U		< 500 U		N/A		< 500 U		< 500 U		< 500 U		< 500 U	
Manganese	7439-96-5	ug/L	NE	< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.2 U		< 0.2 U		< 0.5 U		N/A		< 0.2 U		< 0.2 U		< 0.2 U		< 0.5 U	
Molybdenum	7439-98-7	ug/L	100 (b)	27.9		47.5		94.8		163		N/A		25.5		47.5		62.8		44	
Nickel	7440-02-0	ug/L	100 (a)	0.613 J		1.74		1.31		2.03		N/A		0.451 J		0.668 J		3.05 J	FG	1.11	
Potassium	7440-09-7	ug/L	NE	11800		5710		4290		4080		N/A		6970		8310		9560		10200	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		< 5 U		1.51 J		N/A		< 5 U		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	81700		80900		71000		58300		N/A		82600		83800		78000		66500	
Thallium	7440-28-0	ug/L	2 (a,b)	< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U	
Vanadium	7440-62-2	ug/L	NE	42.7		47.4		40.9		33.8		N/A		30.4		10.7		6.81		3.25	
Zinc	7440-66-6	ug/L	NE	< 5 U		< 5 U		< 5 U		13.7 J	FG	N/A		< 5 U		< 5 U		3.77 J		< 5 U	
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	642		N/A		6930		3150		3690		1770		N/A		2530		3890	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		N/A		0.908 J		< 2 U		< 2 U		< 2 U		N/A		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	2.78		N/A		6.51		7.06		8.54		2.23		N/A		2.18		2.42	
Barium	7440-39-3	ug/L	2000 (a,b)	25.7		N/A		40		33		31.8		39.9		N/A		37.5		52	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	891		N/A		231		102		< 80 U		632		N/A		< 80 U		< 80 U	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	250000		N/A		240000		293000		233000		260000		N/A		152000		191000	
Chromium	7440-47-3	ug/L	100 (a,b)	77.1		N/A		188		314		504		120		N/A		178		95.8	
Cobalt	7440-48-4	ug/L	NE (c)	2.21		N/A		8.12		12.7		20.3		1.83		N/A		6.17		10.6	
Copper	7440-50-8	ug/L	NE	1.61 J		N/A		6.17		5.43		7.74		2.04		N/A		3.04		4.08	
Iron	7439-89-6	ug/L	NE	313		N/A		7310		4640		5160		639		N/A		564		421	
Lead	7439-92-1	ug/L	15 (a,b)	0.163 J		N/A		2.91		1.3		1.35		0.229 J		N/A		0.243 J		0.131 J	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	221 J		N/A		402 J		184 J		258 J		< 500 U		N/A		< 500 U		< 500 U	
Manganese	7439-96-5	ug/L	NE	4.19 J		N/A		43.4		26.6		38.1		7.02		N/A		4.51 J		3.39 J	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		N/A		< 0.2 U		< 0.2 U		< 0.5 U		< 0.2 U		N/A		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	27.1		N/A		92.4		156		236		26.5		N/A		60.1		46.4	
Nickel	7440-02-0	ug/L	100 (a)	0.814 J		N/A		4.59		3.47		5.02		1.61		N/A		1.09 J	FG	1.3	
Potassium	7440-09-7	ug/L	NE	11900		N/A		8940		4750		7050		7480		N/A		9010		10700	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		N/A		< 5 U		< 5 U		1.9 J		< 5 U		N/A		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	0.83 J		N/A		0.485 J		0.19 J		1.09		< 1 U		N/A		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	80600		N/A		70500		59300		41100		87500		N/A		75500		70700	
Thallium	7440-28-0	ug/L	2 (a,b)	< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U	
Vanadium	7440-62-2	ug/L	NE	43.6		N/A		49.7		38		37.3		33.7		N/A		7.09		3.88	
Zinc	7440-66-6	ug/L	NE	< 5 U		N/A		15.8		5.35 J	FG	5.86		< 5 U		N/A		< 5 U		< 5 U	

Table B-4
In-Situ Stabilization
Method 1316 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/29/2020		12/30/2020		12/30/2020		12/30/2020		12/30/2020		12/30/2020		12/30/2020		12/30/2020		12/30/2020	
		Sample ID		GAF-GW-1316-Rich-T5-Mid		GAF-GW-1316-Lean-T1-End		GAF-GW-1316-Lean-T2-End		GAF-GW-1316-Lean-T3-End		GAF-GW-1316-Lean-T4-End		GAF-GW-1316-Lean-T5-End		GAF-GW-1316-Rich-T1-End		GAF-GW-1316-Rich-T2-End		GAF-GW-1316-Rich-T3-End	
		Lab Sample ID		180-115551-10		180-115551-11		180-115551-12		180-115551-13		180-115551-14		180-115551-15		180-115551-16		180-115551-17		180-115551-18	
		Sample Type		N		N		N		N		N		N		N		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH																					
Laboratory pH	--	SU	--	11.69		9.49		9.79		10.55		10.74		10.79		11.26		11.47		11.65	
Anions																					
Chloride	16887-00-6	MG/L	NE	N/A		N/A		43.0		N/A		N/A		N/A		N/A		39.5		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A		0.377		N/A		N/A		N/A		N/A		0.395		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A		407		N/A		N/A		N/A		N/A		239		N/A	
General Chemistry																					
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A		33.9		N/A		N/A		N/A		N/A		46.8		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A		< 5 U		N/A		N/A		N/A		N/A		190		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A		34.0		N/A		N/A		N/A		N/A		237		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A		< 5 U		N/A		N/A		N/A		N/A		< 5 U		N/A	
Metals, Dissolved																					
Aluminum	7429-90-5	ug/L	NE	N/A		297		276		578		626		N/A		1260		739		2590	
Antimony	7440-36-0	ug/L	6 (a,b)	N/A		< 2 U		< 2 U		< 2 U		< 2 U		N/A		< 2 U		< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	N/A		2.72		3.06		4.67		6.34		N/A		1.7		1.55		2.06	
Barium	7440-39-3	ug/L	2000 (a,b)	N/A		23.9		17.9		25.2		24.5		N/A		37		35.8		39.8	
Beryllium	7440-41-7	ug/L	4 (a,b)	N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U	
Boron	7440-42-8	ug/L	NE	N/A		929		735		186		39.3 J		N/A		275		< 80 U		< 80 U	
Cadmium	7440-43-9	ug/L	5 (a,b)	N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	N/A		309000		255000		268000		286000		N/A		214000		157000		160000	
Chromium	7440-47-3	ug/L	100 (a,b)	N/A		67.5		66.1		191		297		N/A		121		204		135	
Cobalt	7440-48-4	ug/L	NE (c)	N/A		2.14		3.15		6.98		11.6		N/A		2.15		3.55		6.69	
Copper	7440-50-8	ug/L	NE	N/A		1.53 J		2.19		3.48		4.33		N/A		2.81		2.62		4.24	
Iron	7439-89-6	ug/L	NE	N/A		< 50 U		< 50 U		< 50 U		< 50 U		N/A		< 50 U		< 50 U		< 50 U	
Lead	7439-92-1	ug/L	15 (a,b)	N/A		< 1 U		< 1 U		0.14 J		< 1 U		N/A		< 1 U		< 1 U		< 1 U	
Lithium	7439-93-2	ug/L	40 (b)	N/A		< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	N/A		230 J		169 J		< 500 U		< 500 U		N/A		< 500 U		< 500 U		< 500 U	
Manganese	7439-96-5	ug/L	NE	N/A		< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U	
Mercury	7439-97-6	ug/L	2 (a,b)	N/A		< 0.2 U		< 0.2 U		< 0.2 U		< 0.5 U		N/A		< 0.2 U		< 0.2 U		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	N/A		26.7		39.3		89.3		167		N/A		25.7		48.8		50.8	
Nickel	7440-02-0	ug/L	100 (a)	N/A		0.58 J		0.639 J		1.34		1.99		N/A		0.423 J		0.557 J		1.04	
Potassium	7440-09-7	ug/L	NE	N/A		4530		3590		3770		3770		N/A		7320		7760		9180	
Selenium	7782-49-2	ug/L	50 (a,b)	N/A		< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U		< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	N/A		84200		81200		74900		62100		N/A		87200		86500		79300	
Thallium	7440-28-0	ug/L	2 (a,b)	N/A		< 1 U		< 1 U		0.357 J		< 1 U		N/A		< 1 U		< 1 U		< 1 U	
Vanadium	7440-62-2	ug/L	NE	N/A		38.1		28.2		41.9		34.3		N/A		26.1		12.9		5.14	
Zinc	7440-66-6	ug/L	NE	N/A		< 5 U		< 5 U		< 5 U		4.46 J		N/A		3.35 J		3.68 J		14.5 J	FG
Metals, Total																					
Aluminum	7429-90-5	ug/L	NE	17700		529		N/A		1180		842		3620		1350		N/A		2800	
Antimony	7440-36-0	ug/L	6 (a,b)	1.44 J		< 2 U		N/A		< 2 U		< 2 U		< 2 U		< 2 U		N/A		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	9.71		2.77		N/A		4.84		6.51		8.24		1.87		N/A		1.97	
Barium	7440-39-3	ug/L	2000 (a,b)	128		25.3		N/A		27.2		28.3		25.9		37.8		N/A		41.2	
Beryllium	7440-41-7	ug/L	4 (a,b)	0.607 J		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U	
Boron	7440-42-8	ug/L	NE	< 80 U		945		N/A		193		61.1 J		< 80 U		281		N/A		< 80 U	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U	
Calcium	7440-70-2	ug/L	NE	227000		317000		N/A		276000		308000		225000		216000		N/A		171000	
Chromium	7440-47-3	ug/L	100 (a,b)	84.7		68.3		N/A		193		302		430		120		N/A		140	
Cobalt	7440-48-4	ug/L	NE (c)	18.7		2.24		N/A		7.08		12.3		20		2.17		N/A		6.92	
Copper	7440-50-8	ug/L	NE	13.8		1.79 J		N/A		3.45		4.95		7.81		1.82 J		N/A		3.26	
Iron	7439-89-6	ug/L	NE	24400		194		N/A		548		265		4240		77.6		N/A		458	
Lead	7439-92-1	ug/L	15 (a,b)	8.11		< 1 U		N/A		0.215 J		0.192 J		1.28		< 1 U		N/A		0.239 J	
Lithium	7439-93-2	ug/L	40 (b)	4.15 J		< 5 U		N/A		< 5 U		< 5 U		< 5 U		< 5 U		N/A		< 5 U	
Magnesium	7439-95-4	ug/L	NE	1500		263 J		N/A		< 500 U		< 500 U		253 J		< 500 U		N/A		< 500 U	
Manganese	7439-96-5	ug/L	NE	173		2.71 J		N/A		3.64 J		1.88 J		33		1.28 J		N/A		3.13 J	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.5 U		< 0.2 U		N/A		< 0.2 U		< 0.2 U		< 0.5 U		< 0.2 U		N/A		< 0.2 U	
Molybdenum	7439-98-7	ug/L	100 (b)	33.4		27.4		N/A		91.1		172		250		25.7		N/A		51.9	
Nickel	7440-02-0	ug/L	100 (a)	12.8		0.626 J		N/A		1.61		2.44		4.97		0.525 J		N/A		1.07	
Potassium	7440-09-7	ug/L	NE	14400		4630		N/A		4020		3860		3490		7280		N/A		9340	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U		N/A		< 5 U		< 5 U		2.08 J		< 5 U		N/A		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	0.203 J		< 1 U		N/A		< 1 U		< 1 U		< 1 U		< 1 U		N/A		< 1 U	
Sodium	7440-23-5	ug/L	NE	58800		87400		N/A		75500		63700		39800		86400		N/A		83800	
Thallium	7440-28-0	ug/L	2 (a,b)	0.428 J		< 1 U		N/A		< 1 U		0.171 J		0.206 J		< 1 U		N/A		< 1 U	
Vanadium	7440-62-2	ug/L	NE	31		39.6		N/A		43.2		35		35.5		26.1		N/A		5.86	
Zinc	7440-66-6	ug/L	NE	36.9		< 5 U		N/A		< 5 U		< 5 U		5.89		< 5 U		N/A		< 5 UJ	FG

Table B-4
In-Situ Stabilization
Method 1316 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

		Sample Date		12/30/2020		12/30/2020	
		Sample ID		GAF-GW-1316-Rich-T4-End		GAF-GW-1316-Rich-T5-End	
		Lab Sample ID		180-115551-19		180-115551-20	
		Sample Type		N		N	
Analyte	CASNO	Units	MCL	Result	Reason Code	Result	Reason Code
Treatability Laboratory pH							
Laboratory pH	--	SU	--	11.68		11.43	
Anions							
Chloride	16887-00-6	MG/L	NE	N/A		N/A	
Fluoride	16984-48-8	MG/L	4 (a,b)	N/A		N/A	
Sulfate	14808-79-8	MG/L	NE	N/A		N/A	
General Chemistry							
Alkalinity, Carbonate (CaCO3)	ALKC	MG/L	NE	N/A		N/A	
Alkalinity, Hydroxide as CaCO3	ALK_HYD	MG/L	NE	N/A		N/A	
Alkalinity, Total as CaCO3	ALK	MG/L	NE	N/A		N/A	
Alkalinity, Bicarbonate (CaCO3)	ALKB	MG/L	NE	N/A		N/A	
Metals, Dissolved							
Aluminum	7429-90-5	ug/L	NE	2950		N/A	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		N/A	
Arsenic	7440-38-2	ug/L	10 (a,b)	1.75		N/A	
Barium	7440-39-3	ug/L	2000 (a,b)	52.4		N/A	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		N/A	
Boron	7440-42-8	ug/L	NE	< 80 U		N/A	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		N/A	
Calcium	7440-70-2	ug/L	NE	155000		N/A	
Chromium	7440-47-3	ug/L	100 (a,b)	60.3		N/A	
Cobalt	7440-48-4	ug/L	NE (c)	8.2		N/A	
Copper	7440-50-8	ug/L	NE	3.02		N/A	
Iron	7439-89-6	ug/L	NE	< 50 U		N/A	
Lead	7439-92-1	ug/L	15 (a,b)	< 1 U		N/A	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		N/A	
Magnesium	7439-95-4	ug/L	NE	< 500 U		N/A	
Manganese	7439-96-5	ug/L	NE	< 5 U		N/A	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.5 U		N/A	
Molybdenum	7439-98-7	ug/L	100 (b)	28		N/A	
Nickel	7440-02-0	ug/L	100 (a)	0.914 J		N/A	
Potassium	7440-09-7	ug/L	NE	9190		N/A	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		N/A	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		N/A	
Sodium	7440-23-5	ug/L	NE	57600		N/A	
Thallium	7440-28-0	ug/L	2 (a,b)	< 1 U		N/A	
Vanadium	7440-62-2	ug/L	NE	2.06		N/A	
Zinc	7440-66-6	ug/L	NE	4.41 J		N/A	
Metals, Total							
Aluminum	7429-90-5	ug/L	NE	4640		7860	
Antimony	7440-36-0	ug/L	6 (a,b)	< 2 U		< 2 U	
Arsenic	7440-38-2	ug/L	10 (a,b)	2.63		4.82	
Barium	7440-39-3	ug/L	2000 (a,b)	69.9		54.4	
Beryllium	7440-41-7	ug/L	4 (a,b)	< 1 U		0.187 J	
Boron	7440-42-8	ug/L	NE	< 80 U		< 80 U	
Cadmium	7440-43-9	ug/L	5 (a,b)	< 1 U		< 1 U	
Calcium	7440-70-2	ug/L	NE	203000		169000	
Chromium	7440-47-3	ug/L	100 (a,b)	70.7		115	
Cobalt	7440-48-4	ug/L	NE (c)	10.5		16.7	
Copper	7440-50-8	ug/L	NE	4.47		6.61	
Iron	7439-89-6	ug/L	NE	2470		5860	
Lead	7439-92-1	ug/L	15 (a,b)	0.886 J		2	
Lithium	7439-93-2	ug/L	40 (b)	< 5 U		< 5 U	
Magnesium	7439-95-4	ug/L	NE	120 J		367 J	
Manganese	7439-96-5	ug/L	NE	16.6		42.1	
Mercury	7439-97-6	ug/L	2 (a,b)	< 0.2 U		< 0.5 U	
Molybdenum	7439-98-7	ug/L	100 (b)	33.5		50.6	
Nickel	7440-02-0	ug/L	100 (a)	2.15		4.1	
Potassium	7440-09-7	ug/L	NE	11200		10100	
Selenium	7782-49-2	ug/L	50 (a,b)	< 5 U		< 5 U	
Silver	7440-22-4	ug/L	100 (a)	< 1 U		< 1 U	
Sodium	7440-23-5	ug/L	NE	70800		55000	
Thallium	7440-28-0	ug/L	2 (a,b)	< 1 U		0.155 J	
Vanadium	7440-62-2	ug/L	NE	5		12.3	
Zinc	7440-66-6	ug/L	NE	3.54 J		8.92	

Table B-4
In-Situ Stabilization
Method 1316 Whole Sampling Leaching Test Results
TVA Gallatin Fossil Plant, Gallatin, Tennessee

Notes and Acronymns

< - analyte not detected at the reporting quantitation limit shown

MG/L - miligrams per liter

N - primary sample

N/A - not analyzed

NE - not established at the Non-Registered Site

ug/L - micrograms per liter

(a) - Default published GWPS based on TN MCLs from Tennessee solid waste regulations, Appendix III (TN Rule 0400-11-01-.04). Site-specific GWPS may be developed under TN Rules (Alternate Concentration Limits, ACLs) with TDEC Approval.

(b) - Default published GWPS from CCR Rule, Appendix IV (40 CFR 257.95) based on Primary MCLs for public drinking water supplies (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations) and default values for parameters without primary MCLs. Site-specific GWPSs may be developed under the CCR Rule if background is above the default GWPS/MCL.

(c) TDEC approved an Alternate Source Demonstration for cobalt at the NRS; no alternate GWPS established.

Qualifier Definitions

U	The analyte was analyzed for but not detected. The associated numerical value is at or below the reporting limit.
U*	This result should be considered “not detected” because it was detected in a rinsate blank or laboratory blank at a similar level.
UR	Unreliable reporting limit; analyte may or may not be present in sample.
R	Unreliable positive result; analyte may or may not be present in sample.
R*	This result has been rejected following data user review.
J	Quantitation is approximate due to limitations identified during data validation.
UJ	This analyte was not detected, but the reporting or detection limit may or may not be higher due to a bias identified during data validation.

Reason Code Definitions

BE	Equipment blank contamination. The result should be considered “not-detected.”
BF	Field blank contamination. The result should be considered “not-detected.”
BL	Laboratory blank contamination. The result should be considered “not-detected.”
BN	Negative laboratory blank contamination.
C	Initial and/or continuing calibration issue, indeterminate bias.
C+	Initial and/or continuing calibration issue. The result may be biased high.
C-	Initial and/or continuing calibration issue. The result may be biased low.
DQ	Data user qualification.
FD	Field duplicate imprecision.
FG	Total versus Dissolved Imprecision.
H	Holding time exceeded.
I	Internal standard recovery outside of acceptance limits.
L	LCS and LCSD recoveries outside of acceptance limits, indeterminate bias.
L+	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased high.
L-	LCS and/or LCSD recoveries outside of acceptance limits. The result may be biased low.
LD	Laboratory duplicate imprecision.
LP	LCS/LCSD imprecision.
M	MS and MSD recoveries outside of acceptance limits, indeterminate bias.
M+	MS and/or MSD recoveries outside of acceptance limits. The result may be biased high.
M-	MS and/or MSD recoveries outside of acceptance limits. The result may be biased low.
MP	MS/MSD imprecision.
P	Post-digestion spike recoveries outside of acceptance limits, indeterminate bias.
P+	Post-digestion spike recovery outside of acceptance limits. The result may be biased high.
P-	Post-digestion spike recovery outside of acceptance limits. The result may be biased low.
Q	Chemical preservation issue.
R	RL standards outside of acceptance limits, indeterminate bias.
R+	RL standard(s) outside of acceptance limits. The result may be biased high.
R-	RL standard(s) outside of acceptance limits. The result may be biased low.
S	Radium-226+228 flagged due to reporting protocol for combined results.
SD	Serial dilution imprecision.
T	Temperature preservation issue.
X	Percent solids < 50%.
Y+	Chemical yield outside of acceptance limits. The result may be biased high.
Y-	Chemical yield outside of acceptance limits. The result may be biased low.
Z	ICP/MS interference.
ZZ	Other.

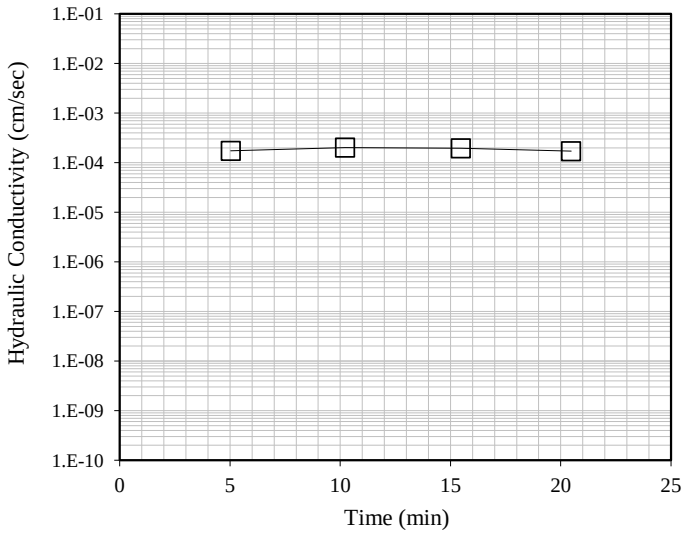
Appendix C Analytical Laboratory Reports

Hydraulic Conductivity

Client: AECOM
Project: 60621225 - NRS Treatability
Sample ID: Lean Mix - Type 5

TRI Log #: 61118.1
Test Method: ASTM D5084

Sample Condition	Initial	Final
	Client-Remolded	Post-Test
Diameter (in)	1.99	1.98
Height (in)	3.08	3.04
Mass (g)	290.5	305.8
Sample Area (in^2)	3.10	3.09
Water Content (%)	14.0	18.8
Total Unit Weight (pcf)	115.9	123.9
Dry Unit Weight (pcf)	101.7	104.3
Specific Gravity (Assumed)	2.75	
Degree of Saturation	56.0	80.0
Void Ratio	0.69	0.64
Porosity	0.41	0.39
1 Pore Volume (cc)	63.7	60.4



Eff. Confining Stress (psi)	5.0
Back-Pressure	80.0
B-Value Prior to Permeation	0.96
Permeant	De-Aired Tap Water

Specimen Image



Method C—Falling Head, rising tailwater elevation			
Time, t	Initial Gradient	Final Gradient	K_{20}
Min	-	-	cm/s
5.0	2.9	2.6	1.7E-04
10.2	2.6	2.2	2.0E-04
15.5	2.2	1.9	1.9E-04
20.5	1.9	1.6	1.7E-04
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Average, Last 4 Readings			**1.9E-04**

Jeffrey A. Kuhn, Ph.D, P.E. 12/29/2020
Analysis & Quality Review/Date

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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TESTING, RESEARCH, CONSULTING AND FIELD SERVICES

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Unconfined Compression Test Report

Client: AECOM

Project: 60621225 - NRS Treatability

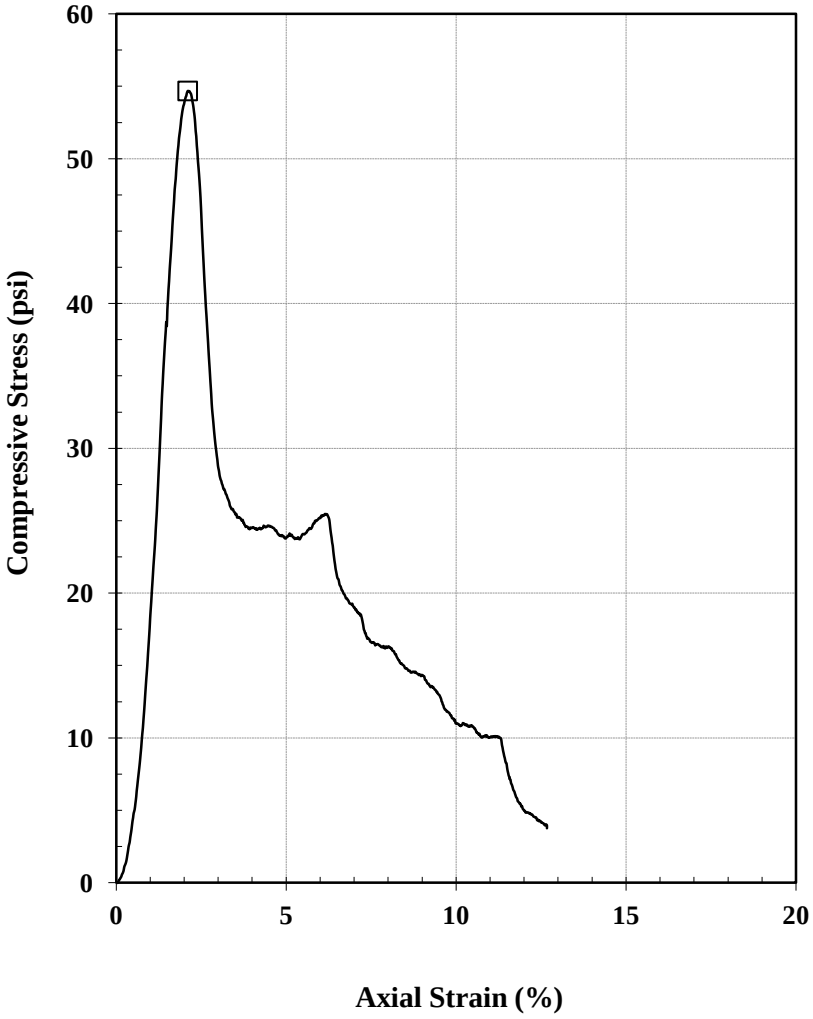
Sample ID: Lean Mix - Type 5

TRI Log No.: 61118.2

Type of Specimen: Client-Remolded

Test Method: ASTM D2166

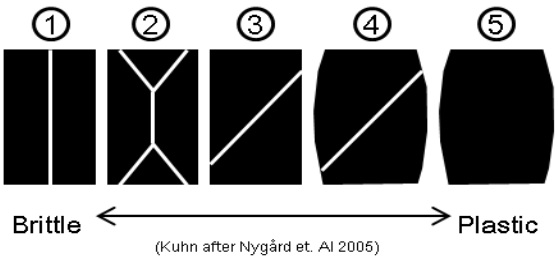
Strain Rate (%/min): 1.0 % / min



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.99
Avg. Height (in)	H_o	3.77
Avg, Water Content (%)	w_o	17.9
Bulk Density (pcf)	γ_{total}	103.9
Dry Density (pcf)	γ_{dry}	88.2
Saturation (%)	S_r	51.7
Void Ratio	e_o	0.95
Assumed Specific Gravity	G_s	2.75

Stresses at Failure	
Unconfined Compressive Strength (psi)	54.7
Axial Strain at Failure (%)	2.1
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	54.7
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	27.3

Failure Mode	2



(Kuhn after Nygård et. Al 2005)

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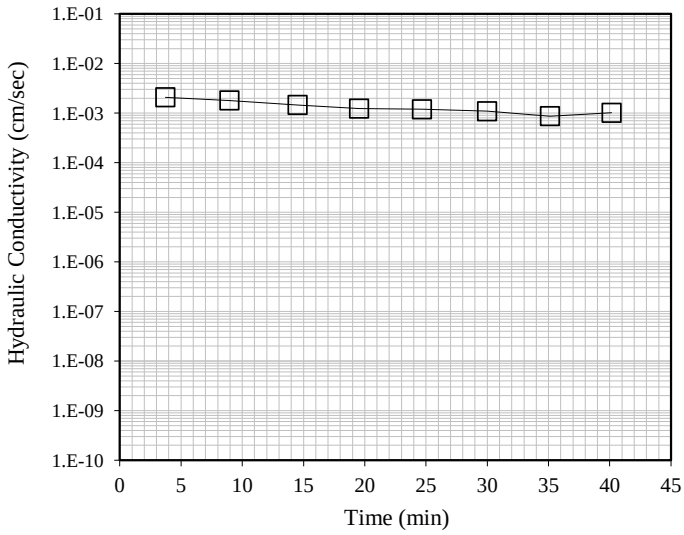
Hydraulic Conductivity

Client: AECOM
Project: 60621225 - NRS Treatability
Sample ID: Rich Mix - Type 5

TRI Log #: 61118.3
Test Method: ASTM D5084

Sample Condition	Initial	Final
	Client-Remolded	Post-Test
Diameter (in)	1.99	1.97
Height (in)	3.14	3.12
Mass (g)	257.5	280.9
Sample Area (in^2)	3.10	3.03
Water Content (%)	16.3	23.6
Total Unit Weight (pcf)	100.9	113.1
Dry Unit Weight (pcf)	86.7	91.5
Specific Gravity (Assumed)	2.75	
Degree of Saturation	45.9	74.3
Void Ratio	0.98	0.88
Porosity	0.49	0.47
1 Pore Volume (cc)	78.8	72.3



Eff. Confining Stress (psi)	5.0
Back-Pressure	80.0
B-Value Prior to Permeation	0.91
Permeant	De-Aired Tap Water

Specimen Image



Method C—Falling Head, rising tailwater elevation			
Time, t	Initial Gradient	Final Gradient	K_{20}
Min	-	-	cm/s
3.7	2.9	2.3	2.1E-03
9.0	2.3	1.8	1.8E-03
14.5	1.8	1.4	1.5E-03
19.5	1.4	1.2	1.2E-03
24.7	1.2	1.0	1.2E-03
30.0	1.0	0.9	1.1E-03
35.1	0.9	0.8	8.7E-04
40.2	0.8	0.7	1.0E-03
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Average, Last 4 Readings			**1.0E-03**

Jeffrey A. Kuhn, Ph.D, P.E. 12/29/2020
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Unconfined Compression Test Report

Client: AECOM

Project: 60621225 - NRS Treatability

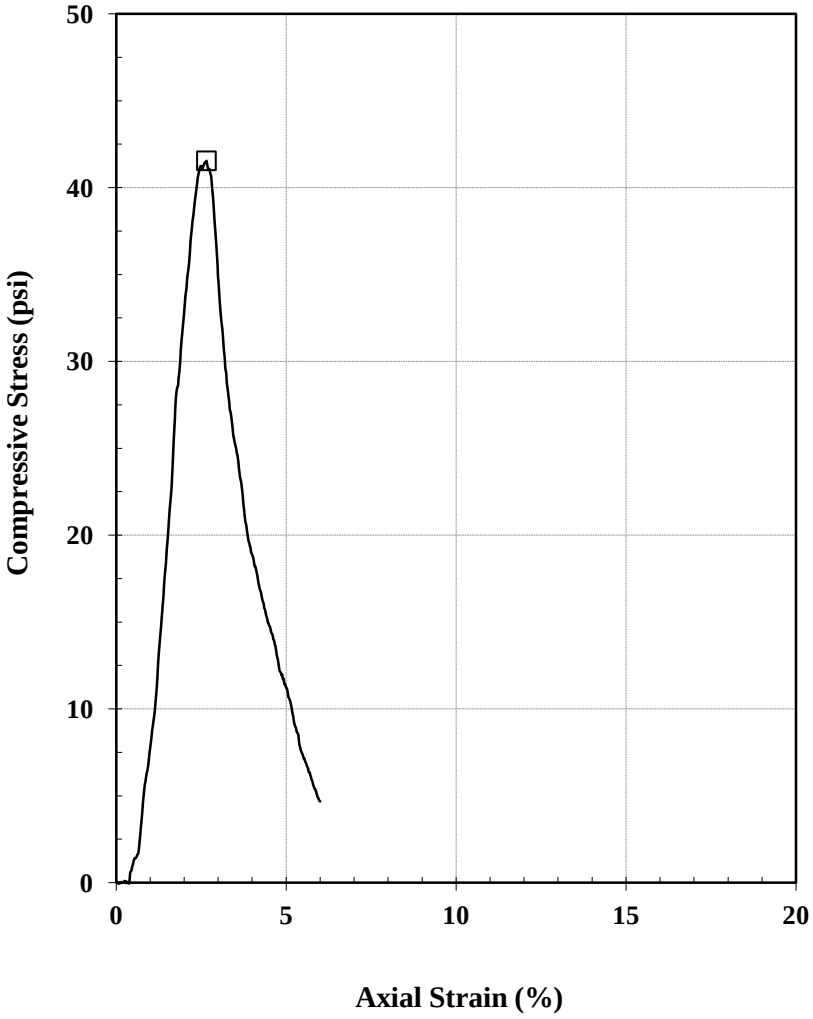
Sample ID: Rich Mix - Type 5

TRI Log No.: 61118.4

Type of Specimen: Client-Remolded

Test Method: ASTM D2166

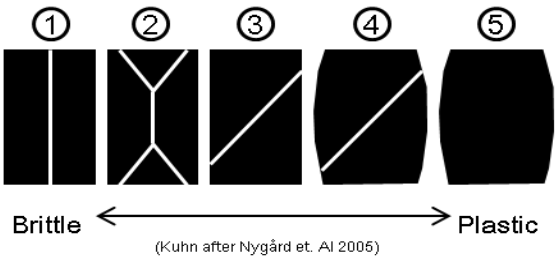
Strain Rate (%/min): 1.0 % / min



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.98
Avg. Height (in)	H_o	3.88
Avg, Water Content (%)	w_o	12.7
Bulk Density (pcf)	γ_{total}	102.8
Dry Density (pcf)	γ_{dry}	91.2
Saturation (%)	S_r	37.5
Void Ratio	e_o	0.88
Assumed Specific Gravity	G_s	2.75

Stresses at Failure	
Unconfined Compressive Strength (psi)	41.5
Axial Strain at Failure (%)	2.7
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	41.5
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	20.8

Failure Mode	2



(Kuhn after Nygård et. Al 2005)

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-114256-1
Client Project/Site: GAF-NRS-Treatabilty

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
12/7/2020 4:33:16 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

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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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Job ID: 180-114256-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-114256-1

Receipt
The samples were received on 12/2/2020 10:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.9º C.

Receipt Exceptions
The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): GAF-1315-DOLO 1.0%-T2-T (180-114256-19). The container labels list an id of GAF-1315 DOLO 1%-T2-T, while the COC lists GAF-1315 DOLO 1.0%-T2-T. The ID on the COC was used.

The container labels for the following samples did not match the information listed on the Chain-of-Custody (COC): GAF-1315-CONTROL-T48-D (180-114256-6), GAF-1315-HICAL 0.5%-T2-D (180-114256-8), GAF-1315-HICAL 0.5-T48-D (180-114256-12), GAF-1315-DOLO 0.5-T2-D (180-114256-14) and GAF-1315-DOLO 1.0-T24-D (180-114256-22). The container labels do not list nitric dissolved, while the COC listed dissolved metals analysis. They were logged as dissolved metals according to the COC.

The container labels for the following samples did not match the information listed on the Chain-of-Custody (COC): GAF-1315-HICAL 0.5%-T2-T (180-114256-7), GAF-1315-HICAL 0.5-T48-T (180-114256-11), GAF-1315-DOLO 1.0%-T2-T (180-114256-19), GAF-1315-DOLO 1.0-T24-T (180-114256-21), GAF-1315-DOLO 1.0-T48-T (180-114256-23) and GAF-GW-COL 1 REDOSE-PV1 (180-114256-34). The container labels listed nitric dissolved, while the COC listed total metals analysis. They were logged as total metals according to the COC.

Metals
Method 3005A: Insufficient sample was provided for preparation/analysis of GAF-GW-COL 1 REDOSE-PV1 (180-114256-34). THe volume was adjusted so as to not affect the reporting limit.

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

Definitions/Glossary

Client: Environmental Standards Inc. Job ID: 180-114256-1
Project/Site: GAF-NRS-Treatabilty

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Job ID: 180-114256-1
Project/Site: GAF-NRS-Treatabilty

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-114256-1	GAF-1315-CONTROL-T2-T	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-2	GAF-1315-CONTROL-T2-D	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-3	GAF-1315-CONTROL-T24-T	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-4	GAF-1315-CONTROL-T24-D	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-5	GAF-1315-CONTROL-T48-T	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-6	GAF-1315-CONTROL-T48-D	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-7	GAF-1315-HICAL 0.5-T2-T	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-8	GAF-1315-HICAL 0.5-T2-D	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-9	GAF-1315-HICAL 0.5-T24-T	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-10	GAF-1315-HICAL 0.5-T24-D	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-11	GAF-1315-HICAL 0.5-T48-T	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-12	GAF-1315-HICAL 0.5-T48-D	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-13	GAF-1315-DOLO 0.5-T2-T	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-14	GAF-1315-DOLO 0.5-T2-D	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-15	GAF-1315-DOLO 0.5-T24-T	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-16	GAF-1315-DOLO 0.5-T24-D	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-17	GAF-1315-DOLO 0.5-T48-T	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-18	GAF-1315-DOLO 0.5-T48-D	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-19	GAF-1315-DOLO 1.0-T2-T	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-20	GAF-1315-DOLO 1.0-T2-D	Water	11/23/20 14:40	12/02/20 10:30	
180-114256-21	GAF-1315-DOLO 1.0-T24-T	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-22	GAF-1315-DOLO 1.0-T24-D	Water	11/24/20 12:40	12/02/20 10:30	
180-114256-23	GAF-1315-DOLO 1.0-T48-T	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-24	GAF-1315-DOLO 1.0-T48-D	Water	11/25/20 12:40	12/02/20 10:30	
180-114256-25	GAF-1315-CONTROL-T7DAY-T	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-26	GAF-1315-CONTROL-T7DAY-D	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-27	GAF-1315-HICAL 0.5-T7DAY-T	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-28	GAF-1315-HICAL 0.5-T-7DAY-D	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-29	GAF-1315-DOLO 0.5-T7DAY-T	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-30	GAF-1315-DOLO 0.5-T7DAY-D	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-31	GAF-1315-DOLO 1.0-T7DAY-T	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-32	GAF-1315-DOLO 1.0-T7DAY-D	Water	11/30/20 12:40	12/02/20 10:30	
180-114256-33	GAF-GW-COL 1 REDOSE-PV0.5	Water	11/22/20 11:30	12/02/20 10:30	
180-114256-34	GAF-GW-COL 1 REDOSE-PV1	Water	11/23/20 03:30	12/02/20 10:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T2-T

Lab Sample ID: 180-114256-1
Date Collected: 11/23/20 14:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 09:28	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339667	12/07/20 07:39	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-CONTROL-T2-D

Lab Sample ID: 180-114256-2
Date Collected: 11/23/20 14:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 09:31	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339667	12/07/20 07:42	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-CONTROL-T24-T

Lab Sample ID: 180-114256-3
Date Collected: 11/24/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 09:39	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339667	12/07/20 07:45	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-CONTROL-T24-D

Lab Sample ID: 180-114256-4
Date Collected: 11/24/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 09:41	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339667	12/07/20 07:47	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T48-T

Lab Sample ID: 180-114256-5
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 09:44	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339667	12/07/20 07:50	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-CONTROL-T48-D

Lab Sample ID: 180-114256-6
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 09:46	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339667	12/07/20 07:52	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-HICAL 0.5-T2-T

Lab Sample ID: 180-114256-7
Date Collected: 11/23/20 14:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 09:49	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339667	12/07/20 07:55	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-HICAL 0.5-T2-D

Lab Sample ID: 180-114256-8
Date Collected: 11/23/20 14:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 09:52	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339667	12/07/20 08:05	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T24-T

Lab Sample ID: 180-114256-9
Date Collected: 11/24/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 09:54	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339667	12/07/20 08:08	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-HICAL 0.5-T24-D

Lab Sample ID: 180-114256-10
Date Collected: 11/24/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 09:57	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339667	12/07/20 08:10	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-HICAL 0.5-T48-T

Lab Sample ID: 180-114256-11
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 09:59	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339667	12/07/20 08:13	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-HICAL 0.5-T48-D

Lab Sample ID: 180-114256-12
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 10:02	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339667	12/07/20 08:16	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T2-T

Lab Sample ID: 180-114256-13
Date Collected: 11/23/20 14:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 10:10	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T2-D

Lab Sample ID: 180-114256-14
Date Collected: 11/23/20 14:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 10:30	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T24-T

Lab Sample ID: 180-114256-15
Date Collected: 11/24/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 10:33	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T24-D

Lab Sample ID: 180-114256-16
Date Collected: 11/24/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 10:35	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T48-T

Lab Sample ID: 180-114256-17
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 10:38	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T48-D

Lab Sample ID: 180-114256-18

Date Collected: 11/25/20 12:40

Matrix: Water

Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 10:40	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T2-T

Lab Sample ID: 180-114256-19

Date Collected: 11/23/20 14:40

Matrix: Water

Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 10:48	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T2-D

Lab Sample ID: 180-114256-20

Date Collected: 11/23/20 14:40

Matrix: Water

Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339278	12/03/20 07:32	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 10:51	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T24-T

Lab Sample ID: 180-114256-21

Date Collected: 11/24/20 12:40

Matrix: Water

Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 10:59	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T24-D

Lab Sample ID: 180-114256-22

Date Collected: 11/24/20 12:40

Matrix: Water

Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 11:01	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T48-T
Lab Sample ID: 180-114256-23
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 11:04	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T48-D
Lab Sample ID: 180-114256-24
Date Collected: 11/25/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 11:06	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-CONTROL-T7DAY-T
Lab Sample ID: 180-114256-25
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 11:09	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-CONTROL-T7DAY-D
Lab Sample ID: 180-114256-26
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 11:42	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-HICAL 0.5-T7DAY-T
Lab Sample ID: 180-114256-27
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 11:45	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T-7DAY-D

Lab Sample ID: 180-114256-28
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 11:48	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T7DAY-T

Lab Sample ID: 180-114256-29
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 11:50	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 0.5-T7DAY-D

Lab Sample ID: 180-114256-30
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 11:53	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T7DAY-T

Lab Sample ID: 180-114256-31
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 11:55	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1315-DOLO 1.0-T7DAY-D

Lab Sample ID: 180-114256-32
Date Collected: 11/30/20 12:40
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			339509	12/04/20 11:58	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-GW-COL 1 REDOSE-PV0.5

Lab Sample ID: 180-114256-33
Date Collected: 11/22/20 11:30
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 12:06	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL 1 REDOSE-PV1

Lab Sample ID: 180-114256-34
Date Collected: 11/23/20 03:30
Matrix: Water
Date Received: 12/02/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			25 mL	25 mL	339274	12/03/20 07:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			339509	12/04/20 12:16	RJR	TAL PIT
	Instrument ID: NEMO									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KHM = Kyle Mucroski

Batch Type: Analysis

RJR = Ron Rosenbaum

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T2-T

Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.000264**	**J**	0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:39	1
Cadmium	**0.000321**	**J**	0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:28	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:39	1
Nickel	**0.0144**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:28	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T2-D

Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:42	1
Cadmium	**0.000230**	**J**	0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:31	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:42	1
Nickel	**0.0143**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:31	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T24-T

Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:45	1
Cadmium	**0.000299**	**J**	0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:39	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:45	1
Nickel	**0.0234**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:39	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T24-D
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:47	1
Cadmium	**0.000275**	**J**	0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:41	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:47	1
Nickel	**0.0230**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:41	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T48-T
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:50	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:44	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:50	1
Nickel	**0.0121**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:44	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T48-D
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:52	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:46	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:52	1
Nickel	**0.0117**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:46	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T2-T
Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:55	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:49	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:55	1
Nickel	**0.00548**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:49	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T2-D

Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 08:05	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:52	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 08:05	1
Nickel	**0.00474**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:52	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T24-T
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 08:08	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:54	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 08:08	1
Nickel	**0.00397**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:54	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T24-D
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 08:10	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:57	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 08:10	1
Nickel	**0.00349**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:57	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T48-T
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 08:13	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:59	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 08:13	1
Nickel	**0.00379**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:59	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T48-D
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-12
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 08:16	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:02	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 08:16	1
Nickel	**0.00372**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:02	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T2-T
Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:10	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:10	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:10	1
Nickel	**0.00534**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:10	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T2-D
Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:30	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:30	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:30	1
Nickel	**0.00501**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:30	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T24-T
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:33	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:33	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:33	1
Nickel	**0.00457**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:33	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T24-D
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-16
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:35	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:35	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:35	1
Nickel	**0.00430**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:35	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T48-T
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-17
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:38	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:38	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:38	1
Nickel	**0.00431**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:38	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T48-D
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-18
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:40	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:40	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:40	1
Nickel	**0.00418**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:40	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T2-T
Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-19
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:48	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:48	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:48	1
Nickel	**0.00575**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:48	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T2-D
Date Collected: 11/23/20 14:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-20
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/04/20 10:51	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 10:51	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/04/20 10:51	1
Nickel	**0.00486**	**B**	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 10:51	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T24-T
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-21
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.000319**	**J**	0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 10:59	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 10:59	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 10:59	1
Nickel	**0.00424**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 10:59	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T24-D
Date Collected: 11/24/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-22
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:01	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:01	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:01	1
Nickel	**0.00459**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:01	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T48-T
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-23
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:04	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:04	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:04	1
Nickel	**0.00403**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:04	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T48-D
Date Collected: 11/25/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-24
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:06	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:06	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:06	1
Nickel	**0.00383**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:06	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T7DAY-T
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-25
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:09	1
Cadmium	**0.000344**	**J**	0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:09	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:09	1
Nickel	**0.0128**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:09	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-CONTROL-T7DAY-D

Lab Sample ID: 180-114256-26

Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:42	1
Cadmium	**0.000364**	**J**	0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:42	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:42	1
Nickel	**0.0129**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:42	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T7DAY-T
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-27
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:45	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:45	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:45	1
Nickel	**0.00223**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:45	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-HICAL 0.5-T-7DAY-D
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-28
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:48	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:48	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:48	1
Nickel	**0.00269**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:48	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T7DAY-T
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-29
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:50	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:50	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:50	1
Nickel	**0.00301**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:50	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 0.5-T7DAY-D
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-30
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:53	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:53	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:53	1
Nickel	**0.00302**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:53	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T7DAY-T
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-31
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:55	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:55	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:55	1
Nickel	**0.00271**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:55	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-1315-DOLO 1.0-T7DAY-D
Date Collected: 11/30/20 12:40
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-32
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 11:58	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 11:58	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 11:58	1
Nickel	**0.00249**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 11:58	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-GW-COL 1 REDOSE-PV0.5

Lab Sample ID: 180-114256-33

Date Collected: 11/22/20 11:30
Matrix: Water
Date Received: 12/02/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 12:06	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 12:06	1
Lithium	**0.00364**	**J**	0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 12:06	1
Nickel	**0.00957**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 12:06	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatabilty

Job ID: 180-114256-1

Client Sample ID: GAF-GW-COL 1 REDOSE-PV1
Date Collected: 11/23/20 03:30
Date Received: 12/02/20 10:30

Lab Sample ID: 180-114256-34
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 12:16	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 12:16	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 12:16	1
Nickel	**0.0179**		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 12:16	1

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

Lab Sample ID: MB 180-339274/1-A
Matrix: Water
Analysis Batch: 339509

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 339274

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:28	12/04/20 10:53	1
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:28	12/04/20 10:53	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:28	12/04/20 10:53	1
Nickel	ND		0.00100	0.000336	mg/L		12/03/20 07:28	12/04/20 10:53	1

Lab Sample ID: LCS 180-339274/2-A
Matrix: Water
Analysis Batch: 339509

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 339274

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.5182		mg/L		104	80 - 120
Cadmium	0.500	0.5101		mg/L		102	80 - 120
Lithium	0.500	0.4776		mg/L		96	80 - 120
Nickel	0.500	0.4686		mg/L		94	80 - 120

Lab Sample ID: 180-114256-25 MS
Matrix: Water
Analysis Batch: 339509

Client Sample ID: GAF-1315-CONTROL-T7DAY-T
Prep Type: Total Recoverable
Prep Batch: 339274

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.4939		mg/L		99	75 - 125
Cadmium	0.000344	J	0.500	0.4924		mg/L		98	75 - 125
Lithium	ND		0.500	0.4505		mg/L		90	75 - 125
Nickel	0.0128		0.500	0.4603		mg/L		90	75 - 125

Lab Sample ID: 180-114256-25 MSD
Matrix: Water
Analysis Batch: 339509

Client Sample ID: GAF-1315-CONTROL-T7DAY-T
Prep Type: Total Recoverable
Prep Batch: 339274

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.4932		mg/L		99	75 - 125	0	20
Cadmium	0.000344	J	0.500	0.4929		mg/L		99	75 - 125	0	20
Lithium	ND		0.500	0.4653		mg/L		93	75 - 125	3	20
Nickel	0.0128		0.500	0.4629		mg/L		90	75 - 125	1	20

Lab Sample ID: MB 180-339278/1-A
Matrix: Water
Analysis Batch: 339509

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 339278

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		12/03/20 07:32	12/04/20 09:23	1
Nickel	0.0003570	J	0.00100	0.000336	mg/L		12/03/20 07:32	12/04/20 09:23	1

Lab Sample ID: MB 180-339278/1-A
Matrix: Water
Analysis Batch: 339667

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 339278

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		12/03/20 07:32	12/07/20 07:34	1
Lithium	ND		0.00500	0.00339	mg/L		12/03/20 07:32	12/07/20 07:34	1

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

Lab Sample ID: LCS 180-339278/2-A
Matrix: Water
Analysis Batch: 339509

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 339278

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.5004		mg/L		100	80 - 120
Nickel	0.500	0.4640		mg/L		93	80 - 120

Lab Sample ID: LCS 180-339278/2-A
Matrix: Water
Analysis Batch: 339667

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 339278

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.4668		mg/L		93	80 - 120
Lithium	0.500	0.5029		mg/L		101	80 - 120

Lab Sample ID: 180-114256-13 MS
Matrix: Water
Analysis Batch: 339509

Client Sample ID: GAF-1315-DOLO 0.5-T2-T
Prep Type: Total Recoverable
Prep Batch: 339278

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.5157		mg/L		103	75 - 125
Cadmium	ND		0.500	0.4902		mg/L		98	75 - 125
Lithium	ND		0.500	0.4590		mg/L		92	75 - 125
Nickel	0.00534	B	0.500	0.4618		mg/L		91	75 - 125

Lab Sample ID: 180-114256-13 MSD
Matrix: Water
Analysis Batch: 339509

Client Sample ID: GAF-1315-DOLO 0.5-T2-T
Prep Type: Total Recoverable
Prep Batch: 339278

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.4948		mg/L		99	75 - 125	4	20
Cadmium	ND		0.500	0.4838		mg/L		97	75 - 125	1	20
Lithium	ND		0.500	0.4498		mg/L		90	75 - 125	2	20
Nickel	0.00534	B	0.500	0.4480		mg/L		89	75 - 125	3	20

Metals

Prep Batch: 339274

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114256-21	GAF-1315-DOLO 1.0-T24-T	Total Recoverable	Water	3005A	
180-114256-22	GAF-1315-DOLO 1.0-T24-D	Dissolved	Water	3005A	
180-114256-23	GAF-1315-DOLO 1.0-T48-T	Total Recoverable	Water	3005A	
180-114256-24	GAF-1315-DOLO 1.0-T48-D	Dissolved	Water	3005A	
180-114256-25	GAF-1315-CONTROL-T7DAY-T	Total Recoverable	Water	3005A	
180-114256-26	GAF-1315-CONTROL-T7DAY-D	Dissolved	Water	3005A	
180-114256-27	GAF-1315-HICAL 0.5-T7DAY-T	Total Recoverable	Water	3005A	
180-114256-28	GAF-1315-HICAL 0.5-T-7DAY-D	Dissolved	Water	3005A	
180-114256-29	GAF-1315-DOLO 0.5-T7DAY-T	Total Recoverable	Water	3005A	
180-114256-30	GAF-1315-DOLO 0.5-T7DAY-D	Dissolved	Water	3005A	
180-114256-31	GAF-1315-DOLO 1.0-T7DAY-T	Total Recoverable	Water	3005A	
180-114256-32	GAF-1315-DOLO 1.0-T7DAY-D	Dissolved	Water	3005A	
180-114256-33	GAF-GW-COL 1 REDOSE-PV0.5	Total Recoverable	Water	3005A	
180-114256-34	GAF-GW-COL 1 REDOSE-PV1	Total Recoverable	Water	3005A	
MB 180-339274/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-339274/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-114256-25 MS	GAF-1315-CONTROL-T7DAY-T	Total Recoverable	Water	3005A	
180-114256-25 MSD	GAF-1315-CONTROL-T7DAY-T	Total Recoverable	Water	3005A	

Prep Batch: 339278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114256-1	GAF-1315-CONTROL-T2-T	Total Recoverable	Water	3005A	
180-114256-2	GAF-1315-CONTROL-T2-D	Dissolved	Water	3005A	
180-114256-3	GAF-1315-CONTROL-T24-T	Total Recoverable	Water	3005A	
180-114256-4	GAF-1315-CONTROL-T24-D	Dissolved	Water	3005A	
180-114256-5	GAF-1315-CONTROL-T48-T	Total Recoverable	Water	3005A	
180-114256-6	GAF-1315-CONTROL-T48-D	Dissolved	Water	3005A	
180-114256-7	GAF-1315-HICAL 0.5-T2-T	Total Recoverable	Water	3005A	
180-114256-8	GAF-1315-HICAL 0.5-T2-D	Dissolved	Water	3005A	
180-114256-9	GAF-1315-HICAL 0.5-T24-T	Total Recoverable	Water	3005A	
180-114256-10	GAF-1315-HICAL 0.5-T24-D	Dissolved	Water	3005A	
180-114256-11	GAF-1315-HICAL 0.5-T48-T	Total Recoverable	Water	3005A	
180-114256-12	GAF-1315-HICAL 0.5-T48-D	Dissolved	Water	3005A	
180-114256-13	GAF-1315-DOLO 0.5-T2-T	Total Recoverable	Water	3005A	
180-114256-14	GAF-1315-DOLO 0.5-T2-D	Dissolved	Water	3005A	
180-114256-15	GAF-1315-DOLO 0.5-T24-T	Total Recoverable	Water	3005A	
180-114256-16	GAF-1315-DOLO 0.5-T24-D	Dissolved	Water	3005A	
180-114256-17	GAF-1315-DOLO 0.5-T48-T	Total Recoverable	Water	3005A	
180-114256-18	GAF-1315-DOLO 0.5-T48-D	Dissolved	Water	3005A	
180-114256-19	GAF-1315-DOLO 1.0-T2-T	Total Recoverable	Water	3005A	
180-114256-20	GAF-1315-DOLO 1.0-T2-D	Dissolved	Water	3005A	
MB 180-339278/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-339278/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-114256-13 MS	GAF-1315-DOLO 0.5-T2-T	Total Recoverable	Water	3005A	
180-114256-13 MSD	GAF-1315-DOLO 0.5-T2-T	Total Recoverable	Water	3005A	

Analysis Batch: 339509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114256-1	GAF-1315-CONTROL-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-2	GAF-1315-CONTROL-T2-D	Dissolved	Water	EPA 6020A	339278
180-114256-3	GAF-1315-CONTROL-T24-T	Total Recoverable	Water	EPA 6020A	339278

Metals (Continued)

Analysis Batch: 339509 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114256-4	GAF-1315-CONTROL-T24-D	Dissolved	Water	EPA 6020A	339278
180-114256-5	GAF-1315-CONTROL-T48-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-6	GAF-1315-CONTROL-T48-D	Dissolved	Water	EPA 6020A	339278
180-114256-7	GAF-1315-HICAL 0.5-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-8	GAF-1315-HICAL 0.5-T2-D	Dissolved	Water	EPA 6020A	339278
180-114256-9	GAF-1315-HICAL 0.5-T24-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-10	GAF-1315-HICAL 0.5-T24-D	Dissolved	Water	EPA 6020A	339278
180-114256-11	GAF-1315-HICAL 0.5-T48-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-12	GAF-1315-HICAL 0.5-T48-D	Dissolved	Water	EPA 6020A	339278
180-114256-13	GAF-1315-DOLO 0.5-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-14	GAF-1315-DOLO 0.5-T2-D	Dissolved	Water	EPA 6020A	339278
180-114256-15	GAF-1315-DOLO 0.5-T24-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-16	GAF-1315-DOLO 0.5-T24-D	Dissolved	Water	EPA 6020A	339278
180-114256-17	GAF-1315-DOLO 0.5-T48-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-18	GAF-1315-DOLO 0.5-T48-D	Dissolved	Water	EPA 6020A	339278
180-114256-19	GAF-1315-DOLO 1.0-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-20	GAF-1315-DOLO 1.0-T2-D	Dissolved	Water	EPA 6020A	339278
180-114256-21	GAF-1315-DOLO 1.0-T24-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-22	GAF-1315-DOLO 1.0-T24-D	Dissolved	Water	EPA 6020A	339274
180-114256-23	GAF-1315-DOLO 1.0-T48-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-24	GAF-1315-DOLO 1.0-T48-D	Dissolved	Water	EPA 6020A	339274
180-114256-25	GAF-1315-CONTROL-T7DAY-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-26	GAF-1315-CONTROL-T7DAY-D	Dissolved	Water	EPA 6020A	339274
180-114256-27	GAF-1315-HICAL 0.5-T7DAY-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-28	GAF-1315-HICAL 0.5-T-7DAY-D	Dissolved	Water	EPA 6020A	339274
180-114256-29	GAF-1315-DOLO 0.5-T7DAY-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-30	GAF-1315-DOLO 0.5-T7DAY-D	Dissolved	Water	EPA 6020A	339274
180-114256-31	GAF-1315-DOLO 1.0-T7DAY-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-32	GAF-1315-DOLO 1.0-T7DAY-D	Dissolved	Water	EPA 6020A	339274
180-114256-33	GAF-GW-COL 1 REDOSE-PV0.5	Total Recoverable	Water	EPA 6020A	339274
180-114256-34	GAF-GW-COL 1 REDOSE-PV1	Total Recoverable	Water	EPA 6020A	339274
MB 180-339274/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	339274
MB 180-339278/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	339278
LCS 180-339274/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	339274
LCS 180-339278/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	339278
180-114256-13 MS	GAF-1315-DOLO 0.5-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-13 MSD	GAF-1315-DOLO 0.5-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-25 MS	GAF-1315-CONTROL-T7DAY-T	Total Recoverable	Water	EPA 6020A	339274
180-114256-25 MSD	GAF-1315-CONTROL-T7DAY-T	Total Recoverable	Water	EPA 6020A	339274

Analysis Batch: 339667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114256-1	GAF-1315-CONTROL-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-2	GAF-1315-CONTROL-T2-D	Dissolved	Water	EPA 6020A	339278
180-114256-3	GAF-1315-CONTROL-T24-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-4	GAF-1315-CONTROL-T24-D	Dissolved	Water	EPA 6020A	339278
180-114256-5	GAF-1315-CONTROL-T48-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-6	GAF-1315-CONTROL-T48-D	Dissolved	Water	EPA 6020A	339278
180-114256-7	GAF-1315-HICAL 0.5-T2-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-8	GAF-1315-HICAL 0.5-T2-D	Dissolved	Water	EPA 6020A	339278
180-114256-9	GAF-1315-HICAL 0.5-T24-T	Total Recoverable	Water	EPA 6020A	339278

Metals (Continued)

Analysis Batch: 339667 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114256-10	GAF-1315-HICAL 0.5-T24-D	Dissolved	Water	EPA 6020A	339278
180-114256-11	GAF-1315-HICAL 0.5-T48-T	Total Recoverable	Water	EPA 6020A	339278
180-114256-12	GAF-1315-HICAL 0.5-T48-D	Dissolved	Water	EPA 6020A	339278
MB 180-339278/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	339278
LCS 180-339278/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	339278

Pittsburgh, PA 15238
(413) 7[illegible]9018

Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr
Chelmsford, MA 01824

P O No: _____ Quote #: _____

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: _____ State: _____
Sampler(s): Craig Katkic

3=H_2SO_4 4=HNO_3 5–NaOH 6=Ascorbic Acid
er 10=H_3PO_4 1= _____ 12= _____

List Preservative Code below: 4 4

QA/QC Reporting Notes:

SW=Surface Water WW=Waste Water
ndoor/Ambient Air SG=Soil Gas
X2= _____ _____

C=Compsite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____
State-specific reporting standards:

	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni	6020 Dissolved -Be, Cd, Li, Ni							
I-T2-T	11/23/2020	2:40 PM	G	X1				1		x								
I-T2-D	11/23/2020	2:40 PM	G	X1				1			x							
-T24-T	11/24/2020	12:40 PM	G	X1				1		x								
-T24-D	11/24/2020	12:40 PM	G	X1				1			x							
-T48-T	11/25/2020	12:40 PM	G	X1				1		x								
-T48-D	11/25/2020	12:40 PM	G	X1				1			x							
0.5-T2-T ~~5%-T2-T~~	11/23/2020	2:40 PM	G	X1				1		x								
0.5-T2-D ~~5%-T2-D~~	11/23/2020	2:40 PM	G	X1				1			x							
5-T24-T	11/24/2020	12:40 PM	G	X1				1		x								
5-T24-D	11/24/2020	12:40 PM	G	X1				1			x							

180-114256 Chain of Custody

Received by:	Date:	Time:	Temp °C
	12/1/20	1500	Observed
Dallie Watson	12-2-20	10:30	Correction Factor
ETAPITT			Corrected
			IR ID #

☐ EDD format: _____
☐ E-mail to _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Pittsburgh, PA 15238
(412) 963-7058

Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824

P.O No.: _____ Quote #: _____

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: _____ State: _____
Sampler(s): Craig Katkic

3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
10=H_3PO_4 1= _____ 12= _____

SW=Surface Water WW=Waste Water
door/Ambient Air SG=Soil Gas
2= _____ _____

C=Compsite

	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		List Preservative Code below: 4	4								QA/QC Reporting Notes:
										Containers					Analysis				
-T48-T	11/25/2020	12:40 PM	G	X1				1		x									QA/QC Reporting Level: ☐ Level I ☐ Level II ☐ Level III ☐ Level IV ☐ Other: _____ State-specific reporting standards:
-T48-D	11/25/2020	12:40 PM	G	X1				1			x								
~~6-T2-T~~	11/23/2020	2:40 PM	G	X1				1		x									
-T2-D	11/23/2020	2:40 PM	G	X1				1			x								
T24-T	11/24/2020	12:40 PM	G	X1				1		x									
T24-D	11/24/2020	12:40 PM	G	X1				1			x								
T48-T	11/25/2020	12:40 PM	G	X1				1		x									
T48-D	11/25/2020	12:40 PM	G	X1				1			x								
~~6-T2-T~~	11/23/2020	2:40 PM	G	X1				1		x									
-T2-D	11/23/2020	2:40 PM	G	X1				1			x								

Received by:	Date:	Time:	Temp °C
	12/1/20	1500	Observed
[illegible]	12-2-20	10:31	Correction Factor
ETAPIT			Corrected
			IR ID #

☐ EDD format: _____
☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Pittsburgh, PA 15238
(412) 788-9318

Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr
Chelmsford, MA 01824

P.O No.: _____ Quote #: _____

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: _____ State: _____
Sampler(s): Craig Katkic

3 H_2SO_4 4=HNO_3 5 NaOH 6=Ascorbic Acid
10=H_3PO_4 t= _____ 12= _____

SW=Surface Water WW=Waste Water
loor/Ambient Air SG=Soil Gas
= _____ _____

C=Composite

	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni	6020 Dissolved -Be, Cd, Li, Ni							
					Containers					List Preservative Code below:								
										4	4							
'24-T	11/24/2020	12:40 PM	G	X1				1		x								
'24-D	11/24/2020	12:40 PM	G	X1				1			x							
'48-T	11/25/2020	12:40 PM	G	X1				1		x								
'48-D	11/25/2020	12:40 PM	G	X1				1			x							
day-T	11/30/2020	12:40 PM	G	X1				1		x								
day-D	11/30/2020	12:40 PM	G	X1				1			x							
7day-T	11/30/2020	12:40 PM	G	X1				1		x								
7day-D	11/30/2020	12:40 PM	G	X1				1			x							
'day-T	11/30/2020	12:40 PM	G	X1				1		x								
'day-D	11/30/2020	12:40 PM	G	X1				1			x							

Analysis

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other: _____
State-specific reporting standards:

Received by:	Date:	Time:	Temp °C
	12/1/20	1500	Observed:
Distilled Water	12-2-20	10:30	Correction Factor:
FTAH TI			Corrected:
			IR ID #:

☐ EDD format: _____
☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Pittsburgh, PA 15238
(412) 788-8618

Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824

P O No.: _____ Quote #: _____

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: _____ State: _____
Sampler(s): Craig Katkic

3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
10=H_3PO_4 11= _____ 12= _____

SW=Surface Water WW=Waste Water
door/Ambient Air SG=Soil Gas
2= _____ _____

C=Composite

	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni	6020 Dissolved - Be, Cd, Li, Ni								
					Containers					Analysis									
					List Preservative Code below:					4	4								
7day-T	11/30/2020	12:40 PM	G	X1				1		x									
7day-D	11/30/2020	12:40 PM	G	X1				1			x								
e-PV0.5	11/22/2020	11:30 AM	G	GW				1		x									
se-PV1	11/23/2020	3:30 AM	G	GW				1		x									

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other: _____
State-specific reporting standards

Received by:	Date:	Time:	Temp °C
	12/1/20	1500	Observed
Debbie Watson	12-2-20	10:30	Correction Factor
			Corrected
			IR ID #

☐ EDD format: _____
☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Page 1 of 4

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

RUSH

Special Handling:

☑TAT - Date Needed: 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

List Preservative Code below: 4 4

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= 1315 leachate X2=

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	6020 Totals -Be, Cd, Li, Ni	6020 Dissolved -Be, Cd, Li, Ni
	GAF-1315-Control-T2-T	11/23/2020	2:40 PM	G	X1				1	x	
	GAF-1315-Control-T2-D	11/23/2020	2:40 PM	G	X1				1		x
	GAF-1315-Control-T24-T	11/24/2020	12:40 PM	G	X1				1	x	
	GAF-1315-Control-T24-D	11/24/2020	12:40 PM	G	X1				1		x
	GAF-1315-Control-T48-T	11/25/2020	12:40 PM	G	X1				1	x	
	GAF-1315-Control-T48-D	11/25/2020	12:40 PM	G	X1				1		x
	GAF-1315-HiCal 0.5%-T2-T	11/23/2020	2:40 PM	G	X1				1	x	
	GAF-1315-HiCal 0.5%-T2-D	11/23/2020	2:40 PM	G	X1				1		x
	GAF-1315-HiCal 0.5-T24-T	11/24/2020	12:40 PM	G	X1				1	x	
	GAF-1315-HiCal 0.5-T24-D	11/24/2020	12:40 PM	G	X1				1		x

180-114256 Chain of Custody

Relinquished by:	Received by:	Date:	Time:	Temp °C
[signature]		12/1/20	1500	Observed
	Dulce Watson	12-2-20	10:30	Correction Factor
	ETAPITT			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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Rev. Nov 2016

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CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

RUSH

Special Handling:

☑ TAT - Date Needed: 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

List Preservative Code below: 4 4

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= 1315 leachate X2=

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni	6020 Dissolved -Be, Cd, Li, Ni								
	GAF-1315-HiCal 0.5-T48-T	11/25/2020	12:40 PM	G	X1				1		x									
	GAF-1315-HiCal 0.5-T48-D	11/25/2020	12:40 PM	G	X1				1			x								
	GAF-1315-Dolo 0.5%-T2-T	11/23/2020	2:40 PM	G	X1				1		x									
	GAF-1315-Dolo 0.5-T2-D	11/23/2020	2:40 PM	G	X1				1			x								
	GAF-1315-Dolo 0.5-T24-T	11/24/2020	12:40 PM	G	X1				1		x									
	GAF-1315-Dolo 0.5-T24-D	11/24/2020	12:40 PM	G	X1				1			x								
	GAF-1315-Dolo 0.5-T48-T	11/25/2020	12:40 PM	G	X1				1		x									
	GAF-1315-Dolo 0.5-T48-D	11/25/2020	12:40 PM	G	X1				1			x								
	GAF-1315-Dolo 1.0%-T2-T	11/23/2020	2:40 PM	G	X1				1		x									
	GAF-1315-Dolo 1.0-T2-D	11/23/2020	2:40 PM	G	X1				1			x								

Relinquished by:	Received by:	Date:	Time:	Temp °C
[signature]		12/1/20	1500	Observed
	Dennie Watts	12-2-20	10:30	Correction Factor
	ETAPiH			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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CHAIN OF CUSTODY RECORD

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(413) 789-9018

RUSH

Special Handling:

☑ TAT - Date Needed: 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

List Preservative Code below: 4 4

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= 1315 leachate X2=

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards:

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni	6020 Dissolved -Be, Cd, Li, Ni							
	GAF-1315-Dolo 1.0-T24-T	11/24/2020	12:40 PM	G	X1				1		x								
	GAF-1315-Dolo 1.0-T24-D	11/24/2020	12:40 PM	G	X1				1			x							
	GAF-1315-Dolo 1.0-T48-T	11/25/2020	12:40 PM	G	X1				1		x								
	GAF-1315-Dolo 1.0-T48-D	11/25/2020	12:40 PM	G	X1				1			x							
	GAF-1315-Control-T7day-T	11/30/2020	12:40 PM	G	X1				1		x								
	GAF-1315-Control-T7day-D	11/30/2020	12:40 PM	G	X1				1			x							
	GAF-1315-HiCal 0.5-T7day-T	11/30/2020	12:40 PM	G	X1				1		x								
	GAF-1315-HiCal 0.5-T7day-D	11/30/2020	12:40 PM	G	X1				1			x							
	GAF-1315-Dolo 0.5-T7day-T	11/30/2020	12:40 PM	G	X1				1		x								
	GAF-1315-Dolo 0.5-T7day-D	11/30/2020	12:40 PM	G	X1				1			x							

Relinquished by:	Received by:	Date:	Time:	Temp °C
[signature]		12/1/20	1500	Observed
	[signature]	12-2-20	10:30	Correction Factor
	ETAPH			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

RUSH

Special Handling:

☑ TAT - Date Needed: 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To:	Franciscos Barajas
	AECOM
	9400 Amberglen Blvd
	Austin, TX 78729
Telephone #:	978-905-2299
Project Mgr:	Craig MacPhee

Invoice To:	Craig MacPhee
	AECOM
	250 Apollo Dr.
	Chelmsford, MA 01824
P.O No.:	
Quote #:	

Project No:	TVA Gallatin EIP
Site Name:	GAF-NRS-Treatability
Location:	State:
Sampler(s):	Craig Katkic

F=Field Filtered **1**=Na_2S2O_3 **2**=HCl **3**=H_2SO_4 **4**=HNO_3 **5**=NaOH **6**=Ascorbic Acid
7=CH3OH **8**=$NaHSO_4$ **9**=Deionized Water **10**=H_3PO_4 **11**= **12**=

List Preservative Code below: 4 4

QA/QC Reporting Notes:

DW=Drinking Water **GW**=Groundwater **SW**=Surface Water **WW**=Waste Water
O=Oil **SO**=Soil **SL**=Sludge **A**=Indoor/Ambient Air **SG**=Soil Gas
X1= 1315 leachate X2=

G= Grab **C**=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni	6020 Dissolved -Be, Cd, Li, Ni
	GAF-1315-Dolo 1.0-T7day-T	11/30/2020	12:40 PM	G	X1				1	x	
	GAF-1315-Dolo 1.0-T7day-D	11/30/2020	12:40 PM	G	X1				1		x
	GAF-GW-Col 1 Redose-PV0.5	11/22/2020	11:30 AM	G	GW				1	x	
	GAF-GW-Col 1 Redose-PV1	11/23/2020	3:30 AM	G	GW				1	x	

QA/QC Reporting Level
☐ Level I ☐ Level II ☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
		12/1/20	1500
	Debbie Watson	12-2-20	10:30

Temp °C: Observed | Correction Factor | Corrected | IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-114256-1

Login Number: 114256 **List Source: Eurofins 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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-114632-1
Client Project/Site: GAF-NRS-Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
12/15/2020 3:54:38 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Job ID: 180-114632-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-114632-1

Receipt
The samples were received on 12/9/2020 9:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.4º C.

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

Metals
Method 3005A: Elevated reporting limits are provided for the following samples due to insufficient sample provided for preparation/analysis: GAF-GW-1316-DOLO 1.0-T3-MID (180-114632-18). Due to the limited sample, the sample could not be run at a lower dilution.

Method 3005A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-1316-CONTROL-T4-MID (180-114632-4), GAF-GW-1316-CONTROL-T5-MID (180-114632-5) and GAF-GW-1316-HI-CAL-T3-MID (180-114632-8). Elevated reporting limits (RLs) are provided.

Method 3005A: The following sample was diluted due to the nature of the sample matrix: GAF-GW-1316-DOLO 1.0-T4-MID (180-114632-19). Elevated reporting limits (RLs) are provided.

Method 6020A: The following sample was diluted due to the turbid nature of the sample matrix: GAF-GW-1316-HI-CAL-T3-MID (180-114632-8). Elevated reporting limits (RLs) are provided. This sample could not be run at a lower dilution.

Method 6020A: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following samples: GAF-GW-1316-CONTROL-T3-MID (180-114632-3), GAF-GW-1316-CONTROL-T4-MID (180-114632-4) and GAF-GW-1316-CONTROL-T5-MID (180-114632-5). These samples could not be run at a lower dilution for the affected analytes.

Method 6020A: The continuing calibration blank (CCB) associated with batch 180-340422 recovered above the upper control limit for chromium. The samples associated with this CCB were non-detects -or- less than the RL for the affected analytes; therefore, the data have been reported. The associated samples are impacted: GAF-GW-1316-HI-CAL-T5-MID (180-114632-10), GAF-GW-1316-DOLO 0.5-T1-MID (180-114632-11), GAF-GW-1316-DOLO 0.5-T2-MID (180-114632-12), GAF-GW-1316-DOLO 0.5-T3-MID (180-114632-13), GAF-GW-1316-DOLO 0.5-T4-MID (180-114632-14), GAF-GW-1316-DOLO 0.5-T5-MID (180-114632-15), (LCS 180-340145/2-A), (LCSD 180-340145/3-A), (MB 180-340145/1-A) and (180-114632-B-11-A SD ^5).

Methods 6020A: The data in this batch was analyzed on the A instrument however the data transfer program to the LIMs system was not working. Since this data needed to be reported the file was copied over to the DORY instrument and then uploaded. GAF-GW-1316-CONTROL-T3-MID (180-114632-3), GAF-GW-1316-CONTROL-T4-MID (180-114632-4), GAF-GW-1316-CONTROL-T5-MID (180-114632-5), GAF-GW-1316-DOLO 0.5-T4-MID (180-114632-14) and GAF-GW-1316-DOLO 0.5-T5-MID (180-114632-15)

Method 7470A: The continuing calibration verification (CCV) associated with batch 180-340576 recovered above the upper control limit for mercury . The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: GAF-GW-1316-CONTROL-T1-MID (180-114632-1), GAF-GW-1316-CONTROL-T2-MID (180-114632-2), GAF-GW-1316-CONTROL-T3-MID (180-114632-3), GAF-GW-1316-CONTROL-T4-MID (180-114632-4), GAF-GW-1316-CONTROL-T5-MID (180-114632-5), GAF-GW-1316-HI-CAL-T1-MID (180-114632-6), GAF-GW-1316-HI-CAL-T2-MID (180-114632-7), GAF-GW-1316-HI-CAL-T3-MID (180-114632-8), GAF-GW-1316-HI-CAL-T4-MID (180-114632-9), GAF-GW-1316-HI-CAL-T5-MID (180-114632-10), GAF-GW-1316-DOLO 0.5-T1-MID (180-114632-11), GAF-GW-1316-DOLO 0.5-T2-MID (180-114632-12), GAF-GW-1316-DOLO 0.5-T3-MID (180-114632-13), GAF-GW-1316-DOLO 0.5-T4-MID (180-114632-14), GAF-GW-1316-DOLO 0.5-T5-MID (180-114632-15), GAF-GW-1316-DOLO 1.0-T1-MID (180-114632-16), GAF-GW-1316-DOLO 1.0-T2-MID (180-114632-17), GAF-GW-1316-DOLO 1.0-T3-MID (180-114632-18), GAF-GW-1316-DOLO 1.0-T4-MID (180-114632-19), GAF-GW-1316-DOLO 1.0-T5-MID (180-114632-20), (LCS 180-340320/2-A), (LCS 180-340322/2-A), (LCSD 180-340320/3-A), (LCSD 180-340322/3-A), (MB 180-340320/1-A) and (MB 180-340322/1-A).

Job ID: 180-114632-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

Method 7470A: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 180-340320. LCSD was used instead

Method 7470A: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/(MS/MSD) associated with preparation batch 180-340322.

Method 7470A: Elevated reporting limits are provided for the following samples due to insufficient sample provided for 7470A preparation/analysis: GAF-GW-1316-CONTROL-T2-MID (180-114632-2), GAF-GW-1316-CONTROL-T3-MID (180-114632-3), GAF-GW-1316-CONTROL-T4-MID (180-114632-4), GAF-GW-1316-CONTROL-T5-MID (180-114632-5), GAF-GW-1316-HI-CAL-T4-MID (180-114632-9), GAF-GW-1316-HI-CAL-T5-MID (180-114632-10). Acid amounts and spike amounts have been adjusted accordingly. There is not enough volume to run these samples at a lower dilution.

Method 7470A: Elevated reporting limits are provided for the following samples due to insufficient sample provided for 7470A preparation/analysis: GAF-GW-1316-DOLO 0.5-T2-MID (180-114632-12), GAF-GW-1316-DOLO 0.5-T4-MID (180-114632-14), GAF-GW-1316-DOLO 0.5-T5-MID (180-114632-15), GAF-GW-1316-DOLO 1.0-T2-MID (180-114632-17), GAF-GW-1316-DOLO 1.0-T3-MID (180-114632-18), GAF-GW-1316-DOLO 1.0-T5-MID (180-114632-20). Acid amounts and spike have been adjusted accordingly. There is not enough volume to run these samples at a lower dilution.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Qualifiers

Metals

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
B	Compound was found in the blank and sample.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc. Job ID: 180-114632-1
Project/Site: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Water	12/02/20 11:20	12/09/20 09:30	
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Water	12/02/20 11:20	12/09/20 09:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

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
SM2320 B	Alkalinity, Total	SM18	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T1-MID

Lab Sample ID: 180-114632-1
Date Collected: 12/02/20 11:20
Matrix: Water
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 13:34	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 13:31	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:06	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:03	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-CONTROL-T2-MID

Lab Sample ID: 180-114632-2
Date Collected: 12/02/20 11:20
Matrix: Water
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			340113	12/10/20 14:39	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			340113	12/10/20 14:55	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 13:37	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:07	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			340265	12/10/20 16:52	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-CONTROL-T3-MID

Lab Sample ID: 180-114632-3
Date Collected: 12/02/20 11:20
Matrix: Water
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 13:44	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		10			340599	12/12/20 12:49	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 13:41	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T3-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			340599	12/12/20 12:46	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:09	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:08	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-CONTROL-T4-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 13:51	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		10			340599	12/12/20 12:59	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			5 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 13:48	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:11	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 16:33	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-CONTROL-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:05	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		10			340599	12/12/20 13:03	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			5 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 14:01	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-1316-CONTROL-T5-MID

Lab Sample ID: 180-114632-5
Date Collected: 12/02/20 11:20
Matrix: Water
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	7470A			20 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:13	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 16:36	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T1-MID

Lab Sample ID: 180-114632-6
Date Collected: 12/02/20 11:20
Matrix: Water
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:12	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 14:08	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:15	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:14	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T2-MID

Lab Sample ID: 180-114632-7
Date Collected: 12/02/20 11:20
Matrix: Water
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			340113	12/10/20 15:12	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			340113	12/10/20 15:28	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:15	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:18	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			340265	12/10/20 17:25	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-HI-CAL-T3-MID

Lab Sample ID: 180-114632-8

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:22	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			5 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		2			340422	12/11/20 14:19	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:20	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 16:37	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T4-MID

Lab Sample ID: 180-114632-9

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:29	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 14:26	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			10 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:22	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:21	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T5-MID

Lab Sample ID: 180-114632-10

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:43	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 14:32	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:24	KEM	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-HI-CAL-T5-MID

Lab Sample ID: 180-114632-10
Matrix: Water
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			20 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:23	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-MID

Lab Sample ID: 180-114632-11
Matrix: Water
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 14:50	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340144	12/10/20 07:58	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 14:46	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:26	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340320	12/11/20 09:29	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:25	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T2-MID

Lab Sample ID: 180-114632-12
Matrix: Water
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			340113	12/10/20 16:17	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			340113	12/10/20 16:33	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 15:17	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:32	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			340265	12/10/20 17:40	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T3-MID

Lab Sample ID: 180-114632-13

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 15:24	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 15:21	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:33	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:33	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T4-MID

Lab Sample ID: 180-114632-14

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 15:31	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 15:28	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340599	12/12/20 13:27	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:35	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			10 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:34	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-MID

Lab Sample ID: 180-114632-15

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 15:38	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 15:35	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-MID

Lab Sample ID: 180-114632-15

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340599	12/12/20 13:31	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:37	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			10 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:36	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-MID

Lab Sample ID: 180-114632-16

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 15:52	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 15:48	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:41	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:40	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T2-MID

Lab Sample ID: 180-114632-17

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			340113	12/10/20 16:50	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		10			340113	12/10/20 17:06	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 15:55	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:42	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			340265	12/10/20 17:46	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T3-MID

Lab Sample ID: 180-114632-18

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			10 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 16:02	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 15:59	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			10 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:44	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:43	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T4-MID

Lab Sample ID: 180-114632-19

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 16:09	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			5 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 16:06	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:46	KEM	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 16:38	KEM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-MID

Lab Sample ID: 180-114632-20

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			340422	12/11/20 16:16	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			25 mL	25 mL	340145	12/10/20 08:02	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			340422	12/11/20 16:13	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			340576	12/14/20 15:48	KEM	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-MID

Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			20 mL	25 mL	340322	12/11/20 09:36	KEM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			340576	12/14/20 15:47	KEM	TAL PIT
	Instrument ID: HGZ									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney
KHM = Kyle Mucroski

Batch Type: Analysis

AVS = Abbey Smith
EPS = Evan Scheuer
KEM = Kimberly Mahoney
RSK = Robert Kurtz

Client Sample ID: GAF-GW-1316-CONTROL-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.776**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:31	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 13:31	1
Arsenic	**0.000672**	**J**	0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:31	1
Barium	**0.00936**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 13:31	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:31	1
Boron	**1.63**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:31	1
Cadmium	**0.000242**	**J**	0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:31	1
Calcium	**248**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:31	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:31	1
Cobalt	**0.0235**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:31	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:31	1
Iron	**1.17**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:31	1
Lead	**0.000634**	**J**	0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:31	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:31	1
Magnesium	**27.0**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:31	1
Manganese	**7.50**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 13:31	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:31	1
Nickel	**0.0146**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:31	1
Potassium	**6.41**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:31	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:31	1
Silver	**0.000399**	**J**	0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:31	1
Sodium	**86.0**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:31	1
Thallium	**0.000624**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:31	1
Vanadium	**0.00176**		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:31	1
Zinc	**0.00594**		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:31	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0257**	**J**	0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:34	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 13:34	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:34	1
Barium	**0.00770**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 13:34	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:34	1
Boron	**1.63**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:34	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:34	1
Calcium	**246**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:34	1
Chromium	**0.00343**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:34	1
Cobalt	**0.0190**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:34	1
Copper	**0.000796**	**J**	0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:34	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:34	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:34	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:34	1
Magnesium	**26.5**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:34	1
Manganese	**7.19**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 13:34	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:34	1
Nickel	**0.0119**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:34	1
Potassium	**4.83**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:34	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:34	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:34	1
Sodium	**86.6**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:34	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000454	J	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:34	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:34	1
Zinc	0.00547		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:34	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:03	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:06	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T2-MID

Lab Sample ID: 180-114632-2

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	40.5		1.00	0.320	mg/L			12/10/20 14:39	1
Fluoride	0.316		0.100	0.0440	mg/L			12/10/20 14:39	1
Sulfate	1610		10.0	3.80	mg/L			12/10/20 14:55	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.38		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:37	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 13:37	1
Arsenic	0.000592	J	0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:37	1
Barium	0.0112		0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 13:37	1
Beryllium	0.000499	J	0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:37	1
Boron	1.58		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:37	1
Cadmium	0.00114		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:37	1
Calcium	242		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:37	1
Chromium	0.00417		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:37	1
Cobalt	0.157		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:37	1
Copper	0.000839	J	0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:37	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:37	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:37	1
Lithium	0.00447	J	0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:37	1
Magnesium	31.1		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:37	1
Manganese	13.0		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 13:37	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:37	1
Nickel	0.0799		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:37	1
Potassium	3.78		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:37	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:37	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:37	1
Sodium	87.7		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:37	1
Thallium	0.000747	J	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:37	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:37	1
Zinc	0.127		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:37	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000250	0.000163	mg/L		12/11/20 09:29	12/14/20 15:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	66.6		5.00	5.00	mg/L			12/10/20 16:52	1
Bicarbonate Alkalinity as CaCO3	66.6		5.00	5.00	mg/L			12/10/20 16:52	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 16:52	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/10/20 16:52	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T3-MID

Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**58.8**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:41	1
Antimony	ND		0.0200	0.00378	mg/L		12/10/20 07:58	12/12/20 12:46	10
Arsenic	**0.00747**		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:41	1
Barium	**0.0226**	**J**	0.100	0.0160	mg/L		12/10/20 07:58	12/12/20 12:46	10
Beryllium	**0.0119**		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:41	1
Boron	**1.46**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:41	1
Cadmium	**0.00377**		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:41	1
Calcium	**339**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:41	1
Chromium	**0.00222**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:41	1
Cobalt	**0.465**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:41	1
Copper	**0.0120**		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:41	1
Iron	**1.75**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:41	1
Lead	**0.000605**	**J**	0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:41	1
Lithium	**0.0179**		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:41	1
Magnesium	**52.4**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:41	1
Manganese	**29.3**		0.0500	0.00866	mg/L		12/10/20 07:58	12/12/20 12:46	10
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:41	1
Nickel	**0.245**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:41	1
Potassium	**4.13**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:41	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:41	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:41	1
Sodium	**85.3**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:41	1
Thallium	**0.000853**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:41	1
Vanadium	**0.00224**		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:41	1
Zinc	**0.641**		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:41	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**59.5**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:44	1
Antimony	ND		0.0200	0.00378	mg/L		12/10/20 07:58	12/12/20 12:49	10
Arsenic	**0.00691**		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:44	1
Barium	**0.0168**	**J**	0.100	0.0160	mg/L		12/10/20 07:58	12/12/20 12:49	10
Beryllium	**0.0117**		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:44	1
Boron	**1.43**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:44	1
Cadmium	**0.00370**		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:44	1
Calcium	**347**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:44	1
Chromium	**0.00504**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:44	1
Cobalt	**0.469**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:44	1
Copper	**0.0115**		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:44	1
Iron	**0.0964**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:44	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:44	1
Lithium	**0.0174**		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:44	1
Magnesium	**53.8**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:44	1
Manganese	**29.6**		0.0500	0.00866	mg/L		12/10/20 07:58	12/12/20 12:49	10
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:44	1
Nickel	**0.249**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:44	1
Potassium	**3.76**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:44	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:44	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:44	1
Sodium	**88.4**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:44	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T3-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000720**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:44	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:44	1
Zinc	**0.636**		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:44	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:08	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000250	0.000163	mg/L		12/11/20 09:29	12/14/20 15:09	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T4-MID

Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**228**		0.150	0.0625	mg/L		12/10/20 07:58	12/11/20 13:48	1
Antimony	ND		0.0100	0.00189	mg/L		12/10/20 07:58	12/11/20 13:48	1
Arsenic	**0.0502**		0.00500	0.00157	mg/L		12/10/20 07:58	12/11/20 13:48	1
Barium	**0.119**		0.0500	0.00800	mg/L		12/10/20 07:58	12/11/20 13:48	1
Beryllium	**0.0409**		0.00500	0.000910	mg/L		12/10/20 07:58	12/11/20 13:48	1
Boron	**1.67**		0.400	0.193	mg/L		12/10/20 07:58	12/11/20 13:48	1
Cadmium	**0.00699**		0.00500	0.00109	mg/L		12/10/20 07:58	12/11/20 13:48	1
Calcium	**407**		2.50	0.635	mg/L		12/10/20 07:58	12/11/20 13:48	1
Chromium	**0.0483**		0.0100	0.00765	mg/L		12/10/20 07:58	12/11/20 13:48	1
Cobalt	**0.927**		0.00250	0.000670	mg/L		12/10/20 07:58	12/11/20 13:48	1
Copper	**0.0750**		0.0100	0.00314	mg/L		12/10/20 07:58	12/11/20 13:48	1
Iron	**118**		0.250	0.0975	mg/L		12/10/20 07:58	12/11/20 13:48	1
Lead	**0.0368**		0.00500	0.000640	mg/L		12/10/20 07:58	12/11/20 13:48	1
Lithium	**0.0564**		0.0250	0.0170	mg/L		12/10/20 07:58	12/11/20 13:48	1
Magnesium	**85.5**		2.50	0.414	mg/L		12/10/20 07:58	12/11/20 13:48	1
Manganese	**52.3**		0.0250	0.00433	mg/L		12/10/20 07:58	12/11/20 13:48	1
Molybdenum	**0.00746**	**J**	0.0250	0.00305	mg/L		12/10/20 07:58	12/11/20 13:48	1
Nickel	**0.430**		0.00500	0.00168	mg/L		12/10/20 07:58	12/11/20 13:48	1
Potassium	**9.53**		2.50	0.780	mg/L		12/10/20 07:58	12/11/20 13:48	1
Selenium	ND		0.0250	0.00755	mg/L		12/10/20 07:58	12/11/20 13:48	1
Silver	ND		0.00500	0.000885	mg/L		12/10/20 07:58	12/11/20 13:48	1
Sodium	**98.1**		2.50	1.74	mg/L		12/10/20 07:58	12/11/20 13:48	1
Thallium	**0.00286**	**J**	0.00500	0.000740	mg/L		12/10/20 07:58	12/11/20 13:48	1
Vanadium	**0.123**		0.00500	0.00496	mg/L		12/10/20 07:58	12/11/20 13:48	1
Zinc	**1.42**		0.0250	0.0161	mg/L		12/10/20 07:58	12/11/20 13:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**125**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:51	1
Antimony	ND		0.0200	0.00378	mg/L		12/10/20 07:58	12/12/20 12:59	10
Arsenic	**0.0137**		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:51	1
Barium	**0.0170**	**J**	0.100	0.0160	mg/L		12/10/20 07:58	12/12/20 12:59	10
Beryllium	**0.0335**		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:51	1
Boron	**2.20**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:51	1
Cadmium	**0.00715**		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:51	1
Calcium	**372**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:51	1
Chromium	**0.00561**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:51	1
Cobalt	**0.979**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:51	1
Copper	**0.0355**		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:51	1
Iron	**2.30**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:51	1
Lead	**0.000136**	**J**	0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:51	1
Lithium	**0.0363**		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:51	1
Magnesium	**63.5**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:51	1
Manganese	**59.0**		0.0500	0.00866	mg/L		12/10/20 07:58	12/12/20 12:59	10
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:51	1
Nickel	**0.392**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:51	1
Potassium	**3.69**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:51	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:51	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:51	1
Sodium	**83.0**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:51	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T4-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.00123**		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:51	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:51	1
Zinc	**1.09**		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:51	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000306**		0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 16:33	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000250	0.000163	mg/L		12/11/20 09:29	12/14/20 15:11	1

Client Sample ID: GAF-GW-1316-CONTROL-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**218**		0.150	0.0625	mg/L		12/10/20 07:58	12/11/20 14:01	1
Antimony	ND		0.0100	0.00189	mg/L		12/10/20 07:58	12/11/20 14:01	1
Arsenic	**0.0504**		0.00500	0.00157	mg/L		12/10/20 07:58	12/11/20 14:01	1
Barium	**0.0916**		0.0500	0.00800	mg/L		12/10/20 07:58	12/11/20 14:01	1
Beryllium	**0.0663**		0.00500	0.000910	mg/L		12/10/20 07:58	12/11/20 14:01	1
Boron	**2.11**		0.400	0.193	mg/L		12/10/20 07:58	12/11/20 14:01	1
Cadmium	**0.00999**		0.00500	0.00109	mg/L		12/10/20 07:58	12/11/20 14:01	1
Calcium	**333**		2.50	0.635	mg/L		12/10/20 07:58	12/11/20 14:01	1
Chromium	**0.0548**		0.0100	0.00765	mg/L		12/10/20 07:58	12/11/20 14:01	1
Cobalt	**1.34**		0.00250	0.000670	mg/L		12/10/20 07:58	12/11/20 14:01	1
Copper	**0.107**		0.0100	0.00314	mg/L		12/10/20 07:58	12/11/20 14:01	1
Iron	**132**		0.250	0.0975	mg/L		12/10/20 07:58	12/11/20 14:01	1
Lead	**0.0303**		0.00500	0.000640	mg/L		12/10/20 07:58	12/11/20 14:01	1
Lithium	**0.0646**		0.0250	0.0170	mg/L		12/10/20 07:58	12/11/20 14:01	1
Magnesium	**82.4**		2.50	0.414	mg/L		12/10/20 07:58	12/11/20 14:01	1
Manganese	**68.0**		0.0250	0.00433	mg/L		12/10/20 07:58	12/11/20 14:01	1
Molybdenum	**0.00799**	**J**	0.0250	0.00305	mg/L		12/10/20 07:58	12/11/20 14:01	1
Nickel	**0.523**		0.00500	0.00168	mg/L		12/10/20 07:58	12/11/20 14:01	1
Potassium	**10.9**		2.50	0.780	mg/L		12/10/20 07:58	12/11/20 14:01	1
Selenium	ND		0.0250	0.00755	mg/L		12/10/20 07:58	12/11/20 14:01	1
Silver	ND		0.00500	0.000885	mg/L		12/10/20 07:58	12/11/20 14:01	1
Sodium	**73.6**		2.50	1.74	mg/L		12/10/20 07:58	12/11/20 14:01	1
Thallium	**0.00348**	**J**	0.00500	0.000740	mg/L		12/10/20 07:58	12/11/20 14:01	1
Vanadium	**0.123**		0.00500	0.00496	mg/L		12/10/20 07:58	12/11/20 14:01	1
Zinc	**1.69**		0.0250	0.0161	mg/L		12/10/20 07:58	12/11/20 14:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**206**		0.300	0.125	mg/L		12/10/20 07:58	12/12/20 13:03	10
Antimony	ND		0.0200	0.00378	mg/L		12/10/20 07:58	12/12/20 13:03	10
Arsenic	**0.0196**		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:05	1
Barium	ND		0.100	0.0160	mg/L		12/10/20 07:58	12/12/20 13:03	10
Beryllium	**0.0639**		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:05	1
Boron	**1.92**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:05	1
Cadmium	**0.00978**		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:05	1
Calcium	**396**		5.00	1.27	mg/L		12/10/20 07:58	12/12/20 13:03	10
Chromium	**0.00956**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:05	1
Cobalt	**1.40**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:05	1
Copper	**0.0777**		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:05	1
Iron	**14.8**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:05	1
Lead	**0.000242**	**J**	0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:05	1
Lithium	**0.0461**		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:05	1
Magnesium	**90.1**		5.00	0.827	mg/L		12/10/20 07:58	12/12/20 13:03	10
Manganese	**76.9**		0.0500	0.00866	mg/L		12/10/20 07:58	12/12/20 13:03	10
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:05	1
Nickel	**0.493**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:05	1
Potassium	**7.04**		5.00	1.56	mg/L		12/10/20 07:58	12/12/20 13:03	10
Selenium	ND		0.0500	0.0151	mg/L		12/10/20 07:58	12/12/20 13:03	10
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:05	1
Sodium	**73.2**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:05	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-CONTROL-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.00171		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:05	1
Vanadium	0.00108		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:05	1
Zinc	1.57		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:05	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000717		0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 16:36	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000250	0.000163	mg/L		12/11/20 09:29	12/14/20 15:13	1

Client Sample ID: GAF-GW-1316-HI-CAL-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.225**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:08	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:08	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:08	1
Barium	**0.0157**		0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:08	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:08	1
Boron	**1.61**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:08	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:08	1
Calcium	**401**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:08	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:08	1
Cobalt	**0.00480**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:08	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:08	1
Iron	**0.153**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:08	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:08	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:08	1
Magnesium	**32.9**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:08	1
Manganese	**4.66**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:08	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:08	1
Nickel	**0.00183**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:08	1
Potassium	**11.7**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:08	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:08	1
Silver	**0.000752**	**J**	0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:08	1
Sodium	**94.3**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:08	1
Thallium	**0.000219**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:08	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:08	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:12	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:12	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:12	1
Barium	**0.0168**		0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:12	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:12	1
Boron	**1.58**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:12	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:12	1
Calcium	**387**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:12	1
Chromium	**0.00154**	**J**	0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:12	1
Cobalt	**0.00241**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:12	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:12	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:12	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:12	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:12	1
Magnesium	**31.9**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:12	1
Manganese	**3.37**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:12	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:12	1
Nickel	**0.00109**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:12	1
Potassium	**8.22**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:12	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:12	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:12	1
Sodium	**94.6**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:12	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-HI-CAL-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000237	J	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:12	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:12	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:12	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:14	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:15	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-HI-CAL-T2-MID

Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-7

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**40.4**		1.00	0.320	mg/L			12/10/20 15:12	1
Fluoride	**0.166**		0.100	0.0440	mg/L			12/10/20 15:12	1
Sulfate	**1460**		10.0	3.80	mg/L			12/10/20 15:28	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0167**	**J**	0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:15	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:15	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:15	1
Barium	**0.00753**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:15	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:15	1
Boron	**1.06**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:15	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:15	1
Calcium	**459**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:15	1
Chromium	**0.00397**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:15	1
Cobalt	**0.000545**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:15	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:15	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:15	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:15	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:15	1
Magnesium	**34.6**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:15	1
Manganese	**0.668**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:15	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:15	1
Nickel	**0.000358**	**J**	0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:15	1
Potassium	**3.37**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:15	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:15	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:15	1
Sodium	**89.1**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:15	1
Thallium	**0.000176**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:15	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:15	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:15	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**188**		5.00	5.00	mg/L			12/10/20 17:25	1
Bicarbonate Alkalinity as CaCO3	**188**		5.00	5.00	mg/L			12/10/20 17:25	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 17:25	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/10/20 17:25	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-HI-CAL-T3-MID

Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**192**		0.300	0.125	mg/L		12/10/20 07:58	12/11/20 14:19	2
Antimony	ND		0.0200	0.00378	mg/L		12/10/20 07:58	12/11/20 14:19	2
Arsenic	**0.0778**		0.0100	0.00313	mg/L		12/10/20 07:58	12/11/20 14:19	2
Barium	**0.411**		0.100	0.0160	mg/L		12/10/20 07:58	12/11/20 14:19	2
Beryllium	**0.00805**	**J**	0.0100	0.00182	mg/L		12/10/20 07:58	12/11/20 14:19	2
Boron	**1.26**		0.800	0.386	mg/L		12/10/20 07:58	12/11/20 14:19	2
Cadmium	ND		0.0100	0.00217	mg/L		12/10/20 07:58	12/11/20 14:19	2
Calcium	**759**		5.00	1.27	mg/L		12/10/20 07:58	12/11/20 14:19	2
Chromium	**0.175**		0.0200	0.0153	mg/L		12/10/20 07:58	12/11/20 14:19	2
Cobalt	**0.0522**		0.00500	0.00134	mg/L		12/10/20 07:58	12/11/20 14:19	2
Copper	**0.102**		0.0200	0.00627	mg/L		12/10/20 07:58	12/11/20 14:19	2
Iron	**311**		0.500	0.195	mg/L		12/10/20 07:58	12/11/20 14:19	2
Lead	**0.0938**		0.0100	0.00128	mg/L		12/10/20 07:58	12/11/20 14:19	2
Lithium	**0.0714**		0.0500	0.0339	mg/L		12/10/20 07:58	12/11/20 14:19	2
Magnesium	**47.7**		5.00	0.827	mg/L		12/10/20 07:58	12/11/20 14:19	2
Manganese	**3.00**		0.0500	0.00866	mg/L		12/10/20 07:58	12/11/20 14:19	2
Molybdenum	**0.0146**	**J**	0.0500	0.00610	mg/L		12/10/20 07:58	12/11/20 14:19	2
Nickel	**0.0949**		0.0100	0.00336	mg/L		12/10/20 07:58	12/11/20 14:19	2
Potassium	**17.5**		5.00	1.56	mg/L		12/10/20 07:58	12/11/20 14:19	2
Selenium	ND		0.0500	0.0151	mg/L		12/10/20 07:58	12/11/20 14:19	2
Silver	ND		0.0100	0.00177	mg/L		12/10/20 07:58	12/11/20 14:19	2
Sodium	**83.5**		5.00	3.48	mg/L		12/10/20 07:58	12/11/20 14:19	2
Thallium	**0.00399**	**J**	0.0100	0.00148	mg/L		12/10/20 07:58	12/11/20 14:19	2
Vanadium	**0.463**		0.0100	0.00991	mg/L		12/10/20 07:58	12/11/20 14:19	2
Zinc	**0.330**		0.0500	0.0322	mg/L		12/10/20 07:58	12/11/20 14:19	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0176**	**J**	0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:22	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:22	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:22	1
Barium	**0.00479**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:22	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:22	1
Boron	**0.514**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:22	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:22	1
Calcium	**659**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:22	1
Chromium	**0.00209**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:22	1
Cobalt	**0.000416**	**J**	0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:22	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:22	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:22	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:22	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:22	1
Magnesium	**36.2**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:22	1
Manganese	**0.645**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:22	1
Molybdenum	**0.000782**	**J**	0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:22	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:22	1
Potassium	**3.34**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:22	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:22	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:22	1
Sodium	**79.4**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:22	1

Client: Environmental Standards Inc.
Job ID: 180-114632-1
Project/Site: GAF-NRS-Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T3-MID — **Lab Sample ID: 180-114632-8**
Date Collected: 12/02/20 11:20 — **Matrix: Water**
Date Received: 12/09/20 09:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:22	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:22	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:22	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000488**		0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 16:37	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:20	1

Client Sample ID: GAF-GW-1316-HI-CAL-T4-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.53**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:26	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:26	1
Arsenic	**0.000670**	**J**	0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:26	1
Barium	**0.00802**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:26	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:26	1
Boron	**0.209**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:26	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:26	1
Calcium	**664**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:26	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:26	1
Cobalt	**0.000423**	**J**	0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:26	1
Copper	**0.000688**	**J**	0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:26	1
Iron	**1.58**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:26	1
Lead	**0.000596**	**J**	0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:26	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:26	1
Magnesium	**19.5**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:26	1
Manganese	**0.103**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:26	1
Molybdenum	**0.00224**	**J**	0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:26	1
Nickel	**0.000820**	**J**	0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:26	1
Potassium	**2.77**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:26	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:26	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:26	1
Sodium	**70.7**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:26	1
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:26	1
Vanadium	**0.00316**		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:26	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:26	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0307**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:29	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:29	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:29	1
Barium	**0.00532**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:29	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:29	1
Boron	**0.210**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:29	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:29	1
Calcium	**616**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:29	1
Chromium	**0.00417**		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:29	1
Cobalt	**0.000145**	**J**	0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:29	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:29	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:29	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:29	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:29	1
Magnesium	**18.6**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:29	1
Manganese	**0.0805**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:29	1
Molybdenum	**0.00231**	**J**	0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:29	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:29	1
Potassium	**2.66**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:29	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:29	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:29	1
Sodium	**72.5**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:29	1

Client: Environmental Standards Inc.
Job ID: 180-114632-1
Project/Site: GAF-NRS-Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T4-MID — **Lab Sample ID: 180-114632-9**
Date Collected: 12/02/20 11:20 — **Matrix: Water**
Date Received: 12/09/20 09:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:29	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:29	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:29	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:21	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000500	0.000325	mg/L		12/11/20 09:29	12/14/20 15:22	1

Client Sample ID: GAF-GW-1316-HI-CAL-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.613**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:32	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:32	1
Arsenic	**0.00195**		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:32	1
Barium	**0.00274**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:32	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:32	1
Boron	**0.195**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:32	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:32	1
Calcium	**693**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:32	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:32	1
Cobalt	**0.00163**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:32	1
Copper	**0.00104**	**J**	0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:32	1
Iron	**0.154**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:32	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:32	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:32	1
Magnesium	**1.41**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:32	1
Manganese	**0.00221**	**J**	0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:32	1
Molybdenum	**0.0478**		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:32	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:32	1
Potassium	**1.87**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:32	1
Selenium	**0.00284**	**J**	0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:32	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:32	1
Sodium	**49.7**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:32	1
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:32	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:32	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:32	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.290**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:43	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:43	1
Arsenic	**0.00113**		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:43	1
Barium	**0.00433**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:43	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:43	1
Boron	**0.315**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:43	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:43	1
Calcium	**613**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:43	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:43	1
Cobalt	**0.00116**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:43	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:43	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:43	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:43	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:43	1
Magnesium	**3.92**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:43	1
Manganese	**0.00539**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:43	1
Molybdenum	**0.0283**		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:43	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:43	1
Potassium	**7.33**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:43	1
Selenium	**0.00178**	**J**	0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:43	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:43	1
Sodium	**68.8**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:43	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-HI-CAL-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000148**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:43	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:43	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:43	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000250	0.000163	mg/L		12/11/20 09:29	12/14/20 15:23	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000250	0.000163	mg/L		12/11/20 09:29	12/14/20 15:24	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.09**		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:46	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:46	1
Arsenic	**0.000408**	**J**	0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:46	1
Barium	**0.00913**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:46	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:46	1
Boron	**1.45**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:46	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:46	1
Calcium	**305**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:46	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:46	1
Cobalt	**0.00865**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:46	1
Copper	**0.000801**	**J**	0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:46	1
Iron	**1.25**		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:46	1
Lead	**0.000500**	**J**	0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:46	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:46	1
Magnesium	**72.1**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:46	1
Manganese	**6.33**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:46	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:46	1
Nickel	**0.00338**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:46	1
Potassium	**5.21**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:46	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:46	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:46	1
Sodium	**93.7**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:46	1
Thallium	**0.000265**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:46	1
Vanadium	**0.00258**		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:46	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:46	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 14:50	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 14:50	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 14:50	1
Barium	**0.00631**	**J**	0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 14:50	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 14:50	1
Boron	**1.48**		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 14:50	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 14:50	1
Calcium	**303**		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 14:50	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 14:50	1
Cobalt	**0.00798**		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 14:50	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 14:50	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 14:50	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 14:50	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 14:50	1
Magnesium	**71.3**		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 14:50	1
Manganese	**6.19**		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 14:50	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 14:50	1
Nickel	**0.00264**		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 14:50	1
Potassium	**4.86**		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 14:50	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 14:50	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 14:50	1
Sodium	**94.4**		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 14:50	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000213**	**J**	0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 14:50	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 14:50	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 14:50	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:25	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+ *+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:26	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T2-MID

Lab Sample ID: 180-114632-12

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.2**		1.00	0.320	mg/L			12/10/20 16:17	1
Fluoride	**0.139**		0.100	0.0440	mg/L			12/10/20 16:17	1
Sulfate	**1570**		10.0	3.80	mg/L			12/10/20 16:33	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.37**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:17	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:17	1
Arsenic	**0.000425**	**J**	0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:17	1
Barium	**0.00797**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:17	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:17	1
Boron	**1.36**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:17	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:17	1
Calcium	**371**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:17	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:17	1
Cobalt	**0.00214**		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:17	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:17	1
Iron	**1.44**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:17	1
Lead	**0.000566**	**J**	0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:17	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:17	1
Magnesium	**150**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:17	1
Manganese	**3.09**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:17	1
Molybdenum	**0.000656**	**J**	0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:17	1
Nickel	**0.00114**		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:17	1
Potassium	**3.81**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:17	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:17	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:17	1
Sodium	**90.6**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:17	1
Thallium	**0.000462**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:17	1
Vanadium	**0.00309**		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:17	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:17	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**359**		5.00	5.00	mg/L			12/10/20 17:40	1
Bicarbonate Alkalinity as CaCO3	**359**		5.00	5.00	mg/L			12/10/20 17:40	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 17:40	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/10/20 17:40	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T3-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.42**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:21	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:21	1
Arsenic	**0.000755**	**J**	0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:21	1
Barium	**0.00723**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:21	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:21	1
Boron	**0.349**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:21	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:21	1
Calcium	**462**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:21	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:21	1
Cobalt	**0.000629**		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:21	1
Copper	**0.000760**	**J**	0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:21	1
Iron	**1.55**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:21	1
Lead	**0.000648**	**J**	0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:21	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:21	1
Magnesium	**144**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:21	1
Manganese	**0.0296**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:21	1
Molybdenum	**0.00842**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:21	1
Nickel	**0.000780**	**J**	0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:21	1
Potassium	**2.80**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:21	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:21	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:21	1
Sodium	**84.2**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:21	1
Thallium	**0.000390**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:21	1
Vanadium	**0.00289**		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:21	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0426**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:24	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:24	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:24	1
Barium	**0.00588**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:24	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:24	1
Boron	**0.389**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:24	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:24	1
Calcium	**480**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:24	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:24	1
Cobalt	**0.000479**	**J**	0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:24	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:24	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:24	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:24	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:24	1
Magnesium	**147**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:24	1
Manganese	**0.0457**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:24	1
Molybdenum	**0.00810**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:24	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:24	1
Potassium	**2.92**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:24	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:24	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:24	1
Sodium	**87.2**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:24	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T3-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000297**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:24	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:24	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:24	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 15:33	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 15:33	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T4-MID

Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-14

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.54**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:28	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:28	1
Arsenic	**0.00184**		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:28	1
Barium	**0.0149**		0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:28	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:28	1
Boron	**0.210**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:28	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:28	1
Calcium	**585**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:28	1
Chromium	**0.00277**		0.00200	0.00153	mg/L		12/10/20 08:02	12/12/20 13:27	1
Cobalt	**0.00220**		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:28	1
Copper	**0.00172**	**J**	0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:28	1
Iron	**3.48**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:28	1
Lead	**0.00135**		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:28	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:28	1
Magnesium	**186**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:28	1
Manganese	**0.131**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:28	1
Molybdenum	**0.0162**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:28	1
Nickel	**0.00152**		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:28	1
Potassium	**3.26**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:28	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:28	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:28	1
Sodium	**71.9**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:28	1
Thallium	**0.000283**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:28	1
Vanadium	**0.00708**		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:28	1
Zinc	**0.00446**	**J**	0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:28	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0211**	**J**	0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:31	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:31	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:31	1
Barium	**0.00792**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:31	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:31	1
Boron	**0.208**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:31	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:31	1
Calcium	**566**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:31	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:31	1
Cobalt	**0.00106**		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:31	1
Copper	**0.000836**	**J**	0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:31	1
Iron	**0.390**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:31	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:31	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:31	1
Magnesium	**244**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:31	1
Manganese	**0.318**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:31	1
Molybdenum	**0.00391**	**J**	0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:31	1
Nickel	**0.000372**	**J**	0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:31	1
Potassium	**3.01**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:31	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:31	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:31	1
Sodium	**76.6**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:31	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T4-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000267**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:31	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:31	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:31	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000500	0.000325	mg/L		12/11/20 09:36	12/14/20 15:34	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:35	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4.67		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:35	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:35	1
Arsenic	0.00246		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:35	1
Barium	0.0147		0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:35	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:35	1
Boron	0.743		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:35	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:35	1
Calcium	461		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:35	1
Chromium	0.00411		0.00200	0.00153	mg/L		12/10/20 08:02	12/12/20 13:31	1
Cobalt	0.00191		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:35	1
Copper	0.00234		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:35	1
Iron	6.36		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:35	1
Lead	0.00200		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:35	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:35	1
Magnesium	117		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:35	1
Manganese	0.931	B	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:35	1
Molybdenum	0.00168	J	0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:35	1
Nickel	0.00269		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:35	1
Potassium	4.12		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:35	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:35	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:35	1
Sodium	81.6		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:35	1
Thallium	0.000389	J	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:35	1
Vanadium	0.0101		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:35	1
Zinc	0.00795		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:35	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0302		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:38	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:38	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:38	1
Barium	0.00571	J	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:38	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:38	1
Boron	0.230		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:38	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:38	1
Calcium	541		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:38	1
Chromium	0.00184	J	0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:38	1
Cobalt	0.00216		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:38	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:38	1
Iron	0.456		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:38	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:38	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:38	1
Magnesium	180		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:38	1
Manganese	0.810	B	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:38	1
Molybdenum	0.00297	J	0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:38	1
Nickel	0.000733	J	0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:38	1
Potassium	3.05		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:38	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:38	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:38	1
Sodium	70.2		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:38	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000226	J	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:38	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:38	1
Zinc	0.00362	J	0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:38	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000500	0.000325	mg/L		12/11/20 09:36	12/14/20 15:36	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:37	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-MID

Lab Sample ID: 180-114632-16

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.912**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:48	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:48	1
Arsenic	**0.000435**	**J**	0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:48	1
Barium	**0.00747**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:48	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:48	1
Boron	**1.10**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:48	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:48	1
Calcium	**109**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:48	1
Chromium	**0.00276**		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:48	1
Cobalt	**0.000438**	**J**	0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:48	1
Copper	**0.000644**	**J**	0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:48	1
Iron	**2.06**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:48	1
Lead	**0.000587**	**J**	0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:48	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:48	1
Magnesium	**139**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:48	1
Manganese	**0.0506**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:48	1
Molybdenum	**0.00601**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:48	1
Nickel	**0.000594**	**J**	0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:48	1
Potassium	**3.44**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:48	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:48	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:48	1
Sodium	**96.1**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:48	1
Thallium	**0.000250**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:48	1
Vanadium	**0.00416**		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:48	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0418**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:52	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:52	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:52	1
Barium	**0.00516**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:52	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:52	1
Boron	**1.17**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:52	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:52	1
Calcium	**111**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:52	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:52	1
Cobalt	**0.000237**	**J**	0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:52	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:52	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:52	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:52	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:52	1
Magnesium	**143**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:52	1
Manganese	**0.0385**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:52	1
Molybdenum	**0.00643**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:52	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:52	1
Potassium	**3.58**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:52	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:52	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:52	1
Sodium	**99.5**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:52	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-16
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000182**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:52	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:52	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:52	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 15:40	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 15:41	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T2-MID

Lab Sample ID: 180-114632-17

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.2**		1.00	0.320	mg/L			12/10/20 16:50	1
Fluoride	**0.478**		0.100	0.0440	mg/L			12/10/20 16:50	1
Sulfate	**1010**		10.0	3.80	mg/L			12/10/20 17:06	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0420**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:55	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:55	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:55	1
Barium	**0.00466**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:55	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:55	1
Boron	**0.855**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:55	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:55	1
Calcium	**223**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:55	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:55	1
Cobalt	**0.000350**	**J**	0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:55	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:55	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:55	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:55	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:55	1
Magnesium	**189**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:55	1
Manganese	**0.160**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:55	1
Molybdenum	**0.00415**	**J**	0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:55	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:55	1
Potassium	**3.14**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:55	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:55	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:55	1
Sodium	**95.2**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:55	1
Thallium	**0.000150**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:55	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:55	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:55	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**5.57**		5.00	5.00	mg/L			12/10/20 17:46	1
Bicarbonate Alkalinity as CaCO3	**5.57**		5.00	5.00	mg/L			12/10/20 17:46	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 17:46	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/10/20 17:46	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T3-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-18
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9.27		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 15:59	1
Antimony	0.00108	J	0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 15:59	1
Arsenic	0.00491		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 15:59	1
Barium	0.0270		0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 15:59	1
Beryllium	0.000269	J	0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 15:59	1
Boron	0.467		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 15:59	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 15:59	1
Calcium	626		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 15:59	1
Chromium	0.00832		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 15:59	1
Cobalt	0.00392		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 15:59	1
Copper	0.00520		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 15:59	1
Iron	13.2		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 15:59	1
Lead	0.00427		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 15:59	1
Lithium	0.00356	J	0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 15:59	1
Magnesium	9.08		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 15:59	1
Manganese	0.0939	B	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 15:59	1
Molybdenum	0.0354		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 15:59	1
Nickel	0.00429		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 15:59	1
Potassium	3.52		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 15:59	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 15:59	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 15:59	1
Sodium	80.2		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 15:59	1
Thallium	0.000272	J	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 15:59	1
Vanadium	0.0197		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 15:59	1
Zinc	0.0163		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 15:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0590	J	0.0750	0.0313	mg/L		12/10/20 08:02	12/11/20 16:02	1
Antimony	ND		0.00500	0.000945	mg/L		12/10/20 08:02	12/11/20 16:02	1
Arsenic	0.000943	J	0.00250	0.000783	mg/L		12/10/20 08:02	12/11/20 16:02	1
Barium	0.00890	J	0.0250	0.00400	mg/L		12/10/20 08:02	12/11/20 16:02	1
Beryllium	ND		0.00250	0.000455	mg/L		12/10/20 08:02	12/11/20 16:02	1
Boron	0.483		0.200	0.0965	mg/L		12/10/20 08:02	12/11/20 16:02	1
Cadmium	ND		0.00250	0.000543	mg/L		12/10/20 08:02	12/11/20 16:02	1
Calcium	601		1.25	0.318	mg/L		12/10/20 08:02	12/11/20 16:02	1
Chromium	ND		0.00500	0.00383	mg/L		12/10/20 08:02	12/11/20 16:02	1
Cobalt	0.00204		0.00125	0.000335	mg/L		12/10/20 08:02	12/11/20 16:02	1
Copper	ND		0.00500	0.00157	mg/L		12/10/20 08:02	12/11/20 16:02	1
Iron	ND		0.125	0.0488	mg/L		12/10/20 08:02	12/11/20 16:02	1
Lead	ND		0.00250	0.000320	mg/L		12/10/20 08:02	12/11/20 16:02	1
Lithium	ND		0.0125	0.00848	mg/L		12/10/20 08:02	12/11/20 16:02	1
Magnesium	6.38		1.25	0.207	mg/L		12/10/20 08:02	12/11/20 16:02	1
Manganese	ND		0.0125	0.00217	mg/L		12/10/20 08:02	12/11/20 16:02	1
Molybdenum	0.0319		0.0125	0.00153	mg/L		12/10/20 08:02	12/11/20 16:02	1
Nickel	ND		0.00250	0.000840	mg/L		12/10/20 08:02	12/11/20 16:02	1
Potassium	2.67		1.25	0.390	mg/L		12/10/20 08:02	12/11/20 16:02	1
Selenium	ND		0.0125	0.00378	mg/L		12/10/20 08:02	12/11/20 16:02	1
Silver	ND		0.00250	0.000443	mg/L		12/10/20 08:02	12/11/20 16:02	1
Sodium	80.0		1.25	0.870	mg/L		12/10/20 08:02	12/11/20 16:02	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T3-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-18
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00250	0.000370	mg/L		12/10/20 08:02	12/11/20 16:02	1
Vanadium	ND		0.00250	0.00248	mg/L		12/10/20 08:02	12/11/20 16:02	1
Zinc	ND		0.0125	0.00805	mg/L		12/10/20 08:02	12/11/20 16:02	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:43	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000500	0.000325	mg/L		12/11/20 09:36	12/14/20 15:44	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T4-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-19
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	63.7		0.150	0.0625	mg/L		12/10/20 08:02	12/11/20 16:06	1
Antimony	0.00395	J	0.0100	0.00189	mg/L		12/10/20 08:02	12/11/20 16:06	1
Arsenic	0.0309		0.00500	0.00157	mg/L		12/10/20 08:02	12/11/20 16:06	1
Barium	0.137		0.0500	0.00800	mg/L		12/10/20 08:02	12/11/20 16:06	1
Beryllium	0.00265	J	0.00500	0.000910	mg/L		12/10/20 08:02	12/11/20 16:06	1
Boron	1.75		0.400	0.193	mg/L		12/10/20 08:02	12/11/20 16:06	1
Cadmium	ND		0.00500	0.00109	mg/L		12/10/20 08:02	12/11/20 16:06	1
Calcium	902		2.50	0.635	mg/L		12/10/20 08:02	12/11/20 16:06	1
Chromium	0.0527		0.0100	0.00765	mg/L		12/10/20 08:02	12/11/20 16:06	1
Cobalt	0.0491		0.00250	0.000670	mg/L		12/10/20 08:02	12/11/20 16:06	1
Copper	0.0388		0.0100	0.00314	mg/L		12/10/20 08:02	12/11/20 16:06	1
Iron	109		0.250	0.0975	mg/L		12/10/20 08:02	12/11/20 16:06	1
Lead	0.0305		0.00500	0.000640	mg/L		12/10/20 08:02	12/11/20 16:06	1
Lithium	0.0224	J	0.0250	0.0170	mg/L		12/10/20 08:02	12/11/20 16:06	1
Magnesium	40.8		2.50	0.414	mg/L		12/10/20 08:02	12/11/20 16:06	1
Manganese	2.71	B	0.0250	0.00433	mg/L		12/10/20 08:02	12/11/20 16:06	1
Molybdenum	0.0378		0.0250	0.00305	mg/L		12/10/20 08:02	12/11/20 16:06	1
Nickel	0.0413		0.00500	0.00168	mg/L		12/10/20 08:02	12/11/20 16:06	1
Potassium	11.7		2.50	0.780	mg/L		12/10/20 08:02	12/11/20 16:06	1
Selenium	ND		0.0250	0.00755	mg/L		12/10/20 08:02	12/11/20 16:06	1
Silver	ND		0.00500	0.000885	mg/L		12/10/20 08:02	12/11/20 16:06	1
Sodium	74.4		2.50	1.74	mg/L		12/10/20 08:02	12/11/20 16:06	1
Thallium	0.00181	J	0.00500	0.000740	mg/L		12/10/20 08:02	12/11/20 16:06	1
Vanadium	0.147		0.00500	0.00496	mg/L		12/10/20 08:02	12/11/20 16:06	1
Zinc	0.141		0.0250	0.0161	mg/L		12/10/20 08:02	12/11/20 16:06	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.189		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 16:09	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 16:09	1
Arsenic	0.00280		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 16:09	1
Barium	0.00482	J	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 16:09	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 16:09	1
Boron	0.185		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 16:09	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 16:09	1
Calcium	706		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 16:09	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 16:09	1
Cobalt	0.00643		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 16:09	1
Copper	0.00195	J	0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 16:09	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 16:09	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 16:09	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 16:09	1
Magnesium	1.61		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 16:09	1
Manganese	ND		0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 16:09	1
Molybdenum	0.0567		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 16:09	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 16:09	1
Potassium	2.23		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 16:09	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 16:09	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 16:09	1
Sodium	63.8		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 16:09	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T4-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-19
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 16:09	1
Vanadium	**0.00207**		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 16:09	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 16:09	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000175**	**J**	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 16:38	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 15:46	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-MID

Lab Sample ID: 180-114632-20

Date Collected: 12/02/20 11:20

Matrix: Water

Date Received: 12/09/20 09:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.76**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 16:13	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 16:13	1
Arsenic	**0.00198**		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 16:13	1
Barium	**0.0196**		0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 16:13	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 16:13	1
Boron	**2.34**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 16:13	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 16:13	1
Calcium	**690**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 16:13	1
Chromium	**0.00352**		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 16:13	1
Cobalt	**0.0241**		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 16:13	1
Copper	**0.00195**	**J**	0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 16:13	1
Iron	**5.83**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 16:13	1
Lead	**0.00198**		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 16:13	1
Lithium	**0.00520**		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 16:13	1
Magnesium	**48.9**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 16:13	1
Manganese	**10.0**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 16:13	1
Molybdenum	**0.00737**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 16:13	1
Nickel	**0.0189**		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 16:13	1
Potassium	**7.02**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 16:13	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 16:13	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 16:13	1
Sodium	**62.1**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 16:13	1
Thallium	**0.000463**	**J**	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 16:13	1
Vanadium	**0.00945**		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 16:13	1
Zinc	**0.00826**		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 16:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.152**		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 16:16	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 16:16	1
Arsenic	**0.000577**	**J**	0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 16:16	1
Barium	**0.00720**	**J**	0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 16:16	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 16:16	1
Boron	**1.09**		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 16:16	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 16:16	1
Calcium	**737**		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 16:16	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 16:16	1
Cobalt	**0.00270**		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 16:16	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 16:16	1
Iron	**0.0529**		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 16:16	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 16:16	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 16:16	1
Magnesium	**23.5**		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 16:16	1
Manganese	**0.239**	**B**	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 16:16	1
Molybdenum	**0.0227**		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 16:16	1
Nickel	**0.000499**	**J**	0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 16:16	1
Potassium	**4.81**		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 16:16	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 16:16	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 16:16	1
Sodium	**60.5**		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 16:16	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114632-1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-MID
Date Collected: 12/02/20 11:20
Date Received: 12/09/20 09:30

Lab Sample ID: 180-114632-20
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000173	J	0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 16:16	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 16:16	1
Zinc	0.00537		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 16:16	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:47	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000250	0.000163	mg/L		12/11/20 09:36	12/14/20 15:48	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-340113/6
Matrix: Water
Analysis Batch: 340113

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.320	mg/L			12/10/20 05:46	1
Fluoride	ND		0.100	0.0440	mg/L			12/10/20 05:46	1
Sulfate	ND		1.00	0.380	mg/L			12/10/20 05:46	1

Lab Sample ID: LCS 180-340113/5
Matrix: Water
Analysis Batch: 340113

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	46.43		mg/L		93	80 - 120
Fluoride	2.50	2.531		mg/L		101	80 - 120
Sulfate	50.0	50.18		mg/L		100	80 - 120

Lab Sample ID: 180-114592-R-1 MS
Matrix: Water
Analysis Batch: 340113

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	ND		50.0	50.33		mg/L		101	80 - 120
Fluoride	ND		2.50	2.562		mg/L		102	80 - 120
Sulfate	ND		50.0	51.40		mg/L		103	80 - 120

Lab Sample ID: 180-114592-R-1 MSD
Matrix: Water
Analysis Batch: 340113

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	ND		50.0	51.15		mg/L		102	80 - 120	2	15
Fluoride	ND		2.50	2.696		mg/L		108	80 - 120	5	15
Sulfate	ND		50.0	54.53		mg/L		109	80 - 120	6	15

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

Lab Sample ID: MB 180-340144/1-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 340144

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/10/20 07:58	12/11/20 13:03	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 07:58	12/11/20 13:03	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 07:58	12/11/20 13:03	1
Barium	ND		0.0100	0.00160	mg/L		12/10/20 07:58	12/11/20 13:03	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 07:58	12/11/20 13:03	1
Boron	ND		0.0800	0.0386	mg/L		12/10/20 07:58	12/11/20 13:03	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 07:58	12/11/20 13:03	1
Calcium	ND		0.500	0.127	mg/L		12/10/20 07:58	12/11/20 13:03	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 07:58	12/11/20 13:03	1
Cobalt	ND		0.000500	0.000134	mg/L		12/10/20 07:58	12/11/20 13:03	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 07:58	12/11/20 13:03	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 07:58	12/11/20 13:03	1

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

Lab Sample ID: MB 180-340144/1-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 340144

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.00100	0.000128	mg/L		12/10/20 07:58	12/11/20 13:03	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 07:58	12/11/20 13:03	1
Magnesium	ND		0.500	0.0827	mg/L		12/10/20 07:58	12/11/20 13:03	1
Manganese	ND		0.00500	0.000866	mg/L		12/10/20 07:58	12/11/20 13:03	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 07:58	12/11/20 13:03	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 07:58	12/11/20 13:03	1
Potassium	ND		0.500	0.156	mg/L		12/10/20 07:58	12/11/20 13:03	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 07:58	12/11/20 13:03	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 07:58	12/11/20 13:03	1
Sodium	ND		0.500	0.348	mg/L		12/10/20 07:58	12/11/20 13:03	1
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 07:58	12/11/20 13:03	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 07:58	12/11/20 13:03	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 07:58	12/11/20 13:03	1

Lab Sample ID: LCS 180-340144/2-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 340144

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.969		mg/L		99	80 - 120
Antimony	0.250	0.2232		mg/L		89	80 - 120
Arsenic	1.00	1.020		mg/L		102	80 - 120
Barium	1.00	0.9613		mg/L		96	80 - 120
Beryllium	0.500	0.4927		mg/L		99	80 - 120
Boron	1.25	1.223		mg/L		98	80 - 120
Cadmium	0.500	0.5237		mg/L		105	80 - 120
Calcium	25.0	28.50		mg/L		114	80 - 120
Chromium	0.500	0.5178		mg/L		104	80 - 120
Cobalt	0.500	0.4974		mg/L		99	80 - 120
Copper	0.500	0.4997		mg/L		100	80 - 120
Iron	5.00	4.996		mg/L		100	80 - 120
Lead	0.500	0.5234		mg/L		105	80 - 120
Lithium	0.500	0.4938		mg/L		99	80 - 120
Magnesium	25.0	25.65		mg/L		103	80 - 120
Manganese	0.500	0.5243		mg/L		105	80 - 120
Molybdenum	0.500	0.5143		mg/L		103	80 - 120
Nickel	0.500	0.4907		mg/L		98	80 - 120
Potassium	25.0	23.99		mg/L		96	80 - 120
Selenium	1.00	1.055		mg/L		105	80 - 120
Silver	0.250	0.2525		mg/L		101	80 - 120
Sodium	25.0	25.67		mg/L		103	80 - 120
Thallium	1.00	1.079		mg/L		108	80 - 120
Vanadium	0.500	0.5174		mg/L		103	80 - 120
Zinc	0.250	0.2458		mg/L		98	80 - 120

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

Lab Sample ID: LCSD 180-340144/3-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 340144

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			5.00	4.817		mg/L		96	80 - 120	3	20
Antimony			0.250	0.2165		mg/L		87	80 - 120	3	20
Arsenic			1.00	0.9874		mg/L		99	80 - 120	3	20
Barium			1.00	0.9262		mg/L		93	80 - 120	4	20
Beryllium			0.500	0.4755		mg/L		95	80 - 120	4	20
Boron			1.25	1.227		mg/L		98	80 - 120	0	20
Cadmium			0.500	0.5057		mg/L		101	80 - 120	4	20
Calcium			25.0	27.97		mg/L		112	80 - 120	2	20
Chromium			0.500	0.4975		mg/L		100	80 - 120	4	20
Cobalt			0.500	0.4765		mg/L		95	80 - 120	4	20
Copper			0.500	0.4792		mg/L		96	80 - 120	4	20
Iron			5.00	4.616		mg/L		92	80 - 120	8	20
Lead			0.500	0.5005		mg/L		100	80 - 120	4	20
Lithium			0.500	0.4762		mg/L		95	80 - 120	4	20
Magnesium			25.0	25.10		mg/L		100	80 - 120	2	20
Manganese			0.500	0.4983		mg/L		100	80 - 120	5	20
Molybdenum			0.500	0.4935		mg/L		99	80 - 120	4	20
Nickel			0.500	0.4683		mg/L		94	80 - 120	5	20
Potassium			25.0	23.25		mg/L		93	80 - 120	3	20
Selenium			1.00	1.006		mg/L		101	80 - 120	5	20
Silver			0.250	0.2445		mg/L		98	80 - 120	3	20
Sodium			25.0	25.11		mg/L		100	80 - 120	2	20
Thallium			1.00	1.041		mg/L		104	80 - 120	4	20
Vanadium			0.500	0.4980		mg/L		100	80 - 120	4	20
Zinc			0.250	0.2341		mg/L		94	80 - 120	5	20

Lab Sample ID: MB 180-340145/1-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 340145

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/10/20 08:02	12/11/20 14:57	1
Antimony	ND		0.00200	0.000378	mg/L		12/10/20 08:02	12/11/20 14:57	1
Arsenic	ND		0.00100	0.000313	mg/L		12/10/20 08:02	12/11/20 14:57	1
Barium	ND		0.0100	0.00160	mg/L		12/10/20 08:02	12/11/20 14:57	1
Beryllium	ND		0.00100	0.000182	mg/L		12/10/20 08:02	12/11/20 14:57	1
Boron	ND		0.0800	0.0386	mg/L		12/10/20 08:02	12/11/20 14:57	1
Cadmium	ND		0.00100	0.000217	mg/L		12/10/20 08:02	12/11/20 14:57	1
Calcium	ND		0.500	0.127	mg/L		12/10/20 08:02	12/11/20 14:57	1
Chromium	ND		0.00200	0.00153	mg/L		12/10/20 08:02	12/11/20 14:57	1
Cobalt	ND		0.000500	0.000134	mg/L		12/10/20 08:02	12/11/20 14:57	1
Copper	ND		0.00200	0.000627	mg/L		12/10/20 08:02	12/11/20 14:57	1
Iron	ND		0.0500	0.0195	mg/L		12/10/20 08:02	12/11/20 14:57	1
Lead	ND		0.00100	0.000128	mg/L		12/10/20 08:02	12/11/20 14:57	1
Lithium	ND		0.00500	0.00339	mg/L		12/10/20 08:02	12/11/20 14:57	1
Magnesium	ND		0.500	0.0827	mg/L		12/10/20 08:02	12/11/20 14:57	1
Manganese	0.001042	J	0.00500	0.000866	mg/L		12/10/20 08:02	12/11/20 14:57	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/10/20 08:02	12/11/20 14:57	1
Nickel	ND		0.00100	0.000336	mg/L		12/10/20 08:02	12/11/20 14:57	1

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

Lab Sample ID: MB 180-340145/1-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 340145

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	ND		0.500	0.156	mg/L		12/10/20 08:02	12/11/20 14:57	1
Selenium	ND		0.00500	0.00151	mg/L		12/10/20 08:02	12/11/20 14:57	1
Silver	ND		0.00100	0.000177	mg/L		12/10/20 08:02	12/11/20 14:57	1
Sodium	ND		0.500	0.348	mg/L		12/10/20 08:02	12/11/20 14:57	1
Thallium	ND		0.00100	0.000148	mg/L		12/10/20 08:02	12/11/20 14:57	1
Vanadium	ND		0.00100	0.000991	mg/L		12/10/20 08:02	12/11/20 14:57	1
Zinc	ND		0.00500	0.00322	mg/L		12/10/20 08:02	12/11/20 14:57	1

Lab Sample ID: LCS 180-340145/2-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 340145

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	5.140		mg/L		103	80 - 120
Antimony	0.250	0.2267		mg/L		91	80 - 120
Arsenic	1.00	1.059		mg/L		106	80 - 120
Barium	1.00	0.9387		mg/L		94	80 - 120
Beryllium	0.500	0.4856		mg/L		97	80 - 120
Boron	1.25	1.242		mg/L		99	80 - 120
Cadmium	0.500	0.5528		mg/L		111	80 - 120
Calcium	25.0	29.14		mg/L		117	80 - 120
Chromium	0.500	0.5330		mg/L		107	80 - 120
Cobalt	0.500	0.4942		mg/L		99	80 - 120
Copper	0.500	0.4970		mg/L		99	80 - 120
Iron	5.00	4.873		mg/L		97	80 - 120
Lead	0.500	0.5327		mg/L		107	80 - 120
Lithium	0.500	0.4979		mg/L		100	80 - 120
Magnesium	25.0	27.49		mg/L		110	80 - 120
Manganese	0.500	0.5276		mg/L		106	80 - 120
Molybdenum	0.500	0.5131		mg/L		103	80 - 120
Nickel	0.500	0.4877		mg/L		98	80 - 120
Potassium	25.0	24.09		mg/L		96	80 - 120
Selenium	1.00	1.104		mg/L		110	80 - 120
Silver	0.250	0.2612		mg/L		104	80 - 120
Sodium	25.0	27.73		mg/L		111	80 - 120
Thallium	1.00	1.122		mg/L		112	80 - 120
Vanadium	0.500	0.5328		mg/L		107	80 - 120
Zinc	0.250	0.2447		mg/L		98	80 - 120

Lab Sample ID: LCSD 180-340145/3-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 340145

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5.00	5.185		mg/L		104	80 - 120	1	20
Antimony	0.250	0.2243		mg/L		90	80 - 120	1	20
Arsenic	1.00	1.060		mg/L		106	80 - 120	0	20
Barium	1.00	0.9286		mg/L		93	80 - 120	1	20
Beryllium	0.500	0.4817		mg/L		96	80 - 120	1	20

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

Lab Sample ID: LCSD 180-340145/3-A
Matrix: Water
Analysis Batch: 340422

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 340145

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron			1.25	1.309		mg/L		105	80 - 120	5	20
Cadmium			0.500	0.5545		mg/L		111	80 - 120	0	20
Calcium			25.0	29.00		mg/L		116	80 - 120	0	20
Chromium			0.500	0.5334		mg/L		107	80 - 120	0	20
Cobalt			0.500	0.4906		mg/L		98	80 - 120	1	20
Copper			0.500	0.4923		mg/L		98	80 - 120	1	20
Iron			5.00	4.821		mg/L		96	80 - 120	1	20
Lead			0.500	0.5278		mg/L		106	80 - 120	1	20
Lithium			0.500	0.4916		mg/L		98	80 - 120	1	20
Magnesium			25.0	27.58		mg/L		110	80 - 120	0	20
Manganese			0.500	0.5288		mg/L		106	80 - 120	0	20
Molybdenum			0.500	0.5096		mg/L		102	80 - 120	1	20
Nickel			0.500	0.4803		mg/L		96	80 - 120	2	20
Potassium			25.0	24.06		mg/L		96	80 - 120	0	20
Selenium			1.00	1.074		mg/L		107	80 - 120	3	20
Silver			0.250	0.2602		mg/L		104	80 - 120	0	20
Sodium			25.0	27.80		mg/L		111	80 - 120	0	20
Thallium			1.00	1.098		mg/L		110	80 - 120	2	20
Vanadium			0.500	0.5308		mg/L		106	80 - 120	0	20
Zinc			0.250	0.2489		mg/L		100	80 - 120	2	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-340320/1-A
Matrix: Water
Analysis Batch: 340576

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 340320

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:29	12/14/20 15:00	1

Lab Sample ID: LCS 180-340320/2-A
Matrix: Water
Analysis Batch: 340576

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 340320

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00250	0.002476	^+	mg/L		99	80 - 120		

Lab Sample ID: LCSD 180-340320/3-A
Matrix: Water
Analysis Batch: 340576

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 340320

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			0.00250	0.002885	^+	mg/L		115	80 - 120	6	20

Lab Sample ID: MB 180-340322/1-A
Matrix: Water
Analysis Batch: 340576

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 340322

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND	^+	0.000200	0.000130	mg/L		12/11/20 09:36	12/14/20 15:29	1

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: LCS 180-340322/2-A
Matrix: Water
Analysis Batch: 340576

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 340322

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00250	0.002904	^+	mg/L		116	80 - 120

Lab Sample ID: LCSD 180-340322/3-A
Matrix: Water
Analysis Batch: 340576

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 340322

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.00250	0.003011	^+	mg/L		120	80 - 120	4	20

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-340265/54
Matrix: Water
Analysis Batch: 340265

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			12/10/20 14:39	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 14:39	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 14:39	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/10/20 14:39	1

Lab Sample ID: MB 180-340265/78
Matrix: Water
Analysis Batch: 340265

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			12/10/20 17:18	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 17:18	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/10/20 17:18	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/10/20 17:18	1

Lab Sample ID: LCS 180-340265/53
Matrix: Water
Analysis Batch: 340265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3 to pH 4.5	250	240.1		mg/L		96	90 - 110

Lab Sample ID: LCS 180-340265/77
Matrix: Water
Analysis Batch: 340265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3 to pH 4.5	250	238.0		mg/L		95	90 - 110

Method: SM2320 B - Alkalinity, Total (Continued)

Lab Sample ID: LLCS 180-340265/4
Matrix: Water
Analysis Batch: 340265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Alkalinity as CaCO3 to pH 4.5			20.0	20.68		mg/L		103	90 - 110		

Lab Sample ID: 180-114605-B-7 DU
Matrix: Water
Analysis Batch: 340265

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	157			152.3		mg/L				3	20
Bicarbonate Alkalinity as CaCO3	157			152.3		mg/L				3	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Lab Sample ID: 180-114632-7 DU
Matrix: Water
Analysis Batch: 340265

Client Sample ID: GAF-GW-1316-HI-CAL-T2-MID
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	188			195.5		mg/L				4	20
Bicarbonate Alkalinity as CaCO3	188			195.5		mg/L				4	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

HPLC/IC

Analysis Batch: 340113

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Total/NA	Water	EPA 9056A	
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Total/NA	Water	EPA 9056A	
MB 180-340113/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-340113/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-114592-R-1 MS	Matrix Spike	Total/NA	Water	EPA 9056A	
180-114592-R-1 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 340144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Dissolved	Water	3005A	
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Total Recoverable	Water	3005A	
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Dissolved	Water	3005A	
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Dissolved	Water	3005A	
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Total Recoverable	Water	3005A	
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Dissolved	Water	3005A	
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Total Recoverable	Water	3005A	
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Dissolved	Water	3005A	
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Total Recoverable	Water	3005A	
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Dissolved	Water	3005A	
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Total Recoverable	Water	3005A	
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Dissolved	Water	3005A	
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Dissolved	Water	3005A	
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Total Recoverable	Water	3005A	
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Dissolved	Water	3005A	
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Total Recoverable	Water	3005A	
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Dissolved	Water	3005A	
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Total Recoverable	Water	3005A	
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Dissolved	Water	3005A	
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Total Recoverable	Water	3005A	
MB 180-340144/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-340144/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-340144/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Prep Batch: 340145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Dissolved	Water	3005A	
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Dissolved	Water	3005A	
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Total Recoverable	Water	3005A	
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Dissolved	Water	3005A	
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Total Recoverable	Water	3005A	
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Dissolved	Water	3005A	
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Total Recoverable	Water	3005A	
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Dissolved	Water	3005A	

Metals (Continued)

Prep Batch: 340145 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Total Recoverable	Water	3005A	
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Dissolved	Water	3005A	
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Dissolved	Water	3005A	
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Total Recoverable	Water	3005A	
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Dissolved	Water	3005A	
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Total Recoverable	Water	3005A	
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Dissolved	Water	3005A	
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Total Recoverable	Water	3005A	
MB 180-340145/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-340145/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-340145/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Prep Batch: 340320

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Dissolved	Water	7470A	
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Total/NA	Water	7470A	
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Dissolved	Water	7470A	
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Dissolved	Water	7470A	
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Total/NA	Water	7470A	
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Dissolved	Water	7470A	
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Total/NA	Water	7470A	
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Dissolved	Water	7470A	
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Total/NA	Water	7470A	
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Dissolved	Water	7470A	
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Total/NA	Water	7470A	
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Dissolved	Water	7470A	
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Dissolved	Water	7470A	
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Total/NA	Water	7470A	
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Dissolved	Water	7470A	
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Total/NA	Water	7470A	
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Dissolved	Water	7470A	
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Total/NA	Water	7470A	
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Dissolved	Water	7470A	
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Total/NA	Water	7470A	
MB 180-340320/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-340320/2-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 180-340320/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	

Prep Batch: 340322

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Dissolved	Water	7470A	
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Dissolved	Water	7470A	
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Total/NA	Water	7470A	
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Dissolved	Water	7470A	
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Total/NA	Water	7470A	
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Dissolved	Water	7470A	
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Total/NA	Water	7470A	
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Dissolved	Water	7470A	
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Total/NA	Water	7470A	
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Dissolved	Water	7470A	
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Dissolved	Water	7470A	

Metals (Continued)

Prep Batch: 340322 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Total/NA	Water	7470A	
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Dissolved	Water	7470A	
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Total/NA	Water	7470A	
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Dissolved	Water	7470A	
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Total/NA	Water	7470A	
MB 180-340322/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-340322/2-A	Lab Control Sample	Total/NA	Water	7470A	
LCSD 180-340322/3-A	Lab Control Sample Dup	Total/NA	Water	7470A	

Analysis Batch: 340422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Dissolved	Water	EPA 6020A	340144
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Dissolved	Water	EPA 6020A	340144
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Dissolved	Water	EPA 6020A	340144
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Dissolved	Water	EPA 6020A	340144
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Dissolved	Water	EPA 6020A	340144
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Dissolved	Water	EPA 6020A	340144
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Dissolved	Water	EPA 6020A	340144
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Dissolved	Water	EPA 6020A	340144
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Dissolved	Water	EPA 6020A	340144
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Dissolved	Water	EPA 6020A	340144
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Dissolved	Water	EPA 6020A	340144
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Dissolved	Water	EPA 6020A	340145
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Dissolved	Water	EPA 6020A	340145
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Dissolved	Water	EPA 6020A	340145
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Dissolved	Water	EPA 6020A	340145
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Dissolved	Water	EPA 6020A	340145
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Dissolved	Water	EPA 6020A	340145
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Dissolved	Water	EPA 6020A	340145
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Dissolved	Water	EPA 6020A	340145
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Dissolved	Water	EPA 6020A	340145
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Total Recoverable	Water	EPA 6020A	340145
MB 180-340144/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	340144
MB 180-340145/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	340145
LCS 180-340144/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	340144
LCS 180-340145/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	340145

Metals (Continued)

Analysis Batch: 340422 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 180-340144/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	340144
LCSD 180-340145/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	340145

Analysis Batch: 340576

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Dissolved	Water	EPA 7470A	340320
180-114632-1	GAF-GW-1316-CONTROL-T1-MID	Total/NA	Water	EPA 7470A	340320
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Dissolved	Water	EPA 7470A	340320
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Dissolved	Water	EPA 7470A	340320
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Total/NA	Water	EPA 7470A	340320
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Dissolved	Water	EPA 7470A	340320
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Total/NA	Water	EPA 7470A	340320
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Dissolved	Water	EPA 7470A	340320
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Total/NA	Water	EPA 7470A	340320
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Dissolved	Water	EPA 7470A	340320
180-114632-6	GAF-GW-1316-HI-CAL-T1-MID	Total/NA	Water	EPA 7470A	340320
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Dissolved	Water	EPA 7470A	340320
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Dissolved	Water	EPA 7470A	340320
180-114632-8	GAF-GW-1316-HI-CAL-T3-MID	Total/NA	Water	EPA 7470A	340320
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Dissolved	Water	EPA 7470A	340320
180-114632-9	GAF-GW-1316-HI-CAL-T4-MID	Total/NA	Water	EPA 7470A	340320
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Dissolved	Water	EPA 7470A	340320
180-114632-10	GAF-GW-1316-HI-CAL-T5-MID	Total/NA	Water	EPA 7470A	340320
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Dissolved	Water	EPA 7470A	340320
180-114632-11	GAF-GW-1316-DOLO 0.5-T1-MID	Total/NA	Water	EPA 7470A	340320
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Dissolved	Water	EPA 7470A	340322
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Dissolved	Water	EPA 7470A	340322
180-114632-13	GAF-GW-1316-DOLO 0.5-T3-MID	Total/NA	Water	EPA 7470A	340322
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Dissolved	Water	EPA 7470A	340322
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Total/NA	Water	EPA 7470A	340322
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Dissolved	Water	EPA 7470A	340322
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Total/NA	Water	EPA 7470A	340322
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Dissolved	Water	EPA 7470A	340322
180-114632-16	GAF-GW-1316-DOLO 1.0-T1-MID	Total/NA	Water	EPA 7470A	340322
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Dissolved	Water	EPA 7470A	340322
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Dissolved	Water	EPA 7470A	340322
180-114632-18	GAF-GW-1316-DOLO 1.0-T3-MID	Total/NA	Water	EPA 7470A	340322
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Dissolved	Water	EPA 7470A	340322
180-114632-19	GAF-GW-1316-DOLO 1.0-T4-MID	Total/NA	Water	EPA 7470A	340322
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Dissolved	Water	EPA 7470A	340322
180-114632-20	GAF-GW-1316-DOLO 1.0-T5-MID	Total/NA	Water	EPA 7470A	340322
MB 180-340320/1-A	Method Blank	Total/NA	Water	EPA 7470A	340320
MB 180-340322/1-A	Method Blank	Total/NA	Water	EPA 7470A	340322
LCS 180-340320/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	340320
LCS 180-340322/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	340322
LCSD 180-340320/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 7470A	340320
LCSD 180-340322/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 7470A	340322

Analysis Batch: 340599

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Dissolved	Water	EPA 6020A	340144

Metals (Continued)

Analysis Batch: 340599 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-3	GAF-GW-1316-CONTROL-T3-MID	Total Recoverable	Water	EPA 6020A	340144
180-114632-4	GAF-GW-1316-CONTROL-T4-MID	Dissolved	Water	EPA 6020A	340144
180-114632-5	GAF-GW-1316-CONTROL-T5-MID	Dissolved	Water	EPA 6020A	340144
180-114632-14	GAF-GW-1316-DOLO 0.5-T4-MID	Total Recoverable	Water	EPA 6020A	340145
180-114632-15	GAF-GW-1316-DOLO 0.5-T5-MID	Total Recoverable	Water	EPA 6020A	340145

General Chemistry

Analysis Batch: 340265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114632-2	GAF-GW-1316-CONTROL-T2-MID	Total/NA	Water	SM2320 B	
180-114632-7	GAF-GW-1316-HI-CAL-T2-MID	Total/NA	Water	SM2320 B	
180-114632-12	GAF-GW-1316-DOLO 0.5-T2-MID	Total/NA	Water	SM2320 B	
180-114632-17	GAF-GW-1316-DOLO 1.0-T2-MID	Total/NA	Water	SM2320 B	
MB 180-340265/54	Method Blank	Total/NA	Water	SM2320 B	
MB 180-340265/78	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-340265/53	Lab Control Sample	Total/NA	Water	SM2320 B	
LCS 180-340265/77	Lab Control Sample	Total/NA	Water	SM2320 B	
LLCS 180-340265/4	Lab Control Sample	Total/NA	Water	SM2320 B	
180-114605-B-7 DU	Duplicate	Total/NA	Water	SM2320 B	
180-114632-7 DU	GAF-GW-1316-HI-CAL-T2-MID	Total/NA	Water	SM2320 B	

RUSH

Special Handling:

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

☑TAT - Date Nee 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 12=

List Preservative Code below:

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= 1316 leachate X2=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroixe, bicarbonate, carbonate)
	GAF-GW-1316-Control-T1-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Control-T2-Mid	12/2/2020	11:20 AM	G	X1				2		x	x	x
	GAF-GW-1316-Control-T3-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Control-T4-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Control-T5-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T1-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T2-Mid	12/2/2020	11:20 AM	G	X1				2		x	x	x
	GAF-GW-1316-Hi-Cal-T3-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T4-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T5-Mid	12/2/2020	11:20 AM	G	X1				2	x	x		

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:

State-specific reporting standards:

180-114632 Chain of Custody

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		12/8/20	1500
	Jennifer Malm	12-9-20	
	ETA Pitt		9:30

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Froze

RUSH

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

Special Handling:

☑ TAT - Date Nee 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= 1316 leachate X2=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroixe, bicarbonate, carbonate)	QA/QC Reporting Notes:
						List Preservative Code below:				4	4			
	GAF-GW-1316-Dolo 0.5-T1-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 0.5-T2-Mid	12/2/2020	11:20 AM	G	X1				2		x	x	x	
	GAF-GW-1316-Dolo 0.5-T3-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 0.5-T4-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 0.5-T5-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 1.0-T1-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 1.0-T2-Mid	12/2/2020	11:20 AM	G	X1				2		x	x	x	
	GAF-GW-1316-Dolo 1.0-T3-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 1.0-T4-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			
	GAF-GW-1316-Dolo 1.0-T5-Mid	12/2/2020	11:20 AM	G	X1				2	x	x			

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		12/8/20	1500
	Dilly Watson	12-9-20	9:30
	FedEx		

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☑ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Jar Frozen


eurofins | Environment Testing TestAmerica
180-114632 Waybill
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562021/CAFE3311
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S160-58932
RMA:
FedEx Express
WED - 09 DEC AA
PRIORITY OVERNIGHT
15238
PA-US
PIT
FedEx
TRK# 0221 1680 3500 0883
XH AGCA
Uncorrected temp 2.4 °C
Thermometer ID 14
Initials
CF 0
PT-WI-SR-001 effective 7/26/13
ESE

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-114632-1

Login Number: 114632 **List Source: Eurofins 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	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-115017-1
Laboratory Sample Delivery Group: Treatability
Client Project/Site: GAF-NRS-Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
1/6/2021 11:47:26 AM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-115017-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-115017-1

Receipt
The samples were received on 12/16/2020 10:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 3.4º C and 3.8º C.

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

Metals
Method 3005A: The following sample was diluted due to the nature of the sample matrix: GAF-GW-1316-CONTROL-T5-END (180-115017-5). Elevated reporting limits (RLs) are provided.

Method 6020A: The following sample was analyzed at a 5X dilution due to the nature of the sample matrix and the internal standard: GAF-GW-1316-CONTROL-T5-END (180-115017-5). Elevated reporting limits (RLs) are provided.

Method 6020A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-1316-CONTROL-T3-END (180-115017-3), GAF-GW-1316-CONTROL-T4-END (180-115017-4) and GAF-GW-1316-CONTROL-T5-END (180-115017-5). Elevated reporting limits (RLs) are provided. No lower dilutions could be read due to sample matrix.

Method 7470A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-342043 and analytical batch 180-342315 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 7470A: Due to lack of sample volume, samples GAF-GW-1316-CONTROL-T4-END (180-115017-4) and GAF-GW-1316-HI-CAL-T4-END (180-115017-9) were prepped 20ml to 20ml

Method 7470A: Elevated reporting limits are provided for the following samples due to insufficient sample available for mercury preparation: GAF-GW-1316-DOLO 0.5-T4-END (180-115017-14) and GAF-GW-1316-DOLO 1.0-T4-END (180-115017-19).

Method 7470A: Due to limited sample volume available for mercury prep/digestion, samples GAF-GW-1316-DOLO 0.5-T3-END (180-115017-13) and GAF-GW-1316-DOLO 0.5-T5-END (180-115017-15) were digested 20ml to 20ml so as not to raise the reporting limit.

Method 7470A: The matrix spike/matrix spike duplicate (MS/MSD) sample associated with preparation batch 342043 was rejected and not available for reporting.

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.

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Qualifiers

Metals

Qualifier	Qualifier Description
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.
B	Compound was found in the blank and sample.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	05-21-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Water	12/04/20 11:00	12/16/20 10:00	
180-115017-21	GAF-GW-1315-CONTROL-T14	Water	12/07/20 12:40	12/16/20 10:00	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Water	12/07/20 12:40	12/16/20 10:00	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Water	12/07/20 12:40	12/16/20 10:00	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Water	12/07/20 12:40	12/16/20 10:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 7470A	Mercury (CVAA)	SW846	TAL PIT
SM2320 B	Alkalinity, Total	SM18	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-CONTROL-T1-END

Lab Sample ID: 180-115017-1
Matrix: Water
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 15:21	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 12:01	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 15:18	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 11:57	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:07	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:40	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-CONTROL-T2-END

Lab Sample ID: 180-115017-2
Matrix: Water
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 16:03	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 16:19	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 15:24	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 12:04	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 10:41	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 17:57	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-CONTROL-T3-END

Lab Sample ID: 180-115017-3

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 15:31	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		10			341798	12/23/20 12:12	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 15:28	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		10			341798	12/23/20 12:08	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:08	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:44	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-CONTROL-T4-END

Lab Sample ID: 180-115017-4

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 15:37	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		10			341798	12/23/20 12:19	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 15:34	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		10			341798	12/23/20 12:15	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:09	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			20 mL	20 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:45	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-CONTROL-T5-END

Lab Sample ID: 180-115017-5

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 15:44	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		5			341798	12/23/20 12:37	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			5 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 15:41	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			5 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		5			341798	12/23/20 12:22	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:09	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:46	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T1-END

Lab Sample ID: 180-115017-6

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 15:57	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 12:44	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 15:54	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 12:40	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:10	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:46	RJR	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T2-END

Lab Sample ID: 180-115017-7

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 17:08	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 17:24	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:00	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 12:48	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:11	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 18:04	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-HI-CAL-T3-END

Lab Sample ID: 180-115017-8

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:07	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 12:55	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 16:04	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 12:51	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:12	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:47	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T4-END

Lab Sample ID: 180-115017-9

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:13	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 13:02	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 16:10	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341300	12/21/20 08:29	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 12:58	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:13	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			20 mL	20 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:48	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-HI-CAL-T5-END

Lab Sample ID: 180-115017-10

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 12:29	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 12:26	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:16	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:49	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-END

Lab Sample ID: 180-115017-11

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 12:36	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 12:33	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:17	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:50	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T2-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 17:41	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 17:57	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 12:39	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:25	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 18:11	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T3-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 12:46	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 12:43	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:26	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			20 mL	20 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:16	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T4-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 13:09	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 13:06	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:27	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			10 mL	20 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:17	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 13:16	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 13:12	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:28	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			20 mL	20 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:18	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 13:22	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 13:19	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:29	RJR	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-END
Lab Sample ID: 180-115017-16
Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:19	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T2-END
Lab Sample ID: 180-115017-17
Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 19:16	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 19:32	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 13:25	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:30	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 18:17	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T3-END
Lab Sample ID: 180-115017-18
Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 13:32	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 13:29	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:31	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:20	RJR	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T4-END
Lab Sample ID: 180-115017-19

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 13:45	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341297	12/21/20 08:22	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 13:35	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			10 mL	20 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:32	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:21	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-END
Lab Sample ID: 180-115017-20

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:37	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			25 mL	25 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 09:47	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 16:33	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			25 mL	25 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 09:44	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341765	12/24/20 09:33	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341715	12/24/20 05:48	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341765	12/24/20 09:22	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-1315-CONTROL-T14
Lab Sample ID: 180-115017-21

Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 18:12	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 18:28	EPS	TAL PIT
	Instrument ID: CHIC2100A									

Client Sample ID: GAF-GW-1315-CONTROL-T14

Lab Sample ID: 180-115017-21

Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:43	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 09:55	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 16:40	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 09:51	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	342043	12/29/20 12:14	KEM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			342315	12/31/20 17:14	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:37	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 18:57	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T14

Lab Sample ID: 180-115017-22

Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 19:47	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 20:03	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:50	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 10:02	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 16:47	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 09:58	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:06	RJR	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T14

Lab Sample ID: 180-115017-22
Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:34	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 19:11	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1315-DOLO 0.5-T14

Lab Sample ID: 180-115017-23
Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 20:19	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 20:35	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 16:56	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 10:24	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 16:53	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 10:20	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:05	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:38	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 19:19	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1315-DOLO 1.0-T14

Lab Sample ID: 180-115017-24
Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			341424	12/22/20 20:51	EPS	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			341424	12/22/20 21:07	EPS	TAL PIT
	Instrument ID: CHIC2100A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1315-DOLO 1.0-T14

Date Collected: 12/07/20 12:40
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-24

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341583	12/22/20 17:10	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Dissolved	Analysis	6020A		1			341798	12/23/20 10:31	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341583	12/22/20 17:06	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	341302	12/21/20 08:33	KHM	TAL PIT
Total Recoverable	Analysis	6020A		1			341798	12/23/20 10:27	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	341476	12/22/20 09:05	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			341658	12/23/20 11:00	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			25 mL	25 mL	341475	12/22/20 09:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			341658	12/23/20 10:39	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			341258	12/18/20 19:26	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney
KHM = Kyle Mucroski
RJR = Ron Rosenbaum

Batch Type: Analysis

AVS = Abbey Smith
EPS = Evan Scheuer
KEM = Kimberly Mahoney
RJR = Ron Rosenbaum
RSK = Robert Kurtz

Client Sample ID: GAF-GW-1316-CONTROL-T1-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-1

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.74		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:18	1
Antimony	0.00120	J	0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:18	1
Arsenic	0.00401		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:18	1
Barium	0.0398		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:18	1
Beryllium	0.000524	J	0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:18	1
Boron	1.72	B	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 11:57	1
Cadmium	0.000316	J	0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:18	1
Calcium	298		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:18	1
Chromium	0.00590		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:18	1
Cobalt	0.0165		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:18	1
Copper	0.00417		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:18	1
Iron	14.1		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:18	1
Lead	0.00370		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:18	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:18	1
Magnesium	29.7		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:18	1
Manganese	7.10		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 15:18	1
Molybdenum	0.000888	J	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:18	1
Nickel	0.0113		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:18	1
Potassium	4.56		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:18	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:18	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:18	1
Sodium	98.8		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:18	1
Thallium	0.000727	J	0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:18	1
Vanadium	0.0178		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:18	1
Zinc	0.0238		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:18	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0162	J	0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:21	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:21	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:21	1
Barium	0.0108		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:21	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:21	1
Boron	1.74	B	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:01	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:21	1
Calcium	296		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:21	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:21	1
Cobalt	0.00535		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:21	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:21	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:21	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:21	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:21	1
Magnesium	29.2		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:21	1
Manganese	5.66		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 15:21	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:21	1
Nickel	0.00248		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:21	1
Potassium	3.75		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:21	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:21	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:21	1
Sodium	98.3		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:21	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-CONTROL-T1-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000453**	**J**	0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:21	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:21	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:21	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:40	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:07	1

Client Sample ID: GAF-GW-1316-CONTROL-T2-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-2

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.6**		1.00	0.320	mg/L			12/22/20 16:03	1
Fluoride	**0.304**		0.100	0.0440	mg/L			12/22/20 16:03	1
Sulfate	**877**		10.0	3.80	mg/L			12/22/20 16:19	10

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.07**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:24	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:24	1
Arsenic	**0.000894**	**J**	0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:24	1
Barium	**0.0133**		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:24	1
Beryllium	**0.00101**		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:24	1
Boron	**1.82**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:04	1
Cadmium	**0.00137**		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:24	1
Calcium	**256**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:24	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:24	1
Cobalt	**0.180**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:24	1
Copper	**0.000848**	**J**	0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:24	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:24	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:24	1
Lithium	**0.00414**	**J**	0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:24	1
Magnesium	**34.0**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:24	1
Manganese	**13.4**		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 15:24	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:24	1
Nickel	**0.0869**		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:24	1
Potassium	**4.09**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:24	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:24	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:24	1
Sodium	**93.2**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:24	1
Thallium	**0.000624**	**J**	0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:24	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:24	1
Zinc	**0.148**		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:24	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**67.5**		5.00	5.00	mg/L			12/18/20 17:57	1
Bicarbonate Alkalinity as CaCO3	**67.5**		5.00	5.00	mg/L			12/18/20 17:57	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 17:57	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 17:57	1

Client Sample ID: GAF-GW-1316-CONTROL-T3-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-3

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	74.7		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:28	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:28	1
Arsenic	0.0110		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:28	1
Barium	0.0397		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:28	1
Beryllium	0.0135		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:28	1
Boron	2.72	B	0.800	0.386	mg/L		12/21/20 08:29	12/23/20 12:08	10
Cadmium	0.00399		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:28	1
Calcium	446		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:28	1
Chromium	0.00880		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:28	1
Cobalt	0.505		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:28	1
Copper	0.0153		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:28	1
Iron	18.7		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:28	1
Lead	0.00513		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:28	1
Lithium	0.0203		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:28	1
Magnesium	59.1		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:28	1
Manganese	29.6		0.0500	0.00866	mg/L		12/21/20 08:29	12/23/20 12:08	10
Molybdenum	0.00134	J	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:28	1
Nickel	0.280		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:28	1
Potassium	6.67		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:28	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:28	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:28	1
Sodium	94.9		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:28	1
Thallium	0.00120		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:28	1
Vanadium	0.0181		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:28	1
Zinc	0.706		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:28	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	68.7		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:31	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:31	1
Arsenic	0.00627		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:31	1
Barium	0.0174		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:31	1
Beryllium	0.0141		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:31	1
Boron	2.29	B	0.800	0.386	mg/L		12/21/20 08:29	12/23/20 12:12	10
Cadmium	0.00403		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:31	1
Calcium	459		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:31	1
Chromium	0.00206		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:31	1
Cobalt	0.510		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:31	1
Copper	0.0101		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:31	1
Iron	0.105		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:31	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:31	1
Lithium	0.0188		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:31	1
Magnesium	60.8		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:31	1
Manganese	30.3		0.0500	0.00866	mg/L		12/21/20 08:29	12/23/20 12:12	10
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:31	1
Nickel	0.279		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:31	1
Potassium	5.18		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:31	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:31	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:31	1
Sodium	97.8		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:31	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-CONTROL-T3-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000976**	**J**	0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:31	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:31	1
Zinc	**0.699**		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:31	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:44	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:08	1

Client Sample ID: GAF-GW-1316-CONTROL-T4-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-4

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**128**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:34	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:34	1
Arsenic	**0.0121**		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:34	1
Barium	**0.0282**		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:34	1
Beryllium	**0.0315**		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:34	1
Boron	**1.84**	**B**	0.800	0.386	mg/L		12/21/20 08:29	12/23/20 12:15	10
Cadmium	**0.00544**		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:34	1
Calcium	**415**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:34	1
Chromium	**0.00846**		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:34	1
Cobalt	**0.713**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:34	1
Copper	**0.0342**		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:34	1
Iron	**10.2**		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:34	1
Lead	**0.00480**		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:34	1
Lithium	**0.0321**		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:34	1
Magnesium	**64.4**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:34	1
Manganese	**42.0**		0.0500	0.00866	mg/L		12/21/20 08:29	12/23/20 12:15	10
Molybdenum	**0.00213**	**J**	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:34	1
Nickel	**0.302**		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:34	1
Potassium	**4.64**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:34	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:34	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:34	1
Sodium	**86.9**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:34	1
Thallium	**0.000970**	**J**	0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:34	1
Vanadium	**0.00942**		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:34	1
Zinc	**1.03**		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:34	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**106**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:37	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:37	1
Arsenic	**0.00853**		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:37	1
Barium	**0.0146**		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:37	1
Beryllium	**0.0294**		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:37	1
Boron	**2.93**	**B**	0.800	0.386	mg/L		12/21/20 08:29	12/23/20 12:19	10
Cadmium	**0.00684**		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:37	1
Calcium	**402**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:37	1
Chromium	**0.00519**		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:37	1
Cobalt	**0.958**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:37	1
Copper	**0.0302**		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:37	1
Iron	**2.17**		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:37	1
Lead	**0.000130**	**J**	0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:37	1
Lithium	**0.0331**		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:37	1
Magnesium	**59.6**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:37	1
Manganese	**57.6**		0.0500	0.00866	mg/L		12/21/20 08:29	12/23/20 12:19	10
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:37	1
Nickel	**0.370**		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:37	1
Potassium	**4.76**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:37	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:37	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:37	1
Sodium	**77.9**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:37	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-CONTROL-T4-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.00113**		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:37	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:37	1
Zinc	**0.965**		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:37	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000146**	**J**	0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:45	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:09	1

Client Sample ID: GAF-GW-1316-CONTROL-T5-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-5

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	283		0.150	0.0625	mg/L		12/21/20 08:29	12/22/20 15:41	1
Antimony	0.00244	J	0.0100	0.00189	mg/L		12/21/20 08:29	12/22/20 15:41	1
Arsenic	0.0786		0.00500	0.00157	mg/L		12/21/20 08:29	12/22/20 15:41	1
Barium	0.311		0.0500	0.00800	mg/L		12/21/20 08:29	12/22/20 15:41	1
Beryllium	0.0640		0.00500	0.000910	mg/L		12/21/20 08:29	12/22/20 15:41	1
Boron	2.33	B	2.00	0.965	mg/L		12/21/20 08:29	12/23/20 12:22	5
Cadmium	0.00875		0.00500	0.00109	mg/L		12/21/20 08:29	12/22/20 15:41	1
Calcium	326		2.50	0.635	mg/L		12/21/20 08:29	12/22/20 15:41	1
Chromium	0.101		0.0100	0.00765	mg/L		12/21/20 08:29	12/22/20 15:41	1
Cobalt	1.18		0.00250	0.000670	mg/L		12/21/20 08:29	12/22/20 15:41	1
Copper	0.137		0.0100	0.00314	mg/L		12/21/20 08:29	12/22/20 15:41	1
Iron	244		0.250	0.0975	mg/L		12/21/20 08:29	12/22/20 15:41	1
Lead	0.0733		0.00500	0.000640	mg/L		12/21/20 08:29	12/22/20 15:41	1
Lithium	0.0840		0.0250	0.0170	mg/L		12/21/20 08:29	12/22/20 15:41	1
Magnesium	86.5		2.50	0.414	mg/L		12/21/20 08:29	12/22/20 15:41	1
Manganese	58.3		0.0250	0.00433	mg/L		12/21/20 08:29	12/22/20 15:41	1
Molybdenum	0.0160	J	0.0250	0.00305	mg/L		12/21/20 08:29	12/22/20 15:41	1
Nickel	0.488		0.00500	0.00168	mg/L		12/21/20 08:29	12/22/20 15:41	1
Potassium	15.4		2.50	0.780	mg/L		12/21/20 08:29	12/22/20 15:41	1
Selenium	ND		0.0250	0.00755	mg/L		12/21/20 08:29	12/22/20 15:41	1
Silver	ND		0.00500	0.000885	mg/L		12/21/20 08:29	12/22/20 15:41	1
Sodium	74.9		2.50	1.74	mg/L		12/21/20 08:29	12/22/20 15:41	1
Thallium	0.00531		0.00500	0.000740	mg/L		12/21/20 08:29	12/22/20 15:41	1
Vanadium	0.236		0.00500	0.00496	mg/L		12/21/20 08:29	12/22/20 15:41	1
Zinc	1.75		0.0250	0.0161	mg/L		12/21/20 08:29	12/22/20 15:41	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	207		0.150	0.0625	mg/L		12/21/20 08:29	12/23/20 12:37	5
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:44	1
Arsenic	0.0148		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:44	1
Barium	0.0155		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:44	1
Beryllium	0.0666		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:44	1
Boron	1.63	B	0.400	0.193	mg/L		12/21/20 08:29	12/23/20 12:37	5
Cadmium	0.00936		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:44	1
Calcium	402		2.50	0.635	mg/L		12/21/20 08:29	12/23/20 12:37	5
Chromium	0.0118		0.0100	0.00765	mg/L		12/21/20 08:29	12/23/20 12:37	5
Cobalt	1.30		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:44	1
Copper	0.0721		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:44	1
Iron	5.41		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:44	1
Lead	0.000217	J	0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:44	1
Lithium	0.0524		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:44	1
Magnesium	93.8		2.50	0.414	mg/L		12/21/20 08:29	12/23/20 12:37	5
Manganese	65.9		0.0250	0.00433	mg/L		12/21/20 08:29	12/23/20 12:37	5
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:44	1
Nickel	0.463		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:44	1
Potassium	6.35		2.50	0.780	mg/L		12/21/20 08:29	12/23/20 12:37	5
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:44	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:44	1
Sodium	84.5		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:44	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-CONTROL-T5-END

Lab Sample ID: 180-115017-5

Date Collected: 12/04/20 11:00

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.00149**		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:44	1
Vanadium	ND		0.00500	0.00496	mg/L		12/21/20 08:29	12/23/20 12:37	5
Zinc	**1.68**		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:44	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000549**		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:46	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:09	1

Client Sample ID: GAF-GW-1316-HI-CAL-T1-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-6

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0657**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:54	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:54	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:54	1
Barium	**0.0110**		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:54	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:54	1
Boron	**1.62**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:40	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:54	1
Calcium	**437**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:54	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:54	1
Cobalt	**0.000987**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:54	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:54	1
Iron	**0.0676**		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:54	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:54	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:54	1
Magnesium	**32.8**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:54	1
Manganese	**1.41**		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 15:54	1
Molybdenum	**0.000629**	**J**	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:54	1
Nickel	**0.000561**	**J**	0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:54	1
Potassium	**4.26**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:54	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:54	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:54	1
Sodium	**96.3**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:54	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:54	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:54	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:54	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0184**	**J**	0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 15:57	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 15:57	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 15:57	1
Barium	**0.00868**	**J**	0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 15:57	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 15:57	1
Boron	**1.65**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:44	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 15:57	1
Calcium	**356**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 15:57	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 15:57	1
Cobalt	**0.000527**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 15:57	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 15:57	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 15:57	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 15:57	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 15:57	1
Magnesium	**31.5**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 15:57	1
Manganese	**0.529**		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 15:57	1
Molybdenum	**0.000706**	**J**	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 15:57	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 15:57	1
Potassium	**4.16**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 15:57	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 15:57	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 15:57	1
Sodium	**94.3**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 15:57	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T1-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 15:57	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 15:57	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 15:57	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000216**		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:46	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000291**		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:10	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T2-END

Lab Sample ID: 180-115017-7

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	40.1		1.00	0.320	mg/L			12/22/20 17:08	1
Fluoride	0.271		0.100	0.0440	mg/L			12/22/20 17:08	1
Sulfate	960		10.0	3.80	mg/L			12/22/20 17:24	10

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0667		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 16:00	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 16:00	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 16:00	1
Barium	0.00765	J	0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 16:00	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 16:00	1
Boron	0.999	B	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:48	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 16:00	1
Calcium	386		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 16:00	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 16:00	1
Cobalt	0.000336	J	0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 16:00	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 16:00	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 16:00	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 16:00	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 16:00	1
Magnesium	12.1		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 16:00	1
Manganese	0.0200		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 16:00	1
Molybdenum	0.00639		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 16:00	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 16:00	1
Potassium	3.14		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 16:00	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 16:00	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 16:00	1
Sodium	84.4		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 16:00	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 16:00	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 16:00	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 16:00	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	165		5.00	5.00	mg/L			12/18/20 18:04	1
Bicarbonate Alkalinity as CaCO3	165		5.00	5.00	mg/L			12/18/20 18:04	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 18:04	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 18:04	1

Client Sample ID: GAF-GW-1316-HI-CAL-T3-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-8

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.41**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 16:04	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 16:04	1
Arsenic	**0.00143**		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 16:04	1
Barium	**0.0190**		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 16:04	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 16:04	1
Boron	**0.868**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:51	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 16:04	1
Calcium	**643**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 16:04	1
Chromium	**0.00388**		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 16:04	1
Cobalt	**0.00106**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 16:04	1
Copper	**0.00182**	**J**	0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 16:04	1
Iron	**4.32**		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 16:04	1
Lead	**0.00175**		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 16:04	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 16:04	1
Magnesium	**35.0**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 16:04	1
Manganese	**0.508**		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 16:04	1
Molybdenum	**0.00106**	**J**	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 16:04	1
Nickel	**0.00205**		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 16:04	1
Potassium	**5.70**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 16:04	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 16:04	1
Silver	**0.000223**	**J**	0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 16:04	1
Sodium	**77.1**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 16:04	1
Thallium	**0.000185**	**J**	0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 16:04	1
Vanadium	**0.00745**		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 16:04	1
Zinc	**0.00581**		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 16:04	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0140**	**J**	0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 16:07	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 16:07	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 16:07	1
Barium	**0.00973**	**J**	0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 16:07	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 16:07	1
Boron	**0.786**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:55	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 16:07	1
Calcium	**622**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 16:07	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 16:07	1
Cobalt	**0.000412**	**J**	0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 16:07	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 16:07	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 16:07	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 16:07	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 16:07	1
Magnesium	**35.2**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 16:07	1
Manganese	**0.510**		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 16:07	1
Molybdenum	**0.000849**	**J**	0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 16:07	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 16:07	1
Potassium	**3.52**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 16:07	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 16:07	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 16:07	1
Sodium	**79.9**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 16:07	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T3-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 16:07	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 16:07	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 16:07	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000273**		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:47	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:12	1

Client Sample ID: GAF-GW-1316-HI-CAL-T4-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-9

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.692**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 16:10	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 16:10	1
Arsenic	**0.00212**		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 16:10	1
Barium	**0.00593**	**J**	0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 16:10	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 16:10	1
Boron	**0.413**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 12:58	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 16:10	1
Calcium	**688**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 16:10	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 16:10	1
Cobalt	**0.00236**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 16:10	1
Copper	**0.00146**	**J**	0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 16:10	1
Iron	**0.217**		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 16:10	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 16:10	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 16:10	1
Magnesium	**0.779**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 16:10	1
Manganese	**0.00678**		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 16:10	1
Molybdenum	**0.0577**		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 16:10	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 16:10	1
Potassium	**3.47**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 16:10	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 16:10	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 16:10	1
Sodium	**62.2**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 16:10	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 16:10	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 16:10	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 16:10	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.648**		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 16:13	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 16:13	1
Arsenic	**0.00182**		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 16:13	1
Barium	**0.00560**	**J**	0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 16:13	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 16:13	1
Boron	**0.460**	**B**	0.0800	0.0386	mg/L		12/21/20 08:29	12/23/20 13:02	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 16:13	1
Calcium	**666**		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 16:13	1
Chromium	**0.00222**		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 16:13	1
Cobalt	**0.00285**		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 16:13	1
Copper	**0.00126**	**J**	0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 16:13	1
Iron	**0.0260**	**J**	0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 16:13	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 16:13	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 16:13	1
Magnesium	**0.652**		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 16:13	1
Manganese	**0.00203**	**J**	0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 16:13	1
Molybdenum	**0.0562**		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 16:13	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 16:13	1
Potassium	**2.48**		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 16:13	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 16:13	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 16:13	1
Sodium	**61.6**		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 16:13	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T4-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 16:13	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 16:13	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 16:13	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:48	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:13	1

Client Sample ID: GAF-GW-1316-HI-CAL-T5-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-10

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.28**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:26	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:26	1
Arsenic	**0.00298**		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:26	1
Barium	**0.0177**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:26	1
Beryllium	**0.000286**	**J**	0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:26	1
Boron	**0.332**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:26	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:26	1
Calcium	**640**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:26	1
Chromium	**0.00403**		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:26	1
Cobalt	**0.00268**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:26	1
Copper	**0.00352**		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:26	1
Iron	**6.69**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:26	1
Lead	**0.00183**		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:26	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:26	1
Magnesium	**2.11**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:26	1
Manganese	**0.0665**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:26	1
Molybdenum	**0.0302**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:26	1
Nickel	**0.00241**		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:26	1
Potassium	**3.47**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:26	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:26	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:26	1
Sodium	**48.9**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:26	1
Thallium	**0.000413**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:26	1
Vanadium	**0.00915**		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:26	1
Zinc	**0.00789**		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:26	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.208**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:29	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:29	1
Arsenic	**0.00122**		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:29	1
Barium	**0.00899**	**J**	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:29	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:29	1
Boron	**0.351**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:29	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:29	1
Calcium	**656**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:29	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:29	1
Cobalt	**0.00151**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:29	1
Copper	**0.000905**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:29	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:29	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:29	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:29	1
Magnesium	**2.07**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:29	1
Manganese	**0.0111**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:29	1
Molybdenum	**0.0273**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:29	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:29	1
Potassium	**3.01**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:29	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:29	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:29	1
Sodium	**52.7**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:29	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-HI-CAL-T5-END
Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000183**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:29	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:29	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:29	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:49	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:16	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-END

Lab Sample ID: 180-115017-11

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.290**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:33	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:33	1
Arsenic	**0.000329**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:33	1
Barium	**0.00940**	**J**	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:33	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:33	1
Boron	**1.44**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:33	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:33	1
Calcium	**294**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:33	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:33	1
Cobalt	**0.00100**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:33	1
Copper	**0.00147**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:33	1
Iron	**0.324**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:33	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:33	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:33	1
Magnesium	**101**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:33	1
Manganese	**1.20**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:33	1
Molybdenum	**0.000807**	**J**	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:33	1
Nickel	**0.000623**	**J**	0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:33	1
Potassium	**4.04**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:33	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:33	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:33	1
Sodium	**89.6**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:33	1
Thallium	**0.000185**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:33	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:33	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:33	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:36	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:36	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:36	1
Barium	**0.00844**	**J**	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:36	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:36	1
Boron	**1.56**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:36	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:36	1
Calcium	**279**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:36	1
Chromium	**0.00246**		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:36	1
Cobalt	**0.000646**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:36	1
Copper	**0.000691**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:36	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:36	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:36	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:36	1
Magnesium	**106**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:36	1
Manganese	**0.703**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:36	1
Molybdenum	**0.00112**	**J**	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:36	1
Nickel	**0.00101**		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:36	1
Potassium	**4.17**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:36	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:36	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:36	1
Sodium	**92.8**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:36	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 0.5-T1-END

Lab Sample ID: 180-115017-11

Date Collected: 12/04/20 11:00

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000211	J	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:36	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:36	1
Zinc	0.00356	J	0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:36	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000313		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:50	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000251		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:17	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T2-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-12

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.4**		1.00	0.320	mg/L			12/22/20 17:41	1
Fluoride	**0.160**		0.100	0.0440	mg/L			12/22/20 17:41	1
Sulfate	**1030**		10.0	3.80	mg/L			12/22/20 17:57	10

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:39	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:39	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:39	1
Barium	**0.0110**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:39	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:39	1
Boron	**1.34**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:39	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:39	1
Calcium	**372**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:39	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:39	1
Cobalt	**0.000901**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:39	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:39	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:39	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:39	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:39	1
Magnesium	**169**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:39	1
Manganese	**0.918**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:39	1
Molybdenum	**0.00104**	**J**	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:39	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:39	1
Potassium	**4.05**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:39	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:39	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:39	1
Sodium	**88.7**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:39	1
Thallium	**0.000175**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:39	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:39	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:39	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000156**	**J**	0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**309**		5.00	5.00	mg/L			12/18/20 18:11	1
Bicarbonate Alkalinity as CaCO3	**309**		5.00	5.00	mg/L			12/18/20 18:11	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 18:11	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 18:11	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T3-END
Lab Sample ID: 180-115017-13
Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12.6		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:43	1
Antimony	0.000958	J	0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:43	1
Arsenic	0.00593		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:43	1
Barium	0.0372		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:43	1
Beryllium	0.000577	J	0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:43	1
Boron	0.630		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:43	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:43	1
Calcium	478		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:43	1
Chromium	0.0103		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:43	1
Cobalt	0.00382		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:43	1
Copper	0.00681		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:43	1
Iron	20.4		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:43	1
Lead	0.00535		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:43	1
Lithium	0.00467	J	0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:43	1
Magnesium	219		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:43	1
Manganese	0.264		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:43	1
Molybdenum	0.00413	J	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:43	1
Nickel	0.00705		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:43	1
Potassium	4.86		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:43	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:43	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:43	1
Sodium	81.4		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:43	1
Thallium	0.000521	J	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:43	1
Vanadium	0.0253		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:43	1
Zinc	0.0264		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:43	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0183	J	0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:46	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:46	1
Arsenic	0.000426	J	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:46	1
Barium	0.00977	J	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:46	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:46	1
Boron	0.494		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:46	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:46	1
Calcium	468		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:46	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:46	1
Cobalt	0.000569		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:46	1
Copper	0.000642	J	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:46	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:46	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:46	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:46	1
Magnesium	210		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:46	1
Manganese	0.132		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:46	1
Molybdenum	0.00254	J	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:46	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:46	1
Potassium	5.17		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:46	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:46	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:46	1
Sodium	77.9		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:46	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 0.5-T3-END

Lab Sample ID: 180-115017-13

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000237**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:46	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:46	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:46	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:16	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:26	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T4-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-14

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.04**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:06	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:06	1
Arsenic	**0.000728**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:06	1
Barium	**0.0132**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:06	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:06	1
Boron	**1.17**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:06	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:06	1
Calcium	**581**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:06	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:06	1
Cobalt	**0.00473**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:06	1
Copper	**0.00146**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:06	1
Iron	**1.50**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:06	1
Lead	**0.000433**	**J**	0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:06	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:06	1
Magnesium	**201**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:06	1
Manganese	**2.78**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:06	1
Molybdenum	**0.00319**	**J**	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:06	1
Nickel	**0.00342**		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:06	1
Potassium	**5.00**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:06	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:06	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:06	1
Sodium	**71.1**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:06	1
Thallium	**0.000305**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:06	1
Vanadium	**0.00275**		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:06	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:06	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0229**	**J**	0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:09	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:09	1
Arsenic	**0.000423**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:09	1
Barium	**0.00964**	**J**	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:09	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:09	1
Boron	**0.316**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:09	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:09	1
Calcium	**594**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:09	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:09	1
Cobalt	**0.000617**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:09	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:09	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:09	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:09	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:09	1
Magnesium	**237**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:09	1
Manganese	**0.0837**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:09	1
Molybdenum	**0.00466**	**J**	0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:09	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:09	1
Potassium	**3.50**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:09	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:09	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:09	1
Sodium	**77.3**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:09	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 0.5-T4-END

Lab Sample ID: 180-115017-14

Date Collected: 12/04/20 11:00

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000179**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:09	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:09	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:09	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000400	0.000260	mg/L		12/24/20 05:48	12/24/20 09:17	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:27	1

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-15

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.37**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:12	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:12	1
Arsenic	**0.00266**		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:12	1
Barium	**0.0180**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:12	1
Beryllium	**0.000243**	**J**	0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:12	1
Boron	**0.601**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:12	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:12	1
Calcium	**585**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:12	1
Chromium	**0.00392**		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:12	1
Cobalt	**0.00319**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:12	1
Copper	**0.00364**		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:12	1
Iron	**8.12**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:12	1
Lead	**0.00196**		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:12	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:12	1
Magnesium	**185**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:12	1
Manganese	**0.477**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:12	1
Molybdenum	**0.00600**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:12	1
Nickel	**0.00352**		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:12	1
Potassium	**8.40**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:12	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:12	1
Silver	**0.000239**	**J**	0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:12	1
Sodium	**73.5**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:12	1
Thallium	**0.000432**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:12	1
Vanadium	**0.00941**		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:12	1
Zinc	**0.0177**		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:12	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.398**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:16	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:16	1
Arsenic	**0.000600**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:16	1
Barium	**0.0108**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:16	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:16	1
Boron	**0.284**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:16	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:16	1
Calcium	**586**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:16	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:16	1
Cobalt	**0.000727**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:16	1
Copper	**0.000688**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:16	1
Iron	**0.451**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:16	1
Lead	**0.000184**	**J**	0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:16	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:16	1
Magnesium	**192**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:16	1
Manganese	**0.102**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:16	1
Molybdenum	**0.00613**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:16	1
Nickel	**0.000449**	**J**	0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:16	1
Potassium	**3.57**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:16	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:16	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:16	1
Sodium	**75.6**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:16	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 0.5-T5-END

Lab Sample ID: 180-115017-15

Date Collected: 12/04/20 11:00

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000226	J	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:16	1
Vanadium	0.00106		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:16	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:16	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:18	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:28	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-END

Lab Sample ID: 180-115017-16

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.979**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:19	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:19	1
Arsenic	**0.000940**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:19	1
Barium	**0.0128**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:19	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:19	1
Boron	**0.836**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:19	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:19	1
Calcium	**309**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:19	1
Chromium	**0.00230**		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:19	1
Cobalt	**0.00125**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:19	1
Copper	**0.00160**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:19	1
Iron	**1.74**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:19	1
Lead	**0.000391**	**J**	0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:19	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:19	1
Magnesium	**63.9**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:19	1
Manganese	**0.0287**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:19	1
Molybdenum	**0.00845**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:19	1
Nickel	**0.000632**	**J**	0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:19	1
Potassium	**4.18**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:19	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:19	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:19	1
Sodium	**91.3**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:19	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:19	1
Vanadium	**0.00462**		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:19	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:19	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:22	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:22	1
Arsenic	**0.000421**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:22	1
Barium	**0.0100**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:22	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:22	1
Boron	**0.875**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:22	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:22	1
Calcium	**308**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:22	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:22	1
Cobalt	**0.000870**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:22	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:22	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:22	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:22	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:22	1
Magnesium	**60.8**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:22	1
Manganese	**0.00182**	**J**	0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:22	1
Molybdenum	**0.00957**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:22	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:22	1
Potassium	**4.05**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:22	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:22	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:22	1
Sodium	**90.5**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:22	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T1-END

Lab Sample ID: 180-115017-16

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:22	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:22	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:22	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:19	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:29	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T2-END

Lab Sample ID: 180-115017-17

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	40.3		1.00	0.320	mg/L			12/22/20 19:16	1
Fluoride	0.274		0.100	0.0440	mg/L			12/22/20 19:16	1
Sulfate	1110		10.0	3.80	mg/L			12/22/20 19:32	10

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0227	J	0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:25	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:25	1
Arsenic	0.000465	J	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:25	1
Barium	0.00857	J	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:25	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:25	1
Boron	0.723		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:25	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:25	1
Calcium	243		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:25	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:25	1
Cobalt	0.000555		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:25	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:25	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:25	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:25	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:25	1
Magnesium	97.1		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:25	1
Manganese	0.00915		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:25	1
Molybdenum	0.00827		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:25	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:25	1
Potassium	3.24		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:25	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:25	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:25	1
Sodium	84.3		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:25	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:25	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:25	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:25	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	25.1		5.00	5.00	mg/L			12/18/20 18:17	1
Bicarbonate Alkalinity as CaCO3	25.1		5.00	5.00	mg/L			12/18/20 18:17	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 18:17	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 18:17	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T3-END

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-18

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2.02**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:29	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:29	1
Arsenic	**0.00115**		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:29	1
Barium	**0.0142**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:29	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:29	1
Boron	**0.440**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:29	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:29	1
Calcium	**536**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:29	1
Chromium	**0.00173**	**J**	0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:29	1
Cobalt	**0.000938**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:29	1
Copper	**0.00135**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:29	1
Iron	**2.67**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:29	1
Lead	**0.000708**	**J**	0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:29	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:29	1
Magnesium	**184**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:29	1
Manganese	**0.0722**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:29	1
Molybdenum	**0.00555**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:29	1
Nickel	**0.00116**		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:29	1
Potassium	**4.55**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:29	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:29	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:29	1
Sodium	**80.5**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:29	1
Thallium	**0.000183**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:29	1
Vanadium	**0.00405**		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:29	1
Zinc	**0.00357**	**J**	0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:29	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0249**	**J**	0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:32	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:32	1
Arsenic	**0.000395**	**J**	0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:32	1
Barium	**0.0102**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:32	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:32	1
Boron	**0.420**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:32	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:32	1
Calcium	**545**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:32	1
Chromium	**0.00164**	**J**	0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:32	1
Cobalt	**0.000507**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:32	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:32	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:32	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:32	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:32	1
Magnesium	**190**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:32	1
Manganese	**0.0611**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:32	1
Molybdenum	**0.00557**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:32	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:32	1
Potassium	**3.42**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:32	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:32	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:32	1
Sodium	**82.4**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:32	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T3-END

Lab Sample ID: 180-115017-18

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:32	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:32	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:32	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:20	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:31	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T4-END

Lab Sample ID: 180-115017-19

Date Collected: 12/04/20 11:00
Date Received: 12/16/20 10:00

Matrix: Water

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**16.2**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:35	1
Antimony	**0.000825**	**J**	0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:35	1
Arsenic	**0.00802**		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:35	1
Barium	**0.0385**		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:35	1
Beryllium	**0.000936**	**J**	0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:35	1
Boron	**0.679**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:35	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:35	1
Calcium	**657**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:35	1
Chromium	**0.0135**		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:35	1
Cobalt	**0.00897**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:35	1
Copper	**0.00902**		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:35	1
Iron	**29.2**		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:35	1
Lead	**0.00602**		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:35	1
Lithium	**0.00486**	**J**	0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:35	1
Magnesium	**25.5**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:35	1
Manganese	**0.373**		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:35	1
Molybdenum	**0.0159**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:35	1
Nickel	**0.00870**		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:35	1
Potassium	**5.09**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:35	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:35	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:35	1
Sodium	**67.3**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:35	1
Thallium	**0.000456**	**J**	0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:35	1
Vanadium	**0.0340**		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:35	1
Zinc	**0.0364**		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:35	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.109**		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 13:45	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 13:45	1
Arsenic	**0.00148**		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 13:45	1
Barium	**0.00800**	**J**	0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 13:45	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 13:45	1
Boron	**0.188**		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 13:45	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 13:45	1
Calcium	**653**		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 13:45	1
Chromium	**0.00155**	**J**	0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 13:45	1
Cobalt	**0.00429**		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 13:45	1
Copper	**0.00104**	**J**	0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 13:45	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 13:45	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 13:45	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 13:45	1
Magnesium	**7.50**		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 13:45	1
Manganese	ND		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 13:45	1
Molybdenum	**0.0245**		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 13:45	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 13:45	1
Potassium	**2.99**		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 13:45	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 13:45	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 13:45	1
Sodium	**65.3**		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 13:45	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T4-END
Lab Sample ID: 180-115017-19
Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 13:45	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 13:45	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 13:45	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:21	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000400	0.000260	mg/L		12/24/20 05:48	12/24/20 09:32	1

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-END

Lab Sample ID: 180-115017-20

Date Collected: 12/04/20 11:00
Matrix: Water
Date Received: 12/16/20 10:00

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**9.54**		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:33	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:33	1
Arsenic	**0.00505**		0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:33	1
Barium	**0.0275**		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:33	1
Beryllium	**0.000427**	J	0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:33	1
Boron	**0.321**		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 09:44	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:33	1
Calcium	**631**		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:33	1
Chromium	**0.00835**		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:33	1
Cobalt	**0.00714**		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:33	1
Copper	**0.00624**		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:33	1
Iron	**14.2**		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:33	1
Lead	**0.00410**		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:33	1
Lithium	**0.00353**	J	0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:33	1
Magnesium	**11.7**		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:33	1
Manganese	**0.102**		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:33	1
Molybdenum	**0.0218**		0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:33	1
Nickel	**0.00502**		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:33	1
Potassium	**4.93**		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:33	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:33	1
Silver	**0.000184**	J	0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:33	1
Sodium	**49.2**		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:33	1
Thallium	**0.000604**	J	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:33	1
Vanadium	**0.0190**		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:33	1
Zinc	**0.0162**		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:33	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0576**		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:37	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:37	1
Arsenic	**0.000900**	J	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:37	1
Barium	**0.00926**	J	0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:37	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:37	1
Boron	**0.263**		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 09:47	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:37	1
Calcium	**610**		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:37	1
Chromium	**0.00194**	J	0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:37	1
Cobalt	**0.00247**		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:37	1
Copper	**0.000779**	J	0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:37	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:37	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:37	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:37	1
Magnesium	**109**		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:37	1
Manganese	**0.0417**		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:37	1
Molybdenum	**0.0128**		0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:37	1
Nickel	**0.000417**	J	0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:37	1
Potassium	**3.23**		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:37	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:37	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:37	1
Sodium	**62.8**		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:37	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1316-DOLO 1.0-T5-END

Lab Sample ID: 180-115017-20

Date Collected: 12/04/20 11:00

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	**0.000298**	**J**	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:37	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:37	1
Zinc	**0.00420**	**J**	0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:37	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:22	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:33	1

Client Sample ID: GAF-GW-1315-CONTROL-T14

Date Collected: 12/07/20 12:40
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-21

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	42.1		1.00	0.320	mg/L			12/22/20 18:12	1
Fluoride	0.212		0.100	0.0440	mg/L			12/22/20 18:12	1
Sulfate	752		10.0	3.80	mg/L			12/22/20 18:28	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.458		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:40	1
Antimony	0.000858	J	0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:40	1
Arsenic	0.000335	J	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:40	1
Barium	0.0241		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:40	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:40	1
Boron	1.90		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 09:51	1
Cadmium	0.000326	J	0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:40	1
Calcium	303		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:40	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:40	1
Cobalt	0.0119		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:40	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:40	1
Iron	0.559		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:40	1
Lead	0.000190	J	0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:40	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:40	1
Magnesium	34.2		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:40	1
Manganese	7.77		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:40	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:40	1
Nickel	0.00706		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:40	1
Potassium	5.26		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:40	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:40	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:40	1
Sodium	94.8		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:40	1
Thallium	0.000856	J	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:40	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:40	1
Zinc	0.00432	J	0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:40	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0137	J	0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:43	1
Antimony	0.000781	J	0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:43	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:43	1
Barium	0.0210		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:43	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:43	1
Boron	1.93		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 09:55	1
Cadmium	0.000340	J	0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:43	1
Calcium	294		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:43	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:43	1
Cobalt	0.0113		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:43	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:43	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:43	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:43	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:43	1
Magnesium	33.5		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:43	1
Manganese	7.45		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:43	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1315-CONTROL-T14

Date Collected: 12/07/20 12:40
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-21

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:43	1
Nickel	**0.00626**		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:43	1
Potassium	**5.94**		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:43	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:43	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:43	1
Sodium	**91.9**		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:43	1
Thallium	**0.000789**	**J**	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:43	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:43	1
Zinc	**0.00372**	**J**	0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:43	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:37	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/29/20 12:14	12/31/20 17:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**312**		5.00	5.00	mg/L			12/18/20 18:57	1
Bicarbonate Alkalinity as CaCO3	**312**		5.00	5.00	mg/L			12/18/20 18:57	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 18:57	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 18:57	1

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T14

Date Collected: 12/07/20 12:40
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-22

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.1**		1.00	0.320	mg/L			12/22/20 19:47	1
Fluoride	**0.215**		0.100	0.0440	mg/L			12/22/20 19:47	1
Sulfate	**534**		10.0	3.80	mg/L			12/22/20 20:03	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0487**		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:47	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:47	1
Arsenic	**0.000465**	**J**	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:47	1
Barium	**0.0231**		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:47	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:47	1
Boron	**1.82**		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 09:58	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:47	1
Calcium	**293**		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:47	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:47	1
Cobalt	**0.00349**		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:47	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:47	1
Iron	**0.154**		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:47	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:47	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:47	1
Magnesium	**25.8**		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:47	1
Manganese	**2.01**		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:47	1
Molybdenum	**0.00119**	**J**	0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:47	1
Nickel	**0.00104**		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:47	1
Potassium	**4.79**		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:47	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:47	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:47	1
Sodium	**93.5**		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:47	1
Thallium	**0.000195**	**J**	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:47	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:47	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:47	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:50	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:50	1
Arsenic	**0.000346**	**J**	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:50	1
Barium	**0.0218**		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:50	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:50	1
Boron	**1.80**		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 10:02	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:50	1
Calcium	**283**		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:50	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:50	1
Cobalt	**0.00313**		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:50	1
Copper	**0.000740**	**J**	0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:50	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:50	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:50	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:50	1
Magnesium	**25.4**		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:50	1
Manganese	**1.60**		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:50	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T14
Date Collected: 12/07/20 12:40
Date Received: 12/16/20 10:00

Lab Sample ID: 180-115017-22
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	0.00116	J	0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:50	1
Nickel	0.000816	J	0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:50	1
Potassium	4.79		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:50	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:50	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:50	1
Sodium	92.5		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:50	1
Thallium	0.000177	J	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:50	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:50	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:50	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:34	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	381		5.00	5.00	mg/L			12/18/20 19:11	1
Bicarbonate Alkalinity as CaCO3	381		5.00	5.00	mg/L			12/18/20 19:11	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 19:11	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 19:11	1

Client Sample ID: GAF-GW-1315-DOLO 0.5-T14

Lab Sample ID: 180-115017-23

Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	42.6		1.00	0.320	mg/L			12/22/20 20:19	1
Fluoride	0.203		0.100	0.0440	mg/L			12/22/20 20:19	1
Sulfate	677		10.0	3.80	mg/L			12/22/20 20:35	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0778		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:53	1
Antimony	0.000603	J	0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:53	1
Arsenic	0.000475	J	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:53	1
Barium	0.0192		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:53	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:53	1
Boron	1.69		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 10:20	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:53	1
Calcium	295		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:53	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:53	1
Cobalt	0.00951		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:53	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:53	1
Iron	0.330		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:53	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:53	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:53	1
Magnesium	55.5		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:53	1
Manganese	3.11		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:53	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:53	1
Nickel	0.00269		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:53	1
Potassium	4.41		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:53	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:53	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:53	1
Sodium	92.0		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:53	1
Thallium	0.000173	J	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:53	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:53	1
Zinc	0.00383	J	0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:53	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:56	1
Antimony	0.000628	J	0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:56	1
Arsenic	0.000318	J	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:56	1
Barium	0.0183		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:56	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:56	1
Boron	1.75		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 10:24	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:56	1
Calcium	279		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:56	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:56	1
Cobalt	0.00817		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:56	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:56	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:56	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:56	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:56	1
Magnesium	54.3		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:56	1
Manganese	2.62		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:56	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1315-DOLO 0.5-T14

Lab Sample ID: 180-115017-23

Date Collected: 12/07/20 12:40

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	**0.000618**	**J**	0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:56	1
Nickel	**0.00260**		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:56	1
Potassium	**4.34**		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:56	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:56	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:56	1
Sodium	**90.4**		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:56	1
Thallium	**0.000185**	**J**	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:56	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:56	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:56	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:38	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**397**		5.00	5.00	mg/L			12/18/20 19:19	1
Bicarbonate Alkalinity as CaCO3	**397**		5.00	5.00	mg/L			12/18/20 19:19	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 19:19	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 19:19	1

Client Sample ID: GAF-GW-1315-DOLO 1.0-T14

Lab Sample ID: 180-115017-24

Date Collected: 12/07/20 12:40
Matrix: Water
Date Received: 12/16/20 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	41.3		1.00	0.320	mg/L			12/22/20 20:51	1
Fluoride	0.192		0.100	0.0440	mg/L			12/22/20 20:51	1
Sulfate	642		10.0	3.80	mg/L			12/22/20 21:07	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.236		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 17:06	1
Antimony	0.00156	J	0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 17:06	1
Arsenic	0.000484	J	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 17:06	1
Barium	0.0224		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 17:06	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 17:06	1
Boron	1.74		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 10:27	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 17:06	1
Calcium	278		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 17:06	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 17:06	1
Cobalt	0.00615		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 17:06	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 17:06	1
Iron	0.405		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 17:06	1
Lead	0.000136	J	0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 17:06	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 17:06	1
Magnesium	46.7		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 17:06	1
Manganese	2.57		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 17:06	1
Molybdenum	0.00120	J	0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 17:06	1
Nickel	0.00228		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 17:06	1
Potassium	4.75		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 17:06	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 17:06	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 17:06	1
Sodium	88.5		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 17:06	1
Thallium	0.000234	J	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 17:06	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 17:06	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 17:06	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 17:10	1
Antimony	0.00143	J	0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 17:10	1
Arsenic	0.000355	J	0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 17:10	1
Barium	0.0207		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 17:10	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 17:10	1
Boron	1.74		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 10:31	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 17:10	1
Calcium	267		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 17:10	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 17:10	1
Cobalt	0.00514		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 17:10	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 17:10	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 17:10	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 17:10	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 17:10	1
Magnesium	46.9		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 17:10	1
Manganese	2.18		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 17:10	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115017-1
SDG: Treatability

Client Sample ID: GAF-GW-1315-DOLO 1.0-T14

Lab Sample ID: 180-115017-24

Date Collected: 12/07/20 12:40

Matrix: Water

Date Received: 12/16/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	**0.00124**	**J**	0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 17:10	1
Nickel	**0.00175**		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 17:10	1
Potassium	**4.73**		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 17:10	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 17:10	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 17:10	1
Sodium	**88.6**		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 17:10	1
Thallium	**0.000228**	**J**	0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 17:10	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 17:10	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 17:10	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:39	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 11:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**345**		5.00	5.00	mg/L			12/18/20 19:26	1
Bicarbonate Alkalinity as CaCO3	**345**		5.00	5.00	mg/L			12/18/20 19:26	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 19:26	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 19:26	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-341424/34
Matrix: Water
Analysis Batch: 341424

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.320	mg/L			12/22/20 14:57	1
Fluoride	ND		0.100	0.0440	mg/L			12/22/20 14:57	1
Sulfate	ND		1.00	0.380	mg/L			12/22/20 14:57	1

Lab Sample ID: LCS 180-341424/33
Matrix: Water
Analysis Batch: 341424

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.46		mg/L		101	80 - 120
Fluoride	2.50	2.608		mg/L		104	80 - 120
Sulfate	50.0	52.63		mg/L		105	80 - 120

Lab Sample ID: 180-115017-2 MS
Matrix: Water
Analysis Batch: 341424

Client Sample ID: GAF-GW-1316-CONTROL-T2-END
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.6		500	527.4		mg/L		97	80 - 120
Fluoride	ND		25.0	25.38		mg/L		102	80 - 120
Sulfate	877		500	1345		mg/L		94	80 - 120

Lab Sample ID: 180-115017-2 MSD
Matrix: Water
Analysis Batch: 341424

Client Sample ID: GAF-GW-1316-CONTROL-T2-END
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	40.6		500	544.8		mg/L		101	80 - 120	3	15
Fluoride	ND		25.0	26.41		mg/L		106	80 - 120	4	15
Sulfate	877		500	1395		mg/L		104	80 - 120	4	15

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 180-341297/1-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 341297

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:22	12/22/20 12:20	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:22	12/22/20 12:20	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:22	12/22/20 12:20	1
Barium	ND		0.0100	0.00160	mg/L		12/21/20 08:22	12/22/20 12:20	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:22	12/22/20 12:20	1
Boron	ND		0.0800	0.0386	mg/L		12/21/20 08:22	12/22/20 12:20	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:22	12/22/20 12:20	1
Calcium	ND		0.500	0.127	mg/L		12/21/20 08:22	12/22/20 12:20	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:22	12/22/20 12:20	1
Cobalt	ND		0.000500	0.000134	mg/L		12/21/20 08:22	12/22/20 12:20	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:22	12/22/20 12:20	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:22	12/22/20 12:20	1

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

Lab Sample ID: MB 180-341297/1-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 341297

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:22	12/22/20 12:20	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:22	12/22/20 12:20	1
Magnesium	ND		0.500	0.0827	mg/L		12/21/20 08:22	12/22/20 12:20	1
Manganese	ND		0.00500	0.000866	mg/L		12/21/20 08:22	12/22/20 12:20	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:22	12/22/20 12:20	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:22	12/22/20 12:20	1
Potassium	ND		0.500	0.156	mg/L		12/21/20 08:22	12/22/20 12:20	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:22	12/22/20 12:20	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:22	12/22/20 12:20	1
Sodium	ND		0.500	0.348	mg/L		12/21/20 08:22	12/22/20 12:20	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:22	12/22/20 12:20	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:22	12/22/20 12:20	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:22	12/22/20 12:20	1

Lab Sample ID: LCS 180-341297/2-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 341297

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.889		mg/L		98	80 - 120
Antimony	0.250	0.2378		mg/L		95	80 - 120
Arsenic	1.00	0.9971		mg/L		100	80 - 120
Barium	1.00	0.9963		mg/L		100	80 - 120
Beryllium	0.500	0.5100		mg/L		102	80 - 120
Boron	1.25	1.116		mg/L		89	80 - 120
Cadmium	0.500	0.5009		mg/L		100	80 - 120
Calcium	25.0	26.96		mg/L		108	80 - 120
Chromium	0.500	0.5026		mg/L		101	80 - 120
Cobalt	0.500	0.4968		mg/L		99	80 - 120
Copper	0.500	0.4953		mg/L		99	80 - 120
Iron	5.00	5.108		mg/L		102	80 - 120
Lead	0.500	0.5060		mg/L		101	80 - 120
Lithium	0.500	0.4882		mg/L		98	80 - 120
Magnesium	25.0	25.08		mg/L		100	80 - 120
Manganese	0.500	0.5018		mg/L		100	80 - 120
Molybdenum	0.500	0.5078		mg/L		102	80 - 120
Nickel	0.500	0.4870		mg/L		97	80 - 120
Potassium	25.0	24.73		mg/L		99	80 - 120
Selenium	1.00	1.016		mg/L		102	80 - 120
Silver	0.250	0.2499		mg/L		100	80 - 120
Sodium	25.0	25.39		mg/L		102	80 - 120
Thallium	1.00	1.039		mg/L		104	80 - 120
Vanadium	0.500	0.5036		mg/L		101	80 - 120
Zinc	0.250	0.2523		mg/L		101	80 - 120

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

Lab Sample ID: 180-114996-E-1-B MS
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 341297

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND		5.00	4.762		mg/L		95	75 - 125
Antimony	ND		0.250	0.2319		mg/L		93	75 - 125
Arsenic	ND		1.00	0.9401		mg/L		94	75 - 125
Barium	0.176		1.00	1.124		mg/L		95	75 - 125
Beryllium	ND		0.500	0.4594		mg/L		92	75 - 125
Boron	0.0510	J	1.25	1.039		mg/L		79	75 - 125
Cadmium	ND		0.500	0.4860		mg/L		97	75 - 125
Calcium	40.3		25.0	64.61		mg/L		97	75 - 125
Chromium	ND		0.500	0.4857		mg/L		97	75 - 125
Cobalt	ND		0.500	0.4750		mg/L		95	75 - 125
Copper	0.00464		0.500	0.4776		mg/L		95	75 - 125
Iron	ND		5.00	5.045		mg/L		101	75 - 125
Lead	0.000172	J	0.500	0.4887		mg/L		98	75 - 125
Lithium	0.0138		0.500	0.4613		mg/L		89	75 - 125
Magnesium	6.46		25.0	31.10		mg/L		99	75 - 125
Manganese	ND		0.500	0.4792		mg/L		96	75 - 125
Molybdenum	ND		0.500	0.4850		mg/L		97	75 - 125
Nickel	ND		0.500	0.4656		mg/L		93	75 - 125
Potassium	1.14		25.0	24.83		mg/L		95	75 - 125
Selenium	ND		1.00	0.9832		mg/L		98	75 - 125
Silver	ND		0.250	0.2445		mg/L		98	75 - 125
Sodium	8.93		25.0	33.46		mg/L		98	75 - 125
Thallium	ND		1.00	1.003		mg/L		100	75 - 125
Vanadium	ND		0.500	0.4847		mg/L		97	75 - 125
Zinc	ND		0.250	0.2472		mg/L		99	75 - 125

Lab Sample ID: 180-114996-E-1-C MSD
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 341297

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND		5.00	4.792		mg/L		96	75 - 125	1	20
Antimony	ND		0.250	0.2346		mg/L		94	75 - 125	1	20
Arsenic	ND		1.00	0.9528		mg/L		95	75 - 125	1	20
Barium	0.176		1.00	1.147		mg/L		97	75 - 125	2	20
Beryllium	ND		0.500	0.4708		mg/L		94	75 - 125	2	20
Boron	0.0510	J	1.25	1.128		mg/L		86	75 - 125	8	20
Cadmium	ND		0.500	0.4952		mg/L		99	75 - 125	2	20
Calcium	40.3		25.0	65.32		mg/L		100	75 - 125	1	20
Chromium	ND		0.500	0.4969		mg/L		99	75 - 125	2	20
Cobalt	ND		0.500	0.4787		mg/L		96	75 - 125	1	20
Copper	0.00464		0.500	0.4800		mg/L		95	75 - 125	0	20
Iron	ND		5.00	5.034		mg/L		101	75 - 125	0	20
Lead	0.000172	J	0.500	0.4961		mg/L		99	75 - 125	1	20
Lithium	0.0138		0.500	0.4739		mg/L		92	75 - 125	3	20
Magnesium	6.46		25.0	31.52		mg/L		100	75 - 125	1	20
Manganese	ND		0.500	0.4869		mg/L		97	75 - 125	2	20
Molybdenum	ND		0.500	0.4924		mg/L		98	75 - 125	2	20
Nickel	ND		0.500	0.4711		mg/L		94	75 - 125	1	20

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

Lab Sample ID: 180-114996-E-1-C MSD
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 341297

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Potassium	1.14		25.0	25.08		mg/L		96	75 - 125	1	20
Selenium	ND		1.00	0.9950		mg/L		100	75 - 125	1	20
Silver	ND		0.250	0.2455		mg/L		98	75 - 125	0	20
Sodium	8.93		25.0	33.91		mg/L		100	75 - 125	1	20
Thallium	ND		1.00	1.019		mg/L		102	75 - 125	2	20
Vanadium	ND		0.500	0.4935		mg/L		99	75 - 125	2	20
Zinc	ND		0.250	0.2439		mg/L		98	75 - 125	1	20

Lab Sample ID: MB 180-341300/1-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 341300

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:29	12/22/20 14:08	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:29	12/22/20 14:08	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:29	12/22/20 14:08	1
Barium	ND		0.0100	0.00160	mg/L		12/21/20 08:29	12/22/20 14:08	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:29	12/22/20 14:08	1
Boron	0.04397	J	0.0800	0.0386	mg/L		12/21/20 08:29	12/22/20 14:08	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:29	12/22/20 14:08	1
Calcium	ND		0.500	0.127	mg/L		12/21/20 08:29	12/22/20 14:08	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:29	12/22/20 14:08	1
Cobalt	ND		0.000500	0.000134	mg/L		12/21/20 08:29	12/22/20 14:08	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:29	12/22/20 14:08	1
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:29	12/22/20 14:08	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:29	12/22/20 14:08	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:29	12/22/20 14:08	1
Magnesium	ND		0.500	0.0827	mg/L		12/21/20 08:29	12/22/20 14:08	1
Manganese	ND		0.00500	0.000866	mg/L		12/21/20 08:29	12/22/20 14:08	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:29	12/22/20 14:08	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:29	12/22/20 14:08	1
Potassium	ND		0.500	0.156	mg/L		12/21/20 08:29	12/22/20 14:08	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:29	12/22/20 14:08	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:29	12/22/20 14:08	1
Sodium	ND		0.500	0.348	mg/L		12/21/20 08:29	12/22/20 14:08	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:29	12/22/20 14:08	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:29	12/22/20 14:08	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:29	12/22/20 14:08	1

Lab Sample ID: LCS 180-341300/2-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 341300

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.883		mg/L		98	80 - 120
Antimony	0.250	0.2359		mg/L		94	80 - 120
Arsenic	1.00	0.9767		mg/L		98	80 - 120
Barium	1.00	0.9839		mg/L		98	80 - 120
Beryllium	0.500	0.4746		mg/L		95	80 - 120

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

Lab Sample ID: LCS 180-341300/2-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 341300

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.25	1.056		mg/L		84	80 - 120
Cadmium	0.500	0.5000		mg/L		100	80 - 120
Calcium	25.0	26.72		mg/L		107	80 - 120
Chromium	0.500	0.5027		mg/L		101	80 - 120
Cobalt	0.500	0.4959		mg/L		99	80 - 120
Copper	0.500	0.4931		mg/L		99	80 - 120
Iron	5.00	5.173		mg/L		103	80 - 120
Lead	0.500	0.5026		mg/L		101	80 - 120
Lithium	0.500	0.4649		mg/L		93	80 - 120
Magnesium	25.0	25.62		mg/L		102	80 - 120
Manganese	0.500	0.4970		mg/L		99	80 - 120
Molybdenum	0.500	0.5029		mg/L		101	80 - 120
Nickel	0.500	0.4866		mg/L		97	80 - 120
Potassium	25.0	24.55		mg/L		98	80 - 120
Selenium	1.00	1.013		mg/L		101	80 - 120
Silver	0.250	0.2518		mg/L		101	80 - 120
Sodium	25.0	26.17		mg/L		105	80 - 120
Thallium	1.00	1.033		mg/L		103	80 - 120
Vanadium	0.500	0.5005		mg/L		100	80 - 120
Zinc	0.250	0.2512		mg/L		100	80 - 120

Lab Sample ID: 180-115022-A-13-B MS
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 341300

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	0.0167	J	5.00	4.913		mg/L		98	75 - 125
Antimony	ND		0.250	0.2360		mg/L		94	75 - 125
Arsenic	ND		1.00	0.9537		mg/L		95	75 - 125
Barium	0.217		1.00	1.189		mg/L		97	75 - 125
Beryllium	ND		0.500	0.4688		mg/L		94	75 - 125
Boron	0.0930	B	1.25	1.139		mg/L		84	75 - 125
Cadmium	ND		0.500	0.4928		mg/L		99	75 - 125
Calcium	13.6		25.0	39.57		mg/L		104	75 - 125
Chromium	ND		0.500	0.4897		mg/L		98	75 - 125
Cobalt	ND		0.500	0.4842		mg/L		97	75 - 125
Copper	ND		0.500	0.4860		mg/L		97	75 - 125
Iron	ND		5.00	5.090		mg/L		102	75 - 125
Lead	ND		0.500	0.4916		mg/L		98	75 - 125
Lithium	0.0172		0.500	0.4790		mg/L		92	75 - 125
Magnesium	1.53		25.0	27.03		mg/L		102	75 - 125
Manganese	0.0137		0.500	0.4940		mg/L		96	75 - 125
Molybdenum	ND		0.500	0.4907		mg/L		98	75 - 125
Nickel	ND		0.500	0.4738		mg/L		95	75 - 125
Potassium	1.92		25.0	26.02		mg/L		96	75 - 125
Selenium	ND		1.00	0.9880		mg/L		99	75 - 125
Silver	ND		0.250	0.2475		mg/L		99	75 - 125
Sodium	55.4		25.0	79.62		mg/L		97	75 - 125
Thallium	ND		1.00	1.026		mg/L		103	75 - 125

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

Lab Sample ID: 180-115022-A-13-B MS
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 341300

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Vanadium	ND		0.500	0.4898		mg/L		98	75 - 125
Zinc	ND		0.250	0.2593		mg/L		104	75 - 125

Lab Sample ID: 180-115022-A-13-C MSD
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 341300

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.0167	J	5.00	4.753		mg/L		95	75 - 125	3	20
Antimony	ND		0.250	0.2351		mg/L		94	75 - 125	0	20
Arsenic	ND		1.00	0.9596		mg/L		96	75 - 125	1	20
Barium	0.217		1.00	1.183		mg/L		97	75 - 125	0	20
Beryllium	ND		0.500	0.4616		mg/L		92	75 - 125	2	20
Boron	0.0930	B	1.25	1.166		mg/L		86	75 - 125	2	20
Cadmium	ND		0.500	0.4912		mg/L		98	75 - 125	0	20
Calcium	13.6		25.0	39.35		mg/L		103	75 - 125	1	20
Chromium	ND		0.500	0.4923		mg/L		98	75 - 125	1	20
Cobalt	ND		0.500	0.4848		mg/L		97	75 - 125	0	20
Copper	ND		0.500	0.4844		mg/L		97	75 - 125	0	20
Iron	ND		5.00	5.532		mg/L		111	75 - 125	8	20
Lead	ND		0.500	0.4907		mg/L		98	75 - 125	0	20
Lithium	0.0172		0.500	0.4714		mg/L		91	75 - 125	2	20
Magnesium	1.53		25.0	26.27		mg/L		99	75 - 125	3	20
Manganese	0.0137		0.500	0.4994		mg/L		97	75 - 125	1	20
Molybdenum	ND		0.500	0.4906		mg/L		98	75 - 125	0	20
Nickel	ND		0.500	0.4735		mg/L		95	75 - 125	0	20
Potassium	1.92		25.0	25.47		mg/L		94	75 - 125	2	20
Selenium	ND		1.00	0.9828		mg/L		98	75 - 125	1	20
Silver	ND		0.250	0.2479		mg/L		99	75 - 125	0	20
Sodium	55.4		25.0	78.95		mg/L		94	75 - 125	1	20
Thallium	ND		1.00	0.9968		mg/L		100	75 - 125	3	20
Vanadium	ND		0.500	0.4920		mg/L		98	75 - 125	0	20
Zinc	ND		0.250	0.2508		mg/L		100	75 - 125	3	20

Lab Sample ID: MB 180-341302/1-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		12/21/20 08:33	12/22/20 16:17	1
Antimony	ND		0.00200	0.000378	mg/L		12/21/20 08:33	12/22/20 16:17	1
Arsenic	ND		0.00100	0.000313	mg/L		12/21/20 08:33	12/22/20 16:17	1
Barium	ND		0.0100	0.00160	mg/L		12/21/20 08:33	12/22/20 16:17	1
Beryllium	ND		0.00100	0.000182	mg/L		12/21/20 08:33	12/22/20 16:17	1
Cadmium	ND		0.00100	0.000217	mg/L		12/21/20 08:33	12/22/20 16:17	1
Calcium	ND		0.500	0.127	mg/L		12/21/20 08:33	12/22/20 16:17	1
Chromium	ND		0.00200	0.00153	mg/L		12/21/20 08:33	12/22/20 16:17	1
Cobalt	ND		0.000500	0.000134	mg/L		12/21/20 08:33	12/22/20 16:17	1
Copper	ND		0.00200	0.000627	mg/L		12/21/20 08:33	12/22/20 16:17	1

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

Lab Sample ID: MB 180-341302/1-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.0500	0.0195	mg/L		12/21/20 08:33	12/22/20 16:17	1
Lead	ND		0.00100	0.000128	mg/L		12/21/20 08:33	12/22/20 16:17	1
Lithium	ND		0.00500	0.00339	mg/L		12/21/20 08:33	12/22/20 16:17	1
Magnesium	ND		0.500	0.0827	mg/L		12/21/20 08:33	12/22/20 16:17	1
Manganese	ND		0.00500	0.000866	mg/L		12/21/20 08:33	12/22/20 16:17	1
Molybdenum	ND		0.00500	0.000610	mg/L		12/21/20 08:33	12/22/20 16:17	1
Nickel	ND		0.00100	0.000336	mg/L		12/21/20 08:33	12/22/20 16:17	1
Potassium	ND		0.500	0.156	mg/L		12/21/20 08:33	12/22/20 16:17	1
Selenium	ND		0.00500	0.00151	mg/L		12/21/20 08:33	12/22/20 16:17	1
Silver	ND		0.00100	0.000177	mg/L		12/21/20 08:33	12/22/20 16:17	1
Sodium	ND		0.500	0.348	mg/L		12/21/20 08:33	12/22/20 16:17	1
Thallium	ND		0.00100	0.000148	mg/L		12/21/20 08:33	12/22/20 16:17	1
Vanadium	ND		0.00100	0.000991	mg/L		12/21/20 08:33	12/22/20 16:17	1
Zinc	ND		0.00500	0.00322	mg/L		12/21/20 08:33	12/22/20 16:17	1

Lab Sample ID: MB 180-341302/1-A
Matrix: Water
Analysis Batch: 341798

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.0800	0.0386	mg/L		12/21/20 08:33	12/23/20 10:16	1

Lab Sample ID: LCS 180-341302/2-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.884		mg/L		98	80 - 120
Antimony	0.250	0.2433		mg/L		97	80 - 120
Arsenic	1.00	0.9530		mg/L		95	80 - 120
Barium	1.00	1.002		mg/L		100	80 - 120
Beryllium	0.500	0.4812		mg/L		96	80 - 120
Cadmium	0.500	0.5175		mg/L		104	80 - 120
Calcium	25.0	26.87		mg/L		107	80 - 120
Chromium	0.500	0.5137		mg/L		103	80 - 120
Cobalt	0.500	0.4946		mg/L		99	80 - 120
Copper	0.500	0.4924		mg/L		98	80 - 120
Iron	5.00	5.287		mg/L		106	80 - 120
Lead	0.500	0.5088		mg/L		102	80 - 120
Lithium	0.500	0.4659		mg/L		93	80 - 120
Magnesium	25.0	26.04		mg/L		104	80 - 120
Manganese	0.500	0.5021		mg/L		100	80 - 120
Molybdenum	0.500	0.5025		mg/L		101	80 - 120
Nickel	0.500	0.4841		mg/L		97	80 - 120
Potassium	25.0	24.49		mg/L		98	80 - 120
Selenium	1.00	1.041		mg/L		104	80 - 120
Silver	0.250	0.2512		mg/L		100	80 - 120
Sodium	25.0	25.62		mg/L		102	80 - 120
Thallium	1.00	1.052		mg/L		105	80 - 120

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

Lab Sample ID: LCS 180-341302/2-A
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vanadium	0.500	0.5104		mg/L		102	80 - 120
Zinc	0.250	0.2470		mg/L		99	80 - 120

Lab Sample ID: LCS 180-341302/2-A
Matrix: Water
Analysis Batch: 341798

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.25	1.161		mg/L		93	80 - 120

Lab Sample ID: 180-115022-A-2-B MS
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND		5.00	4.806		mg/L		96	75 - 125
Antimony	ND		0.250	0.2394		mg/L		96	75 - 125
Arsenic	ND		1.00	0.9548		mg/L		95	75 - 125
Barium	0.0471		1.00	1.031		mg/L		98	75 - 125
Beryllium	ND		0.500	0.4793		mg/L		96	75 - 125
Cadmium	ND		0.500	0.5073		mg/L		101	75 - 125
Calcium	27.7		25.0	53.48		mg/L		103	75 - 125
Chromium	ND		0.500	0.5063		mg/L		101	75 - 125
Cobalt	0.00246		0.500	0.4877		mg/L		97	75 - 125
Copper	ND		0.500	0.4860		mg/L		97	75 - 125
Iron	0.405		5.00	5.579		mg/L		103	75 - 125
Lead	ND		0.500	0.5024		mg/L		100	75 - 125
Lithium	ND		0.500	0.4623		mg/L		92	75 - 125
Magnesium	8.83		25.0	34.21		mg/L		102	75 - 125
Manganese	3.09		0.500	3.567	4	mg/L		94	75 - 125
Molybdenum	ND		0.500	0.4970		mg/L		99	75 - 125
Nickel	0.00203		0.500	0.4793		mg/L		95	75 - 125
Potassium	4.61		25.0	28.57		mg/L		96	75 - 125
Selenium	ND		1.00	1.005		mg/L		100	75 - 125
Silver	ND		0.250	0.2469		mg/L		99	75 - 125
Sodium	37.1		25.0	60.28		mg/L		93	75 - 125
Thallium	ND		1.00	1.046		mg/L		105	75 - 125
Vanadium	ND		0.500	0.5038		mg/L		101	75 - 125
Zinc	0.00371	J	0.250	0.2452		mg/L		97	75 - 125

Lab Sample ID: 180-115022-A-2-B MS
Matrix: Water
Analysis Batch: 341798

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	1.07		1.25	2.099		mg/L		82	75 - 125

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

Lab Sample ID: 180-115022-A-2-C MSD
Matrix: Water
Analysis Batch: 341583

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND		5.00	4.849		mg/L		97	75 - 125	1	20
Antimony	ND		0.250	0.2363		mg/L		95	75 - 125	1	20
Arsenic	ND		1.00	0.9518		mg/L		95	75 - 125	0	20
Barium	0.0471		1.00	1.020		mg/L		97	75 - 125	1	20
Beryllium	ND		0.500	0.4769		mg/L		95	75 - 125	0	20
Cadmium	ND		0.500	0.5023		mg/L		100	75 - 125	1	20
Calcium	27.7		25.0	53.89		mg/L		105	75 - 125	1	20
Chromium	ND		0.500	0.5053		mg/L		101	75 - 125	0	20
Cobalt	0.00246		0.500	0.4844		mg/L		96	75 - 125	1	20
Copper	ND		0.500	0.4834		mg/L		97	75 - 125	1	20
Iron	0.405		5.00	5.531		mg/L		103	75 - 125	1	20
Lead	ND		0.500	0.4968		mg/L		99	75 - 125	1	20
Lithium	ND		0.500	0.4592		mg/L		92	75 - 125	1	20
Magnesium	8.83		25.0	34.84		mg/L		104	75 - 125	2	20
Manganese	3.09		0.500	3.617	4	mg/L		104	75 - 125	1	20
Molybdenum	ND		0.500	0.4957		mg/L		99	75 - 125	0	20
Nickel	0.00203		0.500	0.4739		mg/L		94	75 - 125	1	20
Potassium	4.61		25.0	28.99		mg/L		98	75 - 125	1	20
Selenium	ND		1.00	1.005		mg/L		100	75 - 125	0	20
Silver	ND		0.250	0.2464		mg/L		99	75 - 125	0	20
Sodium	37.1		25.0	61.33		mg/L		97	75 - 125	2	20
Thallium	ND		1.00	1.024		mg/L		102	75 - 125	2	20
Vanadium	ND		0.500	0.5027		mg/L		101	75 - 125	0	20
Zinc	0.00371	J	0.250	0.2430		mg/L		96	75 - 125	1	20

Lab Sample ID: 180-115022-A-2-C MSD
Matrix: Water
Analysis Batch: 341798

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 341302

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.07		1.25	2.113		mg/L		83	75 - 125	1	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-341475/1-A
Matrix: Water
Analysis Batch: 341658

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 341475

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:03	12/23/20 10:32	1

Lab Sample ID: LCS 180-341475/2-A
Matrix: Water
Analysis Batch: 341658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 341475

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00250	0.002575		mg/L		103	80 - 120		

Method: EPA 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 180-115017-22 MS
Matrix: Water
Analysis Batch: 341658

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T14
Prep Type: Total/NA
Prep Batch: 341475

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00100	0.0009300		mg/L		93	75 - 125

Lab Sample ID: 180-115017-22 MSD
Matrix: Water
Analysis Batch: 341658

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T14
Prep Type: Total/NA
Prep Batch: 341475

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0009370		mg/L		94	75 - 125	1	20

Lab Sample ID: MB 180-341476/1-A
Matrix: Water
Analysis Batch: 341658

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 341476

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/22/20 09:05	12/23/20 10:58	1

Lab Sample ID: LCS 180-341476/2-A
Matrix: Water
Analysis Batch: 341658

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 341476

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00250	0.002607		mg/L		104	80 - 120

Lab Sample ID: MB 180-341715/1-A
Matrix: Water
Analysis Batch: 341765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 341715

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/24/20 05:48	12/24/20 09:07	1

Lab Sample ID: LCS 180-341715/2-A
Matrix: Water
Analysis Batch: 341765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 341715

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00250	0.002522		mg/L		101	80 - 120

Lab Sample ID: MB 180-342043/1-A
Matrix: Water
Analysis Batch: 342315

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 342043

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		12/29/20 12:14	12/31/20 17:08	1

Lab Sample ID: LCS 180-342043/2-A
Matrix: Water
Analysis Batch: 342315

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 342043

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00250	0.002707		mg/L		108	80 - 120

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: 180-115017-24 MS
Matrix: Water
Analysis Batch: 341658

Client Sample ID: GAF-GW-1315-DOLO 1.0-T14
Prep Type: Dissolved
Prep Batch: 341476

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00100	0.0009340		mg/L		93	75 - 125

Lab Sample ID: 180-115017-24 MSD
Matrix: Water
Analysis Batch: 341658

Client Sample ID: GAF-GW-1315-DOLO 1.0-T14
Prep Type: Dissolved
Prep Batch: 341476

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0008900		mg/L		89	75 - 125	5	20

Lab Sample ID: 180-114361-C-10-B MS
Matrix: Water
Analysis Batch: 341765

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 341715

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00100	0.0008620		mg/L		86	75 - 125

Lab Sample ID: 180-114361-C-10-C MSD
Matrix: Water
Analysis Batch: 341765

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 341715

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0007890		mg/L		79	75 - 125	9	20

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-341258/54
Matrix: Water
Analysis Batch: 341258

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			12/18/20 16:10	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 16:10	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 16:10	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 16:10	1

Lab Sample ID: MB 180-341258/78
Matrix: Water
Analysis Batch: 341258

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			12/18/20 18:50	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 18:50	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			12/18/20 18:50	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			12/18/20 18:50	1

Method: SM2320 B - Alkalinity, Total (Continued)

Lab Sample ID: LCS 180-341258/53
Matrix: Water
Analysis Batch: 341258

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3 to pH 4.5	250	240.8		mg/L		96	90 - 110

Lab Sample ID: LCS 180-341258/77
Matrix: Water
Analysis Batch: 341258

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3 to pH 4.5	250	238.9		mg/L		96	90 - 110

Lab Sample ID: LLCS 180-341258/52
Matrix: Water
Analysis Batch: 341258

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3 to pH 4.5	20.0	20.68		mg/L		103	90 - 110

Lab Sample ID: 180-114998-A-1 DU
Matrix: Water
Analysis Batch: 341258

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	175		185.4		mg/L		6	20
Bicarbonate Alkalinity as CaCO3	175		185.4		mg/L		6	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Hydroxide Alkalinity	ND		ND		mg/L		NC	20

Lab Sample ID: 180-115017-21 DU
Matrix: Water
Analysis Batch: 341258

Client Sample ID: GAF-GW-1315-CONTROL-T14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	312		324.5		mg/L		4	20
Bicarbonate Alkalinity as CaCO3	312		324.5		mg/L		4	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Hydroxide Alkalinity	ND		ND		mg/L		NC	20

HPLC/IC

Analysis Batch: 341424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Total/NA	Water	EPA 9056A	
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Total/NA	Water	EPA 9056A	
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Total/NA	Water	EPA 9056A	
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Total/NA	Water	EPA 9056A	
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Total/NA	Water	EPA 9056A	
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Total/NA	Water	EPA 9056A	
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Total/NA	Water	EPA 9056A	
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Total/NA	Water	EPA 9056A	
180-115017-21	GAF-GW-1315-CONTROL-T14	Total/NA	Water	EPA 9056A	
180-115017-21	GAF-GW-1315-CONTROL-T14	Total/NA	Water	EPA 9056A	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	EPA 9056A	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	EPA 9056A	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total/NA	Water	EPA 9056A	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total/NA	Water	EPA 9056A	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total/NA	Water	EPA 9056A	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total/NA	Water	EPA 9056A	
MB 180-341424/34	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-341424/33	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-115017-2 MS	GAF-GW-1316-CONTROL-T2-END	Total/NA	Water	EPA 9056A	
180-115017-2 MSD	GAF-GW-1316-CONTROL-T2-END	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 341297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Dissolved	Water	3005A	
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Total Recoverable	Water	3005A	
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Dissolved	Water	3005A	
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Total Recoverable	Water	3005A	
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Dissolved	Water	3005A	
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Dissolved	Water	3005A	
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Total Recoverable	Water	3005A	
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Dissolved	Water	3005A	
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Total Recoverable	Water	3005A	
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Dissolved	Water	3005A	
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Total Recoverable	Water	3005A	
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Dissolved	Water	3005A	
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Total Recoverable	Water	3005A	
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Dissolved	Water	3005A	
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Dissolved	Water	3005A	
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Total Recoverable	Water	3005A	
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Dissolved	Water	3005A	
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Total Recoverable	Water	3005A	
MB 180-341297/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-341297/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-114996-E-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-114996-E-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 341300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Dissolved	Water	3005A	

Metals (Continued)

Prep Batch: 341300 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Total Recoverable	Water	3005A	
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Dissolved	Water	3005A	
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Dissolved	Water	3005A	
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Total Recoverable	Water	3005A	
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Dissolved	Water	3005A	
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Total Recoverable	Water	3005A	
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Dissolved	Water	3005A	
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Total Recoverable	Water	3005A	
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Dissolved	Water	3005A	
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Total Recoverable	Water	3005A	
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Dissolved	Water	3005A	
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Dissolved	Water	3005A	
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Total Recoverable	Water	3005A	
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Dissolved	Water	3005A	
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Total Recoverable	Water	3005A	
MB 180-341300/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-341300/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-115022-A-13-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-115022-A-13-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 341302

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Dissolved	Water	3005A	
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Total Recoverable	Water	3005A	
180-115017-21	GAF-GW-1315-CONTROL-T14	Dissolved	Water	3005A	
180-115017-21	GAF-GW-1315-CONTROL-T14	Total Recoverable	Water	3005A	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Dissolved	Water	3005A	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total Recoverable	Water	3005A	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Dissolved	Water	3005A	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total Recoverable	Water	3005A	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	3005A	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total Recoverable	Water	3005A	
MB 180-341302/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-341302/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-115022-A-2-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-115022-A-2-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 341475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Total/NA	Water	7470A	
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Dissolved	Water	7470A	
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Total/NA	Water	7470A	
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Total/NA	Water	7470A	
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Total/NA	Water	7470A	
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Total/NA	Water	7470A	
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Total/NA	Water	7470A	
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Total/NA	Water	7470A	
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Total/NA	Water	7470A	
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Total/NA	Water	7470A	
180-115017-21	GAF-GW-1315-CONTROL-T14	Total/NA	Water	7470A	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	7470A	

Metals (Continued)

Prep Batch: 341475 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total/NA	Water	7470A	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total/NA	Water	7470A	
MB 180-341475/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-341475/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-115017-22 MS	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	7470A	
180-115017-22 MSD	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	7470A	

Prep Batch: 341476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Dissolved	Water	7470A	
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Dissolved	Water	7470A	
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Dissolved	Water	7470A	
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Dissolved	Water	7470A	
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Dissolved	Water	7470A	
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Dissolved	Water	7470A	
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Dissolved	Water	7470A	
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Dissolved	Water	7470A	
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Dissolved	Water	7470A	
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Dissolved	Water	7470A	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Dissolved	Water	7470A	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Dissolved	Water	7470A	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	7470A	
MB 180-341476/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-341476/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-115017-24 MS	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	7470A	
180-115017-24 MSD	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	7470A	

Analysis Batch: 341583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Dissolved	Water	6020A	341300
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Total Recoverable	Water	6020A	341300
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Dissolved	Water	6020A	341300
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Dissolved	Water	6020A	341300
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Total Recoverable	Water	6020A	341300
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Dissolved	Water	6020A	341300
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Total Recoverable	Water	6020A	341300
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Dissolved	Water	6020A	341300
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Total Recoverable	Water	6020A	341300
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Dissolved	Water	6020A	341300
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Total Recoverable	Water	6020A	341300
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Dissolved	Water	6020A	341300
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Dissolved	Water	6020A	341300
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Total Recoverable	Water	6020A	341300
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Dissolved	Water	6020A	341300
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Total Recoverable	Water	6020A	341300
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Dissolved	Water	6020A	341297
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Total Recoverable	Water	6020A	341297
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Dissolved	Water	6020A	341297
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Total Recoverable	Water	6020A	341297
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Dissolved	Water	6020A	341297
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Dissolved	Water	6020A	341297

Metals (Continued)

Analysis Batch: 341583 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Total Recoverable	Water	6020A	341297
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Dissolved	Water	6020A	341297
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Total Recoverable	Water	6020A	341297
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Dissolved	Water	6020A	341297
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Total Recoverable	Water	6020A	341297
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Dissolved	Water	6020A	341297
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Total Recoverable	Water	6020A	341297
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Dissolved	Water	6020A	341297
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Dissolved	Water	6020A	341297
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Total Recoverable	Water	6020A	341297
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Dissolved	Water	6020A	341297
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Total Recoverable	Water	6020A	341297
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Dissolved	Water	6020A	341302
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Total Recoverable	Water	6020A	341302
180-115017-21	GAF-GW-1315-CONTROL-T14	Dissolved	Water	6020A	341302
180-115017-21	GAF-GW-1315-CONTROL-T14	Total Recoverable	Water	6020A	341302
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Dissolved	Water	6020A	341302
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total Recoverable	Water	6020A	341302
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Dissolved	Water	6020A	341302
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total Recoverable	Water	6020A	341302
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	6020A	341302
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total Recoverable	Water	6020A	341302
MB 180-341297/1-A	Method Blank	Total Recoverable	Water	6020A	341297
MB 180-341300/1-A	Method Blank	Total Recoverable	Water	6020A	341300
MB 180-341302/1-A	Method Blank	Total Recoverable	Water	6020A	341302
LCS 180-341297/2-A	Lab Control Sample	Total Recoverable	Water	6020A	341297
LCS 180-341300/2-A	Lab Control Sample	Total Recoverable	Water	6020A	341300
LCS 180-341302/2-A	Lab Control Sample	Total Recoverable	Water	6020A	341302
180-114996-E-1-B MS	Matrix Spike	Total Recoverable	Water	6020A	341297
180-114996-E-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	341297
180-115022-A-2-B MS	Matrix Spike	Total Recoverable	Water	6020A	341302
180-115022-A-2-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	341302
180-115022-A-13-B MS	Matrix Spike	Total Recoverable	Water	6020A	341300
180-115022-A-13-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	341300

Analysis Batch: 341658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Dissolved	Water	EPA 7470A	341476
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Total/NA	Water	EPA 7470A	341475
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Dissolved	Water	EPA 7470A	341475
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Dissolved	Water	EPA 7470A	341476
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Total/NA	Water	EPA 7470A	341475
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Dissolved	Water	EPA 7470A	341476
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Total/NA	Water	EPA 7470A	341475
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Dissolved	Water	EPA 7470A	341476
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Total/NA	Water	EPA 7470A	341475
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Dissolved	Water	EPA 7470A	341476
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Total/NA	Water	EPA 7470A	341475
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Dissolved	Water	EPA 7470A	341476
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Dissolved	Water	EPA 7470A	341476
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Total/NA	Water	EPA 7470A	341475

Metals (Continued)

Analysis Batch: 341658 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Dissolved	Water	EPA 7470A	341476
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Total/NA	Water	EPA 7470A	341475
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Dissolved	Water	EPA 7470A	341476
180-115017-10	GAF-GW-1316-HI-CAL-T5-END	Total/NA	Water	EPA 7470A	341475
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Dissolved	Water	EPA 7470A	341476
180-115017-11	GAF-GW-1316-DOLO 0.5-T1-END	Total/NA	Water	EPA 7470A	341475
180-115017-21	GAF-GW-1315-CONTROL-T14	Total/NA	Water	EPA 7470A	341475
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Dissolved	Water	EPA 7470A	341476
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	EPA 7470A	341475
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Dissolved	Water	EPA 7470A	341476
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total/NA	Water	EPA 7470A	341475
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	EPA 7470A	341476
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total/NA	Water	EPA 7470A	341475
MB 180-341475/1-A	Method Blank	Total/NA	Water	EPA 7470A	341475
MB 180-341476/1-A	Method Blank	Total/NA	Water	EPA 7470A	341476
LCS 180-341475/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	341475
LCS 180-341476/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	341476
180-115017-22 MS	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	EPA 7470A	341475
180-115017-22 MSD	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	EPA 7470A	341475
180-115017-24 MS	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	EPA 7470A	341476
180-115017-24 MSD	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	EPA 7470A	341476

Prep Batch: 341715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Dissolved	Water	7470A	
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Dissolved	Water	7470A	
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Total/NA	Water	7470A	
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Dissolved	Water	7470A	
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Total/NA	Water	7470A	
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Dissolved	Water	7470A	
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Total/NA	Water	7470A	
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Dissolved	Water	7470A	
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Total/NA	Water	7470A	
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Dissolved	Water	7470A	
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Dissolved	Water	7470A	
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Total/NA	Water	7470A	
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Dissolved	Water	7470A	
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Total/NA	Water	7470A	
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Dissolved	Water	7470A	
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Total/NA	Water	7470A	
MB 180-341715/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-341715/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-114361-C-10-B MS	Matrix Spike	Dissolved	Water	7470A	
180-114361-C-10-C MSD	Matrix Spike Duplicate	Dissolved	Water	7470A	

Analysis Batch: 341765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Dissolved	Water	EPA 7470A	341715
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Dissolved	Water	EPA 7470A	341715
180-115017-13	GAF-GW-1316-DOLO 0.5-T3-END	Total/NA	Water	EPA 7470A	341715
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Dissolved	Water	EPA 7470A	341715

Metals (Continued)

Analysis Batch: 341765 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-14	GAF-GW-1316-DOLO 0.5-T4-END	Total/NA	Water	EPA 7470A	341715
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Dissolved	Water	EPA 7470A	341715
180-115017-15	GAF-GW-1316-DOLO 0.5-T5-END	Total/NA	Water	EPA 7470A	341715
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Dissolved	Water	EPA 7470A	341715
180-115017-16	GAF-GW-1316-DOLO 1.0-T1-END	Total/NA	Water	EPA 7470A	341715
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Dissolved	Water	EPA 7470A	341715
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Dissolved	Water	EPA 7470A	341715
180-115017-18	GAF-GW-1316-DOLO 1.0-T3-END	Total/NA	Water	EPA 7470A	341715
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Dissolved	Water	EPA 7470A	341715
180-115017-19	GAF-GW-1316-DOLO 1.0-T4-END	Total/NA	Water	EPA 7470A	341715
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Dissolved	Water	EPA 7470A	341715
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Total/NA	Water	EPA 7470A	341715
MB 180-341715/1-A	Method Blank	Total/NA	Water	EPA 7470A	341715
LCS 180-341715/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	341715
180-114361-C-10-B MS	Matrix Spike	Dissolved	Water	EPA 7470A	341715
180-114361-C-10-C MSD	Matrix Spike Duplicate	Dissolved	Water	EPA 7470A	341715

Analysis Batch: 341798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Dissolved	Water	6020A	341300
180-115017-1	GAF-GW-1316-CONTROL-T1-END	Total Recoverable	Water	6020A	341300
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Dissolved	Water	6020A	341300
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Dissolved	Water	6020A	341300
180-115017-3	GAF-GW-1316-CONTROL-T3-END	Total Recoverable	Water	6020A	341300
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Dissolved	Water	6020A	341300
180-115017-4	GAF-GW-1316-CONTROL-T4-END	Total Recoverable	Water	6020A	341300
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Dissolved	Water	6020A	341300
180-115017-5	GAF-GW-1316-CONTROL-T5-END	Total Recoverable	Water	6020A	341300
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Dissolved	Water	6020A	341300
180-115017-6	GAF-GW-1316-HI-CAL-T1-END	Total Recoverable	Water	6020A	341300
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Dissolved	Water	6020A	341300
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Dissolved	Water	6020A	341300
180-115017-8	GAF-GW-1316-HI-CAL-T3-END	Total Recoverable	Water	6020A	341300
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Dissolved	Water	6020A	341300
180-115017-9	GAF-GW-1316-HI-CAL-T4-END	Total Recoverable	Water	6020A	341300
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Dissolved	Water	6020A	341302
180-115017-20	GAF-GW-1316-DOLO 1.0-T5-END	Total Recoverable	Water	6020A	341302
180-115017-21	GAF-GW-1315-CONTROL-T14	Dissolved	Water	6020A	341302
180-115017-21	GAF-GW-1315-CONTROL-T14	Total Recoverable	Water	6020A	341302
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Dissolved	Water	6020A	341302
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total Recoverable	Water	6020A	341302
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Dissolved	Water	6020A	341302
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total Recoverable	Water	6020A	341302
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Dissolved	Water	6020A	341302
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total Recoverable	Water	6020A	341302
MB 180-341302/1-A	Method Blank	Total Recoverable	Water	6020A	341302
LCS 180-341302/2-A	Lab Control Sample	Total Recoverable	Water	6020A	341302
180-115022-A-2-B MS	Matrix Spike	Total Recoverable	Water	6020A	341302
180-115022-A-2-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	341302

Metals

Prep Batch: 342043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-21	GAF-GW-1315-CONTROL-T14	Dissolved	Water	7470A	
MB 180-342043/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-342043/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 342315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-21	GAF-GW-1315-CONTROL-T14	Dissolved	Water	EPA 7470A	342043
MB 180-342043/1-A	Method Blank	Total/NA	Water	EPA 7470A	342043
LCS 180-342043/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	342043

General Chemistry

Analysis Batch: 341258

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115017-2	GAF-GW-1316-CONTROL-T2-END	Total/NA	Water	SM2320 B	
180-115017-7	GAF-GW-1316-HI-CAL-T2-END	Total/NA	Water	SM2320 B	
180-115017-12	GAF-GW-1316-DOLO 0.5-T2-END	Total/NA	Water	SM2320 B	
180-115017-17	GAF-GW-1316-DOLO 1.0-T2-END	Total/NA	Water	SM2320 B	
180-115017-21	GAF-GW-1315-CONTROL-T14	Total/NA	Water	SM2320 B	
180-115017-22	GAF-GW-1315-HI CAL 0.5-T14	Total/NA	Water	SM2320 B	
180-115017-23	GAF-GW-1315-DOLO 0.5-T14	Total/NA	Water	SM2320 B	
180-115017-24	GAF-GW-1315-DOLO 1.0-T14	Total/NA	Water	SM2320 B	
MB 180-341258/54	Method Blank	Total/NA	Water	SM2320 B	
MB 180-341258/78	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-341258/53	Lab Control Sample	Total/NA	Water	SM2320 B	
LCS 180-341258/77	Lab Control Sample	Total/NA	Water	SM2320 B	
LLCS 180-341258/52	Lab Control Sample	Total/NA	Water	SM2320 B	
180-114998-A-1 DU	Duplicate	Total/NA	Water	SM2320 B	
180-115017-21 DU	GAF-GW-1315-CONTROL-T14	Total/NA	Water	SM2320 B	

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CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

Special Handling:

☑ TAT - Date Needed: 14-day

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 12=

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= 1316 leachate X2=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroxide, bicarbonate, carbonate)
										List Preservative Code below:	4	4	
	GAF-GW-1316-Control-T1-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Control-T2-End	12/4/2020	11:00 AM	G	X1				2		x	x	x
	GAF-GW-1316-Control-T3-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Control-T4-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Control-T5-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T1-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T2-End	12/4/2020	11:00 AM	G	X1				2		x	x	x
	GAF-GW-1316-Hi-Cal-T3-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T4-End	12/4/2020	11:00 AM	G	X1				2	x	x		
	GAF-GW-1316-Hi-Cal-T5-End	12/4/2020	11:00 AM	G	X1				2	x	x		

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

180-115017 Chain of Custody

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		12/15/2020	1600
	Matthew Jones	12/16/20	1000

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Oil Jar Froze

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CHAIN OF CUSTODY RECORD

301 Alpha Drive
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Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 12=

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
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Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		Analysis: 6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroxide, bicarbonate, carbonate)					QA/QC Reporting Notes:
						List Preservative Code below:					4	4							
	GAF-GW-1316-Dolo 0.5-T1-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 0.5-T2-End	12/4/2020	11:00 AM	G	X1				2			x	x	x					
	GAF-GW-1316-Dolo 0.5-T3-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 0.5-T4-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 0.5-T5-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 1.0-T1-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 1.0-T2-End	12/4/2020	11:00 AM	G	X1				2			x	x	x					
	GAF-GW-1316-Dolo 1.0-T3-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 1.0-T4-End	12/4/2020	11:00 AM	G	X1				2		x	x							
	GAF-GW-1316-Dolo 1.0-T5-End	12/4/2020	11:00 AM	G	X1				2		x	x							

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		12/15/2020	1600
	[signature]	12/16/20	1000

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☑ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Jar Frozen

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CHAIN OF CUSTODY RECORD

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Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		Analysis: 6020 Totals-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroxide, bicarbonate, carbonate)					
											4	4						
	GAF-GW-1315-Control-t14	12/7/2020	12:40 PM	G	X2				3		x	x	x	x				
	GAF-GW-1315-Hi Cal 0.5-t14	12/7/2020	12:40 PM	G	X2				3		x	x	x	x				
	GAF-GW-1315-Dolo 0.5-t14	12/7/2020	12:40 PM	G	X2				3		x	x	x	x				
	GAF-GW-1315-Dolo 1.0-t14	12/7/2020	12:40 PM	G	X2				3		x	x	x	x				

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II ☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		12/15/2020	1600
	[signature]	12/16/20	1000

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☑ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Jar Frozen

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-115017-1
SDG Number: Treatability

Login Number: 115017
List Number: 1
Creator: Jodis, Matthew V

List Source: Eurofins 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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-115551-1
Client Project/Site: GAF-NRS-Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
1/18/2021 3:07:51 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

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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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Job ID: 180-115551-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-115551-1

Receipt
The samples were received on 1/6/2021 9:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 3.7º C, 4.1º C and 4.5º C.

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

Metals
Method 3005A: The following samples were prepped at 20ml due to insufficient sample provided for preparation: GAF-GW-1316-Lean-T1-Mid (180-115551-1), GAF-GW-1316-Lean-T2-Mid (180-115551-2), GAF-GW-1316-Lean-T3-Mid (180-115551-3), GAF-GW-1316-Lean-T4-Mid (180-115551-4), GAF-GW-1316-Lean-T5-Mid (180-115551-5), GAF-GW-1316-Rich-T1-Mid (180-115551-6), GAF-GW-1316-Rich-T2-Mid (180-115551-7), GAF-GW-1316-Rich-T3-Mid (180-115551-8), GAF-GW-1316-Rich-T4-Mid (180-115551-9), GAF-GW-1316-Rich-T5-Mid (180-115551-10), GAF-GW-1316-Lean-T1-End (180-115551-11), GAF-GW-1316-Lean-T2-End (180-115551-12) and GAF-GW-1316-Lean-T3-End (180-115551-13).

Method 3005A: The following samples were prepped at 20ml due to insufficient sample provided for preparation: GAF-GW-1316-Lean-T3-End (180-115551-13), GAF-GW-1316-Lean-T4-End (180-115551-14), GAF-GW-1316-Lean-T5-End (180-115551-15), GAF-GW-1316-Rich-T1-End (180-115551-16), GAF-GW-1316-Rich-T2-End (180-115551-17), GAF-GW-1316-Rich-T3-End (180-115551-18), GAF-GW-1316-Rich-T4-End (180-115551-19), GAF-GW-1316-Rich-T5-End (180-115551-20), GAF-GW-1315-Control-t28 (180-115551-21), GAF-GW-1315-Hi Cal 0.5-t28 (180-115551-22), GAF-GW-1315-Dolo 0.5-t28 (180-115551-23) and GAF-GW-1315-Dolo 1.0-t28 (180-115551-24).

Method 6020A: The serial dilution performed for the following sample associated with batch 180-342917 was outside control limits: (180-115551-A-13-A SD ^5)

Method 6020A: The continuing calibration verification (CCV) associated with batch 180-343242 recovered above the upper control limit for beryllium. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: GAF-GW-1316-Rich-T3-End (180-115551-18), GAF-GW-1316-Rich-T4-End (180-115551-19), GAF-GW-1316-Rich-T5-End (180-115551-20) and (CCV 180-343242/66).

Method 6020A: The serial dilution performed for the following sample associated with batch 180-343414 was outside control limits for multiple analytes: GAF-GW-1315-Rich-t7 (180-115551-36)

Method 6020A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-342908 and analytical batch 180-343414 were outside control limits for arsenic and antimony. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 6020A: The post digestion spike % recovery for multiple analytes associated with batch 180-343414 was outside of control limits. The associated sample is: GAF-GW-1315-Rich-t7 (180-115551-36).

Method 7470A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-343277 and analytical batch 180-343644 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 7470A: Elevated reporting limits are provided for the following samples due to insufficient sample provided by the client for mercury preparation: GAF-GW-1316-Lean-T5-Mid (180-115551-5), GAF-GW-1316-Rich-T5-Mid (180-115551-10), GAF-GW-1316-Lean-T5-End (180-115551-15) and GAF-GW-1316-Rich-T5-End (180-115551-20).

Method 7470A: Elevated reporting limits are provided for the following samples due to insufficient sample provided by the client for mercury preparation: GAF-GW-1316-Lean-T4-Mid (180-115551-4), GAF-GW-1316-Rich-T4-Mid (180-115551-9),

Job ID: 180-115551-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

GAF-GW-1316-Lean-T4-End (180-115551-14) and GAF-GW-1316-Rich-T4-End (180-115551-19).

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Qualifiers

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
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.
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc. Job ID: 180-115551-1
Project/Site: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20 *
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20 *
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20 *
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-5	GAF-GW-1316-Lean-T5-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-10	GAF-GW-1316-Rich-T5-Mid	Water	12/29/20 13:00	01/06/21 09:00	
180-115551-11	GAF-GW-1316-Lean-T1-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-12	GAF-GW-1316-Lean-T2-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-13	GAF-GW-1316-Lean-T3-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-14	GAF-GW-1316-Lean-T4-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-15	GAF-GW-1316-Lean-T5-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-16	GAF-GW-1316-Rich-T1-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-17	GAF-GW-1316-Rich-T2-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-18	GAF-GW-1316-Rich-T3-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-19	GAF-GW-1316-Rich-T4-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-20	GAF-GW-1316-Rich-T5-End	Water	12/30/20 13:00	01/06/21 09:00	
180-115551-21	GAF-GW-1315-Control-t28	Water	12/21/20 12:40	01/06/21 09:00	
180-115551-22	GAF-GW-1315-Hi Cal 0.5-t28	Water	12/21/20 12:40	01/06/21 09:00	
180-115551-23	GAF-GW-1315-Dolo 0.5-t28	Water	12/21/20 12:40	01/06/21 09:00	
180-115551-24	GAF-GW-1315-Dolo 1.0-t28	Water	12/21/20 12:40	01/06/21 09:00	
180-115551-25	GAF-GW-1315-Control-t42	Water	01/04/21 12:40	01/06/21 09:00	
180-115551-26	GAF-GW-1315-Hi Cal 0.5-t42	Water	01/04/21 12:40	01/06/21 09:00	
180-115551-27	GAF-GW-1315-Dolo 0.5-t42	Water	01/04/21 12:40	01/06/21 09:00	
180-115551-28	GAF-GW-1315-Dolo 1.0-t42	Water	01/04/21 12:40	01/06/21 09:00	
180-115551-29	GAF-GW-1315-Lean-t2hr	Water	12/16/20 14:00	01/06/21 09:00	
180-115551-30	GAF-GW-1315-Rich-t2hr	Water	12/16/20 14:00	01/06/21 09:00	
180-115551-31	GAF-GW-1315-Lean-t48hr	Water	12/17/20 13:00	01/06/21 09:00	
180-115551-32	GAF-GW-1315-Rich-t48hr	Water	12/17/20 13:00	01/06/21 09:00	
180-115551-33	GAF-GW-1315-Lean-t 1day	Water	12/18/20 12:00	01/06/21 09:00	
180-115551-34	GAF-GW-1315-Rich-t 1 day	Water	12/18/20 12:00	01/06/21 09:00	
180-115551-35	GAF-GW-1315-Lean-t7	Water	12/23/20 12:00	01/06/21 09:00	
180-115551-36	GAF-GW-1315-Rich-t7	Water	12/23/20 12:00	01/06/21 09:00	
180-115551-37	GAF-GW-1315-Lean-t14	Water	12/30/20 12:00	01/06/21 09:00	
180-115551-38	GAF-GW-1315-Rich-t14	Water	12/30/20 12:00	01/06/21 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

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
SM2320 B	Alkalinity, Total	SM18	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T1-Mid

Lab Sample ID: 180-115551-1

Date Collected: 12/29/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 08:45	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 12:37	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 08:41	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 12:33	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:29	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:03	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Lean-T2-Mid

Lab Sample ID: 180-115551-2

Date Collected: 12/29/20 13:00
Matrix: Water
Date Received: 01/06/21 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	EPA 9056A		1	1 mL	1.0 mL	342705	01/07/21 18:27	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		5			342705	01/07/21 18:43	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		1			343126	01/12/21 17:54	SAT	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 08:48	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 12:40	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:30	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			342807	01/07/21 16:33	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T3-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 08:55	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 12:48	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 08:52	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 12:44	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:34	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:04	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Lean-T4-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 09:10	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:02	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 08:59	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 12:51	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			10 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:35	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:05	KEM	TAL PIT
	Instrument ID: HGY									

Client: Environmental Standards Inc.
Job ID: 180-115551-1
Project/Site: GAF-NRS-Treatability

Client Sample ID: GAF-GW-1316-Lean-T5-Mid
Lab Sample ID: 180-115551-5
Date Collected: 12/29/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 09:13	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:06	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Prep	7470A			10 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:06	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T1-Mid
Lab Sample ID: 180-115551-6
Date Collected: 12/29/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 09:21	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:13	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 09:17	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:09	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:36	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:07	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T2-Mid
Lab Sample ID: 180-115551-7
Date Collected: 12/29/20 13:00
Matrix: Water
Date Received: 01/06/21 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	EPA 9056A		1	1 mL	1.0 mL	342705	01/07/21 17:21	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		1			343126	01/12/21 17:12	SAT	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 09:24	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1316-Rich-T2-Mid

Lab Sample ID: 180-115551-7

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:16	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:37	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			342807	01/07/21 16:26	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-Rich-T3-Mid

Lab Sample ID: 180-115551-8

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 09:32	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:24	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 09:28	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:20	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:38	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:08	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T4-Mid

Lab Sample ID: 180-115551-9

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 09:39	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:31	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1316-Rich-T4-Mid

Lab Sample ID: 180-115551-9

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 09:35	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:27	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			10 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:39	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:09	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T5-Mid

Lab Sample ID: 180-115551-10

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 09:42	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:34	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Prep	7470A			10 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:10	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Lean-T1-End

Lab Sample ID: 180-115551-11

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 09:57	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:49	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 09:53	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:45	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T1-End
Lab Sample ID: 180-115551-11
Date Collected: 12/30/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:40	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:15	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Lean-T2-End
Lab Sample ID: 180-115551-12
Date Collected: 12/30/20 13:00
Matrix: Water
Date Received: 01/06/21 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	EPA 9056A		1	1 mL	1.0 mL	342705	01/07/21 17:54	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		5			342705	01/07/21 18:10	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		1			343126	01/12/21 17:33	SAT	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			342917	01/09/21 10:00	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 13:52	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:41	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			342807	01/07/21 16:18	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-Lean-T3-End
Lab Sample ID: 180-115551-13
Date Collected: 12/30/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 14:25	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			342917	01/09/21 10:04	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342883	01/08/21 14:51	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 13:56	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1316-Lean-T3-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:42	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:16	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Lean-T4-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 14:32	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 14:29	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			10 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:43	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:17	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Lean-T5-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 14:36	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Prep	7470A			10 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:18	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T1-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 14:43	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1316-Rich-T1-End

Lab Sample ID: 180-115551-16

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 14:39	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:47	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:19	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T2-End

Lab Sample ID: 180-115551-17

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 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	EPA 9056A		1			342705	01/07/21 16:49	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			342705	01/07/21 17:05	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		1	1 mL	1.0 mL	343126	01/12/21 16:51	SAT	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 14:47	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:48	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			342807	01/07/21 16:11	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1316-Rich-T3-End

Lab Sample ID: 180-115551-18

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 15:01	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 14:50	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:49	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T3-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:20	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T4-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 15:08	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 15:05	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			10 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:50	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:21	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1316-Rich-T5-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 15:12	RSK	TAL PIT
	Instrument ID: A									
Total/NA	Prep	7470A			10 mL	25 mL	343277	01/13/21 08:56	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 15:22	KEM	TAL PIT
	Instrument ID: HGY									

Client Sample ID: GAF-GW-1315-Control-t28
Date Collected: 12/21/20 12:40
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-21
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 15:19	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 15:15	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t28

Lab Sample ID: 180-115551-22
Date Collected: 12/21/20 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 15:26	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 15:23	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Dolo 0.5-t28

Lab Sample ID: 180-115551-23
Date Collected: 12/21/20 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 15:33	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 15:30	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Dolo 1.0-t28

Lab Sample ID: 180-115551-24
Date Collected: 12/21/20 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 15:48	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			20 mL	20 mL	342888	01/08/21 15:04	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 15:44	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Control-t42

Lab Sample ID: 180-115551-25
Date Collected: 01/04/21 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 16:17	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 16:13	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t42

Lab Sample ID: 180-115551-26
Date Collected: 01/04/21 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:00	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 16:20	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Dolo 0.5-t42

Lab Sample ID: 180-115551-27
Date Collected: 01/04/21 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:14	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 17:04	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Dolo 1.0-t42

Lab Sample ID: 180-115551-28
Date Collected: 01/04/21 12:40
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:22	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 17:18	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Lean-t2hr

Lab Sample ID: 180-115551-29
Date Collected: 12/16/20 14:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:29	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 17:25	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t2hr

Lab Sample ID: 180-115551-30
Date Collected: 12/16/20 14:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:36	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 17:32	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Lean-t48hr

Lab Sample ID: 180-115551-31
Date Collected: 12/17/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:43	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 17:40	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Rich-t48hr

Lab Sample ID: 180-115551-32
Date Collected: 12/17/20 13:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 17:58	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 17:47	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Lean-t 1day

Lab Sample ID: 180-115551-33
Date Collected: 12/18/20 12:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 18:05	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 18:01	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t 1 day
Date Collected: 12/18/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-34
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343242	01/09/21 18:12	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342890	01/08/21 15:09	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343242	01/09/21 18:08	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Lean-t7
Date Collected: 12/23/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-35
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343414	01/13/21 14:42	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343414	01/13/21 14:38	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Rich-t7
Date Collected: 12/23/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-36
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343414	01/13/21 15:14	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343414	01/13/21 14:45	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-1315-Lean-t14
Date Collected: 12/30/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-37
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			342705	01/07/21 19:31	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			342705	01/07/21 19:47	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		1			343126	01/12/21 15:49	SAT	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343414	01/13/21 15:39	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t14

Lab Sample ID: 180-115551-37

Date Collected: 12/30/20 12:00
Matrix: Water
Date Received: 01/06/21 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343414	01/13/21 15:36	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 09:02	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:51	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 14:24	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			342807	01/07/21 16:03	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1315-Rich-t14

Lab Sample ID: 180-115551-38

Date Collected: 12/30/20 12:00
Matrix: Water
Date Received: 01/06/21 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	EPA 9056A		1			342705	01/07/21 18:59	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		10			342705	01/07/21 19:16	SAT	TAL PIT
	Instrument ID: CHIC2100A									
Total/NA	Analysis	EPA 9056A		1			343126	01/12/21 18:56	SAT	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			343414	01/13/21 15:47	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	342908	01/09/21 09:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			343414	01/13/21 15:43	RSK	TAL PIT
	Instrument ID: A									
Dissolved	Prep	7470A			25 mL	25 mL	343278	01/13/21 09:02	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			343644	01/15/21 14:53	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	343278	01/13/21 08:59	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			343644	01/15/21 14:27	KEM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			342807	01/07/21 15:48	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KHM = Kyle Mucroski
RJR = Ron Rosenbaum
TJO = Tyler Oliver

Batch Type: Analysis

AVS = Abbey Smith
KEM = Kimberly Mahoney
RSK = Robert Kurtz
SAT = Stephen Tallam

Client Sample ID: GAF-GW-1316-Lean-T1-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.642**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:41	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:41	1
Arsenic	**0.00278**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:41	1
Barium	**0.0257**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:41	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:41	1
Boron	**0.891**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:41	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:41	1
Calcium	**250**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:41	1
Chromium	**0.0771**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:41	1
Cobalt	**0.00221**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:41	1
Copper	**0.00161**	**J**	0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:41	1
Iron	**0.313**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:41	1
Lead	**0.000163**	**J**	0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:41	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:41	1
Magnesium	**0.221**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:41	1
Manganese	**0.00419**	**J**	0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:41	1
Molybdenum	**0.0271**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:41	1
Nickel	**0.000814**	**J**	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:41	1
Potassium	**11.9**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:41	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:41	1
Silver	**0.000830**	**J**	0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:41	1
Sodium	**80.6**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:41	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:41	1
Vanadium	**0.0436**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:33	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:41	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.365**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:45	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:45	1
Arsenic	**0.00254**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:45	1
Barium	**0.0250**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:45	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:45	1
Boron	**0.895**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:45	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:45	1
Calcium	**253**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:45	1
Chromium	**0.0787**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:45	1
Cobalt	**0.00214**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:45	1
Copper	**0.00160**	**J**	0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:45	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:45	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:45	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:45	1
Magnesium	**0.185**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:45	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:45	1
Molybdenum	**0.0279**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:45	1
Nickel	**0.000613**	**J**	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:45	1
Potassium	**11.8**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:45	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:45	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:45	1
Sodium	**81.7**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:45	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T1-Mid
Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:45	1
Vanadium	**0.0427**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:37	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:45	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:03	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:29	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T2-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-2

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.2**		1.00	0.713	mg/L			01/07/21 18:27	1
Fluoride	**0.347**		0.100	0.0260	mg/L			01/12/21 17:54	1
Sulfate	**387**		5.00	3.78	mg/L			01/07/21 18:43	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.567**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:48	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:48	1
Arsenic	**0.00360**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:48	1
Barium	**0.0271**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:48	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:48	1
Boron	**0.578**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:48	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:48	1
Calcium	**254**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:48	1
Chromium	**0.118**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:48	1
Cobalt	**0.00360**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:48	1
Copper	**0.00220**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:48	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:48	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:48	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:48	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:48	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:48	1
Molybdenum	**0.0475**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:48	1
Nickel	**0.00174**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:48	1
Potassium	**5.71**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:48	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:48	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:48	1
Sodium	**80.9**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:48	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:48	1
Vanadium	**0.0474**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:40	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:48	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**64.9**		5.00	5.00	mg/L			01/07/21 16:33	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 16:33	1
Carbonate Alkalinity as CaCO3	**32.5**		5.00	5.00	mg/L			01/07/21 16:33	1
Hydroxide Alkalinity	**32.5**		5.00	5.00	mg/L			01/07/21 16:33	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T3-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6.93**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:52	1
Antimony	**0.000908**	**J**	0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:52	1
Arsenic	**0.00651**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:52	1
Barium	**0.0400**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:52	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:52	1
Boron	**0.231**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:52	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:52	1
Calcium	**240**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:52	1
Chromium	**0.188**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:52	1
Cobalt	**0.00812**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:52	1
Copper	**0.00617**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:52	1
Iron	**7.31**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:52	1
Lead	**0.00291**		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:52	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:52	1
Magnesium	**0.402**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:52	1
Manganese	**0.0434**		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:52	1
Molybdenum	**0.0924**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:52	1
Nickel	**0.00459**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:52	1
Potassium	**8.94**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:52	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:52	1
Silver	**0.000485**	**J**	0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:52	1
Sodium	**70.5**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:52	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:52	1
Vanadium	**0.0497**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:44	1
Zinc	**0.0158**		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.706**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:55	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:55	1
Arsenic	**0.00514**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:55	1
Barium	**0.0229**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:55	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:55	1
Boron	**0.175**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:55	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:55	1
Calcium	**235**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:55	1
Chromium	**0.189**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:55	1
Cobalt	**0.00719**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:55	1
Copper	**0.00297**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:55	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:55	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:55	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:55	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:55	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:55	1
Molybdenum	**0.0948**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:55	1
Nickel	**0.00131**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:55	1
Potassium	**4.29**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:55	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:55	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:55	1
Sodium	**71.0**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:55	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T3-Mid
Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:55	1
Vanadium	**0.0409**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:48	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:55	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:04	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:34	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T4-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.15**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:59	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:59	1
Arsenic	**0.00706**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:59	1
Barium	**0.0330**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:59	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:59	1
Boron	**0.102**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:59	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:59	1
Calcium	**293**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:59	1
Chromium	**0.314**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:59	1
Cobalt	**0.0127**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:59	1
Copper	**0.00543**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:59	1
Iron	**4.64**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:59	1
Lead	**0.00130**		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:59	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:59	1
Magnesium	**0.184**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:59	1
Manganese	**0.0266**		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:59	1
Molybdenum	**0.156**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:59	1
Nickel	**0.00347**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:59	1
Potassium	**4.75**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:59	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:59	1
Silver	**0.000190**	**J**	0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:59	1
Sodium	**59.3**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:59	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:59	1
Vanadium	**0.0380**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:51	1
Zinc	**0.00535**		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.775**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:10	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:10	1
Arsenic	**0.00651**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:10	1
Barium	**0.0243**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:10	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:10	1
Boron	**0.0596**	**J**	0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:10	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:10	1
Calcium	**272**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:10	1
Chromium	**0.330**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:10	1
Cobalt	**0.0125**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:10	1
Copper	**0.00421**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:10	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:10	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:10	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:10	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:10	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:10	1
Molybdenum	**0.163**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:10	1
Nickel	**0.00203**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:10	1
Potassium	**4.08**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:10	1
Selenium	**0.00151**	**J**	0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:10	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:10	1
Sodium	**58.3**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:10	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T4-Mid
Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:10	1
Vanadium	**0.0338**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:02	1
Zinc	**0.0137**		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:10	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:05	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:59	01/15/21 14:35	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T5-Mid

Lab Sample ID: 180-115551-5

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.69**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:13	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:13	1
Arsenic	**0.00854**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:13	1
Barium	**0.0318**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:13	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:13	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:13	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:13	1
Calcium	**233**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:13	1
Chromium	**0.504**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:13	1
Cobalt	**0.0203**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:13	1
Copper	**0.00774**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:13	1
Iron	**5.16**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:13	1
Lead	**0.00135**		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:13	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:13	1
Magnesium	**0.258**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:13	1
Manganese	**0.0381**		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:13	1
Molybdenum	**0.236**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:13	1
Nickel	**0.00502**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:13	1
Potassium	**7.05**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:13	1
Selenium	**0.00190**	**J**	0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:13	1
Silver	**0.00109**		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:13	1
Sodium	**41.1**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:13	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:13	1
Vanadium	**0.0373**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:06	1
Zinc	**0.00586**		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:13	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:56	01/15/21 15:06	1

Client Sample ID: GAF-GW-1316-Rich-T1-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.77**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:17	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:17	1
Arsenic	**0.00223**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:17	1
Barium	**0.0399**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:17	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:17	1
Boron	**0.632**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:17	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:17	1
Calcium	**260**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:17	1
Chromium	**0.120**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:17	1
Cobalt	**0.00183**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:17	1
Copper	**0.00204**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:17	1
Iron	**0.639**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:17	1
Lead	**0.000229**	**J**	0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:17	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:17	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:17	1
Manganese	**0.00702**		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:17	1
Molybdenum	**0.0265**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:17	1
Nickel	**0.00161**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:17	1
Potassium	**7.48**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:17	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:17	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:17	1
Sodium	**87.5**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:17	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:17	1
Vanadium	**0.0337**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:09	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:17	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.24**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:21	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:21	1
Arsenic	**0.00203**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:21	1
Barium	**0.0364**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:21	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:21	1
Boron	**0.618**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:21	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:21	1
Calcium	**243**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:21	1
Chromium	**0.114**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:21	1
Cobalt	**0.00167**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:21	1
Copper	**0.00161**	**J**	0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:21	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:21	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:21	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:21	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:21	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:21	1
Molybdenum	**0.0255**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:21	1
Nickel	**0.000451**	**J**	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:21	1
Potassium	**6.97**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:21	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:21	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:21	1
Sodium	**82.6**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:21	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T1-Mid
Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:21	1
Vanadium	**0.0304**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:13	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:21	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:07	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:36	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T2-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-7

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	40.0		1.00	0.713	mg/L			01/07/21 17:21	1
Fluoride	0.434		0.100	0.0260	mg/L			01/12/21 17:12	1
Sulfate	170		1.00	0.756	mg/L			01/07/21 17:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.38		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:24	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:24	1
Arsenic	0.00165		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:24	1
Barium	0.0397		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:24	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:24	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:24	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:24	1
Calcium	157		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:24	1
Chromium	0.184		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:24	1
Cobalt	0.00367		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:24	1
Copper	0.00199	J	0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:24	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:24	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:24	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:24	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:24	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:24	1
Molybdenum	0.0475		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:24	1
Nickel	0.000668	J	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:24	1
Potassium	8.31		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:24	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:24	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:24	1
Sodium	83.8		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:24	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:24	1
Vanadium	0.0107		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:16	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:24	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	281		5.00	5.00	mg/L			01/07/21 16:26	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 16:26	1
Carbonate Alkalinity as CaCO3	51.0		5.00	5.00	mg/L			01/07/21 16:26	1
Hydroxide Alkalinity	230		5.00	5.00	mg/L			01/07/21 16:26	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T3-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2.53**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:28	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:28	1
Arsenic	**0.00218**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:28	1
Barium	**0.0375**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:28	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:28	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:28	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:28	1
Calcium	**152**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:28	1
Chromium	**0.178**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:28	1
Cobalt	**0.00617**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:28	1
Copper	**0.00304**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:28	1
Iron	**0.564**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:28	1
Lead	**0.000243**	**J**	0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:28	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:28	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:28	1
Manganese	**0.00451**	**J**	0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:28	1
Molybdenum	**0.0601**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:28	1
Nickel	**0.00109**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:28	1
Potassium	**9.01**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:28	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:28	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:28	1
Sodium	**75.5**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:28	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:28	1
Vanadium	**0.00709**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:20	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:28	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2.50**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:32	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:32	1
Arsenic	**0.00199**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:32	1
Barium	**0.0378**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:32	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:32	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:32	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:32	1
Calcium	**151**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:32	1
Chromium	**0.178**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:32	1
Cobalt	**0.00665**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:32	1
Copper	**0.00291**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:32	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:32	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:32	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:32	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:32	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:32	1
Molybdenum	**0.0628**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:32	1
Nickel	**0.00305**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:32	1
Potassium	**9.56**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:32	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:32	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:32	1
Sodium	**78.0**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:32	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T3-Mid
Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:32	1
Vanadium	**0.00681**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:24	1
Zinc	**0.00377**	**J**	0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:32	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:08	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:38	1

Client Sample ID: GAF-GW-1316-Rich-T4-Mid

Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.89**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:35	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:35	1
Arsenic	**0.00242**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:35	1
Barium	**0.0520**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:35	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:35	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:35	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:35	1
Calcium	**191**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:35	1
Chromium	**0.0958**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:35	1
Cobalt	**0.0106**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:35	1
Copper	**0.00408**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:35	1
Iron	**0.421**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:35	1
Lead	**0.000131**	**J**	0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:35	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:35	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:35	1
Manganese	**0.00339**	**J**	0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:35	1
Molybdenum	**0.0464**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:35	1
Nickel	**0.00130**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:35	1
Potassium	**10.7**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:35	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:35	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:35	1
Sodium	**70.7**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:35	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:35	1
Vanadium	**0.00388**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:27	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:35	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.67**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:39	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:39	1
Arsenic	**0.00237**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:39	1
Barium	**0.0507**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:39	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:39	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:39	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:39	1
Calcium	**178**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:39	1
Chromium	**0.0894**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:39	1
Cobalt	**0.0100**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:39	1
Copper	**0.00317**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:39	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:39	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:39	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:39	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:39	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:39	1
Molybdenum	**0.0440**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:39	1
Nickel	**0.00111**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:39	1
Potassium	**10.2**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:39	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:39	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:39	1
Sodium	**66.5**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:39	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T4-Mid
Date Collected: 12/29/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:39	1
Vanadium	**0.00325**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:31	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:39	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:09	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:59	01/15/21 14:39	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T5-Mid

Lab Sample ID: 180-115551-10

Date Collected: 12/29/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	17.7		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:42	1
Antimony	0.00144	J	0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:42	1
Arsenic	0.00971		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:42	1
Barium	0.128		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:42	1
Beryllium	0.000607	J	0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:42	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:42	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:42	1
Calcium	227		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:42	1
Chromium	0.0847		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:42	1
Cobalt	0.0187		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:42	1
Copper	0.0138		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:42	1
Iron	24.4		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:42	1
Lead	0.00811		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:42	1
Lithium	0.00415	J	0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:42	1
Magnesium	1.50		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:42	1
Manganese	0.173		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:42	1
Molybdenum	0.0334		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:42	1
Nickel	0.0128		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:42	1
Potassium	14.4		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:42	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:42	1
Silver	0.000203	J	0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:42	1
Sodium	58.8		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:42	1
Thallium	0.000428	J	0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:42	1
Vanadium	0.0310		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:34	1
Zinc	0.0369		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:42	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:56	01/15/21 15:10	1

Client Sample ID: GAF-GW-1316-Lean-T1-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-11

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.529**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:53	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:53	1
Arsenic	**0.00277**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:53	1
Barium	**0.0253**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:53	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:53	1
Boron	**0.945**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:53	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:53	1
Calcium	**317**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:53	1
Chromium	**0.0683**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:53	1
Cobalt	**0.00224**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:53	1
Copper	**0.00179**	**J**	0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:53	1
Iron	**0.194**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:53	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:53	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:53	1
Magnesium	**0.263**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:53	1
Manganese	**0.00271**	**J**	0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:53	1
Molybdenum	**0.0274**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:53	1
Nickel	**0.000626**	**J**	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:53	1
Potassium	**4.63**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:53	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:53	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:53	1
Sodium	**87.4**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:53	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:53	1
Vanadium	**0.0396**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:45	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:53	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.297**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 09:57	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 09:57	1
Arsenic	**0.00272**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 09:57	1
Barium	**0.0239**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 09:57	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 09:57	1
Boron	**0.929**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 09:57	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 09:57	1
Calcium	**309**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 09:57	1
Chromium	**0.0675**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 09:57	1
Cobalt	**0.00214**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 09:57	1
Copper	**0.00153**	**J**	0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 09:57	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 09:57	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 09:57	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 09:57	1
Magnesium	**0.230**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 09:57	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 09:57	1
Molybdenum	**0.0267**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 09:57	1
Nickel	**0.000580**	**J**	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 09:57	1
Potassium	**4.53**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 09:57	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 09:57	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 09:57	1
Sodium	**84.2**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 09:57	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T1-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 09:57	1
Vanadium	**0.0381**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:49	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 09:57	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:15	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:40	1

Client Sample ID: GAF-GW-1316-Lean-T2-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-12

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**43.0**		1.00	0.713	mg/L			01/07/21 17:54	1
Fluoride	**0.377**		0.100	0.0260	mg/L			01/12/21 17:33	1
Sulfate	**407**		5.00	3.78	mg/L			01/07/21 18:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.276**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 10:00	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 10:00	1
Arsenic	**0.00306**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 10:00	1
Barium	**0.0179**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 10:00	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 10:00	1
Boron	**0.735**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 10:00	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 10:00	1
Calcium	**255**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 10:00	1
Chromium	**0.0661**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 10:00	1
Cobalt	**0.00315**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 10:00	1
Copper	**0.00219**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 10:00	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 10:00	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 10:00	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 10:00	1
Magnesium	**0.169**	**J**	0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 10:00	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 10:00	1
Molybdenum	**0.0393**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 10:00	1
Nickel	**0.000639**	**J**	0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 10:00	1
Potassium	**3.59**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 10:00	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 10:00	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 10:00	1
Sodium	**81.2**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 10:00	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 10:00	1
Vanadium	**0.0282**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:52	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 10:00	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**34.0**		5.00	5.00	mg/L			01/07/21 16:18	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 16:18	1
Carbonate Alkalinity as CaCO3	**33.9**		5.00	5.00	mg/L			01/07/21 16:18	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/07/21 16:18	1

Client Sample ID: GAF-GW-1316-Lean-T3-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-13

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.18**		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 10:04	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 10:04	1
Arsenic	**0.00484**		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 10:04	1
Barium	**0.0272**		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 10:04	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 10:04	1
Boron	**0.193**		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 10:04	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 10:04	1
Calcium	**276**		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 10:04	1
Chromium	**0.193**		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 10:04	1
Cobalt	**0.00708**		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 10:04	1
Copper	**0.00345**		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 10:04	1
Iron	**0.548**		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 10:04	1
Lead	**0.000215**	**J**	0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 10:04	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 10:04	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 10:04	1
Manganese	**0.00364**	**J**	0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 10:04	1
Molybdenum	**0.0911**		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 10:04	1
Nickel	**0.00161**		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 10:04	1
Potassium	**4.02**		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 10:04	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 10:04	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 10:04	1
Sodium	**75.5**		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 10:04	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 10:04	1
Vanadium	**0.0432**		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 13:56	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 10:04	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.578**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:25	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:25	1
Arsenic	**0.00467**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:25	1
Barium	**0.0252**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:25	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:25	1
Boron	**0.186**		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:25	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:25	1
Calcium	**268**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:25	1
Chromium	**0.191**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:25	1
Cobalt	**0.00698**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:25	1
Copper	**0.00348**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:25	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:25	1
Lead	**0.000140**	**J**	0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:25	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:25	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:25	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:25	1
Molybdenum	**0.0893**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:25	1
Nickel	**0.00134**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:25	1
Potassium	**3.77**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:25	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:25	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:25	1
Sodium	**74.9**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:25	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T3-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.000357	J	0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:25	1
Vanadium	0.0419		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:25	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:25	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:16	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:42	1

Client Sample ID: GAF-GW-1316-Lean-T4-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-14

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.842**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:29	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:29	1
Arsenic	**0.00651**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:29	1
Barium	**0.0283**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:29	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:29	1
Boron	**0.0611**	**J**	0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:29	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:29	1
Calcium	**308**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:29	1
Chromium	**0.302**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:29	1
Cobalt	**0.0123**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:29	1
Copper	**0.00495**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:29	1
Iron	**0.265**		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:29	1
Lead	**0.000192**	**J**	0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:29	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:29	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:29	1
Manganese	**0.00188**	**J**	0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:29	1
Molybdenum	**0.172**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:29	1
Nickel	**0.00244**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:29	1
Potassium	**3.86**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:29	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:29	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:29	1
Sodium	**63.7**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:29	1
Thallium	**0.000171**	**J**	0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:29	1
Vanadium	**0.0350**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:29	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.626**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:32	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:32	1
Arsenic	**0.00634**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:32	1
Barium	**0.0245**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:32	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:32	1
Boron	**0.0393**	**J**	0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:32	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:32	1
Calcium	**286**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:32	1
Chromium	**0.297**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:32	1
Cobalt	**0.0116**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:32	1
Copper	**0.00433**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:32	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:32	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:32	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:32	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:32	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:32	1
Molybdenum	**0.167**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:32	1
Nickel	**0.00199**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:32	1
Potassium	**3.77**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:32	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:32	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:32	1
Sodium	**62.1**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:32	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T4-End
Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:32	1
Vanadium	**0.0343**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:32	1
Zinc	**0.00446**	**J**	0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:32	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:17	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:59	01/15/21 14:43	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Lean-T5-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-15

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3.62**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:36	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:36	1
Arsenic	**0.00824**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:36	1
Barium	**0.0259**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:36	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:36	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:36	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:36	1
Calcium	**225**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:36	1
Chromium	**0.430**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:36	1
Cobalt	**0.0200**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:36	1
Copper	**0.00781**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:36	1
Iron	**4.24**		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:36	1
Lead	**0.00128**		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:36	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:36	1
Magnesium	**0.253**	**J**	0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:36	1
Manganese	**0.0330**		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:36	1
Molybdenum	**0.250**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:36	1
Nickel	**0.00497**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:36	1
Potassium	**3.49**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:36	1
Selenium	**0.00208**	**J**	0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:36	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:36	1
Sodium	**39.8**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:36	1
Thallium	**0.000206**	**J**	0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:36	1
Vanadium	**0.0355**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:36	1
Zinc	**0.00589**		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:36	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:56	01/15/21 15:18	1

Client Sample ID: GAF-GW-1316-Rich-T1-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-16

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.35**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:39	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:39	1
Arsenic	**0.00187**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:39	1
Barium	**0.0378**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:39	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:39	1
Boron	**0.281**		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:39	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:39	1
Calcium	**216**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:39	1
Chromium	**0.120**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:39	1
Cobalt	**0.00217**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:39	1
Copper	**0.00182**	**J**	0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:39	1
Iron	**0.0776**		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:39	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:39	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:39	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:39	1
Manganese	**0.00128**	**J**	0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:39	1
Molybdenum	**0.0257**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:39	1
Nickel	**0.000525**	**J**	0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:39	1
Potassium	**7.28**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:39	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:39	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:39	1
Sodium	**86.4**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:39	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:39	1
Vanadium	**0.0261**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:39	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:39	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.26**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:43	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:43	1
Arsenic	**0.00170**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:43	1
Barium	**0.0370**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:43	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:43	1
Boron	**0.275**		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:43	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:43	1
Calcium	**214**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:43	1
Chromium	**0.121**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:43	1
Cobalt	**0.00215**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:43	1
Copper	**0.00281**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:43	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:43	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:43	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:43	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:43	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:43	1
Molybdenum	**0.0257**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:43	1
Nickel	**0.000423**	**J**	0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:43	1
Potassium	**7.32**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:43	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:43	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:43	1
Sodium	**87.2**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:43	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T1-End

Lab Sample ID: 180-115551-16

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:43	1
Vanadium	**0.0261**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:43	1
Zinc	**0.00335**	**J**	0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:43	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:19	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:47	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T2-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-17

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	39.5		1.00	0.713	mg/L			01/07/21 16:49	1
Fluoride	0.395		0.100	0.0260	mg/L			01/12/21 16:51	1
Sulfate	239		10.0	7.56	mg/L			01/07/21 17:05	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.739		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:47	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:47	1
Arsenic	0.00155		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:47	1
Barium	0.0358		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:47	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:47	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:47	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:47	1
Calcium	157		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:47	1
Chromium	0.204		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:47	1
Cobalt	0.00355		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:47	1
Copper	0.00262		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:47	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:47	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:47	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:47	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:47	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:47	1
Molybdenum	0.0488		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:47	1
Nickel	0.000557	J	0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:47	1
Potassium	7.76		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:47	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:47	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:47	1
Sodium	86.5		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:47	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:47	1
Vanadium	0.0129		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:47	1
Zinc	0.00368	J	0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:47	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	237		5.00	5.00	mg/L			01/07/21 16:11	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 16:11	1
Carbonate Alkalinity as CaCO3	46.8		5.00	5.00	mg/L			01/07/21 16:11	1
Hydroxide Alkalinity	190		5.00	5.00	mg/L			01/07/21 16:11	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T3-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-18

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2.80**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:50	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:50	1
Arsenic	**0.00197**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:50	1
Barium	**0.0412**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:50	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:50	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:50	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:50	1
Calcium	**171**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:50	1
Chromium	**0.140**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:50	1
Cobalt	**0.00692**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:50	1
Copper	**0.00326**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:50	1
Iron	**0.458**		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:50	1
Lead	**0.000239**	**J**	0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:50	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:50	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:50	1
Manganese	**0.00313**	**J**	0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:50	1
Molybdenum	**0.0519**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:50	1
Nickel	**0.00107**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:50	1
Potassium	**9.34**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:50	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:50	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:50	1
Sodium	**83.8**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:50	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:50	1
Vanadium	**0.00586**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:50	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:50	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2.59**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 15:01	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 15:01	1
Arsenic	**0.00206**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 15:01	1
Barium	**0.0398**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 15:01	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:01	1
Boron	ND	^+	0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 15:01	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:01	1
Calcium	**160**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 15:01	1
Chromium	**0.135**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 15:01	1
Cobalt	**0.00669**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 15:01	1
Copper	**0.00424**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 15:01	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 15:01	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 15:01	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:01	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 15:01	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 15:01	1
Molybdenum	**0.0508**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 15:01	1
Nickel	**0.00104**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:01	1
Potassium	**9.18**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 15:01	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 15:01	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 15:01	1
Sodium	**79.3**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 15:01	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T3-End

Lab Sample ID: 180-115551-18

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 15:01	1
Vanadium	**0.00514**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 15:01	1
Zinc	**0.0145**		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 15:01	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:20	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:49	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T4-End

Date Collected: 12/30/20 13:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-19

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4.64**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 15:05	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 15:05	1
Arsenic	**0.00263**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 15:05	1
Barium	**0.0699**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 15:05	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:05	1
Boron	ND	^+	0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 15:05	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:05	1
Calcium	**203**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 15:05	1
Chromium	**0.0707**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 15:05	1
Cobalt	**0.0105**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 15:05	1
Copper	**0.00447**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 15:05	1
Iron	**2.47**		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 15:05	1
Lead	**0.000886**	**J**	0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 15:05	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:05	1
Magnesium	**0.120**	**J**	0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 15:05	1
Manganese	**0.0166**		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 15:05	1
Molybdenum	**0.0335**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 15:05	1
Nickel	**0.00215**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:05	1
Potassium	**11.2**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 15:05	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 15:05	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 15:05	1
Sodium	**70.8**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 15:05	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 15:05	1
Vanadium	**0.00500**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 15:05	1
Zinc	**0.00354**	**J**	0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 15:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2.95**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 15:08	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 15:08	1
Arsenic	**0.00175**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 15:08	1
Barium	**0.0524**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 15:08	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:08	1
Boron	ND	^+	0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 15:08	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:08	1
Calcium	**155**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 15:08	1
Chromium	**0.0603**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 15:08	1
Cobalt	**0.00820**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 15:08	1
Copper	**0.00302**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 15:08	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 15:08	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 15:08	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:08	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 15:08	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 15:08	1
Molybdenum	**0.0280**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 15:08	1
Nickel	**0.000914**	**J**	0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:08	1
Potassium	**9.19**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 15:08	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 15:08	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 15:08	1
Sodium	**57.6**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 15:08	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T4-End

Lab Sample ID: 180-115551-19

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 15:08	1
Vanadium	**0.00206**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 15:08	1
Zinc	**0.00441**	**J**	0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 15:08	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 15:21	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:59	01/15/21 14:50	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1316-Rich-T5-End

Lab Sample ID: 180-115551-20

Date Collected: 12/30/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.86**		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 15:12	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 15:12	1
Arsenic	**0.00482**		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 15:12	1
Barium	**0.0544**		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 15:12	1
Beryllium	**0.000187**	**J**	0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:12	1
Boron	ND	^+	0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 15:12	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:12	1
Calcium	**169**		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 15:12	1
Chromium	**0.115**		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 15:12	1
Cobalt	**0.0167**		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 15:12	1
Copper	**0.00661**		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 15:12	1
Iron	**5.86**		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 15:12	1
Lead	**0.00200**		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 15:12	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:12	1
Magnesium	**0.367**	**J**	0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 15:12	1
Manganese	**0.0421**		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 15:12	1
Molybdenum	**0.0506**		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 15:12	1
Nickel	**0.00410**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:12	1
Potassium	**10.1**		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 15:12	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 15:12	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 15:12	1
Sodium	**55.0**		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 15:12	1
Thallium	**0.000155**	**J**	0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 15:12	1
Vanadium	**0.0123**		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 15:12	1
Zinc	**0.00892**		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 15:12	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000500	0.000325	mg/L		01/13/21 08:56	01/15/21 15:22	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Control-t28

Lab Sample ID: 180-115551-21

Date Collected: 12/21/20 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:15	1
Cadmium	**0.000440**	**J**	0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:15	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:15	1
Nickel	**0.00801**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:15	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:19	1
Cadmium	**0.000476**	**J**	0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:19	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:19	1
Nickel	**0.00760**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:19	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t28

Lab Sample ID: 180-115551-22

Date Collected: 12/21/20 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:23	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:23	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:23	1
Nickel	**0.000808**	**J**	0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:23	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:26	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:26	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:26	1
Nickel	**0.000573**	**J**	0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:26	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Dolo 0.5-t28

Lab Sample ID: 180-115551-23

Date Collected: 12/21/20 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:30	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:30	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:30	1
Nickel	**0.00251**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:33	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:33	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:33	1
Nickel	**0.00225**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:33	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Dolo 1.0-t28

Lab Sample ID: 180-115551-24

Date Collected: 12/21/20 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:44	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:44	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:44	1
Nickel	**0.00141**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 15:48	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 15:48	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 15:48	1
Nickel	**0.00118**		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 15:48	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Control-t42

Lab Sample ID: 180-115551-25

Date Collected: 01/04/21 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 16:13	1
Cadmium	**0.000466**	**J**	0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 16:13	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 16:13	1
Nickel	**0.00476**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 16:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 16:17	1
Cadmium	**0.000396**	**J**	0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 16:17	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 16:17	1
Nickel	**0.00488**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 16:17	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t42

Lab Sample ID: 180-115551-26

Date Collected: 01/04/21 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 16:20	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 16:20	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 16:20	1
Nickel	**0.00111**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 16:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:00	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:00	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:00	1
Nickel	**0.00113**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:00	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Dolo 0.5-t42

Lab Sample ID: 180-115551-27

Date Collected: 01/04/21 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:04	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:04	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:04	1
Nickel	**0.00232**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:04	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:14	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:14	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:14	1
Nickel	**0.00216**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:14	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Dolo 1.0-t42

Lab Sample ID: 180-115551-28

Date Collected: 01/04/21 12:40

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:18	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:18	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:18	1
Nickel	**0.00134**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:22	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:22	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:22	1
Nickel	**0.00190**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:22	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t2hr

Lab Sample ID: 180-115551-29

Date Collected: 12/16/20 14:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:25	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:25	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:25	1
Nickel	**0.00458**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:25	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:29	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:29	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:29	1
Nickel	**0.00451**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:29	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t2hr

Lab Sample ID: 180-115551-30

Date Collected: 12/16/20 14:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:32	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:32	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:32	1
Nickel	**0.00443**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:32	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:36	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:36	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:36	1
Nickel	**0.00422**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:36	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t48hr

Lab Sample ID: 180-115551-31

Date Collected: 12/17/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:40	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:40	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:40	1
Nickel	**0.00515**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:40	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:43	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:43	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:43	1
Nickel	**0.00431**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:43	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t48hr

Lab Sample ID: 180-115551-32

Date Collected: 12/17/20 13:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:47	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:47	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:47	1
Nickel	**0.00532**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 17:58	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 17:58	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 17:58	1
Nickel	**0.00490**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 17:58	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t 1day

Lab Sample ID: 180-115551-33

Date Collected: 12/18/20 12:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 18:01	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 18:01	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 18:01	1
Nickel	**0.00386**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 18:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 18:05	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 18:05	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 18:05	1
Nickel	**0.00354**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 18:05	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t 1 day

Lab Sample ID: 180-115551-34

Date Collected: 12/18/20 12:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 18:08	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 18:08	1
Lithium	**0.00388**	**J**	0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 18:08	1
Nickel	**0.00325**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 18:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 18:12	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 18:12	1
Lithium	**0.00366**	**J**	0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 18:12	1
Nickel	**0.00306**		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 18:12	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t7

Lab Sample ID: 180-115551-35

Date Collected: 12/23/20 12:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 14:38	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 14:38	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 14:38	1
Nickel	**0.00292**		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 14:38	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 14:42	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 14:42	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 14:42	1
Nickel	**0.00235**		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 14:42	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t7

Lab Sample ID: 180-115551-36

Date Collected: 12/23/20 12:00

Matrix: Water

Date Received: 01/06/21 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 14:45	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 14:45	1
Lithium	**0.00417**	**J**	0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 14:45	1
Nickel	**0.00348**		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 14:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 15:14	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 15:14	1
Lithium	**0.00416**	**J**	0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 15:14	1
Nickel	**0.00305**		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 15:14	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t14

Date Collected: 12/30/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-37

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	43.2		1.00	0.713	mg/L			01/07/21 19:31	1
Fluoride	0.299		0.100	0.0260	mg/L			01/12/21 15:49	1
Sulfate	559		10.0	7.56	mg/L			01/07/21 19:47	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.40		0.0300	0.0125	mg/L		01/09/21 09:56	01/13/21 15:36	1
Antimony	0.000827	J	0.00200	0.000378	mg/L		01/09/21 09:56	01/13/21 15:36	1
Arsenic	0.00153		0.00100	0.000313	mg/L		01/09/21 09:56	01/13/21 15:36	1
Barium	0.0369		0.0100	0.00160	mg/L		01/09/21 09:56	01/13/21 15:36	1
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 15:36	1
Boron	1.51	B	0.0800	0.0386	mg/L		01/09/21 09:56	01/13/21 15:36	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 15:36	1
Calcium	251		0.500	0.127	mg/L		01/09/21 09:56	01/13/21 15:36	1
Chromium	0.0521		0.00200	0.00153	mg/L		01/09/21 09:56	01/13/21 15:36	1
Cobalt	0.00384		0.000500	0.000134	mg/L		01/09/21 09:56	01/13/21 15:36	1
Copper	0.00102	J	0.00200	0.000627	mg/L		01/09/21 09:56	01/13/21 15:36	1
Iron	2.78		0.0500	0.0195	mg/L		01/09/21 09:56	01/13/21 15:36	1
Lead	0.000875	J	0.00100	0.000128	mg/L		01/09/21 09:56	01/13/21 15:36	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 15:36	1
Magnesium	15.9		0.500	0.0827	mg/L		01/09/21 09:56	01/13/21 15:36	1
Manganese	1.35		0.00500	0.000866	mg/L		01/09/21 09:56	01/13/21 15:36	1
Molybdenum	0.0177		0.00500	0.000610	mg/L		01/09/21 09:56	01/13/21 15:36	1
Nickel	0.00270		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 15:36	1
Potassium	5.33		0.500	0.156	mg/L		01/09/21 09:56	01/13/21 15:36	1
Selenium	ND		0.00500	0.00151	mg/L		01/09/21 09:56	01/13/21 15:36	1
Silver	ND		0.00100	0.000177	mg/L		01/09/21 09:56	01/13/21 15:36	1
Sodium	96.5		0.500	0.348	mg/L		01/09/21 09:56	01/13/21 15:36	1
Thallium	0.000201	J	0.00100	0.000148	mg/L		01/09/21 09:56	01/13/21 15:36	1
Vanadium	0.00448		0.00100	0.000991	mg/L		01/09/21 09:56	01/13/21 15:36	1
Zinc	0.00712		0.00500	0.00322	mg/L		01/09/21 09:56	01/13/21 15:36	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0226	J	0.0300	0.0125	mg/L		01/09/21 09:56	01/13/21 15:39	1
Antimony	0.000524	J	0.00200	0.000378	mg/L		01/09/21 09:56	01/13/21 15:39	1
Arsenic	0.000847	J	0.00100	0.000313	mg/L		01/09/21 09:56	01/13/21 15:39	1
Barium	0.0294		0.0100	0.00160	mg/L		01/09/21 09:56	01/13/21 15:39	1
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 15:39	1
Boron	1.58	B	0.0800	0.0386	mg/L		01/09/21 09:56	01/13/21 15:39	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 15:39	1
Calcium	247		0.500	0.127	mg/L		01/09/21 09:56	01/13/21 15:39	1
Chromium	0.0508		0.00200	0.00153	mg/L		01/09/21 09:56	01/13/21 15:39	1
Cobalt	0.00246		0.000500	0.000134	mg/L		01/09/21 09:56	01/13/21 15:39	1
Copper	ND		0.00200	0.000627	mg/L		01/09/21 09:56	01/13/21 15:39	1
Iron	0.0305	J	0.0500	0.0195	mg/L		01/09/21 09:56	01/13/21 15:39	1
Lead	ND		0.00100	0.000128	mg/L		01/09/21 09:56	01/13/21 15:39	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 15:39	1
Magnesium	15.8		0.500	0.0827	mg/L		01/09/21 09:56	01/13/21 15:39	1
Manganese	1.18		0.00500	0.000866	mg/L		01/09/21 09:56	01/13/21 15:39	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Lean-t14
Date Collected: 12/30/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-37
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	0.0180		0.00500	0.000610	mg/L		01/09/21 09:56	01/13/21 15:39	1
Nickel	0.00104		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 15:39	1
Potassium	5.10		0.500	0.156	mg/L		01/09/21 09:56	01/13/21 15:39	1
Selenium	ND		0.00500	0.00151	mg/L		01/09/21 09:56	01/13/21 15:39	1
Silver	ND		0.00100	0.000177	mg/L		01/09/21 09:56	01/13/21 15:39	1
Sodium	97.0		0.500	0.348	mg/L		01/09/21 09:56	01/13/21 15:39	1
Thallium	ND		0.00100	0.000148	mg/L		01/09/21 09:56	01/13/21 15:39	1
Vanadium	0.00211		0.00100	0.000991	mg/L		01/09/21 09:56	01/13/21 15:39	1
Zinc	ND		0.00500	0.00322	mg/L		01/09/21 09:56	01/13/21 15:39	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:24	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 09:02	01/15/21 14:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	264		5.00	5.00	mg/L			01/07/21 16:03	1
Bicarbonate Alkalinity as CaCO3	264		5.00	5.00	mg/L			01/07/21 16:03	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 16:03	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/07/21 16:03	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t14

Lab Sample ID: 180-115551-38

Date Collected: 12/30/20 12:00

Matrix: Water

Date Received: 01/06/21 09:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	40.2		1.00	0.713	mg/L			01/07/21 18:59	1
Fluoride	0.211		0.100	0.0260	mg/L			01/12/21 18:56	1
Sulfate	494		10.0	7.56	mg/L			01/07/21 19:16	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.167		0.0300	0.0125	mg/L		01/09/21 09:56	01/13/21 15:43	1
Antimony	0.000541	J	0.00200	0.000378	mg/L		01/09/21 09:56	01/13/21 15:43	1
Arsenic	0.000964	J	0.00100	0.000313	mg/L		01/09/21 09:56	01/13/21 15:43	1
Barium	0.0433		0.0100	0.00160	mg/L		01/09/21 09:56	01/13/21 15:43	1
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 15:43	1
Boron	1.93	B	0.0800	0.0386	mg/L		01/09/21 09:56	01/13/21 15:43	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 15:43	1
Calcium	248		0.500	0.127	mg/L		01/09/21 09:56	01/13/21 15:43	1
Chromium	0.00656		0.00200	0.00153	mg/L		01/09/21 09:56	01/13/21 15:43	1
Cobalt	0.00372		0.000500	0.000134	mg/L		01/09/21 09:56	01/13/21 15:43	1
Copper	ND		0.00200	0.000627	mg/L		01/09/21 09:56	01/13/21 15:43	1
Iron	0.827		0.0500	0.0195	mg/L		01/09/21 09:56	01/13/21 15:43	1
Lead	0.000142	J	0.00100	0.000128	mg/L		01/09/21 09:56	01/13/21 15:43	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 15:43	1
Magnesium	28.9		0.500	0.0827	mg/L		01/09/21 09:56	01/13/21 15:43	1
Manganese	1.23		0.00500	0.000866	mg/L		01/09/21 09:56	01/13/21 15:43	1
Molybdenum	0.00206	J	0.00500	0.000610	mg/L		01/09/21 09:56	01/13/21 15:43	1
Nickel	0.00243		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 15:43	1
Potassium	7.52		0.500	0.156	mg/L		01/09/21 09:56	01/13/21 15:43	1
Selenium	ND		0.00500	0.00151	mg/L		01/09/21 09:56	01/13/21 15:43	1
Silver	ND		0.00100	0.000177	mg/L		01/09/21 09:56	01/13/21 15:43	1
Sodium	105		0.500	0.348	mg/L		01/09/21 09:56	01/13/21 15:43	1
Thallium	0.000167	J	0.00100	0.000148	mg/L		01/09/21 09:56	01/13/21 15:43	1
Vanadium	0.00418		0.00100	0.000991	mg/L		01/09/21 09:56	01/13/21 15:43	1
Zinc	ND		0.00500	0.00322	mg/L		01/09/21 09:56	01/13/21 15:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0175	J	0.0300	0.0125	mg/L		01/09/21 09:56	01/13/21 15:47	1
Antimony	ND		0.00200	0.000378	mg/L		01/09/21 09:56	01/13/21 15:47	1
Arsenic	0.000844	J	0.00100	0.000313	mg/L		01/09/21 09:56	01/13/21 15:47	1
Barium	0.0393		0.0100	0.00160	mg/L		01/09/21 09:56	01/13/21 15:47	1
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 15:47	1
Boron	1.90	B	0.0800	0.0386	mg/L		01/09/21 09:56	01/13/21 15:47	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 15:47	1
Calcium	233		0.500	0.127	mg/L		01/09/21 09:56	01/13/21 15:47	1
Chromium	0.00649		0.00200	0.00153	mg/L		01/09/21 09:56	01/13/21 15:47	1
Cobalt	0.00284		0.000500	0.000134	mg/L		01/09/21 09:56	01/13/21 15:47	1
Copper	ND		0.00200	0.000627	mg/L		01/09/21 09:56	01/13/21 15:47	1
Iron	ND		0.0500	0.0195	mg/L		01/09/21 09:56	01/13/21 15:47	1
Lead	ND		0.00100	0.000128	mg/L		01/09/21 09:56	01/13/21 15:47	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 15:47	1
Magnesium	28.3		0.500	0.0827	mg/L		01/09/21 09:56	01/13/21 15:47	1
Manganese	0.956		0.00500	0.000866	mg/L		01/09/21 09:56	01/13/21 15:47	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Client Sample ID: GAF-GW-1315-Rich-t14

Date Collected: 12/30/20 12:00
Date Received: 01/06/21 09:00

Lab Sample ID: 180-115551-38

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	**0.00198**	**J**	0.00500	0.000610	mg/L		01/09/21 09:56	01/13/21 15:47	1
Nickel	**0.00222**		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 15:47	1
Potassium	**7.41**		0.500	0.156	mg/L		01/09/21 09:56	01/13/21 15:47	1
Selenium	ND		0.00500	0.00151	mg/L		01/09/21 09:56	01/13/21 15:47	1
Silver	ND		0.00100	0.000177	mg/L		01/09/21 09:56	01/13/21 15:47	1
Sodium	**103**		0.500	0.348	mg/L		01/09/21 09:56	01/13/21 15:47	1
Thallium	ND		0.00100	0.000148	mg/L		01/09/21 09:56	01/13/21 15:47	1
Vanadium	**0.00300**		0.00100	0.000991	mg/L		01/09/21 09:56	01/13/21 15:47	1
Zinc	ND		0.00500	0.00322	mg/L		01/09/21 09:56	01/13/21 15:47	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:27	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 09:02	01/15/21 14:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**336**		5.00	5.00	mg/L			01/07/21 15:48	1
Bicarbonate Alkalinity as CaCO3	**336**		5.00	5.00	mg/L			01/07/21 15:48	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 15:48	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/07/21 15:48	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-342705/6
Matrix: Water
Analysis Batch: 342705

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.713	mg/L			01/07/21 09:32	1
Sulfate	ND		1.00	0.756	mg/L			01/07/21 09:32	1

Lab Sample ID: LCS 180-342705/5
Matrix: Water
Analysis Batch: 342705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	52.04		mg/L		104	80 - 120
Sulfate	50.0	52.17		mg/L		104	80 - 120

Lab Sample ID: 180-115550-D-1 MS
Matrix: Water
Analysis Batch: 342705

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	ND		50.0	48.04		mg/L		96	80 - 120
Sulfate	12.8		50.0	58.55		mg/L		92	80 - 120

Lab Sample ID: 180-115550-D-1 MSD
Matrix: Water
Analysis Batch: 342705

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	ND		50.0	48.39		mg/L		97	80 - 120	1	15
Sulfate	12.8		50.0	59.08		mg/L		93	80 - 120	1	15

Lab Sample ID: MB 180-343126/6
Matrix: Water
Analysis Batch: 343126

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.100	0.0260	mg/L			01/12/21 15:07	1

Lab Sample ID: LCS 180-343126/5
Matrix: Water
Analysis Batch: 343126

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	2.50	2.335		mg/L		93	80 - 120

Lab Sample ID: 180-115551-37 MS
Matrix: Water
Analysis Batch: 343126

Client Sample ID: GAF-GW-1315-Lean-t14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	0.299		2.50	2.545		mg/L		90	80 - 120

Method: EPA 9056A - Anions, Ion Chromatography (Continued)

Lab Sample ID: 180-115551-37 MSD
Matrix: Water
Analysis Batch: 343126

Client Sample ID: GAF-GW-1315-Lean-t14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	0.299		2.50	2.615		mg/L		93	80 - 120	3	15

Lab Sample ID: 180-115551-38 MS
Matrix: Water
Analysis Batch: 343126

Client Sample ID: GAF-GW-1315-Rich-t14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	0.211		2.50	2.593		mg/L		95	80 - 120

Lab Sample ID: 180-115551-38 MSD
Matrix: Water
Analysis Batch: 343126

Client Sample ID: GAF-GW-1315-Rich-t14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	0.211		2.50	2.559		mg/L		94	80 - 120	1	15

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

Lab Sample ID: MB 180-342883/1-A
Matrix: Water
Analysis Batch: 342917

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/08/21 14:51	01/09/21 08:27	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 14:51	01/09/21 08:27	1
Arsenic	ND		0.00100	0.000313	mg/L		01/08/21 14:51	01/09/21 08:27	1
Barium	ND		0.0100	0.00160	mg/L		01/08/21 14:51	01/09/21 08:27	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 14:51	01/09/21 08:27	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 14:51	01/09/21 08:27	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 14:51	01/09/21 08:27	1
Calcium	ND		0.500	0.127	mg/L		01/08/21 14:51	01/09/21 08:27	1
Chromium	ND		0.00200	0.00153	mg/L		01/08/21 14:51	01/09/21 08:27	1
Cobalt	ND		0.000500	0.000134	mg/L		01/08/21 14:51	01/09/21 08:27	1
Copper	ND		0.00200	0.000627	mg/L		01/08/21 14:51	01/09/21 08:27	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 14:51	01/09/21 08:27	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 14:51	01/09/21 08:27	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 14:51	01/09/21 08:27	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 14:51	01/09/21 08:27	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 14:51	01/09/21 08:27	1
Molybdenum	ND		0.00500	0.000610	mg/L		01/08/21 14:51	01/09/21 08:27	1
Nickel	ND		0.00100	0.000336	mg/L		01/08/21 14:51	01/09/21 08:27	1
Potassium	ND		0.500	0.156	mg/L		01/08/21 14:51	01/09/21 08:27	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 14:51	01/09/21 08:27	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 14:51	01/09/21 08:27	1
Sodium	ND		0.500	0.348	mg/L		01/08/21 14:51	01/09/21 08:27	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 14:51	01/09/21 08:27	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 14:51	01/09/21 08:27	1

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

Lab Sample ID: MB 180-342883/1-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	ND		0.00100	0.000991	mg/L		01/08/21 14:51	01/09/21 12:19	1

Lab Sample ID: LCS 180-342883/2-A
Matrix: Water
Analysis Batch: 342917

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.698		mg/L		94	80 - 120
Antimony	0.250	0.2294		mg/L		92	80 - 120
Arsenic	1.00	1.007		mg/L		101	80 - 120
Barium	1.00	0.9659		mg/L		97	80 - 120
Beryllium	0.500	0.4549		mg/L		91	80 - 120
Boron	1.25	1.050		mg/L		84	80 - 120
Cadmium	0.500	0.4885		mg/L		98	80 - 120
Calcium	25.0	26.17		mg/L		105	80 - 120
Chromium	0.500	0.4840		mg/L		97	80 - 120
Cobalt	0.500	0.4948		mg/L		99	80 - 120
Copper	0.500	0.4898		mg/L		98	80 - 120
Iron	5.00	5.054		mg/L		101	80 - 120
Lead	0.500	0.4919		mg/L		98	80 - 120
Lithium	0.500	0.4366		mg/L		87	80 - 120
Magnesium	25.0	23.81		mg/L		95	80 - 120
Manganese	0.500	0.4896		mg/L		98	80 - 120
Molybdenum	0.500	0.4982		mg/L		100	80 - 120
Nickel	0.500	0.4807		mg/L		96	80 - 120
Potassium	25.0	24.23		mg/L		97	80 - 120
Selenium	1.00	0.9958		mg/L		100	80 - 120
Silver	0.250	0.2464		mg/L		99	80 - 120
Sodium	25.0	24.28		mg/L		97	80 - 120
Thallium	1.00	1.009		mg/L		101	80 - 120
Zinc	0.250	0.2550		mg/L		102	80 - 120

Lab Sample ID: LCS 180-342883/2-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Vanadium	0.500	0.4837		mg/L		97	80 - 120

Lab Sample ID: LCSD 180-342883/3-A
Matrix: Water
Analysis Batch: 342917

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5.00	4.676		mg/L		94	80 - 120	0	20
Antimony	0.250	0.2279		mg/L		91	80 - 120	1	20
Arsenic	1.00	0.9957		mg/L		100	80 - 120	1	20
Barium	1.00	0.9536		mg/L		95	80 - 120	1	20
Beryllium	0.500	0.4579		mg/L		92	80 - 120	1	20

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

Lab Sample ID: LCSD 180-342883/3-A
Matrix: Water
Analysis Batch: 342917

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	1.25	1.117		mg/L		89	80 - 120	6	20
Cadmium	0.500	0.4833		mg/L		97	80 - 120	1	20
Calcium	25.0	26.09		mg/L		104	80 - 120	0	20
Chromium	0.500	0.4801		mg/L		96	80 - 120	1	20
Cobalt	0.500	0.4855		mg/L		97	80 - 120	2	20
Copper	0.500	0.4797		mg/L		96	80 - 120	2	20
Iron	5.00	5.031		mg/L		101	80 - 120	0	20
Lead	0.500	0.4903		mg/L		98	80 - 120	0	20
Lithium	0.500	0.4289		mg/L		86	80 - 120	2	20
Magnesium	25.0	23.74		mg/L		95	80 - 120	0	20
Manganese	0.500	0.4876		mg/L		98	80 - 120	0	20
Molybdenum	0.500	0.4893		mg/L		98	80 - 120	2	20
Nickel	0.500	0.4775		mg/L		96	80 - 120	1	20
Potassium	25.0	24.11		mg/L		96	80 - 120	0	20
Selenium	1.00	0.9921		mg/L		99	80 - 120	0	20
Silver	0.250	0.2461		mg/L		98	80 - 120	0	20
Sodium	25.0	24.09		mg/L		96	80 - 120	1	20
Thallium	1.00	1.008		mg/L		101	80 - 120	0	20
Zinc	0.250	0.2583		mg/L		103	80 - 120	1	20

Lab Sample ID: LCSD 180-342883/3-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 342883

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vanadium	0.500	0.4791		mg/L		96	80 - 120	1	20

Lab Sample ID: MB 180-342888/1-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/08/21 15:04	01/09/21 14:03	1
Antimony	ND		0.00200	0.000378	mg/L		01/08/21 15:04	01/09/21 14:03	1
Arsenic	ND		0.00100	0.000313	mg/L		01/08/21 15:04	01/09/21 14:03	1
Barium	ND		0.0100	0.00160	mg/L		01/08/21 15:04	01/09/21 14:03	1
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:04	01/09/21 14:03	1
Boron	ND		0.0800	0.0386	mg/L		01/08/21 15:04	01/09/21 14:03	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:04	01/09/21 14:03	1
Calcium	ND		0.500	0.127	mg/L		01/08/21 15:04	01/09/21 14:03	1
Chromium	ND		0.00200	0.00153	mg/L		01/08/21 15:04	01/09/21 14:03	1
Cobalt	ND		0.000500	0.000134	mg/L		01/08/21 15:04	01/09/21 14:03	1
Copper	ND		0.00200	0.000627	mg/L		01/08/21 15:04	01/09/21 14:03	1
Iron	ND		0.0500	0.0195	mg/L		01/08/21 15:04	01/09/21 14:03	1
Lead	ND		0.00100	0.000128	mg/L		01/08/21 15:04	01/09/21 14:03	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:04	01/09/21 14:03	1
Magnesium	ND		0.500	0.0827	mg/L		01/08/21 15:04	01/09/21 14:03	1
Manganese	ND		0.00500	0.000866	mg/L		01/08/21 15:04	01/09/21 14:03	1
Molybdenum	ND		0.00500	0.000610	mg/L		01/08/21 15:04	01/09/21 14:03	1

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

Lab Sample ID: MB 180-342888/1-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	ND		0.00100	0.000336	mg/L		01/08/21 15:04	01/09/21 14:03	1
Potassium	ND		0.500	0.156	mg/L		01/08/21 15:04	01/09/21 14:03	1
Selenium	ND		0.00500	0.00151	mg/L		01/08/21 15:04	01/09/21 14:03	1
Silver	ND		0.00100	0.000177	mg/L		01/08/21 15:04	01/09/21 14:03	1
Sodium	ND		0.500	0.348	mg/L		01/08/21 15:04	01/09/21 14:03	1
Thallium	ND		0.00100	0.000148	mg/L		01/08/21 15:04	01/09/21 14:03	1
Vanadium	ND		0.00100	0.000991	mg/L		01/08/21 15:04	01/09/21 14:03	1
Zinc	ND		0.00500	0.00322	mg/L		01/08/21 15:04	01/09/21 14:03	1

Lab Sample ID: LCS 180-342888/2-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 342888

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.742		mg/L		95	80 - 120
Antimony	0.250	0.2326		mg/L		93	80 - 120
Arsenic	1.00	0.9722		mg/L		97	80 - 120
Barium	1.00	0.9922		mg/L		99	80 - 120
Beryllium	0.500	0.5010		mg/L		100	80 - 120
Boron	1.25	1.104		mg/L		88	80 - 120
Cadmium	0.500	0.4972		mg/L		99	80 - 120
Calcium	25.0	26.72		mg/L		107	80 - 120
Chromium	0.500	0.4864		mg/L		97	80 - 120
Cobalt	0.500	0.4895		mg/L		98	80 - 120
Copper	0.500	0.4897		mg/L		98	80 - 120
Iron	5.00	5.058		mg/L		101	80 - 120
Lead	0.500	0.4954		mg/L		99	80 - 120
Lithium	0.500	0.4876		mg/L		98	80 - 120
Magnesium	25.0	24.60		mg/L		98	80 - 120
Manganese	0.500	0.4830		mg/L		97	80 - 120
Molybdenum	0.500	0.4976		mg/L		100	80 - 120
Nickel	0.500	0.4821		mg/L		96	80 - 120
Potassium	25.0	24.27		mg/L		97	80 - 120
Selenium	1.00	0.9837		mg/L		98	80 - 120
Silver	0.250	0.2449		mg/L		98	80 - 120
Sodium	25.0	25.60		mg/L		102	80 - 120
Thallium	1.00	1.032		mg/L		103	80 - 120
Vanadium	0.500	0.4889		mg/L		98	80 - 120
Zinc	0.250	0.2484		mg/L		99	80 - 120

Lab Sample ID: LCSD 180-342888/3-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 342888

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5.00	4.949		mg/L		99	80 - 120	4	20
Antimony	0.250	0.2320		mg/L		93	80 - 120	0	20
Arsenic	1.00	0.9860		mg/L		99	80 - 120	1	20
Barium	1.00	1.000		mg/L		100	80 - 120	1	20

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

Lab Sample ID: LCSD 180-342888/3-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 342888

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	0.500	0.4998		mg/L		100	80 - 120	0	20
Boron	1.25	1.146		mg/L		92	80 - 120	4	20
Cadmium	0.500	0.5005		mg/L		100	80 - 120	1	20
Calcium	25.0	27.18		mg/L		109	80 - 120	2	20
Chromium	0.500	0.5028		mg/L		101	80 - 120	3	20
Cobalt	0.500	0.4956		mg/L		99	80 - 120	1	20
Copper	0.500	0.4955		mg/L		99	80 - 120	1	20
Iron	5.00	5.049		mg/L		101	80 - 120	0	20
Lead	0.500	0.5004		mg/L		100	80 - 120	1	20
Lithium	0.500	0.4850		mg/L		97	80 - 120	1	20
Magnesium	25.0	25.33		mg/L		101	80 - 120	3	20
Manganese	0.500	0.4994		mg/L		100	80 - 120	3	20
Molybdenum	0.500	0.5047		mg/L		101	80 - 120	1	20
Nickel	0.500	0.4845		mg/L		97	80 - 120	0	20
Potassium	25.0	24.96		mg/L		100	80 - 120	3	20
Selenium	1.00	0.9919		mg/L		99	80 - 120	1	20
Silver	0.250	0.2471		mg/L		99	80 - 120	1	20
Sodium	25.0	26.47		mg/L		106	80 - 120	3	20
Thallium	1.00	1.031		mg/L		103	80 - 120	0	20
Vanadium	0.500	0.5043		mg/L		101	80 - 120	3	20
Zinc	0.250	0.2452		mg/L		98	80 - 120	1	20

Lab Sample ID: MB 180-342890/1-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342890

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		01/08/21 15:09	01/09/21 15:55	1
Cadmium	ND		0.00100	0.000217	mg/L		01/08/21 15:09	01/09/21 15:55	1
Lithium	ND		0.00500	0.00339	mg/L		01/08/21 15:09	01/09/21 15:55	1
Nickel	ND		0.00100	0.000336	mg/L		01/08/21 15:09	01/09/21 15:55	1

Lab Sample ID: LCS 180-342890/2-A
Matrix: Water
Analysis Batch: 343242

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 342890

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.5146		mg/L		103	80 - 120
Cadmium	0.500	0.4994		mg/L		100	80 - 120
Lithium	0.500	0.4870		mg/L		97	80 - 120
Nickel	0.500	0.4884		mg/L		98	80 - 120

Lab Sample ID: 180-115551-26 MS
Matrix: Water
Analysis Batch: 343242

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t42
Prep Type: Total Recoverable
Prep Batch: 342890

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.5163		mg/L		103	75 - 125
Cadmium	ND		0.500	0.5005		mg/L		100	75 - 125

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

Lab Sample ID: 180-115551-26 MS
Matrix: Water
Analysis Batch: 343242

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t42
Prep Type: Total Recoverable
Prep Batch: 342890

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	ND		0.500	0.4974		mg/L		99	75 - 125
Nickel	0.00111		0.500	0.4953		mg/L		99	75 - 125

Lab Sample ID: 180-115551-26 MSD
Matrix: Water
Analysis Batch: 343242

Client Sample ID: GAF-GW-1315-Hi Cal 0.5-t42
Prep Type: Total Recoverable
Prep Batch: 342890

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.5115		mg/L		102	75 - 125	1	20
Cadmium	ND		0.500	0.5038		mg/L		101	75 - 125	1	20
Lithium	ND		0.500	0.4947		mg/L		99	75 - 125	1	20
Nickel	0.00111		0.500	0.4932		mg/L		98	75 - 125	0	20

Lab Sample ID: MB 180-342908/1-A
Matrix: Water
Analysis Batch: 343414

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342908

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/09/21 09:56	01/13/21 14:13	1
Antimony	ND		0.00200	0.000378	mg/L		01/09/21 09:56	01/13/21 14:13	1
Arsenic	ND		0.00100	0.000313	mg/L		01/09/21 09:56	01/13/21 14:13	1
Barium	ND		0.0100	0.00160	mg/L		01/09/21 09:56	01/13/21 14:13	1
Beryllium	ND		0.00100	0.000182	mg/L		01/09/21 09:56	01/13/21 14:13	1
Boron	0.04715	J	0.0800	0.0386	mg/L		01/09/21 09:56	01/13/21 14:13	1
Cadmium	ND		0.00100	0.000217	mg/L		01/09/21 09:56	01/13/21 14:13	1
Calcium	ND		0.500	0.127	mg/L		01/09/21 09:56	01/13/21 14:13	1
Chromium	ND		0.00200	0.00153	mg/L		01/09/21 09:56	01/13/21 14:13	1
Cobalt	ND		0.000500	0.000134	mg/L		01/09/21 09:56	01/13/21 14:13	1
Copper	ND		0.00200	0.000627	mg/L		01/09/21 09:56	01/13/21 14:13	1
Iron	ND		0.0500	0.0195	mg/L		01/09/21 09:56	01/13/21 14:13	1
Lead	ND		0.00100	0.000128	mg/L		01/09/21 09:56	01/13/21 14:13	1
Lithium	ND		0.00500	0.00339	mg/L		01/09/21 09:56	01/13/21 14:13	1
Magnesium	ND		0.500	0.0827	mg/L		01/09/21 09:56	01/13/21 14:13	1
Manganese	ND		0.00500	0.000866	mg/L		01/09/21 09:56	01/13/21 14:13	1
Molybdenum	ND		0.00500	0.000610	mg/L		01/09/21 09:56	01/13/21 14:13	1
Nickel	ND		0.00100	0.000336	mg/L		01/09/21 09:56	01/13/21 14:13	1
Potassium	ND		0.500	0.156	mg/L		01/09/21 09:56	01/13/21 14:13	1
Selenium	ND		0.00500	0.00151	mg/L		01/09/21 09:56	01/13/21 14:13	1
Silver	ND		0.00100	0.000177	mg/L		01/09/21 09:56	01/13/21 14:13	1
Sodium	ND		0.500	0.348	mg/L		01/09/21 09:56	01/13/21 14:13	1
Thallium	ND		0.00100	0.000148	mg/L		01/09/21 09:56	01/13/21 14:13	1
Vanadium	ND		0.00100	0.000991	mg/L		01/09/21 09:56	01/13/21 14:13	1
Zinc	ND		0.00500	0.00322	mg/L		01/09/21 09:56	01/13/21 14:13	1

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

Lab Sample ID: LCS 180-342908/2-A
Matrix: Water
Analysis Batch: 343414

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 342908

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.938		mg/L		99	80 - 120
Antimony	0.250	0.2318		mg/L		93	80 - 120
Arsenic	1.00	0.9881		mg/L		99	80 - 120
Barium	1.00	0.9848		mg/L		98	80 - 120
Beryllium	0.500	0.5049		mg/L		101	80 - 120
Boron	1.25	1.155		mg/L		92	80 - 120
Cadmium	0.500	0.4952		mg/L		99	80 - 120
Calcium	25.0	26.87		mg/L		107	80 - 120
Chromium	0.500	0.4974		mg/L		99	80 - 120
Cobalt	0.500	0.5013		mg/L		100	80 - 120
Copper	0.500	0.4962		mg/L		99	80 - 120
Iron	5.00	5.083		mg/L		102	80 - 120
Lead	0.500	0.5053		mg/L		101	80 - 120
Lithium	0.500	0.4877		mg/L		98	80 - 120
Magnesium	25.0	26.03		mg/L		104	80 - 120
Manganese	0.500	0.4919		mg/L		98	80 - 120
Molybdenum	0.500	0.5040		mg/L		101	80 - 120
Nickel	0.500	0.4893		mg/L		98	80 - 120
Potassium	25.0	24.78		mg/L		99	80 - 120
Selenium	1.00	0.9970		mg/L		100	80 - 120
Silver	0.250	0.2477		mg/L		99	80 - 120
Sodium	25.0	26.77		mg/L		107	80 - 120
Thallium	1.00	1.059		mg/L		106	80 - 120
Vanadium	0.500	0.5033		mg/L		101	80 - 120
Zinc	0.250	0.2530		mg/L		101	80 - 120

Lab Sample ID: 180-115551-36 MS
Matrix: Water
Analysis Batch: 343414

Client Sample ID: GAF-GW-1315-Rich-t7
Prep Type: Total Recoverable
Prep Batch: 342908

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	0.0912		5.00	5.031		mg/L		99	75 - 125
Antimony	0.000511	J	0.250	0.2311		mg/L		92	75 - 125
Arsenic	0.000887	J	1.00	0.9980		mg/L		100	75 - 125
Barium	0.0475		1.00	1.009		mg/L		96	75 - 125
Beryllium	ND		0.500	0.5012		mg/L		100	75 - 125
Boron	1.79	B	1.25	2.767		mg/L		78	75 - 125
Cadmium	ND		0.500	0.4773		mg/L		95	75 - 125
Calcium	272		25.0	292.8	4	mg/L		84	75 - 125
Chromium	0.0195		0.500	0.5024		mg/L		97	75 - 125
Cobalt	0.00543		0.500	0.4985		mg/L		99	75 - 125
Copper	ND		0.500	0.4901		mg/L		98	75 - 125
Iron	0.353		5.00	5.292		mg/L		99	75 - 125
Lead	ND		0.500	0.4964		mg/L		99	75 - 125
Lithium	0.00417	J	0.500	0.4793		mg/L		95	75 - 125
Magnesium	25.7		25.0	51.16		mg/L		102	75 - 125
Manganese	2.33		0.500	2.765	4	mg/L		88	75 - 125
Molybdenum	0.00449	J	0.500	0.5056		mg/L		100	75 - 125
Nickel	0.00348		0.500	0.4851		mg/L		96	75 - 125

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

Lab Sample ID: 180-115551-36 MS
Matrix: Water
Analysis Batch: 343414

Client Sample ID: GAF-GW-1315-Rich-t7
Prep Type: Total Recoverable
Prep Batch: 342908

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Potassium	7.57		25.0	32.07		mg/L		98	75 - 125
Selenium	ND		1.00	0.9678		mg/L		97	75 - 125
Silver	ND		0.250	0.2495		mg/L		100	75 - 125
Sodium	102		25.0	127.8	4	mg/L		103	75 - 125
Thallium	ND		1.00	1.063		mg/L		106	75 - 125
Vanadium	0.00381		0.500	0.5058		mg/L		100	75 - 125
Zinc	ND		0.250	0.2557		mg/L		102	75 - 125

Lab Sample ID: 180-115551-36 MSD
Matrix: Water
Analysis Batch: 343414

Client Sample ID: GAF-GW-1315-Rich-t7
Prep Type: Total Recoverable
Prep Batch: 342908

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.0912		5.00	5.053		mg/L		99	75 - 125	0	20
Antimony	0.000511	J	0.250	0.2324		mg/L		93	75 - 125	1	20
Arsenic	0.000887	J	1.00	0.9956		mg/L		99	75 - 125	0	20
Barium	0.0475		1.00	1.027		mg/L		98	75 - 125	2	20
Beryllium	ND		0.500	0.4993		mg/L		100	75 - 125	0	20
Boron	1.79	B	1.25	2.864		mg/L		86	75 - 125	3	20
Cadmium	ND		0.500	0.4876		mg/L		98	75 - 125	2	20
Calcium	272		25.0	295.7	4	mg/L		96	75 - 125	1	20
Chromium	0.0195		0.500	0.5089		mg/L		98	75 - 125	1	20
Cobalt	0.00543		0.500	0.5017		mg/L		99	75 - 125	1	20
Copper	ND		0.500	0.4950		mg/L		99	75 - 125	1	20
Iron	0.353		5.00	5.397		mg/L		101	75 - 125	2	20
Lead	ND		0.500	0.5023		mg/L		100	75 - 125	1	20
Lithium	0.00417	J	0.500	0.4838		mg/L		96	75 - 125	1	20
Magnesium	25.7		25.0	51.40		mg/L		103	75 - 125	0	20
Manganese	2.33		0.500	2.805	4	mg/L		96	75 - 125	1	20
Molybdenum	0.00449	J	0.500	0.5082		mg/L		101	75 - 125	1	20
Nickel	0.00348		0.500	0.4883		mg/L		97	75 - 125	1	20
Potassium	7.57		25.0	31.99		mg/L		98	75 - 125	0	20
Selenium	ND		1.00	0.9774		mg/L		98	75 - 125	1	20
Silver	ND		0.250	0.2471		mg/L		99	75 - 125	1	20
Sodium	102		25.0	129.6	4	mg/L		110	75 - 125	1	20
Thallium	ND		1.00	1.049		mg/L		105	75 - 125	1	20
Vanadium	0.00381		0.500	0.5095		mg/L		101	75 - 125	1	20
Zinc	ND		0.250	0.2542		mg/L		102	75 - 125	1	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-343277/1-A
Matrix: Water
Analysis Batch: 343644

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 343277

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:56	01/15/21 14:54	1

Method: EPA 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 180-343277/2-A
Matrix: Water
Analysis Batch: 343644

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 343277

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00250	0.002593		mg/L		104	80 - 120		

Lab Sample ID: 180-115793-F-1-E MS
Matrix: Water
Analysis Batch: 343644

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 343277

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND	F1	0.00100	0.001143		mg/L		114	75 - 125		

Lab Sample ID: 180-115793-F-1-F MSD
Matrix: Water
Analysis Batch: 343644

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 343277

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND	F1	0.00100	0.001351	F1	mg/L		135	75 - 125	17	20

Lab Sample ID: MB 180-343278/1-A
Matrix: Water
Analysis Batch: 343644

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 343278

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/13/21 08:59	01/15/21 14:22	1

Lab Sample ID: LCS 180-343278/2-A
Matrix: Water
Analysis Batch: 343644

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 343278

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00250	0.002589		mg/L		104	80 - 120		

Lab Sample ID: 180-115551-37 MS
Matrix: Water
Analysis Batch: 343644

Client Sample ID: GAF-GW-1315-Lean-t14
Prep Type: Total/NA
Prep Batch: 343278

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND		0.00100	0.0009220		mg/L		92	75 - 125		

Lab Sample ID: 180-115551-37 MSD
Matrix: Water
Analysis Batch: 343644

Client Sample ID: GAF-GW-1315-Lean-t14
Prep Type: Total/NA
Prep Batch: 343278

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0009080		mg/L		91	75 - 125	2	20

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-342807/54
Matrix: Water
Analysis Batch: 342807

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			01/07/21 15:41	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 15:41	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/07/21 15:41	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/07/21 15:41	1

Lab Sample ID: LCS 180-342807/53
Matrix: Water
Analysis Batch: 342807

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Alkalinity as CaCO3 to pH 4.5			250	241.5		mg/L		97	90 - 110		

Lab Sample ID: 180-115551-38 DU
Matrix: Water
Analysis Batch: 342807

Client Sample ID: GAF-GW-1315-Rich-t14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	336			334.2		mg/L				0.6	20
Bicarbonate Alkalinity as CaCO3	336			334.2		mg/L				0.6	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

HPLC/IC

Analysis Batch: 342705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Total/NA	Water	EPA 9056A	
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Total/NA	Water	EPA 9056A	
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Total/NA	Water	EPA 9056A	
180-115551-12	GAF-GW-1316-Lean-T2-End	Total/NA	Water	EPA 9056A	
180-115551-12	GAF-GW-1316-Lean-T2-End	Total/NA	Water	EPA 9056A	
180-115551-17	GAF-GW-1316-Rich-T2-End	Total/NA	Water	EPA 9056A	
180-115551-17	GAF-GW-1316-Rich-T2-End	Total/NA	Water	EPA 9056A	
180-115551-37	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 9056A	
180-115551-37	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 9056A	
180-115551-38	GAF-GW-1315-Rich-t14	Total/NA	Water	EPA 9056A	
180-115551-38	GAF-GW-1315-Rich-t14	Total/NA	Water	EPA 9056A	
MB 180-342705/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-342705/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-115550-D-1 MS	Matrix Spike	Total/NA	Water	EPA 9056A	
180-115550-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 9056A	

Analysis Batch: 343126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Total/NA	Water	EPA 9056A	
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Total/NA	Water	EPA 9056A	
180-115551-12	GAF-GW-1316-Lean-T2-End	Total/NA	Water	EPA 9056A	
180-115551-17	GAF-GW-1316-Rich-T2-End	Total/NA	Water	EPA 9056A	
180-115551-37	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 9056A	
180-115551-38	GAF-GW-1315-Rich-t14	Total/NA	Water	EPA 9056A	
MB 180-343126/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-343126/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-115551-37 MS	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 9056A	
180-115551-37 MSD	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 9056A	
180-115551-38 MS	GAF-GW-1315-Rich-t14	Total/NA	Water	EPA 9056A	
180-115551-38 MSD	GAF-GW-1315-Rich-t14	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 342883

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Dissolved	Water	3005A	
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Total Recoverable	Water	3005A	
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Dissolved	Water	3005A	
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Dissolved	Water	3005A	
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Total Recoverable	Water	3005A	
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Dissolved	Water	3005A	
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Total Recoverable	Water	3005A	
180-115551-5	GAF-GW-1316-Lean-T5-Mid	Total Recoverable	Water	3005A	
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Dissolved	Water	3005A	
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Total Recoverable	Water	3005A	
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Dissolved	Water	3005A	
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Dissolved	Water	3005A	
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Total Recoverable	Water	3005A	
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Dissolved	Water	3005A	
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Total Recoverable	Water	3005A	
180-115551-10	GAF-GW-1316-Rich-T5-Mid	Total Recoverable	Water	3005A	

Metals (Continued)

Prep Batch: 342883 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-11	GAF-GW-1316-Lean-T1-End	Dissolved	Water	3005A	
180-115551-11	GAF-GW-1316-Lean-T1-End	Total Recoverable	Water	3005A	
180-115551-12	GAF-GW-1316-Lean-T2-End	Dissolved	Water	3005A	
180-115551-13	GAF-GW-1316-Lean-T3-End	Total Recoverable	Water	3005A	
MB 180-342883/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-342883/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-342883/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Prep Batch: 342888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-13	GAF-GW-1316-Lean-T3-End	Dissolved	Water	3005A	
180-115551-14	GAF-GW-1316-Lean-T4-End	Dissolved	Water	3005A	
180-115551-14	GAF-GW-1316-Lean-T4-End	Total Recoverable	Water	3005A	
180-115551-15	GAF-GW-1316-Lean-T5-End	Total Recoverable	Water	3005A	
180-115551-16	GAF-GW-1316-Rich-T1-End	Dissolved	Water	3005A	
180-115551-16	GAF-GW-1316-Rich-T1-End	Total Recoverable	Water	3005A	
180-115551-17	GAF-GW-1316-Rich-T2-End	Dissolved	Water	3005A	
180-115551-18	GAF-GW-1316-Rich-T3-End	Dissolved	Water	3005A	
180-115551-18	GAF-GW-1316-Rich-T3-End	Total Recoverable	Water	3005A	
180-115551-19	GAF-GW-1316-Rich-T4-End	Dissolved	Water	3005A	
180-115551-19	GAF-GW-1316-Rich-T4-End	Total Recoverable	Water	3005A	
180-115551-20	GAF-GW-1316-Rich-T5-End	Total Recoverable	Water	3005A	
180-115551-21	GAF-GW-1315-Control-t28	Dissolved	Water	3005A	
180-115551-21	GAF-GW-1315-Control-t28	Total Recoverable	Water	3005A	
180-115551-22	GAF-GW-1315-Hi Cal 0.5-t28	Dissolved	Water	3005A	
180-115551-22	GAF-GW-1315-Hi Cal 0.5-t28	Total Recoverable	Water	3005A	
180-115551-23	GAF-GW-1315-Dolo 0.5-t28	Dissolved	Water	3005A	
180-115551-23	GAF-GW-1315-Dolo 0.5-t28	Total Recoverable	Water	3005A	
180-115551-24	GAF-GW-1315-Dolo 1.0-t28	Dissolved	Water	3005A	
180-115551-24	GAF-GW-1315-Dolo 1.0-t28	Total Recoverable	Water	3005A	
MB 180-342888/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-342888/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-342888/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Prep Batch: 342890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-25	GAF-GW-1315-Control-t42	Dissolved	Water	3005A	
180-115551-25	GAF-GW-1315-Control-t42	Total Recoverable	Water	3005A	
180-115551-26	GAF-GW-1315-Hi Cal 0.5-t42	Dissolved	Water	3005A	
180-115551-26	GAF-GW-1315-Hi Cal 0.5-t42	Total Recoverable	Water	3005A	
180-115551-27	GAF-GW-1315-Dolo 0.5-t42	Dissolved	Water	3005A	
180-115551-27	GAF-GW-1315-Dolo 0.5-t42	Total Recoverable	Water	3005A	
180-115551-28	GAF-GW-1315-Dolo 1.0-t42	Dissolved	Water	3005A	
180-115551-28	GAF-GW-1315-Dolo 1.0-t42	Total Recoverable	Water	3005A	
180-115551-29	GAF-GW-1315-Lean-t2hr	Dissolved	Water	3005A	
180-115551-29	GAF-GW-1315-Lean-t2hr	Total Recoverable	Water	3005A	
180-115551-30	GAF-GW-1315-Rich-t2hr	Dissolved	Water	3005A	
180-115551-30	GAF-GW-1315-Rich-t2hr	Total Recoverable	Water	3005A	
180-115551-31	GAF-GW-1315-Lean-t48hr	Dissolved	Water	3005A	
180-115551-31	GAF-GW-1315-Lean-t48hr	Total Recoverable	Water	3005A	
180-115551-32	GAF-GW-1315-Rich-t48hr	Dissolved	Water	3005A	

Metals (Continued)

Prep Batch: 342890 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-32	GAF-GW-1315-Rich-t48hr	Total Recoverable	Water	3005A	
180-115551-33	GAF-GW-1315-Lean-t 1day	Dissolved	Water	3005A	
180-115551-33	GAF-GW-1315-Lean-t 1day	Total Recoverable	Water	3005A	
180-115551-34	GAF-GW-1315-Rich-t 1 day	Dissolved	Water	3005A	
180-115551-34	GAF-GW-1315-Rich-t 1 day	Total Recoverable	Water	3005A	
MB 180-342890/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-342890/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-115551-26 MS	GAF-GW-1315-Hi Cal 0.5-t42	Total Recoverable	Water	3005A	
180-115551-26 MSD	GAF-GW-1315-Hi Cal 0.5-t42	Total Recoverable	Water	3005A	

Prep Batch: 342908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-35	GAF-GW-1315-Lean-t7	Dissolved	Water	3005A	
180-115551-35	GAF-GW-1315-Lean-t7	Total Recoverable	Water	3005A	
180-115551-36	GAF-GW-1315-Rich-t7	Dissolved	Water	3005A	
180-115551-36	GAF-GW-1315-Rich-t7	Total Recoverable	Water	3005A	
180-115551-37	GAF-GW-1315-Lean-t14	Dissolved	Water	3005A	
180-115551-37	GAF-GW-1315-Lean-t14	Total Recoverable	Water	3005A	
180-115551-38	GAF-GW-1315-Rich-t14	Dissolved	Water	3005A	
180-115551-38	GAF-GW-1315-Rich-t14	Total Recoverable	Water	3005A	
MB 180-342908/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-342908/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-115551-36 MS	GAF-GW-1315-Rich-t7	Total Recoverable	Water	3005A	
180-115551-36 MSD	GAF-GW-1315-Rich-t7	Total Recoverable	Water	3005A	

Analysis Batch: 342917

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-5	GAF-GW-1316-Lean-T5-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-10	GAF-GW-1316-Rich-T5-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-11	GAF-GW-1316-Lean-T1-End	Dissolved	Water	EPA 6020A	342883
180-115551-11	GAF-GW-1316-Lean-T1-End	Total Recoverable	Water	EPA 6020A	342883
180-115551-12	GAF-GW-1316-Lean-T2-End	Dissolved	Water	EPA 6020A	342883
180-115551-13	GAF-GW-1316-Lean-T3-End	Total Recoverable	Water	EPA 6020A	342883
MB 180-342883/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	342883
LCS 180-342883/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	342883
LCSD 180-342883/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	342883

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-115551-1

Metals

Analysis Batch: 343242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-5	GAF-GW-1316-Lean-T5-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Dissolved	Water	EPA 6020A	342883
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-10	GAF-GW-1316-Rich-T5-Mid	Total Recoverable	Water	EPA 6020A	342883
180-115551-11	GAF-GW-1316-Lean-T1-End	Dissolved	Water	EPA 6020A	342883
180-115551-11	GAF-GW-1316-Lean-T1-End	Total Recoverable	Water	EPA 6020A	342883
180-115551-12	GAF-GW-1316-Lean-T2-End	Dissolved	Water	EPA 6020A	342883
180-115551-13	GAF-GW-1316-Lean-T3-End	Dissolved	Water	EPA 6020A	342888
180-115551-13	GAF-GW-1316-Lean-T3-End	Total Recoverable	Water	EPA 6020A	342883
180-115551-14	GAF-GW-1316-Lean-T4-End	Dissolved	Water	EPA 6020A	342888
180-115551-14	GAF-GW-1316-Lean-T4-End	Total Recoverable	Water	EPA 6020A	342888
180-115551-15	GAF-GW-1316-Lean-T5-End	Total Recoverable	Water	EPA 6020A	342888
180-115551-16	GAF-GW-1316-Rich-T1-End	Dissolved	Water	EPA 6020A	342888
180-115551-16	GAF-GW-1316-Rich-T1-End	Total Recoverable	Water	EPA 6020A	342888
180-115551-17	GAF-GW-1316-Rich-T2-End	Dissolved	Water	EPA 6020A	342888
180-115551-18	GAF-GW-1316-Rich-T3-End	Dissolved	Water	EPA 6020A	342888
180-115551-18	GAF-GW-1316-Rich-T3-End	Total Recoverable	Water	EPA 6020A	342888
180-115551-19	GAF-GW-1316-Rich-T4-End	Dissolved	Water	EPA 6020A	342888
180-115551-19	GAF-GW-1316-Rich-T4-End	Total Recoverable	Water	EPA 6020A	342888
180-115551-20	GAF-GW-1316-Rich-T5-End	Total Recoverable	Water	EPA 6020A	342888
180-115551-21	GAF-GW-1315-Control-t28	Dissolved	Water	EPA 6020A	342888
180-115551-21	GAF-GW-1315-Control-t28	Total Recoverable	Water	EPA 6020A	342888
180-115551-22	GAF-GW-1315-Hi Cal 0.5-t28	Dissolved	Water	EPA 6020A	342888
180-115551-22	GAF-GW-1315-Hi Cal 0.5-t28	Total Recoverable	Water	EPA 6020A	342888
180-115551-23	GAF-GW-1315-Dolo 0.5-t28	Dissolved	Water	EPA 6020A	342888
180-115551-23	GAF-GW-1315-Dolo 0.5-t28	Total Recoverable	Water	EPA 6020A	342888
180-115551-24	GAF-GW-1315-Dolo 1.0-t28	Dissolved	Water	EPA 6020A	342888
180-115551-24	GAF-GW-1315-Dolo 1.0-t28	Total Recoverable	Water	EPA 6020A	342888
180-115551-25	GAF-GW-1315-Control-t42	Dissolved	Water	EPA 6020A	342890
180-115551-25	GAF-GW-1315-Control-t42	Total Recoverable	Water	EPA 6020A	342890
180-115551-26	GAF-GW-1315-Hi Cal 0.5-t42	Dissolved	Water	EPA 6020A	342890
180-115551-26	GAF-GW-1315-Hi Cal 0.5-t42	Total Recoverable	Water	EPA 6020A	342890
180-115551-27	GAF-GW-1315-Dolo 0.5-t42	Dissolved	Water	EPA 6020A	342890
180-115551-27	GAF-GW-1315-Dolo 0.5-t42	Total Recoverable	Water	EPA 6020A	342890
180-115551-28	GAF-GW-1315-Dolo 1.0-t42	Dissolved	Water	EPA 6020A	342890
180-115551-28	GAF-GW-1315-Dolo 1.0-t42	Total Recoverable	Water	EPA 6020A	342890
180-115551-29	GAF-GW-1315-Lean-t2hr	Dissolved	Water	EPA 6020A	342890
180-115551-29	GAF-GW-1315-Lean-t2hr	Total Recoverable	Water	EPA 6020A	342890
180-115551-30	GAF-GW-1315-Rich-t2hr	Dissolved	Water	EPA 6020A	342890

Metals (Continued)

Analysis Batch: 343242 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-30	GAF-GW-1315-Rich-t2hr	Total Recoverable	Water	EPA 6020A	342890
180-115551-31	GAF-GW-1315-Lean-t48hr	Dissolved	Water	EPA 6020A	342890
180-115551-31	GAF-GW-1315-Lean-t48hr	Total Recoverable	Water	EPA 6020A	342890
180-115551-32	GAF-GW-1315-Rich-t48hr	Dissolved	Water	EPA 6020A	342890
180-115551-32	GAF-GW-1315-Rich-t48hr	Total Recoverable	Water	EPA 6020A	342890
180-115551-33	GAF-GW-1315-Lean-t 1day	Dissolved	Water	EPA 6020A	342890
180-115551-33	GAF-GW-1315-Lean-t 1day	Total Recoverable	Water	EPA 6020A	342890
180-115551-34	GAF-GW-1315-Rich-t 1 day	Dissolved	Water	EPA 6020A	342890
180-115551-34	GAF-GW-1315-Rich-t 1 day	Total Recoverable	Water	EPA 6020A	342890
MB 180-342883/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	342883
MB 180-342888/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	342888
MB 180-342890/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	342890
LCS 180-342883/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	342883
LCS 180-342888/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	342888
LCS 180-342890/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	342890
LCSD 180-342883/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	342883
LCSD 180-342888/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	342888
180-115551-26 MS	GAF-GW-1315-Hi Cal 0.5-t42	Total Recoverable	Water	EPA 6020A	342890
180-115551-26 MSD	GAF-GW-1315-Hi Cal 0.5-t42	Total Recoverable	Water	EPA 6020A	342890

Prep Batch: 343277

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Total/NA	Water	7470A	
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Total/NA	Water	7470A	
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Total/NA	Water	7470A	
180-115551-5	GAF-GW-1316-Lean-T5-Mid	Total/NA	Water	7470A	
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Total/NA	Water	7470A	
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Total/NA	Water	7470A	
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Total/NA	Water	7470A	
180-115551-10	GAF-GW-1316-Rich-T5-Mid	Total/NA	Water	7470A	
180-115551-11	GAF-GW-1316-Lean-T1-End	Total/NA	Water	7470A	
180-115551-13	GAF-GW-1316-Lean-T3-End	Total/NA	Water	7470A	
180-115551-14	GAF-GW-1316-Lean-T4-End	Total/NA	Water	7470A	
180-115551-15	GAF-GW-1316-Lean-T5-End	Total/NA	Water	7470A	
180-115551-16	GAF-GW-1316-Rich-T1-End	Total/NA	Water	7470A	
180-115551-18	GAF-GW-1316-Rich-T3-End	Total/NA	Water	7470A	
180-115551-19	GAF-GW-1316-Rich-T4-End	Total/NA	Water	7470A	
180-115551-20	GAF-GW-1316-Rich-T5-End	Total/NA	Water	7470A	
MB 180-343277/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-343277/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-115793-F-1-E MS	Matrix Spike	Total/NA	Water	7470A	
180-115793-F-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	7470A	

Prep Batch: 343278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Dissolved	Water	7470A	
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Dissolved	Water	7470A	
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Dissolved	Water	7470A	
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Dissolved	Water	7470A	
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Dissolved	Water	7470A	
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Dissolved	Water	7470A	

Metals (Continued)

Prep Batch: 343278 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Dissolved	Water	7470A	
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Dissolved	Water	7470A	
180-115551-11	GAF-GW-1316-Lean-T1-End	Dissolved	Water	7470A	
180-115551-12	GAF-GW-1316-Lean-T2-End	Dissolved	Water	7470A	
180-115551-13	GAF-GW-1316-Lean-T3-End	Dissolved	Water	7470A	
180-115551-14	GAF-GW-1316-Lean-T4-End	Dissolved	Water	7470A	
180-115551-16	GAF-GW-1316-Rich-T1-End	Dissolved	Water	7470A	
180-115551-17	GAF-GW-1316-Rich-T2-End	Dissolved	Water	7470A	
180-115551-18	GAF-GW-1316-Rich-T3-End	Dissolved	Water	7470A	
180-115551-19	GAF-GW-1316-Rich-T4-End	Dissolved	Water	7470A	
180-115551-37	GAF-GW-1315-Lean-t14	Dissolved	Water	7470A	
180-115551-37	GAF-GW-1315-Lean-t14	Total/NA	Water	7470A	
180-115551-38	GAF-GW-1315-Rich-t14	Dissolved	Water	7470A	
180-115551-38	GAF-GW-1315-Rich-t14	Total/NA	Water	7470A	
MB 180-343278/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-343278/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-115551-37 MS	GAF-GW-1315-Lean-t14	Total/NA	Water	7470A	
180-115551-37 MSD	GAF-GW-1315-Lean-t14	Total/NA	Water	7470A	

Analysis Batch: 343414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-35	GAF-GW-1315-Lean-t7	Dissolved	Water	EPA 6020A	342908
180-115551-35	GAF-GW-1315-Lean-t7	Total Recoverable	Water	EPA 6020A	342908
180-115551-36	GAF-GW-1315-Rich-t7	Dissolved	Water	EPA 6020A	342908
180-115551-36	GAF-GW-1315-Rich-t7	Total Recoverable	Water	EPA 6020A	342908
180-115551-37	GAF-GW-1315-Lean-t14	Dissolved	Water	EPA 6020A	342908
180-115551-37	GAF-GW-1315-Lean-t14	Total Recoverable	Water	EPA 6020A	342908
180-115551-38	GAF-GW-1315-Rich-t14	Dissolved	Water	EPA 6020A	342908
180-115551-38	GAF-GW-1315-Rich-t14	Total Recoverable	Water	EPA 6020A	342908
MB 180-342908/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	342908
LCS 180-342908/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	342908
180-115551-36 MS	GAF-GW-1315-Rich-t7	Total Recoverable	Water	EPA 6020A	342908
180-115551-36 MSD	GAF-GW-1315-Rich-t7	Total Recoverable	Water	EPA 6020A	342908

Analysis Batch: 343644

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-1	GAF-GW-1316-Lean-T1-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-3	GAF-GW-1316-Lean-T3-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-4	GAF-GW-1316-Lean-T4-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-5	GAF-GW-1316-Lean-T5-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-6	GAF-GW-1316-Rich-T1-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-8	GAF-GW-1316-Rich-T3-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Dissolved	Water	EPA 7470A	343278
180-115551-9	GAF-GW-1316-Rich-T4-Mid	Total/NA	Water	EPA 7470A	343277

Metals (Continued)

Analysis Batch: 343644 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-10	GAF-GW-1316-Rich-T5-Mid	Total/NA	Water	EPA 7470A	343277
180-115551-11	GAF-GW-1316-Lean-T1-End	Dissolved	Water	EPA 7470A	343278
180-115551-11	GAF-GW-1316-Lean-T1-End	Total/NA	Water	EPA 7470A	343277
180-115551-12	GAF-GW-1316-Lean-T2-End	Dissolved	Water	EPA 7470A	343278
180-115551-13	GAF-GW-1316-Lean-T3-End	Dissolved	Water	EPA 7470A	343278
180-115551-13	GAF-GW-1316-Lean-T3-End	Total/NA	Water	EPA 7470A	343277
180-115551-14	GAF-GW-1316-Lean-T4-End	Dissolved	Water	EPA 7470A	343278
180-115551-14	GAF-GW-1316-Lean-T4-End	Total/NA	Water	EPA 7470A	343277
180-115551-15	GAF-GW-1316-Lean-T5-End	Total/NA	Water	EPA 7470A	343277
180-115551-16	GAF-GW-1316-Rich-T1-End	Dissolved	Water	EPA 7470A	343278
180-115551-16	GAF-GW-1316-Rich-T1-End	Total/NA	Water	EPA 7470A	343277
180-115551-17	GAF-GW-1316-Rich-T2-End	Dissolved	Water	EPA 7470A	343278
180-115551-18	GAF-GW-1316-Rich-T3-End	Dissolved	Water	EPA 7470A	343278
180-115551-18	GAF-GW-1316-Rich-T3-End	Total/NA	Water	EPA 7470A	343277
180-115551-19	GAF-GW-1316-Rich-T4-End	Dissolved	Water	EPA 7470A	343278
180-115551-19	GAF-GW-1316-Rich-T4-End	Total/NA	Water	EPA 7470A	343277
180-115551-20	GAF-GW-1316-Rich-T5-End	Total/NA	Water	EPA 7470A	343277
180-115551-37	GAF-GW-1315-Lean-t14	Dissolved	Water	EPA 7470A	343278
180-115551-37	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 7470A	343278
180-115551-38	GAF-GW-1315-Rich-t14	Dissolved	Water	EPA 7470A	343278
180-115551-38	GAF-GW-1315-Rich-t14	Total/NA	Water	EPA 7470A	343278
MB 180-343277/1-A	Method Blank	Total/NA	Water	EPA 7470A	343277
MB 180-343278/1-A	Method Blank	Total/NA	Water	EPA 7470A	343278
LCS 180-343277/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	343277
LCS 180-343278/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	343278
180-115551-37 MS	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 7470A	343278
180-115551-37 MSD	GAF-GW-1315-Lean-t14	Total/NA	Water	EPA 7470A	343278
180-115793-F-1-E MS	Matrix Spike	Total/NA	Water	EPA 7470A	343277
180-115793-F-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 7470A	343277

General Chemistry

Analysis Batch: 342807

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-115551-2	GAF-GW-1316-Lean-T2-Mid	Total/NA	Water	SM2320 B	
180-115551-7	GAF-GW-1316-Rich-T2-Mid	Total/NA	Water	SM2320 B	
180-115551-12	GAF-GW-1316-Lean-T2-End	Total/NA	Water	SM2320 B	
180-115551-17	GAF-GW-1316-Rich-T2-End	Total/NA	Water	SM2320 B	
180-115551-37	GAF-GW-1315-Lean-t14	Total/NA	Water	SM2320 B	
180-115551-38	GAF-GW-1315-Rich-t14	Total/NA	Water	SM2320 B	
MB 180-342807/54	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-342807/53	Lab Control Sample	Total/NA	Water	SM2320 B	
180-115551-38 DU	GAF-GW-1315-Rich-t14	Total/NA	Water	SM2320 B	

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CHAIN OF CUSTO

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

180-115551 Chain of Custody

Special Handling:

☑ TAT - Date Needed: 14-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

F=Field Filtered **1**=Na_2S2O_3 **2**=HCl **3**=H_2SO_4 **4**=HNO_3 **5**=NaOH **6**=Ascorbic Acid
7=CH3OH **8**=$NaHSO_4$ **9**=Deionized Water **10**=H_3PO_4 **11**= **12**=

DW=Drinking Water **GW**=Groundwater **SW**=Surface Water **WW**=Waste Water
O=Oil **SO**=Soil **SL**=Sludge **A**=Indoor/Ambient Air **SG**=Soil Gas
X1= 1316 leachate **X2**=

G= Grab **C**=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroixe, bicarbonate, carbonate)					QA/QC Reporting Notes:
						List Preservative Code below:				4	4							
	GAF-GW-1316-Lean-T1-Mid	12/29/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Lean-T2-Mid	12/29/2020	1:00 PM	G	X1				2		x	x	x					
	GAF-GW-1316-Lean-T3-Mid	12/29/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Lean-T4-Mid	12/29/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Lean-T5-Mid	12/29/2020	1:00 PM	G	X1				2	x								
	GAF-GW-1316-Rich-T1-Mid	12/29/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Rich-T2-Mid	12/29/2020	1:00 PM	G	X1				2		x	x	x					
	GAF-GW-1316-Rich-T3-Mid	12/29/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Rich-T4-Mid	12/29/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Rich-T5-Mid	12/29/2020	1:00 PM	G	X1				2	x								

QA/QC Reporting Level
☐ Level I ☐ Level II ☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		11/5/2021	1500
		11/6/21	900

Temp °C: Observed; Correction Factor; Corrected; IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Froze

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CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

Special Handling:

☑TAT - Date Needed: 14-day

All TATs subject to laboratory approval
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Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

F=Field Filtered **1**=Na_2S2O_3 **2**=HCl **3**=H_2SO_4 **4**=HNO_3 **5**=NaOH **6**=Ascorbic Acid
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Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroixe, bicarbonate, carbonate)					
						Containers				Analysis								
										List Preservative Code below:								
										4	4							
	GAF-GW-1316-Lean-T1-End	12/30/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Lean-T2-End	12/30/2020	1:00 PM	G	X1				2		x	x	x					
	GAF-GW-1316-Lean-T3-End	12/30/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Lean-T4-End	12/30/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Lean-T5-End	12/30/2020	1:00 PM	G	X1				2	x								
	GAF-GW-1316-Rich-T1-End	12/30/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Rich-T2-End	12/30/2020	1:00 PM	G	X1				2		x	x	x					
	GAF-GW-1316-Rich-T3-End	12/30/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Rich-T4-End	12/30/2020	1:00 PM	G	X1				2	x	x							
	GAF-GW-1316-Rich-T5-End	12/30/2020	1:00 PM	G	X1				2	x								

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		1/5/2021	1500
	My	1/6/21	900

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Froze

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CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

Special Handling:

☑ TAT - Date Needed: 14-day

All TATs subject to laboratory approval
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Report To:	Franciscos Barajas
	AECOM
	9400 Amberglen Blvd
	Austin, TX 78729
Telephone #:	978-905-2299
Project Mgr:	Craig MacPhee

Invoice To:	Craig MacPhee
	AECOM
	250 Apollo Dr.
	Chelmsford, MA 01824
P.O No.:	
Quote #:	

Project No:	TVA Gallatin EIP
Site Name:	GAF-NRS-Treatability
Location:	State:
Sampler(s):	Rachel Watkins, Craig Katkic

F=Field Filtered **1**=Na_2S2O_3 **2**=HCl **3**=H_2SO_4 **4**=HNO_3 **5**=NaOH **6**=Ascorbic Acid
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X1= **X2**= 1315 leachate

G= Grab **C**=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni only	6020 Dissolved-Be, Cd, Li, Ni only						
						Containers					Analysis							
						List Preservative Code below:					4	4						
	GAF-GW-1315-Control-t28	12/21/2020	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Hi Cal 0.5-t28	12/21/2020	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Dolo 0.5-t28	12/21/2020	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Dolo 1.0-t28	12/21/2020	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Control-t42	1/4/2021	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Hi Cal 0.5-t42	1/4/2021	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Dolo 0.5-t42	1/4/2021	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Dolo 1.0-t42	1/4/2021	12:40 PM	G	X2				2		x	x						
	GAF-GW-1315-Lean-t2hr	12/16/2020	2:00 PM	G	X2				2		x	x						
	GAF-GW-1315-Rich-t2hr	12/16/2020	2:00 PM	G	X2				2		x	x						

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other
State-specific reporting standards

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		1/5/2021	1500
	MJ	1/6/21	900

Temp °C
Observed
Correction Factor
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IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Froze

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CHAIN OF CUS

180-115551 Chain of Custody

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

Special Handling:

☑ TAT - Date Needed: 14-day

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Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
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250 Apollo Dr.
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P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins, Craig Katkic

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X1= X2= 1315 leachate

G= Grab **C**=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A-Cl, F, SO4	2320B- Alkalinity (Total hydroxide, bicarbonate, carbonate)	6020 Totals- Be, Cd, Li and Ni only	6020 Dissolved - Be, Cd, Li, Ni only			QA/QC Reporting Notes:
						List Preservative Code below:				4	4							
	GAF-GW-1315-Lean-t48hr	12/17/2020	1:00 PM	G	X2				2					x	x			
	GAF-GW-1315-Rich-t48hr	12/17/2020	1:00 PM	G	X2				2					x	x			
	GAF-GW-1315-Lean-t 1day	12/18/2020	12:00 PM	G	X2				2					x	x			
	GAF-GW-1315-Rich-t 1day	12/18/2020	12:00 PM	G	X2				2					x	x			
	GAF-GW-1315-Lean-t7	12/23/2020	12:00 PM	G	X2				2					x	x			
	GAF-GW-1315-Rich-t7	12/23/2020	12:00 PM	G	X2				2					x	x			
	GAF-GW-1315-Lean-t14	12/30/2020	12:00 PM	G	X2				3	x	x	x	x					
	GAF-GW-1315-Rich-t14	12/30/2020	12:00 PM	G	X2				3	x	x	x	x					

QA/QC Reporting Level
☐ Level I ☐ Level II ☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		1/5/2021	1500
	MJ	1/6/2021	900

Temp °C
Observed
Correction Factor
Corrected
IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Oil Jar Froze

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-115551-1

Login Number: 115551 **List Source: Eurofins TestAmerica, Pittsburgh**
List Number: 1
Creator: Abernathy, Eric

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	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-116485-1
Client Project/Site: GAF-NRS-Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
2/3/2021 2:36:46 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-116485-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-116485-1

Receipt
The samples were received on 1/27/2021 8:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.8º C.

GC Semi VOA
Method 9056A: The matrix spike and matrix spike duplicate (MS/MSD) recoveries for the following sample associated with analytical batch 180-344973 were outside control limits for Sulfate: (180-116485-A-4 MS) and (180-116485-A-4 MSD). The associated laboratory control sample (LCS) recovery met acceptance criteria.

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

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.

Metals

Qualifier	Qualifier Description
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.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc. Job ID: 180-116485-1
Project/Site: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-21
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20 *
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-21
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	01-31-22
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-116485-1	GAF-GW-1315-CONTROL-T63	Water	01/25/21 12:40	01/27/21 08:30	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Water	01/25/21 12:40	01/27/21 08:30	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Water	01/25/21 12:40	01/27/21 08:30	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Water	01/25/21 12:40	01/27/21 08:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

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
SM2320 B	Alkalinity, Total	SM18	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-CONTROL-T63

Lab Sample ID: 180-116485-1

Date Collected: 01/25/21 12:40

Matrix: Water

Date Received: 01/27/21 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			344973	01/29/21 14:23	EPS	TAL PIT
	Instrument ID: INTEGRION									
Total/NA	Analysis	EPA 9056A		10			344973	01/29/21 14:44	EPS	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345118	01/30/21 16:41	RJR	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345350	02/02/21 11:57	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345118	01/30/21 16:27	RJR	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345350	02/02/21 11:42	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			345310	02/02/21 11:34	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			345310	02/02/21 11:33	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			345136	01/28/21 15:19	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T63

Lab Sample ID: 180-116485-2

Date Collected: 01/25/21 12:40

Matrix: Water

Date Received: 01/27/21 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			344973	01/29/21 15:47	EPS	TAL PIT
	Instrument ID: INTEGRION									
Total/NA	Analysis	EPA 9056A		10			344973	01/29/21 16:08	EPS	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345118	01/30/21 16:45	RJR	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345350	02/02/21 12:00	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345118	01/30/21 16:30	RJR	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T63

Lab Sample ID: 180-116485-2
Date Collected: 01/25/21 12:40
Matrix: Water
Date Received: 01/27/21 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345350	02/02/21 11:44	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			345310	02/02/21 11:40	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			345310	02/02/21 11:36	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			345136	01/28/21 15:26	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-1315-DOLO 0.5-T63

Lab Sample ID: 180-116485-3
Date Collected: 01/25/21 12:40
Matrix: Water
Date Received: 01/27/21 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			344973	01/29/21 13:42	EPS	TAL PIT
	Instrument ID: INTEGRION									
Total/NA	Analysis	EPA 9056A		10			344973	01/29/21 14:02	EPS	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345118	01/30/21 16:48	RJR	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345350	02/02/21 12:03	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345118	01/30/21 16:34	RJR	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345350	02/02/21 11:47	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			345310	02/02/21 11:42	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			345310	02/02/21 11:41	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			345136	01/28/21 15:46	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-DOLO 1.0-T63

Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		1			344973	01/29/21 12:18	EPS	TAL PIT
	Instrument ID: INTEGRION									
Total/NA	Analysis	EPA 9056A		10			344973	01/29/21 12:39	EPS	TAL PIT
	Instrument ID: INTEGRION									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345118	01/30/21 16:59	RJR	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Dissolved	Analysis	EPA 6020A		1			345350	02/02/21 12:05	RJR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345118	01/30/21 16:38	RJR	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	345016	01/29/21 11:27	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			345350	02/02/21 11:50	RJR	TAL PIT
	Instrument ID: NEMO									
Dissolved	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Dissolved	Analysis	EPA 7470A		1			345310	02/02/21 11:44	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Prep	7470A			25 mL	25 mL	345076	01/30/21 09:30	KHM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			345310	02/02/21 11:43	KHM	TAL PIT
	Instrument ID: HGY									
Total/NA	Analysis	SM2320 B		1			345136	01/28/21 16:00	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KHM = Kyle Mucroski
TJO = Tyler Oliver

Batch Type: Analysis

AVS = Abbey Smith
EPS = Evan Scheuer
KHM = Kyle Mucroski
RJR = Ron Rosenbaum

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-CONTROL-T63

Lab Sample ID: 180-116485-1

Date Collected: 01/25/21 12:40

Matrix: Water

Date Received: 01/27/21 08:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**41.9**		1.00	0.713	mg/L			01/29/21 14:23	1
Fluoride	**0.228**		0.100	0.0260	mg/L			01/29/21 14:23	1
Sulfate	**770**		10.0	7.56	mg/L			01/29/21 14:44	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.273**		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:27	1
Antimony	ND		0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:27	1
Arsenic	ND		0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:27	1
Barium	**0.0215**		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:27	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:27	1
Boron	**1.52**		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 11:42	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:27	1
Calcium	**268**		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:27	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:27	1
Cobalt	**0.00730**		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:27	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:27	1
Iron	**0.530**		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:27	1
Lead	**0.000169**	**J**	0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:27	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:27	1
Magnesium	**31.9**		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:27	1
Manganese	**5.90**		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:27	1
Molybdenum	ND		0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:27	1
Nickel	**0.00272**		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:27	1
Potassium	**5.49**		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:27	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:27	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:27	1
Sodium	**98.0**		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:27	1
Thallium	**0.000846**	**J**	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:27	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:27	1
Zinc	**0.00410**	**J**	0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:41	1
Antimony	ND		0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:41	1
Arsenic	ND		0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:41	1
Barium	**0.0198**		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:41	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:41	1
Boron	**1.54**		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 11:57	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:41	1
Calcium	**246**		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:41	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:41	1
Cobalt	**0.00574**		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:41	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:41	1
Iron	ND		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:41	1
Lead	ND		0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:41	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:41	1
Magnesium	**30.8**		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:41	1
Manganese	**5.05**		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:41	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-CONTROL-T63
Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:41	1
Nickel	**0.00213**		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:41	1
Potassium	**5.32**		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:41	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:41	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:41	1
Sodium	**96.3**		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:41	1
Thallium	**0.000757**	**J**	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:41	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:41	1
Zinc	ND		0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:41	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000198**	**J**	0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:33	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000161**	**J**	0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**262**		5.00	5.00	mg/L			01/28/21 15:19	1
Bicarbonate Alkalinity as CaCO3	**262**		5.00	5.00	mg/L			01/28/21 15:19	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/28/21 15:19	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/28/21 15:19	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T63
Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-2
Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	46.2		1.00	0.713	mg/L			01/29/21 15:47	1
Fluoride	0.215		0.100	0.0260	mg/L			01/29/21 15:47	1
Sulfate	628		10.0	7.56	mg/L			01/29/21 16:08	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.344		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:30	1
Antimony	0.000457	J	0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:30	1
Arsenic	0.000444	J	0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:30	1
Barium	0.0254		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:30	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:30	1
Boron	1.48		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 11:44	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:30	1
Calcium	307		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:30	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:30	1
Cobalt	0.00386		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:30	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:30	1
Iron	1.05		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:30	1
Lead	0.000245	J	0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:30	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:30	1
Magnesium	24.4		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:30	1
Manganese	2.70		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:30	1
Molybdenum	0.00116	J	0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:30	1
Nickel	0.00144		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:30	1
Potassium	6.12		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:30	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:30	1
Silver	0.000574	J	0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:30	1
Sodium	92.6		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:30	1
Thallium	0.000211	J	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:30	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:30	1
Zinc	0.00439	J	0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:45	1
Antimony	0.000396	J	0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:45	1
Arsenic	ND		0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:45	1
Barium	0.0220		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:45	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:45	1
Boron	1.43		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 12:00	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:45	1
Calcium	294		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:45	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:45	1
Cobalt	0.00202		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:45	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:45	1
Iron	ND		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:45	1
Lead	ND		0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:45	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:45	1
Magnesium	24.6		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:45	1
Manganese	2.01		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:45	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-HI CAL 0.5-T63
Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	**0.00110**	**J**	0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:45	1
Nickel	**0.000922**	**J**	0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:45	1
Potassium	**6.03**		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:45	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:45	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:45	1
Sodium	**92.7**		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:45	1
Thallium	**0.000197**	**J**	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:45	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:45	1
Zinc	ND		0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:45	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:36	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**367**		5.00	5.00	mg/L			01/28/21 15:26	1
Bicarbonate Alkalinity as CaCO3	**367**		5.00	5.00	mg/L			01/28/21 15:26	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/28/21 15:26	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/28/21 15:26	1

Client Sample ID: GAF-GW-1315-DOLO 0.5-T63

Lab Sample ID: 180-116485-3

Date Collected: 01/25/21 12:40

Matrix: Water

Date Received: 01/27/21 08:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**46.3**		1.00	0.713	mg/L			01/29/21 13:42	1
Fluoride	**0.190**		0.100	0.0260	mg/L			01/29/21 13:42	1
Sulfate	**810**		10.0	7.56	mg/L			01/29/21 14:02	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.422**		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:34	1
Antimony	ND		0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:34	1
Arsenic	**0.000454**	**J**	0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:34	1
Barium	**0.0198**		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:34	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:34	1
Boron	**1.47**		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 11:47	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:34	1
Calcium	**319**		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:34	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:34	1
Cobalt	**0.00476**		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:34	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:34	1
Iron	**0.854**		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:34	1
Lead	**0.000302**	**J**	0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:34	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:34	1
Magnesium	**62.7**		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:34	1
Manganese	**3.29**		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:34	1
Molybdenum	ND		0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:34	1
Nickel	**0.00175**		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:34	1
Potassium	**7.55**		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:34	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:34	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:34	1
Sodium	**94.7**		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:34	1
Thallium	**0.000273**	**J**	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:34	1
Vanadium	**0.00106**		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:34	1
Zinc	**0.00356**	**J**	0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:34	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:48	1
Antimony	ND		0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:48	1
Arsenic	ND		0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:48	1
Barium	**0.0181**		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:48	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:48	1
Boron	**1.48**		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 12:03	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:48	1
Calcium	**318**		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:48	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:48	1
Cobalt	**0.00349**		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:48	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:48	1
Iron	ND		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:48	1
Lead	ND		0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:48	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:48	1
Magnesium	**64.1**		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:48	1
Manganese	**3.09**		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:48	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-DOLO 0.5-T63
Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:48	1
Nickel	**0.00135**		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:48	1
Potassium	**7.52**		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:48	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:48	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:48	1
Sodium	**95.7**		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:48	1
Thallium	**0.000261**	**J**	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:48	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:48	1
Zinc	ND		0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:48	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:41	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**496**		5.00	5.00	mg/L			01/28/21 15:46	1
Bicarbonate Alkalinity as CaCO3	**496**		5.00	5.00	mg/L			01/28/21 15:46	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/28/21 15:46	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/28/21 15:46	1

Client Sample ID: GAF-GW-1315-DOLO 1.0-T63

Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-4

Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	44.6		1.00	0.713	mg/L			01/29/21 12:18	1
Fluoride	0.195		0.100	0.0260	mg/L			01/29/21 12:18	1
Sulfate	746	F1	10.0	7.56	mg/L			01/29/21 12:39	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.241		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:38	1
Antimony	0.000486	J	0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:38	1
Arsenic	0.000549	J	0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:38	1
Barium	0.0144		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:38	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:38	1
Boron	1.33		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 11:50	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:38	1
Calcium	214		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:38	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:38	1
Cobalt	0.00190		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:38	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:38	1
Iron	0.821		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:38	1
Lead	0.000186	J	0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:38	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:38	1
Magnesium	43.9		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:38	1
Manganese	1.01		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:38	1
Molybdenum	0.00139	J	0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:38	1
Nickel	0.00109		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:38	1
Potassium	6.01		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:38	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:38	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:38	1
Sodium	86.5		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:38	1
Thallium	0.000181	J	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:38	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:38	1
Zinc	ND		0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:38	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0174	J	0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 16:59	1
Antimony	0.000482	J	0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 16:59	1
Arsenic	ND		0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 16:59	1
Barium	0.0131		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 16:59	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 16:59	1
Boron	1.30		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 12:05	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 16:59	1
Calcium	210		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 16:59	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 16:59	1
Cobalt	0.000758		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 16:59	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 16:59	1
Iron	ND		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 16:59	1
Lead	ND		0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 16:59	1
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 16:59	1
Magnesium	47.5		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 16:59	1
Manganese	0.595		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 16:59	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-116485-1

Client Sample ID: GAF-GW-1315-DOLO 1.0-T63
Date Collected: 01/25/21 12:40
Date Received: 01/27/21 08:30

Lab Sample ID: 180-116485-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	**0.00140**	**J**	0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 16:59	1
Nickel	**0.000736**	**J**	0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 16:59	1
Potassium	**6.25**		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 16:59	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 16:59	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 16:59	1
Sodium	**92.3**		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 16:59	1
Thallium	**0.000197**	**J**	0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 16:59	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 16:59	1
Zinc	ND		0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 16:59	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:43	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**269**		5.00	5.00	mg/L			01/28/21 16:00	1
Bicarbonate Alkalinity as CaCO3	**269**		5.00	5.00	mg/L			01/28/21 16:00	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/28/21 16:00	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/28/21 16:00	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-344973/6
Matrix: Water
Analysis Batch: 344973

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.713	mg/L			01/29/21 07:18	1
Fluoride	ND		0.100	0.0260	mg/L			01/29/21 07:18	1
Sulfate	ND		1.00	0.756	mg/L			01/29/21 07:18	1

Lab Sample ID: LCS 180-344973/5
Matrix: Water
Analysis Batch: 344973

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.02		mg/L		102	80 - 120
Fluoride	2.50	2.726		mg/L		109	80 - 120
Sulfate	50.0	50.19		mg/L		100	80 - 120

Lab Sample ID: 180-116485-4 MS
Matrix: Water
Analysis Batch: 344973

Client Sample ID: GAF-GW-1315-DOLO 1.0-T63
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	49.4		500	554.8		mg/L		101	80 - 120
Fluoride	0.294	J	25.0	26.63		mg/L		105	80 - 120
Sulfate	746	F1	500	1105	F1	mg/L		72	80 - 120

Lab Sample ID: 180-116485-4 MSD
Matrix: Water
Analysis Batch: 344973

Client Sample ID: GAF-GW-1315-DOLO 1.0-T63
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	49.4		500	550.1		mg/L		100	80 - 120	1	15
Fluoride	0.294	J	25.0	26.58		mg/L		105	80 - 120	0	15
Sulfate	746	F1	500	1092	F1	mg/L		69	80 - 120	1	15

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

Lab Sample ID: MB 180-345016/1-A
Matrix: Water
Analysis Batch: 345118

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		01/29/21 11:27	01/30/21 15:40	1
Antimony	ND		0.00200	0.000378	mg/L		01/29/21 11:27	01/30/21 15:40	1
Arsenic	ND		0.00100	0.000313	mg/L		01/29/21 11:27	01/30/21 15:40	1
Barium	ND		0.0100	0.00160	mg/L		01/29/21 11:27	01/30/21 15:40	1
Beryllium	ND		0.00100	0.000182	mg/L		01/29/21 11:27	01/30/21 15:40	1
Cadmium	ND		0.00100	0.000217	mg/L		01/29/21 11:27	01/30/21 15:40	1
Calcium	ND		0.500	0.127	mg/L		01/29/21 11:27	01/30/21 15:40	1
Chromium	ND		0.00200	0.00153	mg/L		01/29/21 11:27	01/30/21 15:40	1
Cobalt	ND		0.000500	0.000134	mg/L		01/29/21 11:27	01/30/21 15:40	1
Copper	ND		0.00200	0.000627	mg/L		01/29/21 11:27	01/30/21 15:40	1
Iron	ND		0.0500	0.0195	mg/L		01/29/21 11:27	01/30/21 15:40	1
Lead	ND		0.00100	0.000128	mg/L		01/29/21 11:27	01/30/21 15:40	1

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

Lab Sample ID: MB 180-345016/1-A
Matrix: Water
Analysis Batch: 345118

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.00500	0.00339	mg/L		01/29/21 11:27	01/30/21 15:40	1
Magnesium	ND		0.500	0.0827	mg/L		01/29/21 11:27	01/30/21 15:40	1
Manganese	ND		0.00500	0.000866	mg/L		01/29/21 11:27	01/30/21 15:40	1
Molybdenum	ND		0.00500	0.000610	mg/L		01/29/21 11:27	01/30/21 15:40	1
Nickel	ND		0.00100	0.000336	mg/L		01/29/21 11:27	01/30/21 15:40	1
Potassium	ND		0.500	0.156	mg/L		01/29/21 11:27	01/30/21 15:40	1
Selenium	ND		0.00500	0.00151	mg/L		01/29/21 11:27	01/30/21 15:40	1
Silver	ND		0.00100	0.000177	mg/L		01/29/21 11:27	01/30/21 15:40	1
Sodium	ND		0.500	0.348	mg/L		01/29/21 11:27	01/30/21 15:40	1
Thallium	ND		0.00100	0.000148	mg/L		01/29/21 11:27	01/30/21 15:40	1
Vanadium	ND		0.00100	0.000991	mg/L		01/29/21 11:27	01/30/21 15:40	1
Zinc	ND		0.00500	0.00322	mg/L		01/29/21 11:27	01/30/21 15:40	1

Lab Sample ID: MB 180-345016/1-A
Matrix: Water
Analysis Batch: 345350

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.0800	0.0386	mg/L		01/29/21 11:27	02/02/21 11:08	1

Lab Sample ID: LCS 180-345016/2-A
Matrix: Water
Analysis Batch: 345118

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	5.045		mg/L		101	80 - 120
Antimony	0.250	0.2384		mg/L		95	80 - 120
Arsenic	1.00	0.9601		mg/L		96	80 - 120
Barium	1.00	1.013		mg/L		101	80 - 120
Beryllium	0.500	0.5052		mg/L		101	80 - 120
Cadmium	0.500	0.5097		mg/L		102	80 - 120
Calcium	25.0	28.15		mg/L		113	80 - 120
Chromium	0.500	0.4949		mg/L		99	80 - 120
Cobalt	0.500	0.4892		mg/L		98	80 - 120
Copper	0.500	0.4834		mg/L		97	80 - 120
Iron	5.00	5.167		mg/L		103	80 - 120
Lead	0.500	0.4988		mg/L		100	80 - 120
Lithium	0.500	0.4918		mg/L		98	80 - 120
Magnesium	25.0	26.25		mg/L		105	80 - 120
Manganese	0.500	0.4905		mg/L		98	80 - 120
Molybdenum	0.500	0.5001		mg/L		100	80 - 120
Nickel	0.500	0.4793		mg/L		96	80 - 120
Potassium	25.0	24.93		mg/L		100	80 - 120
Selenium	1.00	1.006		mg/L		101	80 - 120
Silver	0.250	0.2497		mg/L		100	80 - 120
Sodium	25.0	26.87		mg/L		107	80 - 120
Thallium	1.00	1.063		mg/L		106	80 - 120
Vanadium	0.500	0.4950		mg/L		99	80 - 120
Zinc	0.250	0.2464		mg/L		99	80 - 120

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

Lab Sample ID: LCS 180-345016/2-A
Matrix: Water
Analysis Batch: 345350

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Boron			1.25	1.013		mg/L		81	80 - 120		

Lab Sample ID: 180-116385-E-1-C MS
Matrix: Water
Analysis Batch: 345118

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum	0.0357		5.00	4.801		mg/L		95	75 - 125		
Antimony	ND		0.250	0.2336		mg/L		93	75 - 125		
Arsenic	0.00152		1.00	0.9549		mg/L		95	75 - 125		
Barium	0.0328		1.00	1.021		mg/L		99	75 - 125		
Beryllium	0.000212	J	0.500	0.5070		mg/L		101	75 - 125		
Cadmium	ND		0.500	0.4867		mg/L		97	75 - 125		
Calcium	158		25.0	185.0	4	mg/L		108	75 - 125		
Chromium	ND		0.500	0.4715		mg/L		94	75 - 125		
Cobalt	0.0146		0.500	0.4923		mg/L		96	75 - 125		
Copper	ND		0.500	0.4669		mg/L		93	75 - 125		
Iron	5.03		5.00	9.932		mg/L		98	75 - 125		
Lead	0.000283	J	0.500	0.4841		mg/L		97	75 - 125		
Lithium	0.0154		0.500	0.5086		mg/L		99	75 - 125		
Magnesium	26.9		25.0	51.51		mg/L		99	75 - 125		
Manganese	2.35		0.500	2.789	4	mg/L		88	75 - 125		
Molybdenum	0.00147	J	0.500	0.4899		mg/L		98	75 - 125		
Nickel	0.00635		0.500	0.4727		mg/L		93	75 - 125		
Potassium	6.75		25.0	30.96		mg/L		97	75 - 125		
Selenium	ND		1.00	0.9746		mg/L		97	75 - 125		
Silver	ND		0.250	0.2458		mg/L		98	75 - 125		
Sodium	12.3		25.0	38.30		mg/L		104	75 - 125		
Thallium	0.000243	J	1.00	1.022		mg/L		102	75 - 125		
Vanadium	ND		0.500	0.4789		mg/L		96	75 - 125		
Zinc	0.00837		0.250	0.2479		mg/L		96	75 - 125		

Lab Sample ID: 180-116385-E-1-C MS
Matrix: Water
Analysis Batch: 345350

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Boron	0.729		1.25	1.824		mg/L		88	75 - 125		

Lab Sample ID: 180-116385-E-1-D MSD
Matrix: Water
Analysis Batch: 345118

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.0357		5.00	4.808		mg/L		95	75 - 125	0	20
Antimony	ND		0.250	0.2291		mg/L		92	75 - 125	2	20
Arsenic	0.00152		1.00	0.9664		mg/L		96	75 - 125	1	20
Barium	0.0328		1.00	1.010		mg/L		98	75 - 125	1	20
Beryllium	0.000212	J	0.500	0.4909		mg/L		98	75 - 125	3	20

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

Lab Sample ID: 180-116385-E-1-D MSD
Matrix: Water
Analysis Batch: 345118

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		0.500	0.4836		mg/L		97	75 - 125	1	20
Calcium	158		25.0	182.2	4	mg/L		97	75 - 125	2	20
Chromium	ND		0.500	0.4729		mg/L		95	75 - 125	0	20
Cobalt	0.0146		0.500	0.4943		mg/L		96	75 - 125	0	20
Copper	ND		0.500	0.4747		mg/L		95	75 - 125	2	20
Iron	5.03		5.00	9.664		mg/L		93	75 - 125	3	20
Lead	0.000283	J	0.500	0.4762		mg/L		95	75 - 125	2	20
Lithium	0.0154		0.500	0.4932		mg/L		96	75 - 125	3	20
Magnesium	26.9		25.0	50.95		mg/L		96	75 - 125	1	20
Manganese	2.35		0.500	2.761	4	mg/L		82	75 - 125	1	20
Molybdenum	0.00147	J	0.500	0.4981		mg/L		99	75 - 125	2	20
Nickel	0.00635		0.500	0.4770		mg/L		94	75 - 125	1	20
Potassium	6.75		25.0	30.79		mg/L		96	75 - 125	1	20
Selenium	ND		1.00	0.9777		mg/L		98	75 - 125	0	20
Silver	ND		0.250	0.2474		mg/L		99	75 - 125	1	20
Sodium	12.3		25.0	38.51		mg/L		105	75 - 125	1	20
Thallium	0.000243	J	1.00	1.008		mg/L		101	75 - 125	1	20
Vanadium	ND		0.500	0.4795		mg/L		96	75 - 125	0	20
Zinc	0.00837		0.250	0.2463		mg/L		95	75 - 125	1	20

Lab Sample ID: 180-116385-E-1-D MSD
Matrix: Water
Analysis Batch: 345350

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 345016

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	0.729		1.25	1.769		mg/L		83	75 - 125	3	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-345076/1-A
Matrix: Water
Analysis Batch: 345310

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 345076

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		01/30/21 09:30	02/02/21 11:31	1

Lab Sample ID: LCS 180-345076/2-A
Matrix: Water
Analysis Batch: 345310

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 345076

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00250	0.002746		mg/L		110	80 - 120		

Lab Sample ID: 180-116403-F-2-E MS
Matrix: Water
Analysis Batch: 345310

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 345076

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND		0.00100	0.001065		mg/L		107	75 - 125		

Method: EPA 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 180-116403-F-2-F MSD
Matrix: Water
Analysis Batch: 345310

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 345076

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.001086		mg/L		109	75 - 125	2	20

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-345136/30
Matrix: Water
Analysis Batch: 345136

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			01/28/21 14:41	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/28/21 14:41	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			01/28/21 14:41	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			01/28/21 14:41	1

Lab Sample ID: LCS 180-345136/29
Matrix: Water
Analysis Batch: 345136

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3 to pH 4.5	250	260.3		mg/L		104	90 - 110

Lab Sample ID: 180-116470-B-1 DU
Matrix: Water
Analysis Batch: 345136

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	421		413.1		mg/L		2	20
Bicarbonate Alkalinity as CaCO3	258		253.6		mg/L		2	20
Carbonate Alkalinity as CaCO3	163		159.5		mg/L		2	20
Hydroxide Alkalinity	ND		ND		mg/L		NC	20

Lab Sample ID: 180-116485-3 DU
Matrix: Water
Analysis Batch: 345136

Client Sample ID: GAF-GW-1315-DOLO 0.5-T63
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	496		478.7		mg/L		4	20
Bicarbonate Alkalinity as CaCO3	496		478.7		mg/L		4	20
Carbonate Alkalinity as CaCO3	ND		ND		mg/L		NC	20
Hydroxide Alkalinity	ND		ND		mg/L		NC	20

HPLC/IC

Analysis Batch: 344973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Total/NA	Water	EPA 9056A	
180-116485-1	GAF-GW-1315-CONTROL-T63	Total/NA	Water	EPA 9056A	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total/NA	Water	EPA 9056A	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total/NA	Water	EPA 9056A	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total/NA	Water	EPA 9056A	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total/NA	Water	EPA 9056A	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	EPA 9056A	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	EPA 9056A	
MB 180-344973/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-344973/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-116485-4 MS	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	EPA 9056A	
180-116485-4 MSD	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 345016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Dissolved	Water	3005A	
180-116485-1	GAF-GW-1315-CONTROL-T63	Total Recoverable	Water	3005A	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Dissolved	Water	3005A	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total Recoverable	Water	3005A	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Dissolved	Water	3005A	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total Recoverable	Water	3005A	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Dissolved	Water	3005A	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total Recoverable	Water	3005A	
MB 180-345016/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-345016/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-116385-E-1-C MS	Matrix Spike	Total Recoverable	Water	3005A	
180-116385-E-1-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Prep Batch: 345076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Dissolved	Water	7470A	
180-116485-1	GAF-GW-1315-CONTROL-T63	Total/NA	Water	7470A	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Dissolved	Water	7470A	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total/NA	Water	7470A	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Dissolved	Water	7470A	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total/NA	Water	7470A	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Dissolved	Water	7470A	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	7470A	
MB 180-345076/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-345076/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-116403-F-2-E MS	Matrix Spike	Total/NA	Water	7470A	
180-116403-F-2-F MSD	Matrix Spike Duplicate	Total/NA	Water	7470A	

Analysis Batch: 345118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Dissolved	Water	EPA 6020A	345016
180-116485-1	GAF-GW-1315-CONTROL-T63	Total Recoverable	Water	EPA 6020A	345016
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Dissolved	Water	EPA 6020A	345016
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total Recoverable	Water	EPA 6020A	345016

Metals (Continued)

Analysis Batch: 345118 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Dissolved	Water	EPA 6020A	345016
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total Recoverable	Water	EPA 6020A	345016
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Dissolved	Water	EPA 6020A	345016
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total Recoverable	Water	EPA 6020A	345016
MB 180-345016/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	345016
LCS 180-345016/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	345016
180-116385-E-1-C MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	345016
180-116385-E-1-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	345016

Analysis Batch: 345310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Dissolved	Water	EPA 7470A	345076
180-116485-1	GAF-GW-1315-CONTROL-T63	Total/NA	Water	EPA 7470A	345076
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Dissolved	Water	EPA 7470A	345076
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total/NA	Water	EPA 7470A	345076
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Dissolved	Water	EPA 7470A	345076
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total/NA	Water	EPA 7470A	345076
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Dissolved	Water	EPA 7470A	345076
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	EPA 7470A	345076
MB 180-345076/1-A	Method Blank	Total/NA	Water	EPA 7470A	345076
LCS 180-345076/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	345076
180-116403-F-2-E MS	Matrix Spike	Total/NA	Water	EPA 7470A	345076
180-116403-F-2-F MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 7470A	345076

Analysis Batch: 345350

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Dissolved	Water	EPA 6020A	345016
180-116485-1	GAF-GW-1315-CONTROL-T63	Total Recoverable	Water	EPA 6020A	345016
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Dissolved	Water	EPA 6020A	345016
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total Recoverable	Water	EPA 6020A	345016
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Dissolved	Water	EPA 6020A	345016
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total Recoverable	Water	EPA 6020A	345016
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Dissolved	Water	EPA 6020A	345016
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total Recoverable	Water	EPA 6020A	345016
MB 180-345016/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	345016
LCS 180-345016/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	345016
180-116385-E-1-C MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	345016
180-116385-E-1-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	345016

General Chemistry

Analysis Batch: 345136

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-116485-1	GAF-GW-1315-CONTROL-T63	Total/NA	Water	SM2320 B	
180-116485-2	GAF-GW-1315-HI CAL 0.5-T63	Total/NA	Water	SM2320 B	
180-116485-3	GAF-GW-1315-DOLO 0.5-T63	Total/NA	Water	SM2320 B	
180-116485-4	GAF-GW-1315-DOLO 1.0-T63	Total/NA	Water	SM2320 B	
MB 180-345136/30	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-345136/29	Lab Control Sample	Total/NA	Water	SM2320 B	
180-116470-B-1 DU	Duplicate	Total/NA	Water	SM2320 B	
180-116485-3 DU	GAF-GW-1315-DOLO 0.5-T63	Total/NA	Water	SM2320 B	

Page 1 1

RUSH

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

Special Handling:

☑ TAT - Date Needed: ~~7-day~~ - 5 - day

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2= 1315 leachate

G= Grab C=Compsite

List Preservative Code below: 4 4

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	6020 Dissolved-Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	2320B- Alkalinity (Total hydroixe, bicarbonate, carbonate)	9056A-Cl, F, SO4
	GAF-GW-1315-Control-t63	1/25/2021	12:40 PM	G	X2				3	x	x	x	x
	GAF-GW-1315-Hi Cal 0.5-t63	1/25/2021	12:40 PM	G	X2				3	x	x	x	x
	GAF-GW-1315-Dolo 0.5-t63	1/25/2021	12:40 PM	G	X2				3	x	x	x	x
	GAF-GW-1315-Dolo 1.0-t63	1/25/2021	12:40 PM	G	X2				3	x	x	x	x

180-116485 Chain of Custody

Relinquished by:	Received by:	Date:	Time:	Temp °C
Rachel Watkins		1/26/20	1500	Observed
	Drilling water	1-27-21	8:30	Correction Factor
	ETAPITI			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Froze

www.EurofinsUS.com/Spectrum

Rev. Nov 2016

2/3/2021

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-116485-1

Login Number: 116485 **List Source: Eurofins 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	False	
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 B Alternative Source Demonstration for Cobalt

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

December 19, 2001

Mr. Alfred Majors
Environmental Field Office Manager
Nashville Environmental Assistance Center
Tennessee Division of Solid Waste Management
711 RS Gass Boulevard
Nashville, Tennessee 37243

Dear Mr. Majors:

TENNESSEE VALLEY AUTHORITY (TVA) - GALLATIN FOSSIL PLANT (GAF) - ABANDONED ASH DISPOSAL AREA - EVALUATION OF NATURALLY-OCCURRING COBALT

This is a follow-up to our October 2, 2001 letter in which we committed to conducting soil studies and submitting results that either confirm or deny the presence of naturally-occurring cobalt in the residual soils. The basis for these studies were previous sampling events where cobalt upper prediction limits (UPL) for downgradient wells W7, W8 and W9 and for upgradient well W10 were exceeded (Figure 1). Some background information, a description of the field activities, results of field and laboratory analysis, along with results and a discussion of the results is included for your review.

As you may recall, TVA representatives met with Mr. Alan Spear of your staff on April 10, 2001 to discuss cobalt issues associated with W7 and W10. During that meeting, we presented evidence indicating that the presence of cobalt observed in the compliance monitoring wells could have been derived from naturally-occurring cobalt in the soil deposits in which the wells are developed rather than any activity associated with the inactive ash disposal area, which was closed in 1998. At that time, our justification for this claim was based on the following:

- The presence of cobalt in upgradient well W10 at concentrations were generally above those of downgradient wells W8 and W9. This suggests a cobalt source other than the inactive ash disposal area.
- Manganese nodules observed in soil samples during drilling of replacement monitoring wells W19 - W21 suggests the presence of a natural cobalt source, since cobalt is often associated with manganese and iron deposits. The strong correlation evident between the manganese and cobalt concentrations measured in groundwater at W7 and W10 supports this supposition (Figure 2).

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- Virtually all soil wells at the GAF reservation show a presence of cobalt at concentrations in excess of 100 ug/L, whereas detectable cobalt in water samples from bedrock wells is extremely rare (Figure 3).

Mr. Spear agreed that there was sufficient evidence of naturally-occurring cobalt at the GAF site to warrant further investigation. At that time, TVA proposed collection of soil samples for cobalt analysis at locations upgradient and downgradient of the inactive ash disposal area. In addition, collection and analysis of groundwater samples from two additional soil wells situated upgradient of the disposal area was proposed for comparison with cobalt data from upgradient well W10. Mr. Spear approved of this approach.

Soil overburden samples were obtained in May 2001 from three coreholes in close proximity to W7 and W10 (Figure 4). Coreholes were generally located upgradient of adjacent wells, and sample depths were selected to be within or slightly above the screened interval of each well. Cores were collected by the hydraulic push (Geoprobe) method using a one-inch diameter, plastic-lined core barrel. Soil cores were transported to the laboratory in clear plastic sample tubes where they were visually inspected to identify manganese nodules. Table 1 provides soil sample depths and analytical results.

Groundwater samples were collected on June 12, 2001 from wells W6 and W18, both of which are located upgradient of the closed inactive ash disposal area (Figure 4). Analytical results completed on June 26 indicated cobalt concentrations of 630 µg/L and 9.7 µg/L, respectively, at wells W6 and W18.

Table 1. Cobalt and Manganese Contents of Soil Samples Collected in May 2001

Sample No.	Depth (ft)	Cobalt (mg/kg)	Manganese (mg/kg)
GAF-7A-1	29.1	4.7	99
GAF-7A-2	30.3	3.6	67
GAF-7A-3	30.5	3.4	58
GAF-7B-4	39.1	2.9	76
GAF-7B-5	40.3	3.0	85
GAF-10A-6	32.5	19	780
GAF-10A-7	32.2	29	954
GAF-10A-8	31.1	52	1708
	Mean =	*15*	*478*

Analytical results presented in the above Table 1 show cobalt concentrations of 19 to 52 mg/kg for soil samples collected adjacent to upgradient well W10. In contrast, the cobalt

contents of soil samples obtained near downgradient well W7 are generally less than 5 mg/kg. We believe these differences probably reflect spatial variability of the cobalt distribution in the soil.

Comparison of soil cobalt data of Table 1 with cobalt measurements for GAF ash samples given in Table 2 indicates that cobalt levels for the W7 soil samples are similar to those of the ash samples, whereas the W10 soils exhibit cobalt concentrations that are generally about one order of magnitude higher than ash. The mean cobalt concentration of ash samples is approximately 3 mg/kg, whereas the overall average soil cobalt content is approximately 15 mg/kg. These findings suggest that naturally-occurring cobalt in the soil is the most likely contributor to cobalt exceedances in groundwater at the site. They further explain why unusually high cobalt concentrations are found in both upgradient and downgradient monitoring wells.

Table 2. Cobalt Contents of Ash Samples from Coal Types Burned at Gallatin Fossil Plant

Coal Source	Cobalt (mg/kg)
Peabody	1.9
Lodestar	4.8
Webster County	3.0
Warrior	4.0
PRB	0.8
Mean =	*2.9*

Another key finding is the presence of cobalt in upgradient well W8 groundwater at concentrations roughly equivalent to the elevated concentrations observed at downgradient well W7 during the past year (Figure 1). This result, combined with the fact that the cobalt content of soils locally exceeds that of the GAF coal ash, indicates that the cobalt UPL exceedances observed at downgradient compliance wells W7 - W9 are more likely due to cobalt in the residual soils than to cobalt associated with the inactive ash disposal facility.

As noted during our April 2001 meeting with Mr. Spear, we suspect that drought conditions during 1999-2000 may have contributed to the increasing cobalt trends. Effects of the drought were evident in site groundwater levels which declined by a minimum of 5 ft at W8 to a maximum of 8 ft at W10. The return to more normal rainfall in the region during 2001 also corresponds to decreasing cobalt trends during the latter part of 2001 (Figure 1). Although the mechanism responsible for recent cobalt increases is uncertain, diminished groundwater recharge during the drought would be expected to produce less groundwater dilution and longer groundwater residence times allowing for more metals dissolution. Therefore, we believe drought conditions could

have been a contributor to higher cobalt concentrations. In any case, evidence now exists indicating that recent cobalt increases are the result of a natural source of cobalt in the soil overburden, and not to ash deposited in the inactive disposal area.

Based on the above analyses, TVA believes the recent cobalt UPL exceedances observed during the past two years at wells W7 - W10 are the result of naturally-occurring cobalt coupled with drought effects. Our data clearly show that cobalt concentrations in groundwater in wells located upgradient of the facility are of the same magnitude as those measured in wells downgradient of the facility. The presence of naturally-occurring cobalt in the soil overburden deposits, apparently associated with manganese nodules, was established on the basis of analysis of soil cores. Significantly, the measured cobalt concentrations in the upgradient well W10 soil samples are an order of magnitude higher than those reported for GAF coal ash samples. These findings suggest that cobalt is not an appropriate parameter for detection monitoring at the GAF disposal facility because groundwater is affected by natural-occurring cobalt.

On this basis, we request that cobalt be eliminated from the facility compliance monitoring program. We further request permission to proceed with closure of compliance monitoring wells W7 - W10 and with quarterly baseline monitoring of replacement wells W19 - W21 for a period of two years.

I certify this information was prepared by a system designed to ensure qualified personnel properly gathered and evaluated the information submitted. The information submitted is to the best of my knowledge and belief true, accurate, and complete.

If you have any questions, please contact Robert Harris in Chattanooga at (423) 751-3522 or Bill Hunt at (615) 230-4059.

Gordon G. Park
Manager, Permitted Programs
5D Lookout Place

Enclosures

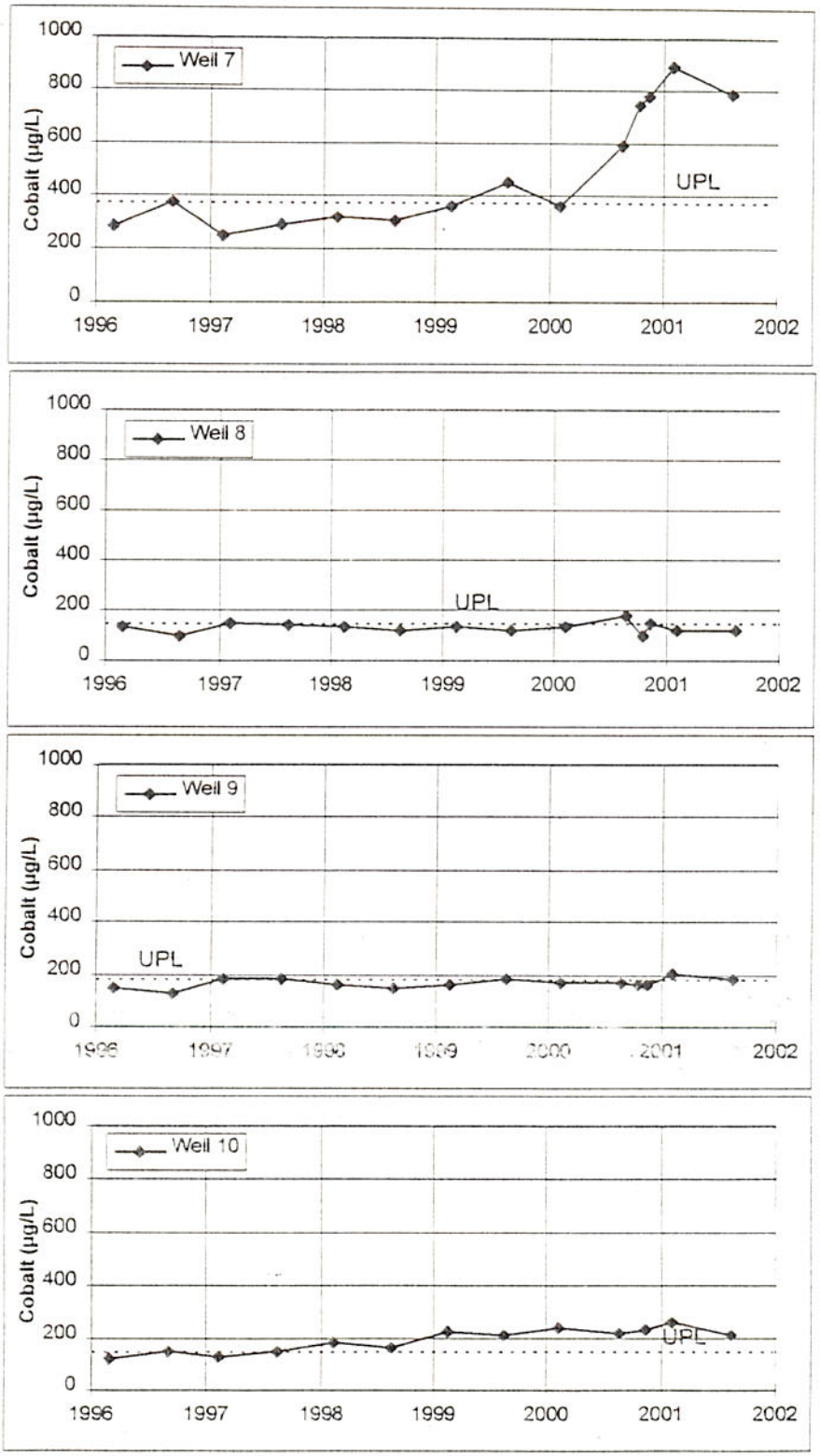

Figure 1. Cobalt Time Series for Wells W7 - W10

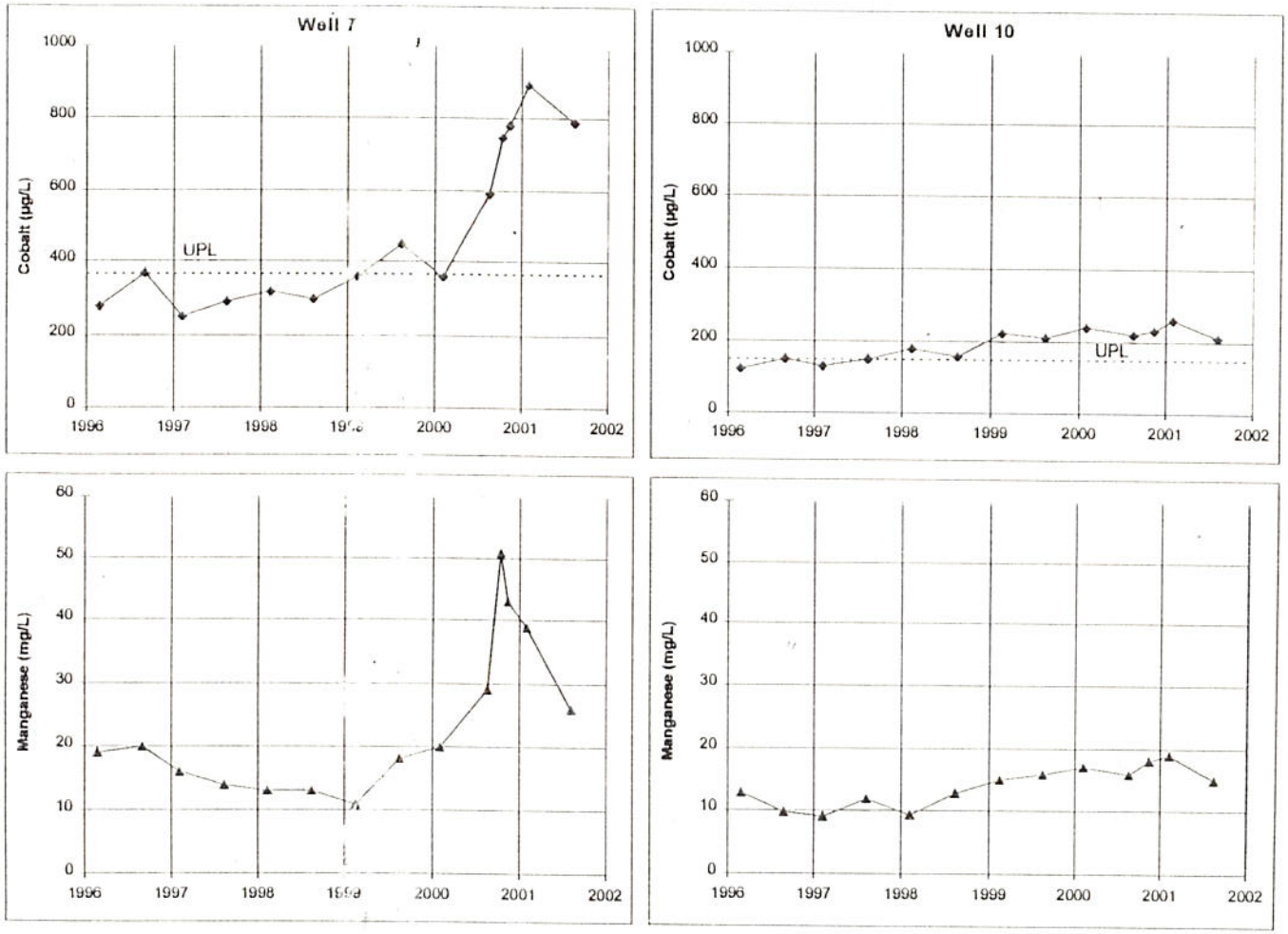

Figure 2. Comparison of Cobalt and Manganese Time Series for W7 and W10

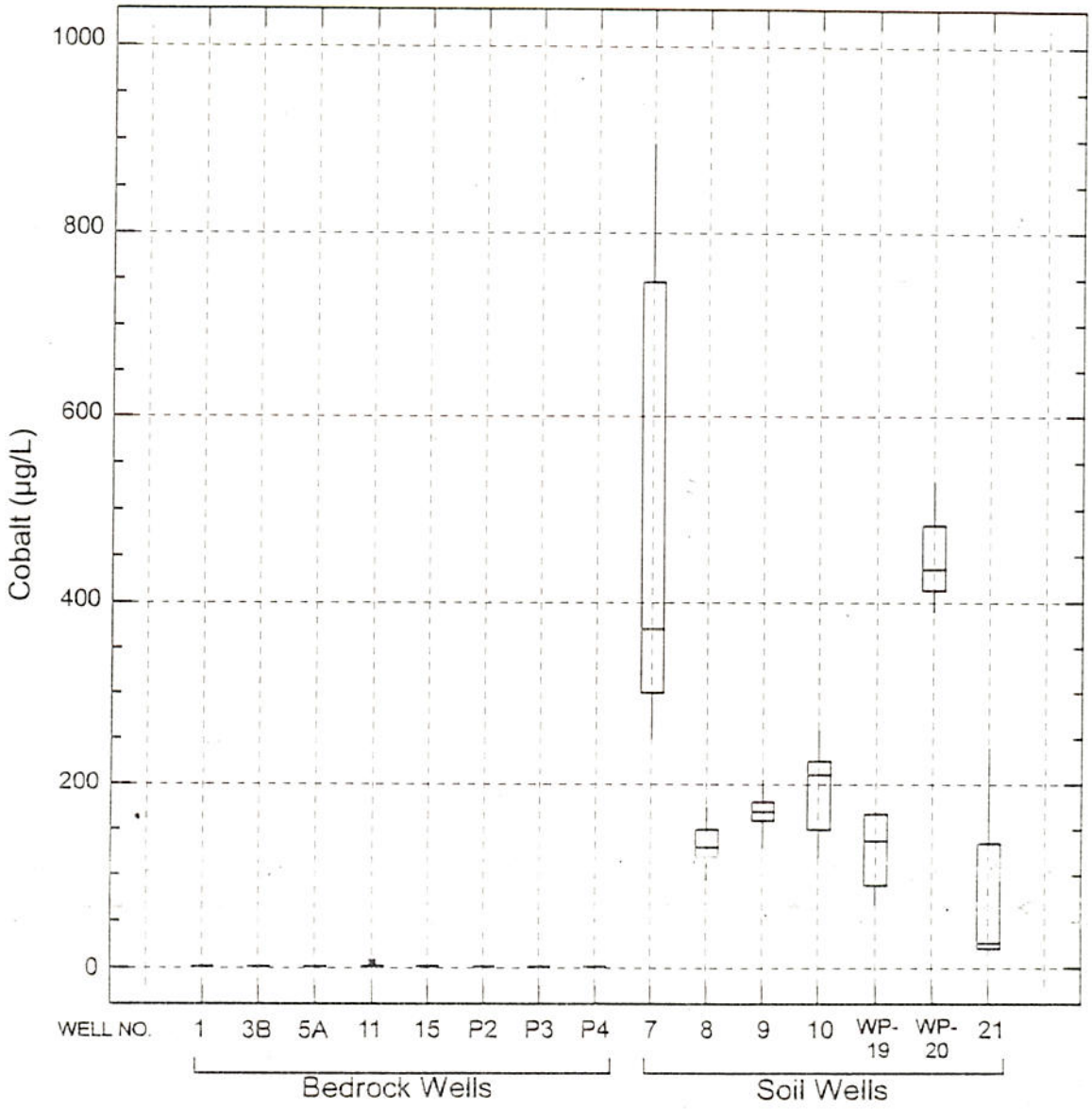

Figure 3. Cobalt Quartile Plots for Soil and Bedrock Wells

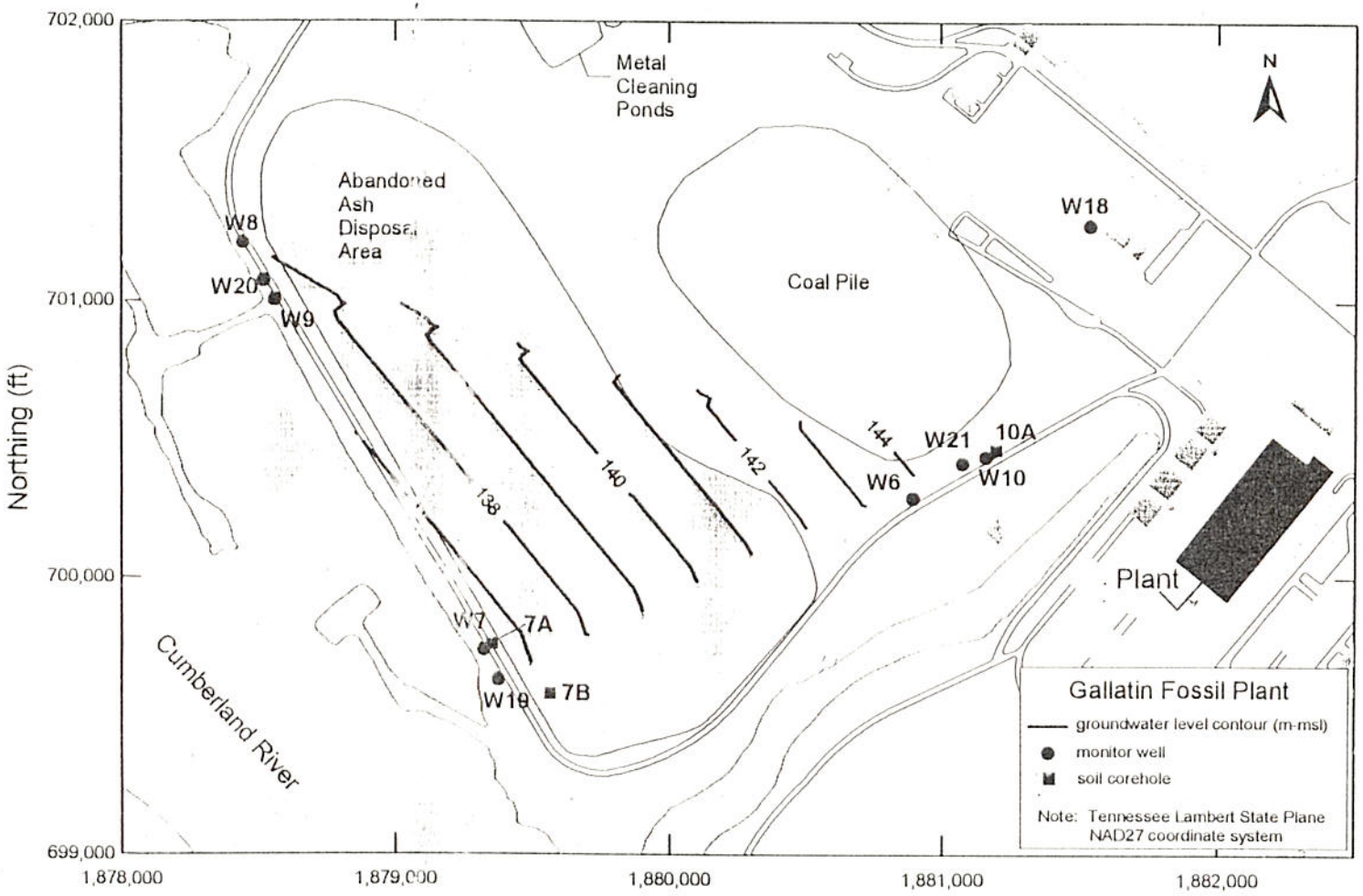

Figure 4. Site Location Map

A60 030213 516
Env. Document Type: Solid Waste Correspondence

A. Smith
xc: EDMS, EB 5G-C

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
711 R. S. GASS BOULEVARD
NASHVILLE, TENNESSEE 37243
PHONE (615) 687-7000 STATEWIDE 1-888-891-8332 FAX (615) 687-7078

February 10, 2003

Mr. Gordon G. Park
Manager, Environmental Affairs
5D Lookout Place
1101 Market Street
Chattanooga, TN 37402 – 2801

RE: Gallatin Fossil Plant – Abandoned Ash Disposal Area
Natural Background Cobalt in Soils and Water
83 - Miscellaneous

Dear Mr. Park,

Sample analyses from monitor wells at Tennessee Valley Authority's (TVA) Gallatin Fossil Plant (file 83 Misc.) have historically indicated a high amount of cobalt and other metals at the facility. During the last three years personnel from the Division of Solid Waste Management (Division) and TVA have corresponded and met in response to the high metals readings in soils and water at TVA's Gallatin Fossil Plant.

On October 23, 2000, the Division received a monitor well replacement request (dated October 4, 2000) that was verbally approved by Mr. Alan Spear (of the Division). Three monitor wells were installed at the Gallatin Fossil Plant to replace monitor wells W7, W8, W9 and W10. The names of the new monitor wells and those that they replaced included W19 replacing W7, W20 replacing W8 and W9, and W21 replacing W10. Once W19, W20, and W21 were developed and representative samples from these wells were analyzed, results indicated lower levels of metals than in W7, W8, W9, and W10. However, cobalt levels were still high enough to be of concern.

In addition to replacing monitor wells W7, W8, W9, and W10, TVA agreed to investigate background cobalt levels in soils at the Gallatin Fossil Plant and submit a report of those levels to the Division. During the drilling of monitor wells W19, W20, and W21, TVA personnel noted an abundance of manganese nodules in auger cuttings, and noted in later correspondence to the Division that manganese is often associated with cobalt. In May 2001, Mr. Mark Boggs (of TVA) sampled soils at discrete depths near monitor wells W7 and W10. Mr. Boggs demonstrated that high concentrations of cobalt exist in soils next

RECEIVED
FEB 13 2003

to W7 and W10 and that these concentrations correlate with analysis results of samples from monitor wells on site.

On January 2, 2002, the Division received a document from TVA including a report (dated December 19, 2001) of the above mentioned soil investigation, conclusions from findings, and a request for abandoning monitor wells W7, W8, W9, and W10. In a meeting with TVA personnel Mr. Spear mentioned an approval of this request would have to be made upon data that indicates it is to TVA's advantage to use W19, W20 and W21 instead of the older wells. Several things have occurred to delay the approval process including a major drought in this region and its resulting influence on sample extraction, sample analysis results, and making determinations about how the new monitor wells are performing.

Please let this letter serve as notice that the Division concurs with TVA's conclusions about soil study findings at the Gallatin Fossil Plant regarding naturally occurring cobalt in soils and its influence on background and foreground groundwater environments. Let this letter also serve as approval of the requested minor modification to the groundwater monitor system at the Gallatin Fossil Plant. This includes using W19, W20, and W21, and properly abandoning monitor wells W7, W8, W9, and W10, and a follow-up report letter to the Division regarding procedures used for monitor well abandonment.

If you or your staff has any questions concerning this or other groundwater issues please call Mr. Spear at (615) 687-7107.

Sincerely,

Al Majors

Mr. Al Majors
Manager
Division of Solid Waste Management

Alan D. Spear, P.G.

Alan D. Spear, P.G.
Geologist
Division of Solid Waste Management

cc:

Mr. Mike Apple, Director, Division of Solid Waste Management, Central Office
Mr. Glen Pugh, Manager, Division of Solid Waste Management, Central Office
Mr. Lennie Fottrell, Manager, Division Solid Waste Management, Nashville EAC
Mr. Tom Golden, Manager, Division Solid Waste Management, Nashville EAC

Appendix C Screening of Potential Reagents

Screening of Reagents to Test

Reagent	Safety	Effectiveness	Adverse Impacts to Stream and Downgradient Areas	Proven Technology	Ease of In Situ Injection	Retain?
NaOH (lye)	Corrosive, strong base	Worked well in previous titration test. Limited long-term effectiveness is a concern	None identified	Yes, has been used for pH adjustment for in-situ use.	Easy to inject	Yes
Potassium hydroxide (KOH)	Corrosive, strong base	Expected to be effective for pH adjustment	None identified	Yes, has been used for pH adjustment for in-situ use.	Easy to inject	Yes
FerroBlack®-H (FeS/NaSH)	H_2S generation at low pH a concern. Evaluate during bench test.	Titration results mixed	Mobile fraction (NaHS) possible impact to surface water. pH may be elevated. Evaluate during bench test. Possible other metals in FB-H	Very effective for As, Ni, Cd, Be, Pb and other multivalent metals	Suspension of iron particles, relatively difficult to create uniform distribution. Has been successfully injected at some sites.	Yes
EnviroBlend® (Magnesium oxide [MgO]/hydroxide [MgOH] product)	No major issues	Worked well in previous titration test. Alkaline reagent with high buffering capacity	None identified	Yes, primarily used ex situ for soil treatment but has also been used in situ.	Powder or pellet form can be mixed with water for simple injection.	Yes
MagOx	No Major Issues	Unknown	None identified	Primarily used for Lead	Powder or pellet form can be mixed with water for simple injection	Yes
Nano-scale ZVI	No major issues, must control dust	Micro-scale ZVI tested previously with mixed results in titration test. Effective for Cd & Be, but limited effectiveness for Ni.	Mobility in the environment and toxicity is a controversial issue.	Proven technology for chromium (Cr) VI treatment. Lowers ORP which promotes precipitation of some metals.	Moderately difficult, but easier to inject than micro-scale ZVI due to smaller particle size.	No

Reagent Screening (cont.)

Reagent	Safety	Effectiveness	Adverse Impacts to Stream and Downgradient Areas	Proven Technology	Ease of In Situ Injection	Retain?
Micro-scale ZVI	No major issues, must control dust	Mixed titration results in previous test.	High mobility potential to impact the river.	Proven technology for soil mixing in reactive barriers and source areas.	Difficult to get good distribution with slurry injection.	No
Metals Remediation Compound (MRC) - organosulfur ester/polylactate	No major issues	Effectiveness unknown for this site. Could provide short-term treatment and long-term bio treatment by changing redox conditions.	May potentially enhance mobility of other metals	Yes	Moderately difficult to inject and obtain uniform distribution.	No
Calcium Polysulfide (CaS_x)	High Ph, potential to generate H_2S in contact with acids. Combustible.	Unknown; treatment relies on native iron; may not be as effective as FerroBlack.	Highly mobile and deep red color, may impact surface water.	Proven technology for Cr VI.	Highly mobile, easy to inject. Plugging of wells with $CaSO_4$ possible.	No
Crushed limestone/ dolomite – $CaMg(CO_3)$	No safety issues	Uncertain, weak alkaline reagent with good buffering capacity	None anticipated	Limestone commonly used for pH adjustment	Not possible to inject, but could be soil mixed	Yes
AQUAMAG (blended phosphates)	No safety issues	Not effective in titration test.	None anticipated	Proven for lead and copper. Limited data for Cd.	Easy to inject.	No
$CaO/CaCO_3$ (lime)	No safety issues	Uncertain, weak alkaline reagent with good buffering capacity	None anticipated	Proven for pH adjustment.	Easy to inject. Can be prepared as powder, pellets, or liquid slurry. $CaSO_4$ plugging of wells possible.	Yes
Sodium carbonate/ bicarbonate ($Na_2CO_3/NaHCO_3$) - baking soda	No safety issues	Uncertain, weak alkaline reagent with good buffering capacity	None anticipated	Used widely for various purposes but use for treatment of metals in groundwater limited.	Highly mobile, easy to inject.	Yes

Reagent Screening (cont.)

Reagent	Safety	Effectiveness	Adverse Impacts to Stream and Downgradient Areas	Proven Technology	Ease of In Situ Injection	Retain?
Potassium bicarbonate ($KHCO_3$)	No safety issues	Uncertain, weak alkaline reagent with good buffering capacity	None anticipated	Used widely for various purposes but use for treatment of metals in groundwater limited.	Highly mobile, easy to inject. Plugging of wells possible	Yes (or pick either $NaHCO_3$ or $KHCO_3$)
Apatite ($Ca/NaPO_4$)	No safety issues	Uncertain, effectiveness depends on site conditions	None anticipated	Excellent buffer for neutralizing acidity through PO_4^{-3}	Granular, powder, or slurry. Can be injected; not likely to be highly mobile.	Yes
Zeolite (aluminosilicates of Na, C, K or Ba)	No safety issues	Uncertain, effectiveness depends on site conditions	Could introduce other metals	High selectivity for many metals	Moderate-difficult to inject and obtain uniform distribution.	Yes
Emulsified vegetable oil (EVO)	No safety issues	Unknown, could form soluble organo-metals complexes	None anticipated	As biological amendment for treatment of Cr IV. Otherwise not demonstrated.	Easy to inject but wells can become fouled.	No

Appendix D Specifications for Sand

TTL
5010 Linbar Drive,
Suite 153
Nashville, TN 37211
615.331.7770
www.TTLUSA.com

CLIENT: Pine Bluff Materials Company
1030 Visco Drive
Nashville, Tennessee 37210

MATERIAL: Coarse Sand (Natural)

SUPPLIER: Client

DATE: January 16, 2020

PROJECT NO. 200812005

ASTM C 136 - 14 "Sieve Analysis of Fine and Coarse Aggregates"					
Sieve Size	Wt Retained	% Retained	Acc % Ret	% Passing	Spec: ASTM C 33
1/2"					
3/8"	0.00	0.00		100.00	100
#4	13.15	2.73		97.27	95 - 100
#8	43.84	9.11		90.89	80 - 100
#16	89.98	18.70		81.30	50 - 85
#30	199.04	41.36		58.64	25 - 60
#50	443.43	92.15		7.85	5 - 30
#100	480.28	99.81		0.19	0 - 10
#200	481.00	99.96		0.04	
Pan					
TOTAL					
			Fineness Modulus	2.64	

ASTM C 33: (Sec. 6.4)

Fine aggregates failing to meet these grading requirements shall meet the requirements of this section provided that it demonstrates that concrete of the class specified, made with fine aggregate under consideration, will have relevant properties at least equal to those of concrete made with the same ingredients, with the exception that the referenced fine aggregate shall be selected from a source having an acceptable performance record in similar concrete construction.

5010 Linbar Drive,
Suite 153
Nashville, TN 37211
615.331.7770
www.TTLUSA.com

CLIENT: Pine Bluff Materials Company
1030 Visco Drive
Nashville, Tennessee 37210

MATERIAL: Coarse Sand (Natural)

SUPPLIER: Client

DATE: January 16, 2020

PROJECT NO. 200812005

ASTM C 128 - 15 "Specific Gravity and Absorption of Fine Aggregates"	
Bulk Specific Gravity	2.58
Bulk Specific Gravity (SSD)	2.60
Apparent Specific Gravity	2.65
Absorption (%)	1.54

5010 Linbar Drive,
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CLIENT: Pine Bluff Materials Company
1030 Visco Drive
Nashville, Tennessee 37210

MATERIAL: Coarse Sand (Natural)

SUPPLIER: Client

DATE: January 16, 2020

PROJECT NO. 200812005

ASTM C 40 - 19 "Organic Impurities in Fine Aggregates for Concrete"	
Organic Plate No.	ASTM C 33 Specification *
# 2	# 3 (Standard)

* Aggregates subjected to the test for organic impurities and producing a color darker than the standard shall be rejected" (7.2.1) – **HIGHER NUMBER INDICATES DARK**

TTL
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Suite 153
Nashville, TN 37211
615.331.7770
www.TTLUSA.com

CLIENT: Pine Bluff Materials Company
1030 Visco Drive
Nashville, Tennessee 37210

MATERIAL: Coarse Sand (Natural)

SUPPLIER: Client

DATE: January 16, 2020

PROJECT NO. 200812005

ASTM C 88 - 18 "Soundness of Aggregates by use of Sodium Sulfate of Magnesium"					
Sieve Size		Original Sample Grading (%)	Weight of Test Fractions Before Testing (g)	% Passing Finer Sieve After Test	Weighted % Loss
Passing	Retained				
# 3/8	#4	3.0	128.4	1.2	0.04
#4	#8	6.9	105.5	0.5	0.03
#8	#16	10.4	107.2	0.1	0.01
#16	#30	24.6	108.6	5.8	1.43
#30	#50	55.1	122.1	0.8	0.42
Total Loss (%)			ASTM C 33 Specification		
1.94			10 % Maximum		

- The test was performed using sodium sulfate.

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615.331.7770
www.TTLUSA.com

CLIENT: Pine Bluff Materials Company
1030 Visco Drive
Nashville, Tennessee 37210

MATERIAL: Coarse Sand (Natural)

SUPPLIER: Client

DATE: January 16, 2020

PROJECT NO. 200812005

ASTM C 117 - 17 "Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing"	
Percent Finer Than No. 200 Sieve	ASTM C 33 Specification (Table 1)
0.49 %	3.0 % max (concrete subject to abrasion) 5.0 % max (all other concrete)

* Test was performed using Procedure A (washing with plain water)

TTL
5010 Linbar Drive,
Suite 153
Nashville, TN 37211
615.331.7770
www.TTLUSA.com

CLIENT:	Pine Bluff Materials Company 1030 Visco Drive Nashville, Tennessee 37210	**MATERIAL:**	Coarse Sand (Natural)
		SUPPLIER:	Client
DATE:	January 16, 2020	**PROJECT NO.**	200812005

ASTM C 123 - 14 "Lightweight Pieces in Aggregates"		
Percent Lightweight Pieces	ASTM C 33 Specification (Table 2)	
0.02 %	0.5 % Maximum	(where surface appearance of concrete is important)
	1.0 % Maximum	(all other concrete)

TTL
5010 Linbar Drive,
Suite 153
Nashville, TN 37211
615.331.7770
www.TTLUSA.com

CLIENT:	Pine Bluff Materials Company 1030 Visco Drive Nashville, Tennessee 37210	**MATERIAL:**	Coarse Sand (Natural)
		SUPPLIER:	Client
DATE:	January 16, 2020	**PROJECT NO.**	200812005

ASTM C 142 - 17 "Clay Lumps and Friable Particles in Aggregates"	
Percent Clay Lumps and Friable Particles	ASTM C 33 - 16 Specification (Table 1)
0.02 %	3.0 % Maximum

Appendix E Mineral Analysis Reports

AECOM
1600 Perimeter Park
Morrisville, NC 27560
aecom.com

Project name:
NRS Treatability Study

Project ref:
60621225

To:
Jason Curtsinger, TVA

From:
Craig McPhee, AECOM

CC:
Scott Veenstra, AECOM
David Skeggs, AECOM
Patrick Haskell, AECOM

Date:
October 1, 2020

Memo

Subject: Minerals Analysis of Microcosm Samples

The purpose of this memorandum is to provide context for the mineralogical testing results conducted as part of the Non-Registered Site (NRS) treatability testing being completed by AECOM at TVA's Gallatin Fossil Plant (GAF). Observations and discussions are preliminary and have not been fully developed and reviewed.

1. Procedure

Mineral analysis samples were collected from the Phase III microcosm buckets as follows:

AECOM-Sand - 073020: This material is sand without addition of any reagents or any dosing with site groundwater. The sand is a natural material with limited processing (water washed and sieved to meet ASTM standards for concrete sand). The material was produced by Pine Bluff Materials Company and was provided by a supplier in the Gallatin area (Garrot Brothers).

AECOM- CONTROL +2 – 073020: This material is sand from the same source as **AECOM-Sand** that has been dosed twice with water from well 19R. The process was to dose the sand with site groundwater, wait one week, drain the water out, and repeat the dose a second time, wait one week, drain it again, and then collect a sample of sand from the approximate center of the test vessel (bucket).

AECOM-DOLO - +2 – 073020: This material is sand from the same source as **AECOM-Sand,** which has been amended with 0.2% by weight of sand dolomitic fines (dolo). The amended sand was then subjected to dosing with well 19R water and sampling as described for **AECOM-CONTROL +2**.

AECOM-Hi CAL +2 – 073020: This material is sand from the same source as **AECOM-Sand** which has been amended with 0.1% by weight of sand of high calcium fines (Hi CAL). The amended sand was then subjected to dosing with well 19R water and sampling as described for **AECOM-CONTROL +2**.

Well 19R water used for the dosing has a low pH (<4) and contains Be (approx. 13 micrograms per liter [ug/L]), Cd (approximately 6 ug/L), Li (approximately 140 ug/L) and Ni (approximately 200 ug/L).

The samples were sent to DCM Science Laboratory, Inc. (DCM) in Wheat Ridge, Colorado. DCM conducted the following tests:

- Semi-Quantitative X-Ray Diffraction (XRD)
- X-Ray Fluorescence (XRF)
- Scanning Electron Microscopy (SEM)

The nature of the samples and purpose of the study were discussed with DCM prior to analysis. In addition to standard analysis, DCM was asked to focus on the following:

- Calcite (present in the HiCal and Dolo fines)
- Dolomite
- Quartzite
- Illite and Kaolinite
- Iron Fe(OOH)x, pyrite, other iron minerals
- Al
- Cadmium – $CdCO_3$ (otavite) CdS (greennockite or hawleyite), $Cd(OH)_2$
- Beryllium (not detectable by XRF) – BeO, $Be(OH)_2$
- Nickel – NiS (millerite), NiS_2 (vaesite) Ni_3S_2 (heazlewoodite), Fe_5NiS_8/$(FeNi)_9S_8$ (greigite,/pentandite), (Fe, Ni)O(OH) (limonite), $Mg,Ni)_3(OH)_4(Si_2O_5)$(garnerite)
- Lithium (not detectable XRF) - Li minerals can be divided into three groups: silicates (spodumene-$LiAlSi_2O_6$,petalite-$LiAlSi_4O_{10}$); micas (lepidolite-$[Li,Al]_3[Al,Si]_4O_{10}[F,OH]_2$, zinnwaldite-$[Li,Al,Fe]_3[Al,Si]_4O_{10}[F,OH]_2$ and phosphates (mainly amblygonite - [Li,Na]Al[F,OH].

2. Preliminary Evaluation of Results

2.1 XRD

The results of the XRD testing is provided in **Attachment A**. All four samples were found to be predominantly quartz and silicate minerals (amphibole, K-feldspar, and plagioclase). These results are consistent with the sand that forms the base material for all four samples. Enrichment of calcite is not apparent because only 0.1 to 0.2% of calcium bearing amendments were added. Enrichment of minerals associated with the target metals was not observable by XRD, because the amount deposited by dosing with 19R groundwater is very low (parts per billion).

2.2 XRF

The results of the XRF testing is provided in **Attachment B**. As with XRD, the sensitivity of XRF makes it difficult to draw distinctions between the four samples tested. MgO appears slightly enriched in the AECOM-DOLO sample, consistent with the presence of MgO in dolomitic fines. Similarly, CaO may be slightly enriched in the amended samples. XRF results for Ni were essentially the same for all four samples. For the AECOM-DOLO and AECOM-Hi Cal samples, enrichment of nickel would be expected as nickel is removed from the groundwater during each dose and added to the sand. However, two doses of groundwater can only deposit a maximum of approximately 0.1 parts per million (ppm) of nickel. Thus, nickel enrichment from two doses of groundwater is not observable by XRF (10-15% precision/accuracy on the 1-100 ppm range).

2.3 SEM

The results of the SEM testing is provided in **Attachment C**. The sample with no amendments and no dosing with groundwater (AECOM-Sand) shows trace amounts of calcite, dolomite, apatite and iron minerals. This finding explains why the unamended sand is providing a degree of groundwater treatment. These trace minerals are consistent with sand from a marine environment (calcite/dolomite from shell fragments, apatite from remains of fish bones).

The observation by SEM of calcite/dolomite fragments with primary and secondary coatings provides some insight into the mechanisms behind removal of the target metals from groundwater.

3. Conclusion and Preliminary Recommendations

The minerology of amended sand and unamended sand are very similar. This is consistent with the relatively small doses of amendments that have been applied, the similarity of the amendments to minerals naturally present in the sand, and the low concentration of target analytes being treated in the microcosms. As anticipated in the Workplan, the mineral analysis does not have the resolution to observe the small amount of target metals deposited by application of site groundwater. It is also difficult to observe the amendments because the amount of amendments applied is very low.

These mineral results will be further considered in the context of the sequential extraction results and other site data.

Further mineral analysis with samples taken to failure (dosed with groundwater until breakthrough) or with much higher amendment doses (>1%) might provide clearer results. However, additional mineralogical testing is unlikely to change amendment selection or dosing. At this time, the practical value of further mineralogical testing seems minimal, and therefore, no further mineralogical testing is proposed.

Appendix A XRD

REVISED REPORT
CORRECT SAMPLE NO.
9-18-20

DCM SCIENCE LABORATORY, INC.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033 (303) 463-8270

Semi-Quantitative X-Ray Diffraction Analysis

Client:
AECOM
9400 Amberglen Blvd.
Austin, TX 78729

Analysis Date:	9-4-20
Reporting Date:	9-4-20
Receipt Date:	7-31-20
Client Job No.:	None Given
Client Project:	TVA - NRS Gallatin
DCMSL Project:	AECOM6

Client Sample No.:	**AECOM-SAND**	**AECOM-DOLO-+2**	**AECOM-CONTROL-+2**	**AECOM-HI CAL-+2**
	073020	**073020**	**073020**	**073020**
Phase				
Amphibole	1	2	1	3
Calcite	<2*	<2*	-	-
Chlorite	4	2	4	3
K-Feldspar	12	11	11	13
Mica	4	4	4	4
Plagioclase	14	17	15	14
Quartz	63	61	63	61
Gypsum	-	-	<2*	-
Unaccounted	<5	<5	<5	<5

*May be present

The sample(s) was/were prepared for x-ray diffraction analysis and scanned over a range of 3° to 45° 2Θ Cu radiation, 40kV, 25mA. Mineral phases were identified with the aid of computer-assisted programs accessing a powder diffraction database. Estimates of mineral concentrations are based on relative peak heights and reference intensity ratios (RIR) measured in-house.

All information provided by clients, including sample results, is considered proprietary and confidential. Client results and other information will not be released to anyone but the client except by client request. When the laboratory is required by law or authorized by contractual arrangement to release confidential information, the client or individual concerned shall, unless prohibited by law, be notified of the information provided.

Jason Barnes, Analyst

DCM SCIENCE LABORATORY, INC.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033

(303) 463-8270/(800) 852-7340
(303) 463-8267 – fax

Date/Time Received _____ DCMSL Group No. 2020 DCMSL Log No. AECOM 6

Field Data Sheet/Chain of Custody

Samples Submitted By:

Company: AECOM
Address: 9400 Amberglen Blvd
Austin, TX 78729

Contact: Francisco Barajas
Phone: 512-419-6474
Cell:
Email: Francisco.Barajas@aecom.com

Job/P.O. # _____

Project Title TVA - NRS Gallatin

Archive: Asbestos samples are archived for 6 months unless other arrangements are made. All other samples are archived for 3 months.

Turnaround Time Requested:

[ ] Standard (3 to 5 Business Days)
[ ] 24 Hour Rush
[ ] 2 Hour Rush (Asbestos Only)
[ ] Other _____

Procedure Requested:

ASBESTOS
Bulk [ ] Standard EPA
[ ] Progressive
[ ] Point Count
[ ] Other
Air [ ] NIOSH 7400
[ ] OSHA ID-160
[ ] Other

DUST & SILICA
[ ] Silica – Air NIOSH 7500
[ ] Silica – Bulk
[ ] Silica – Bulk Respirable
[ ] Dust – NIOSH 0500/0600

OTHER SERVICES
[ ] Optical Microscopy
[ ] X-ray Diffraction – Scan/Search
[ ] X-ray Diffraction – Clay/Bulk
[✓] SEM

Other Analysis: XRF, XRD, Polished Thin Section

	Client Sample No.:	Sample Date	Air Volume	Other Information
1	AECOM - Sand - 073020	7/30/20		
2	AECOM - Dolo-f2-073020	7/30/20		
3	AECOM - Control-f2-073020	7/30/20		
4	AECOM - Hi Cal-f2-073020	7/30/20		
5				
6				
7				
8				
9				
10				

Relinquished By:	Date/Time	Received By:	Date/Time
Rachel Withers	7/30/20 1400	D Howey	7/31/20 9:42

Appendix B XRF

August 4, 2020
Lab no. 220181

Mr. Ron Schott
DCM Science Laboratory, Inc.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, Colorado 80033

Dear Mr. Schott:

Enclosed are the x-ray fluorescence (XRF) analytical results for, “073020” samples received with your PO no. 2021. This report will be mailed and emailed to you.

A representative portion of each sample was ground to approximately -400 mesh in a steel swing mill and then analyzed by our standard XRF procedure for 31 major, minor and trace elements. The relative precision/accuracy for this procedure is ~5–10% for major–minor elements and ~10–15% for trace elements (those elements listed in ppm) at levels greater than twice the detection limit in samples of average geologic composition. A replicate sample and a standard reference material ("GSP-2", a USGS standard rock) was analyzed with the samples to demonstrate analytical reproducibility for your samples and analytical accuracy for a geologic standard, respectively. The accepted ("known") values for the quality control standard are listed with the XRF results.

Thank you for the opportunity to be of continuing service to DCM Science Laboratory.

Sincerely,

Joy Maes

DCM Science Laboratory, Inc.
XRF Results for, "073020" Samples Received with PO# 2021

August 4, 2020
Lab no. 220181

IDENT	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	S	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	BaO
						Wt %							
SAND	1.17	0.39	4.38	85.8	0.09	< 0.05	< 0.02	1.10	0.73	0.18	0.06	1.56	0.04
DOLO+2	1.17	0.51	4.47	87.6	0.14	< 0.05	< 0.02	1.15	0.89	0.15	0.07	1.53	0.03
CONTROL+2	1.10	0.32	4.18	84.8	0.08	< 0.05	< 0.02	1.19	0.55	0.14	0.06	1.66	0.04
HICAL+2	1.40	0.40	4.62	84.4	0.10	< 0.05	< 0.02	1.14	0.71	0.14	0.06	1.55	0.03
Quality Control - Replicate (R) sample and standard reference material (GSP-2) analyzed with samples													
SAND(R)	1.16	0.38	4.39	85.8	0.09	< 0.05	< 0.02	1.10	0.73	0.18	0.06	1.55	0.03
GSP-2-XRF	3.16	1.11	14.7	65.7	0.33	0.07	0.06	5.48	2.16	0.60	0.04	4.24	0.14
GSP-2-known	2.78	0.96	14.9	66.6	0.29	----	----	5.38	2.10	0.66	0.04	4.90	0.15

IDENT	V	Cr	Ni	Cu	Zn	As	Sn	Pb	Mo	Sr	U
					PPM						
SAND	13	< 10	14	< 10	27	< 20	< 20	< 10	< 10	90	< 10
DOLO+2	16	< 10	13	< 10	30	< 20	< 20	< 10	< 10	92	< 10
CONTROL+2	15	< 10	14	12	27	< 20	< 20	< 10	< 10	108	< 10
HICAL+2	17	11	14	< 10	30	< 20	< 20	< 10	< 10	98	< 10
Quality Control											
SAND(R)	19	< 10	15	< 10	28	< 20	< 20	< 10	< 10	93	< 10
GSP-2-XRF	46	18	11	44	106	< 20	< 20	34	< 10	218	< 10
GSP-2-known	52	20	17	43	120	--	--	42	--	240	2

Ident	Th	Nb	Zr	Rb	Y
			PPM		
SAND	< 10	< 10	113	20	11
DOLO+2	< 10	< 10	90	24	12
CONTROL+2	< 10	< 10	99	24	< 10
HICAL+2	< 10	< 10	101	25	10
Quality Control					
SAND(R)	< 10	< 10	112	22	11
GSP-2-XRF	102	22	529	215	33
GSP-2-known	105	27	550	245	28

Initial_____

Date_____

Analysis Performed By The Mineral Lab, Inc

DCM SCIENCE LABORATORY, INC.

September 21, 2020

Mr. Francisco Barajas
AECOM
9400 Amberglen Blvd.
Austin, TX 78729

Dear Mr. Barajas:

We have performed scanning electron microscopy on your four sand samples (client samples no. **AECOM-SAND – 073020, AECOM-DOLO - +2 – 073020, AECOM-CONTROL -+2 – 073020** and **AECOM-Hi CAL -+2 – 073020**).

Thank you for the opportunity to provide this service. If you have any questions, please call.

Sincerely,

Ron Schott
Analyst

12421 W. 49th Ave. ● Unit 6 ● Wheat Ridge, Colorado 80033
303-463-8270 ● Fax 303-463-8267 ● 800-852-7340
www.dcmsciencelab.com

Appendix C SEM

12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033 - (303) 463-8270

Scanning Electron Microscopy Analysis

Client:
AECOM
9400 Amberglen Blvd
Austin, TX 78729

Analysis Date:	9-17-20
Reporting Date:	9-21-20
Receipt Date:	7-31-20
Client Job No.:	None Given
Project Title:	TVA-NRS Gallatin
DCMSL Project:	AECOM8

The purpose of this project is to confirm the bulk mineralogy of four sand samples and determine if additional minerals have formed as coatings/rinds on major phases as a result of groundwater treatment in four sand samples (client samples no. **AECOM-SAND – 073020, AECOM-DOLO - +2 – 073020, AECOM-CONTROL -+2 – 073020** and **AECOM-Hi CAL -+2 – 073020**) by field emission scanning electron microscopy (FE-SEM) equipped with an energy dispersive system (EDS). Each sample was prepared as a standard polished thin section and carbon coated. FE-SEM/EDS analyses were performed at magnifications ranging from 100X to 20,000X, 20keV. FE-SEM images and EDS spectra are included for documentation.

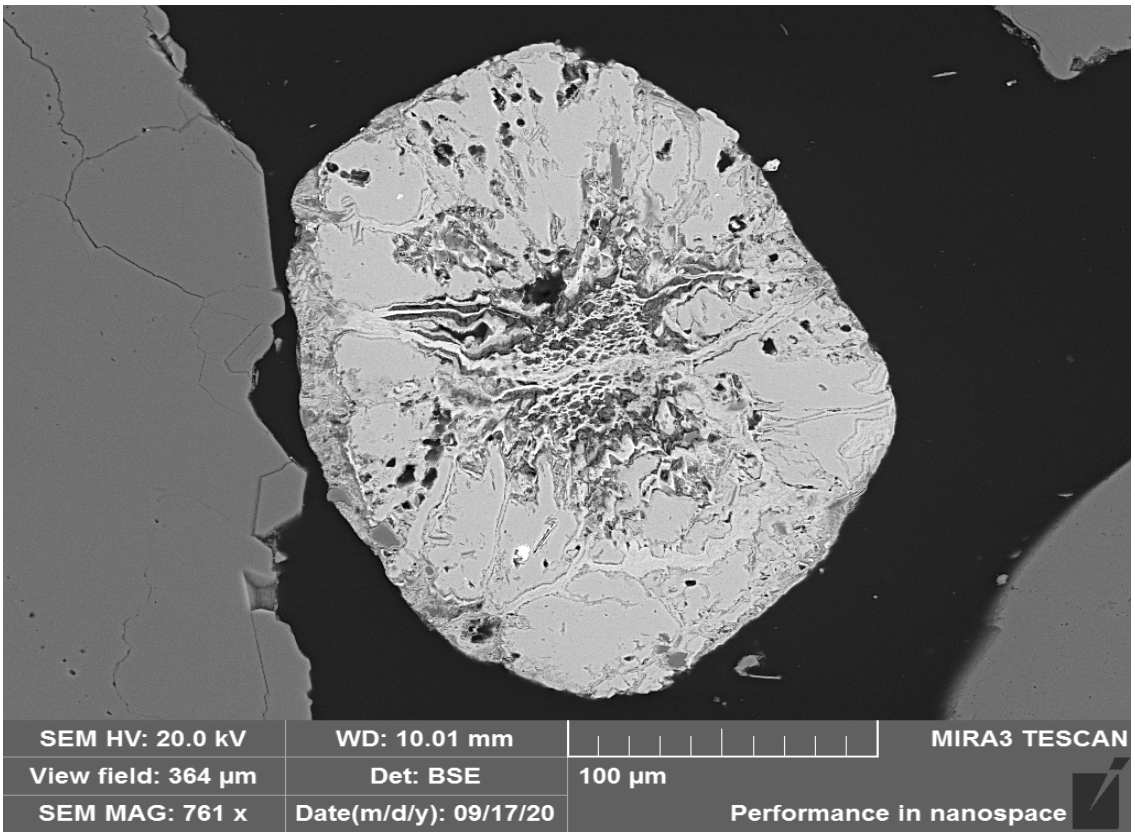
Client Sample No.: **AECOM-SAND – 073020**

Major Mineralogy by XRD: Quartz 63%, Plagioclase 14% K-spar 12% Mica 4% Chlorite 4% Amphibole 1%

Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite, Pyrite

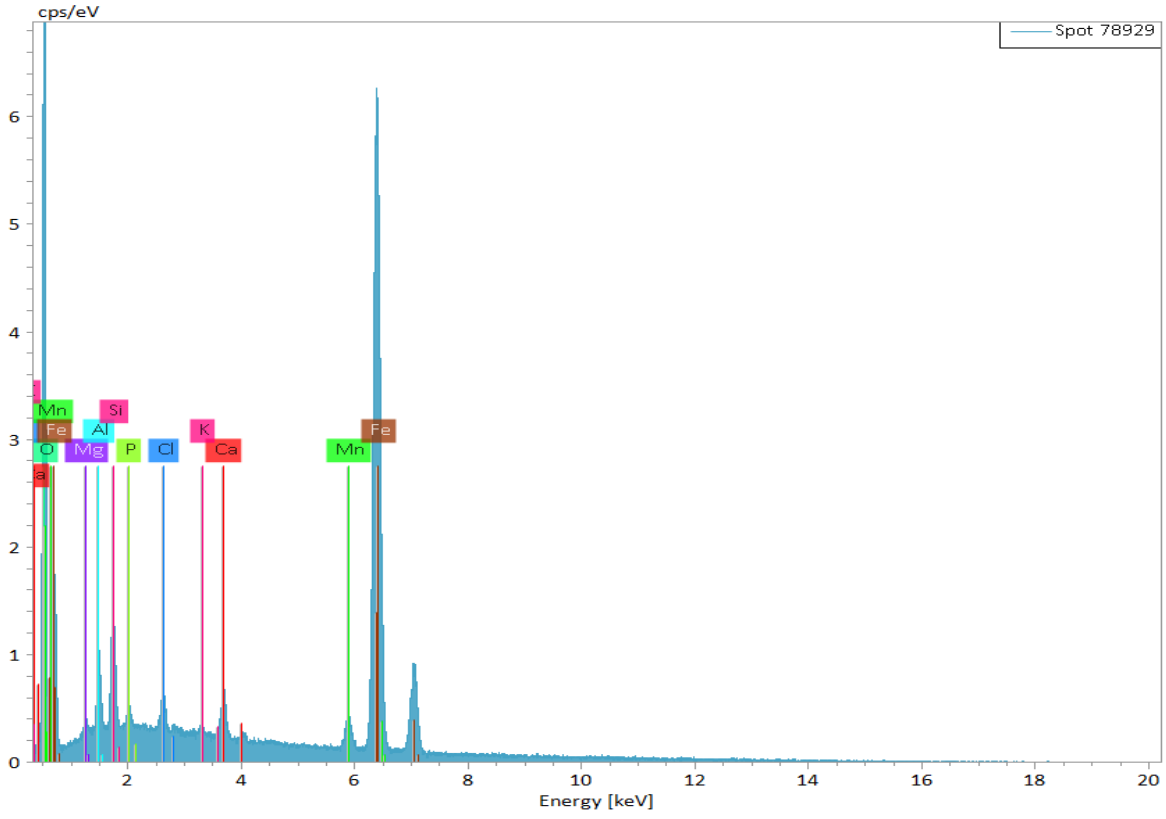
Microscopic Description by FE-SEM

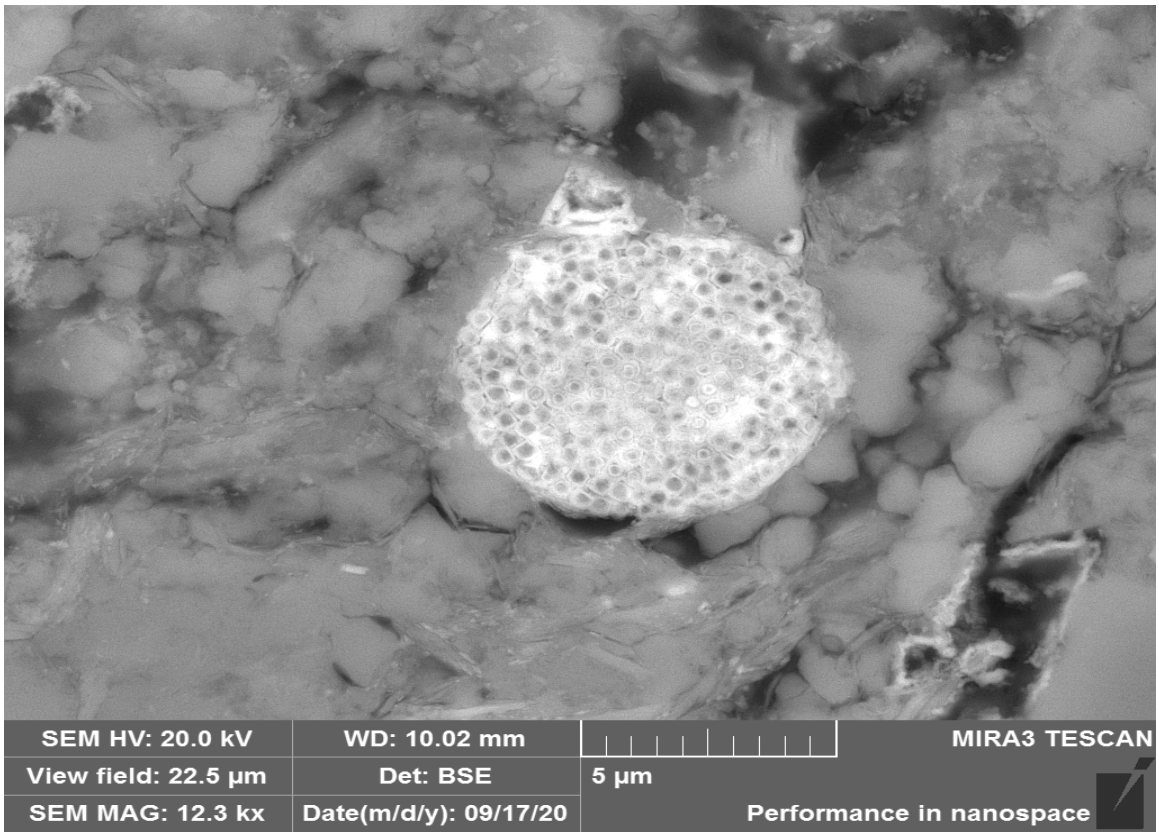
In hand specimen this sample is a brown colored fine, to coarse grained unconsolidated sand. XRD and FE-SEM indicate the sand is primarily composed of subrounded to rounded quartz, feldspar and lesser amounts of mica/chlorite and some amphibole. In thin section individual grains show little in the way of secondary coatings, however, there are a few silicate and carbonate grains that have some attachments of clay or thin rinds of iron oxide. Calcite/dolomite tends to show the most evidence of secondary alteration/coatings composed primarily of Mn. Although uncertain, the coating may represent Mn oxide or secondary Mn carbonate. Iron oxide with significant Mn content is also present as large rounded fragments and as goethite pseudomorphs after pyrite cubes and pyrite framboids. Although sulfides are rare, one small relict grain was identified in a mass of iron oxide.



Client Sample No.: **AECOM-SAND – 073020**

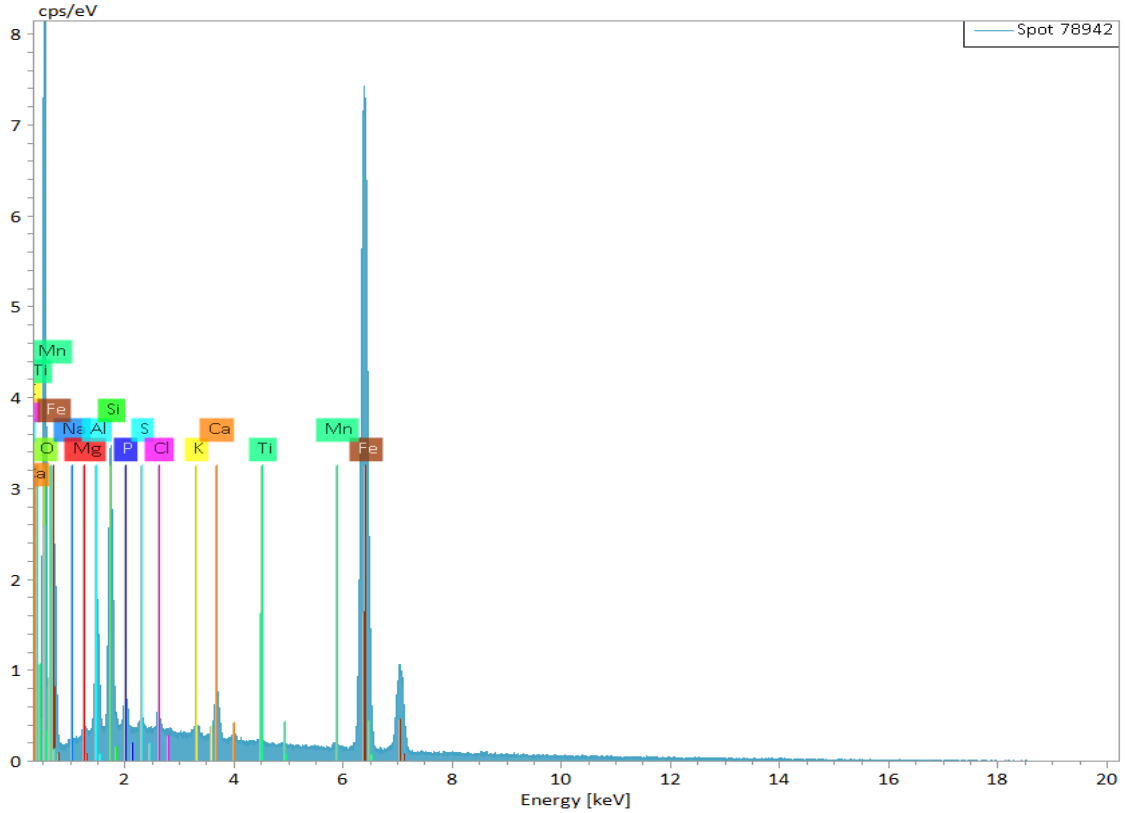
Backscatter image of a large rounded grain of iron oxide with a bright grain of pyrite in lower left – 761X

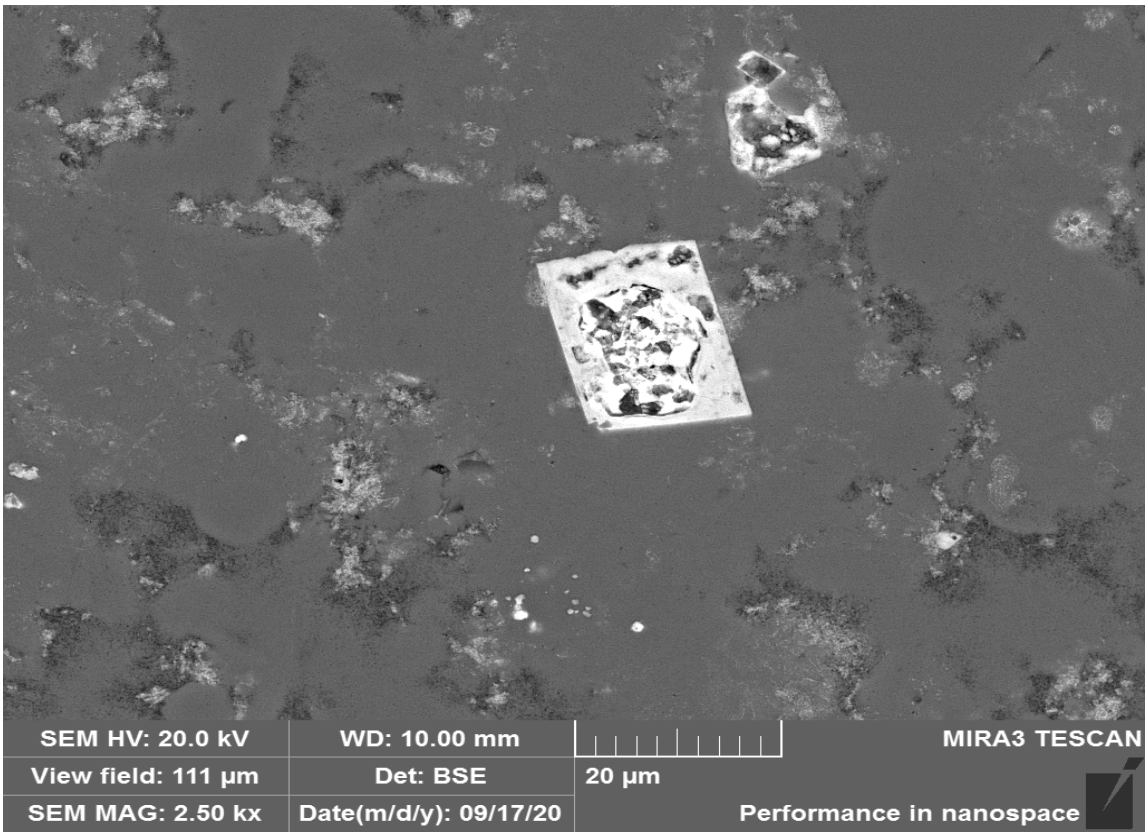




Client Sample No.: **AECOM-SAND – 073020**

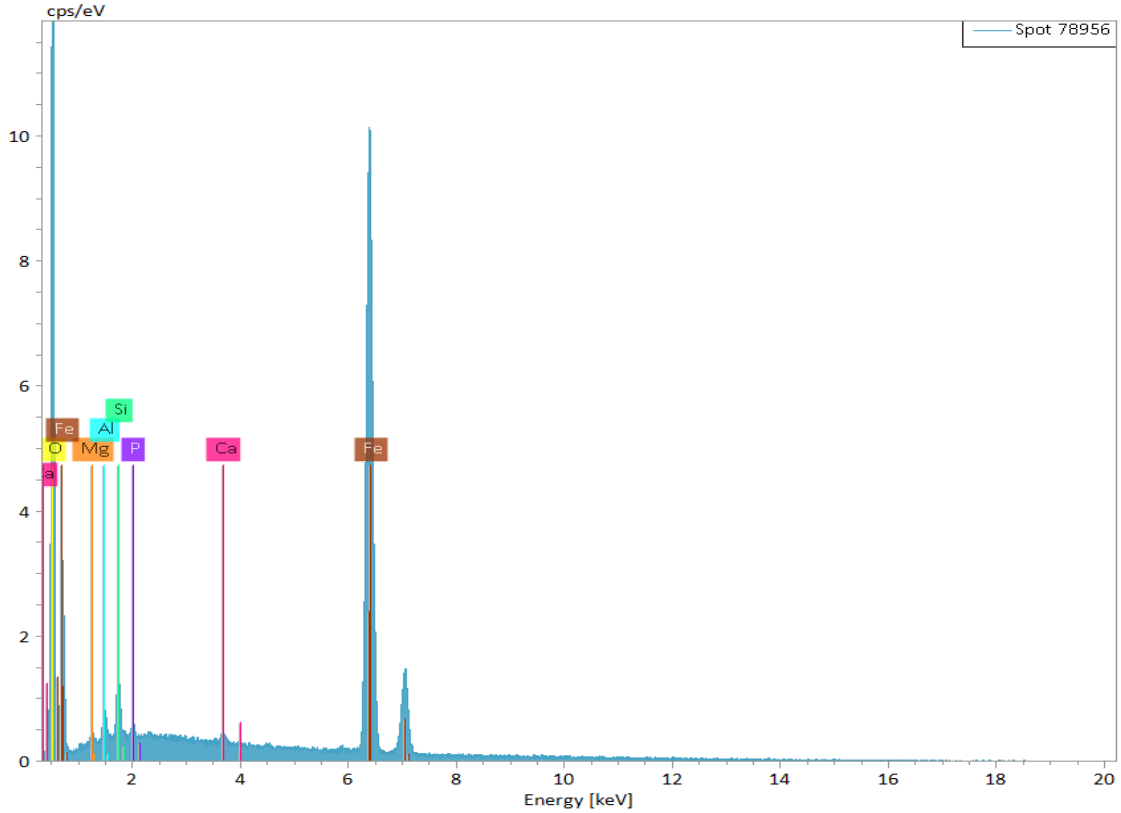
Backscatter image of a goethite pseudomorph after a pyrite framboid – 12,300X

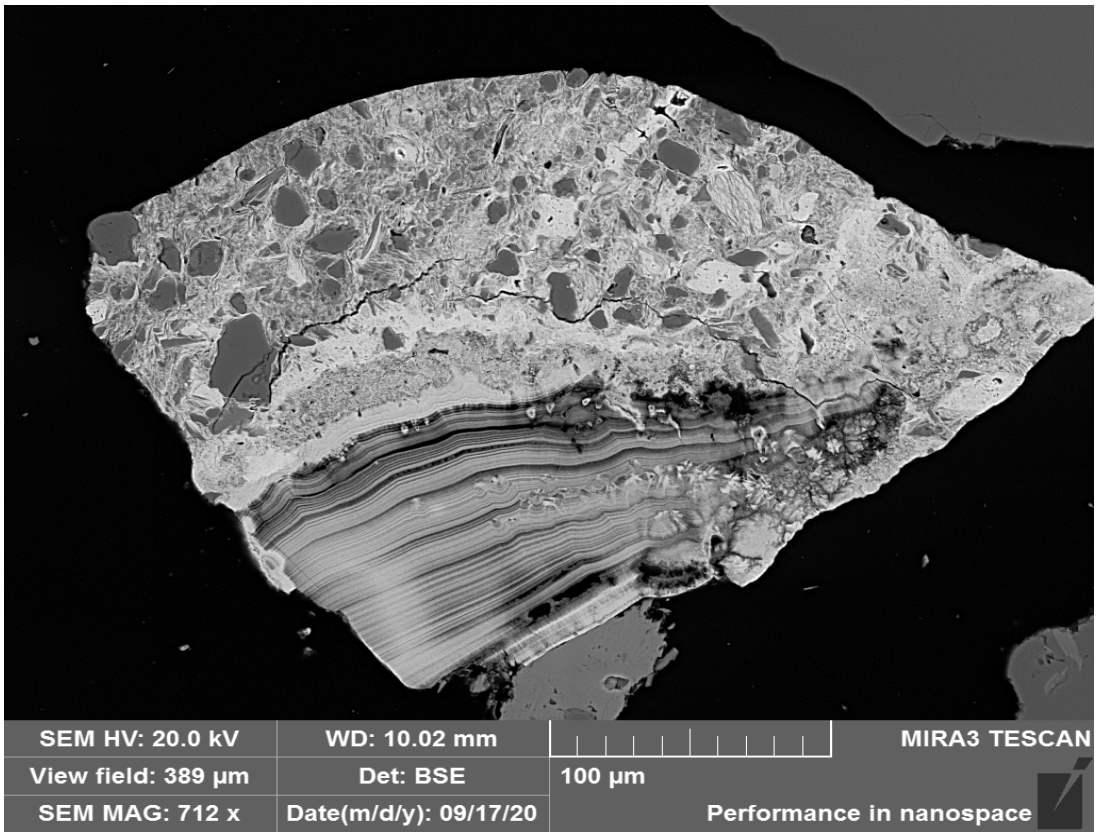




Client Sample No.: **AECOM-SAND – 073020**

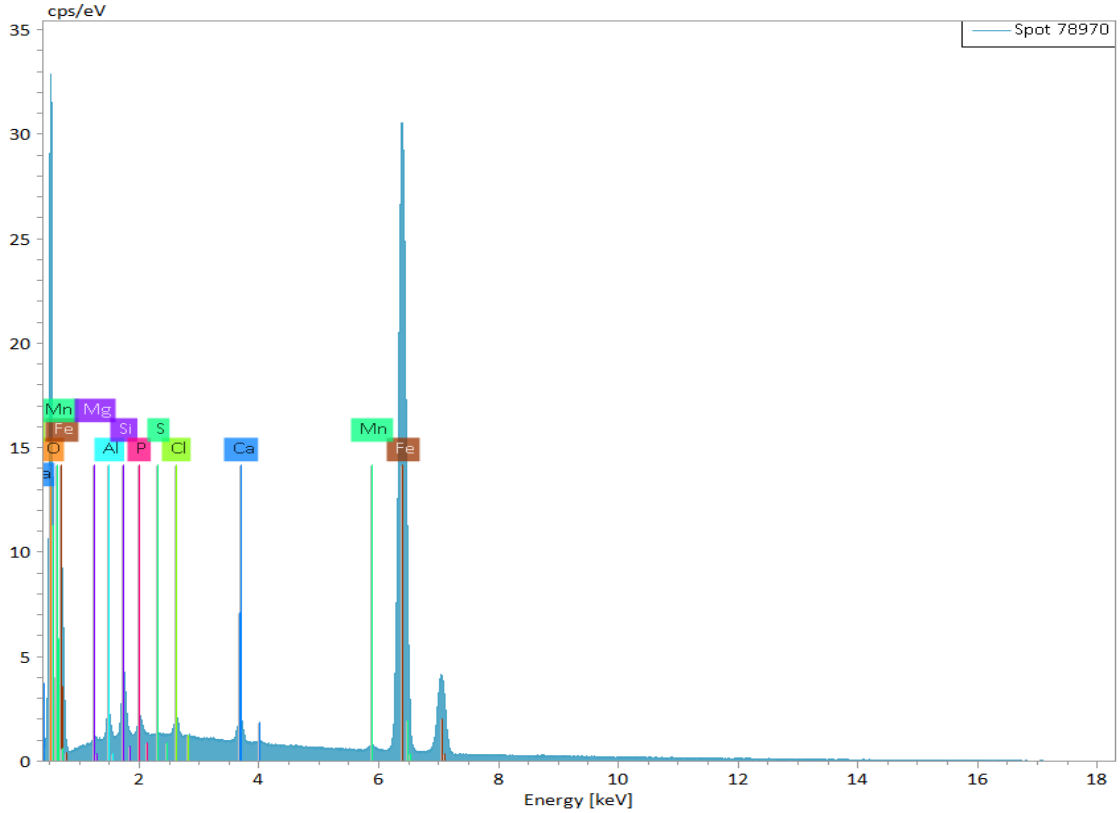
Backscatter image of goethite pseudomorph after pyrite in quartz – 2,500X

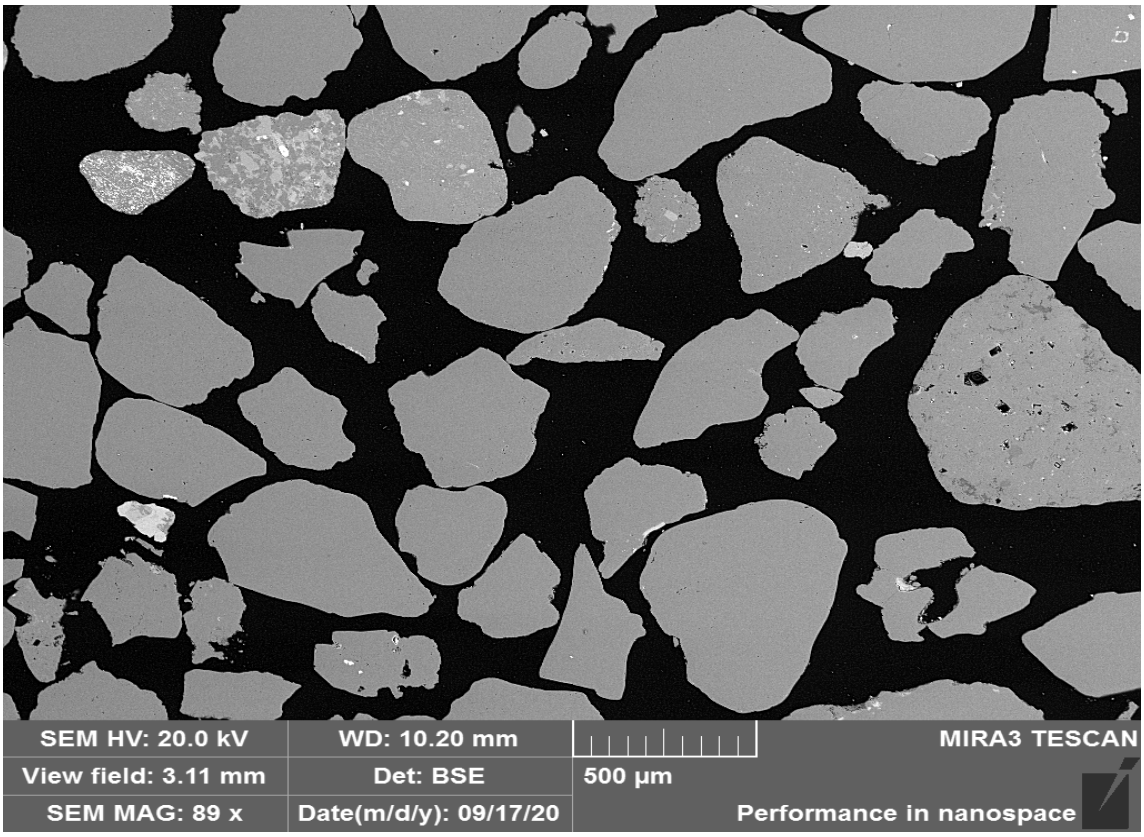




Client Sample No.: **AECOM-SAND – 073020**

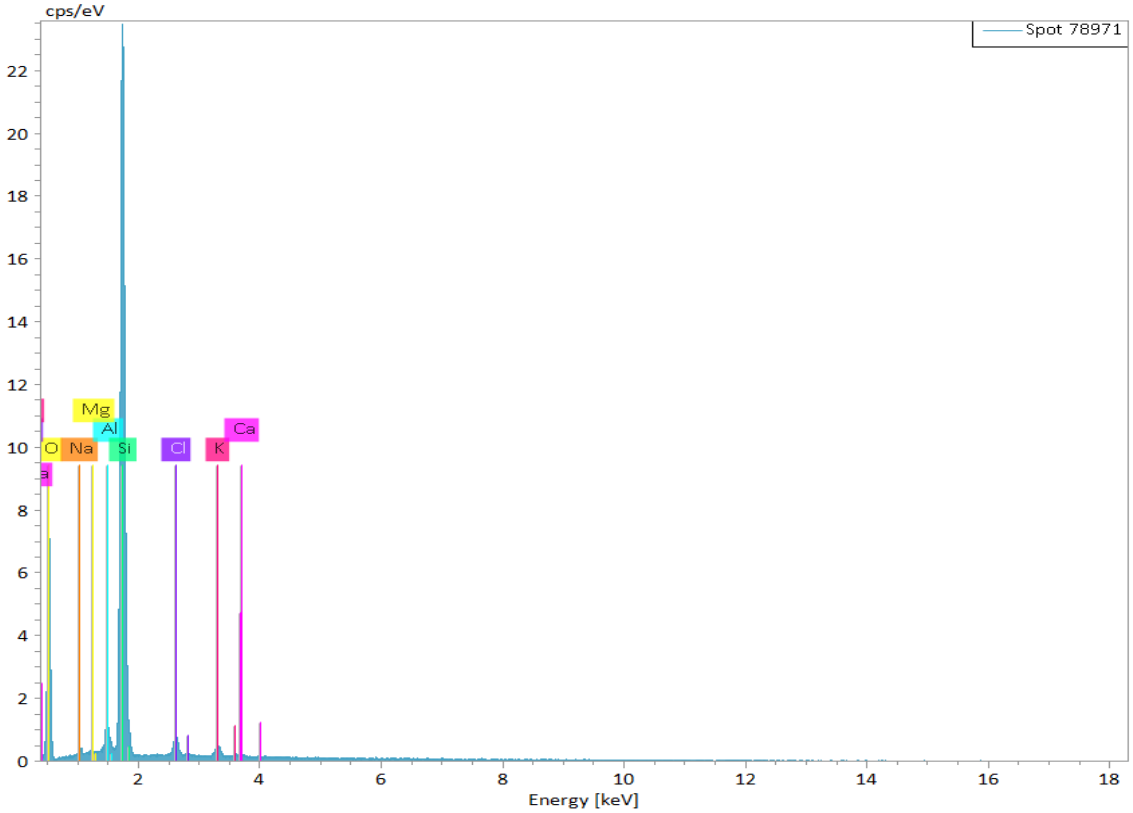
Backscatter image of iron oxide cementing small rock fragments – 712X

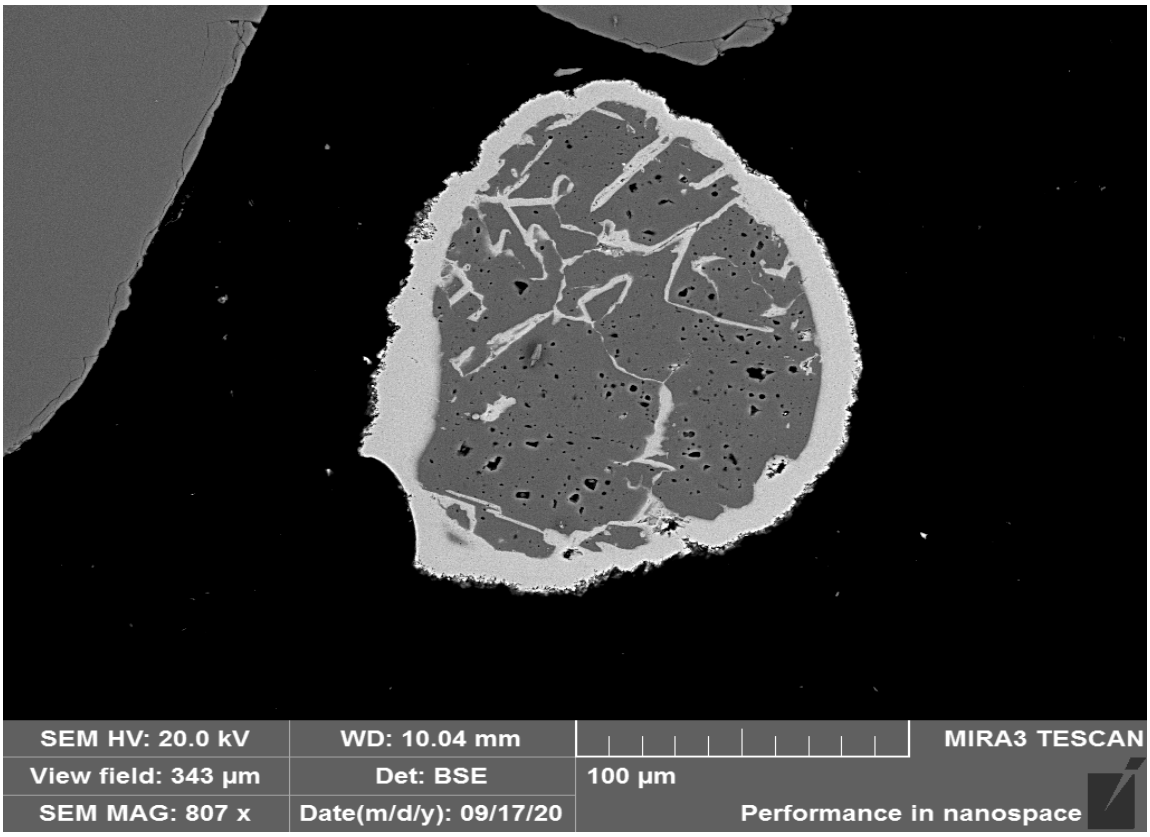




Client Sample No.: **AECOM-SAND – 073020**

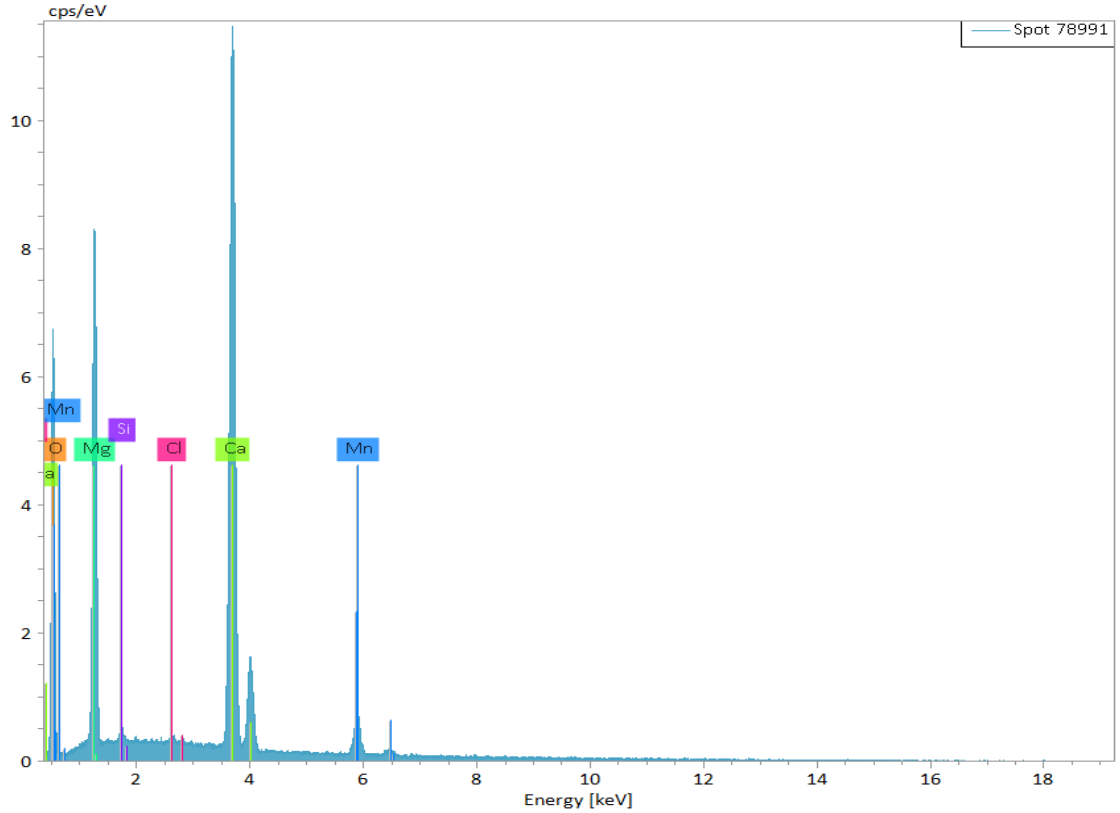
Low magnification backscatter image showing grain morphology and size variation – 89X





Client Sample No.: **AECOM-SAND – 073020**

Backscatter image of a rounded grain of dolomite with a bright Mn rich rind – 807X



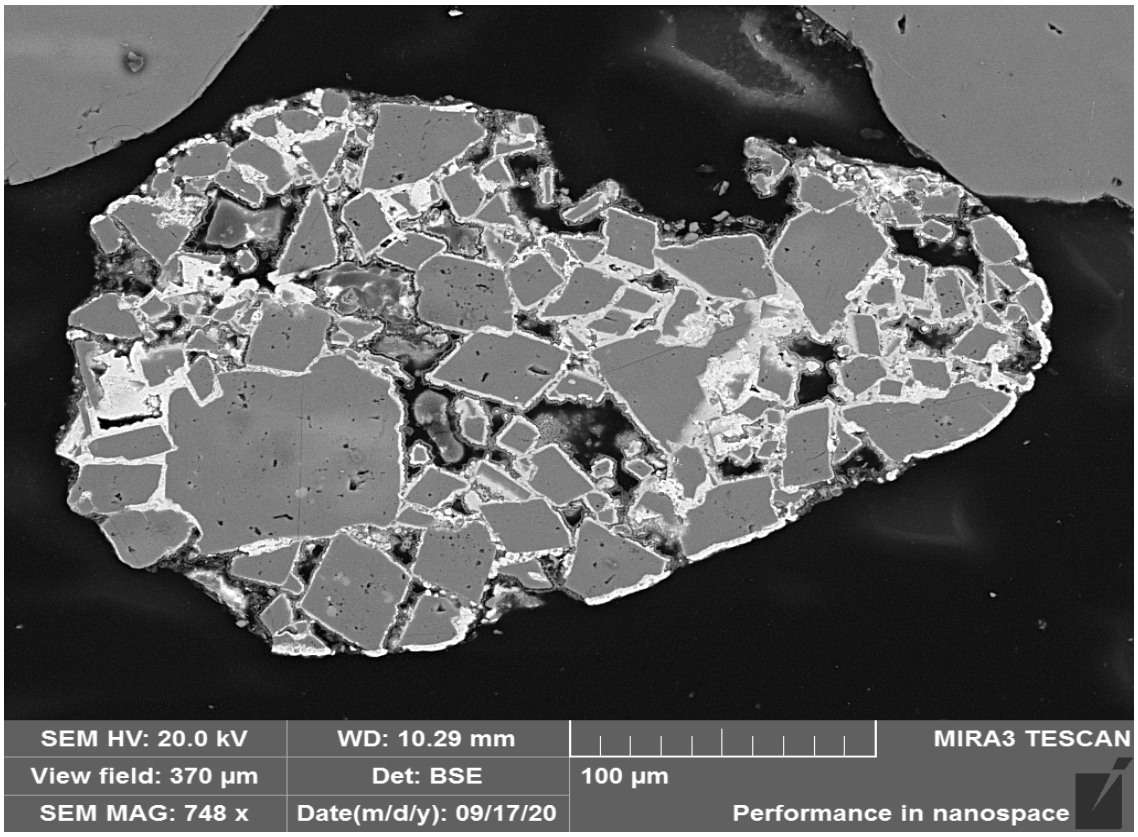
Client Sample No.: **AECOM-DOLO - +2 – 073020**

Major Mineralogy by XRD: Quartz 61%, Plagioclase 17% K-spar 11% Mica 4% Chlorite 2% Amphibole 2%

Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite, Pyrite

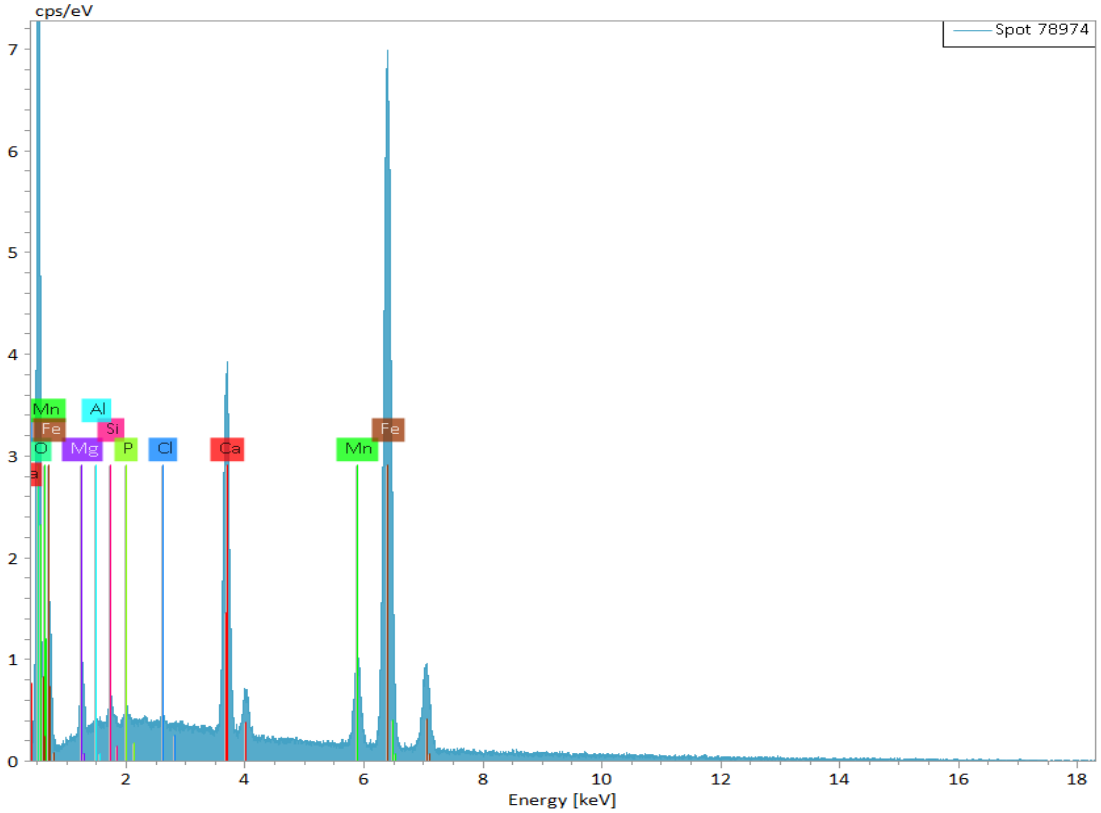
Microscopic Description by FE-SEM

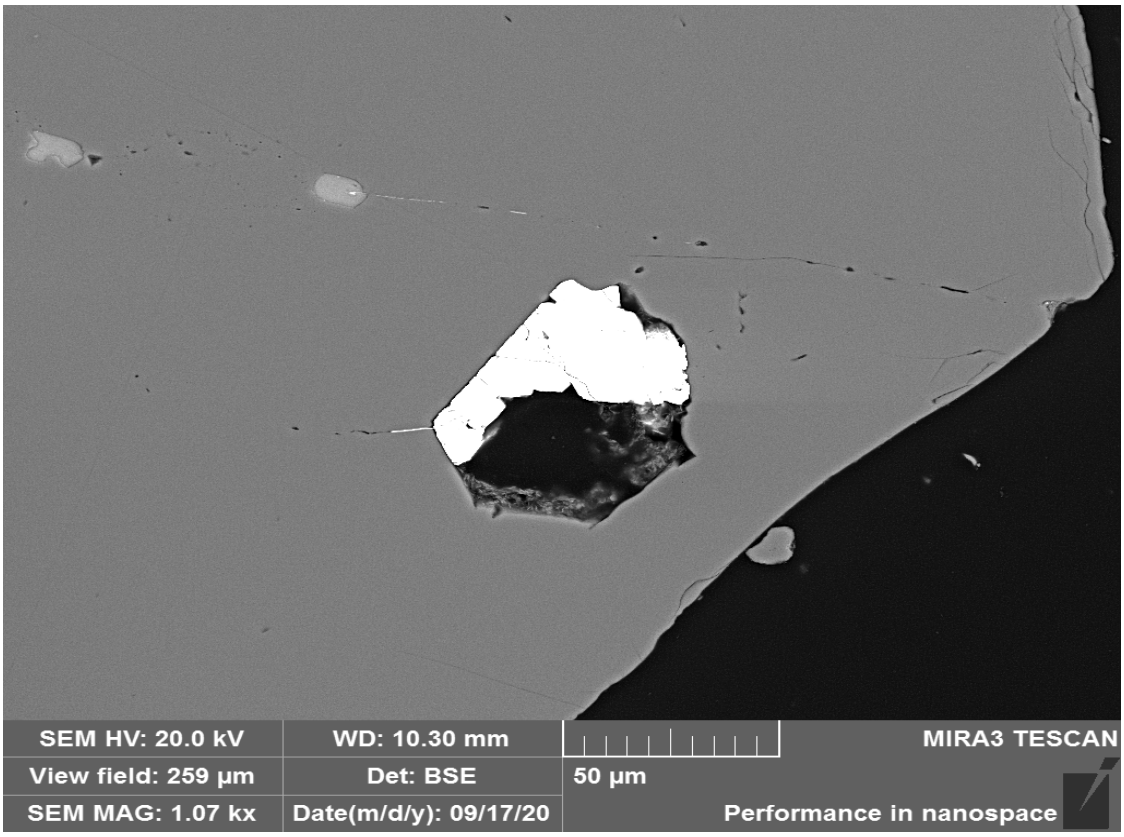
This sample is a brown colored, fine to coarse unconsolidated sand. FE-SEM and XRD confirm the sample is composed mainly of subrounded to rounded quartz/feldspar with lesser amounts of mica and amphibole. A small population of grains shows some minor banding and coatings of secondary iron oxide. Calcite/dolomite fragments show the greatest degree of secondary coatings. Iron oxide with significant Mn content is commonly seen cementing and banding euhedral grains of carbonate. When associated with silicates, iron oxide is seen filling small exterior pits and as occasional thin bands around grains. Iron oxide also occurs as goethite pseudomorphs after pyrite cubes and small pyrite framboids associated with clay. Unaltered pyrite is present as a trace in quartz.



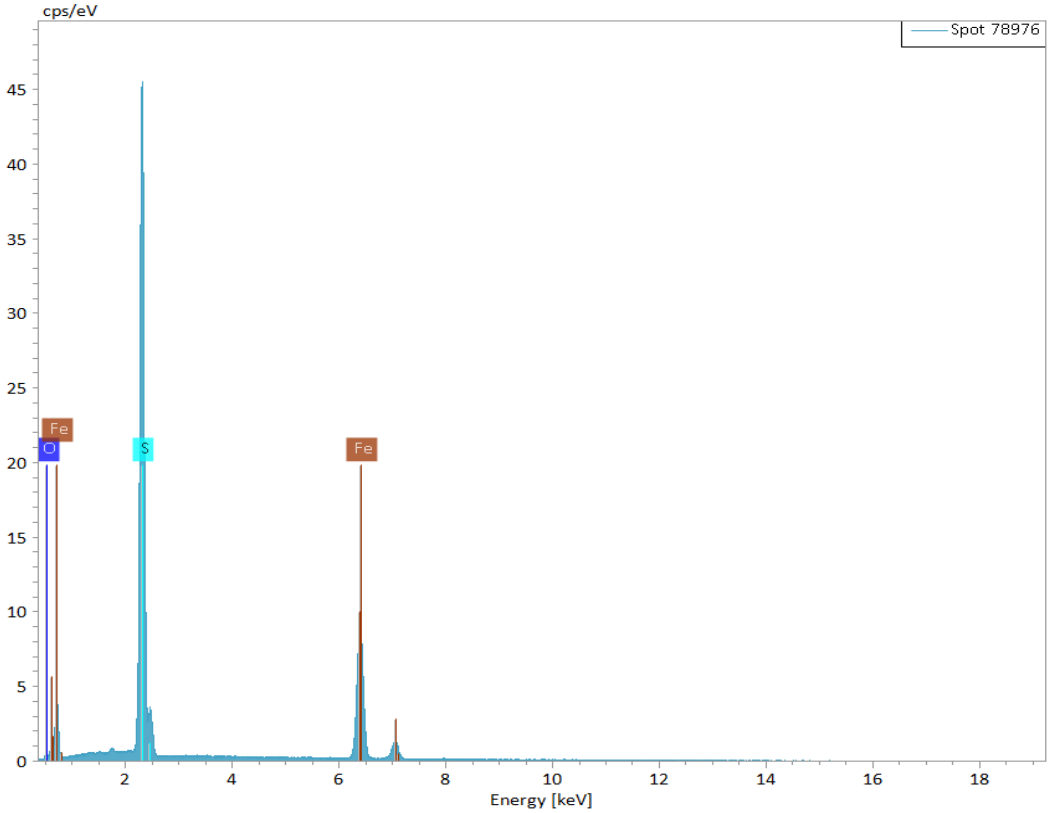
Client Sample No.: **AECOM-DOLO - +2 – 073020**

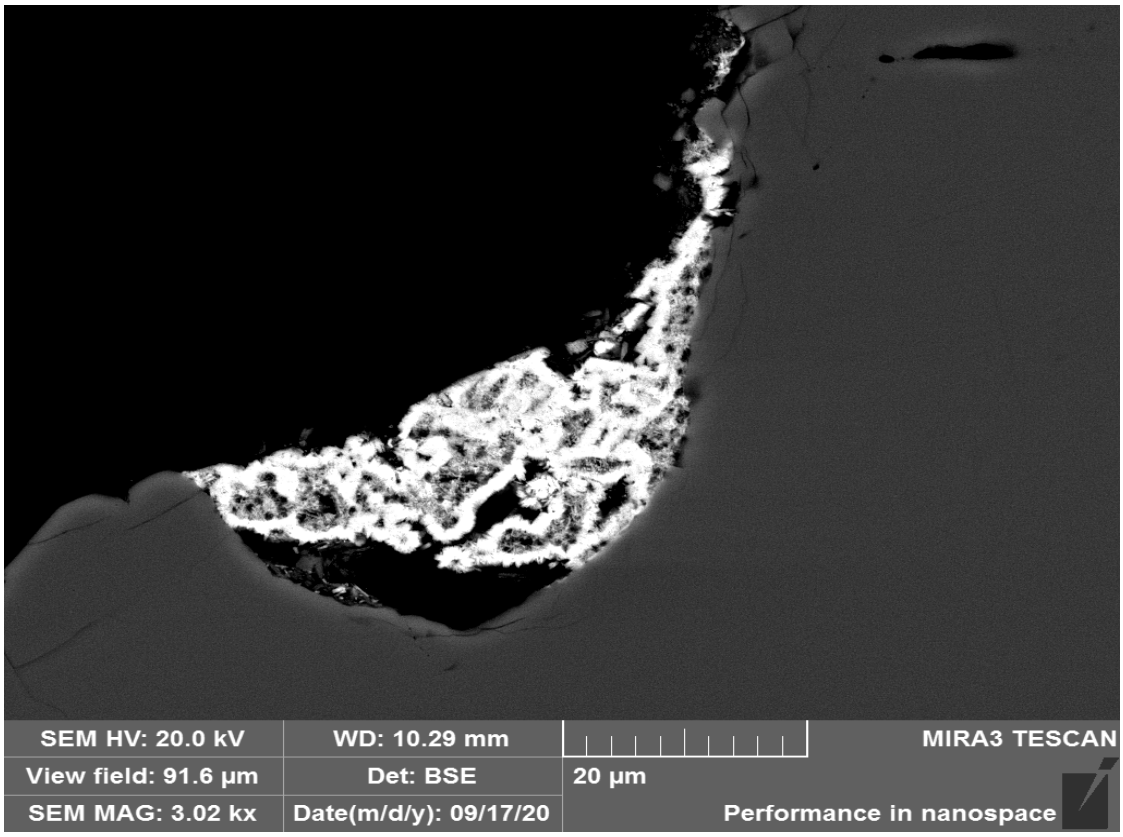
Backscatter image of dolomite grains cemented and rimmed with iron oxide – 748X





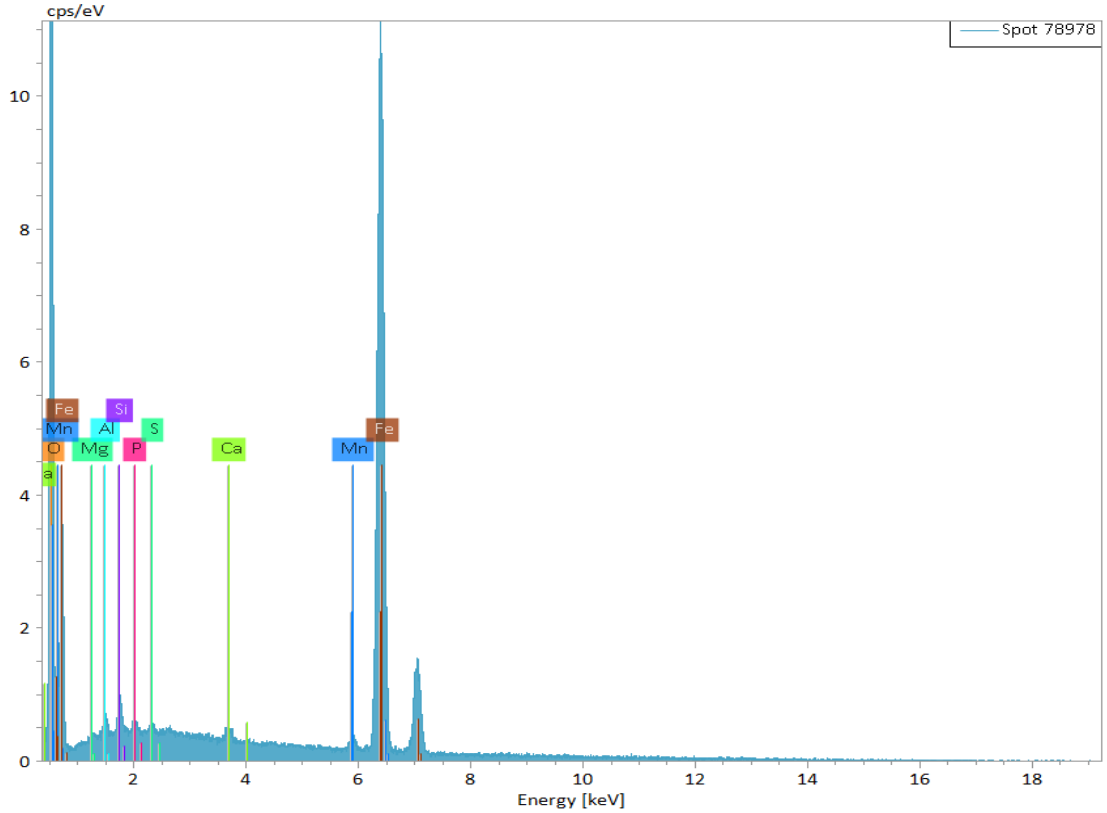
Client Sample No.: **AECOM-DOLO - +2 – 073020**
Backscatter image of quartz with inclusion of pyrite – 1,070X

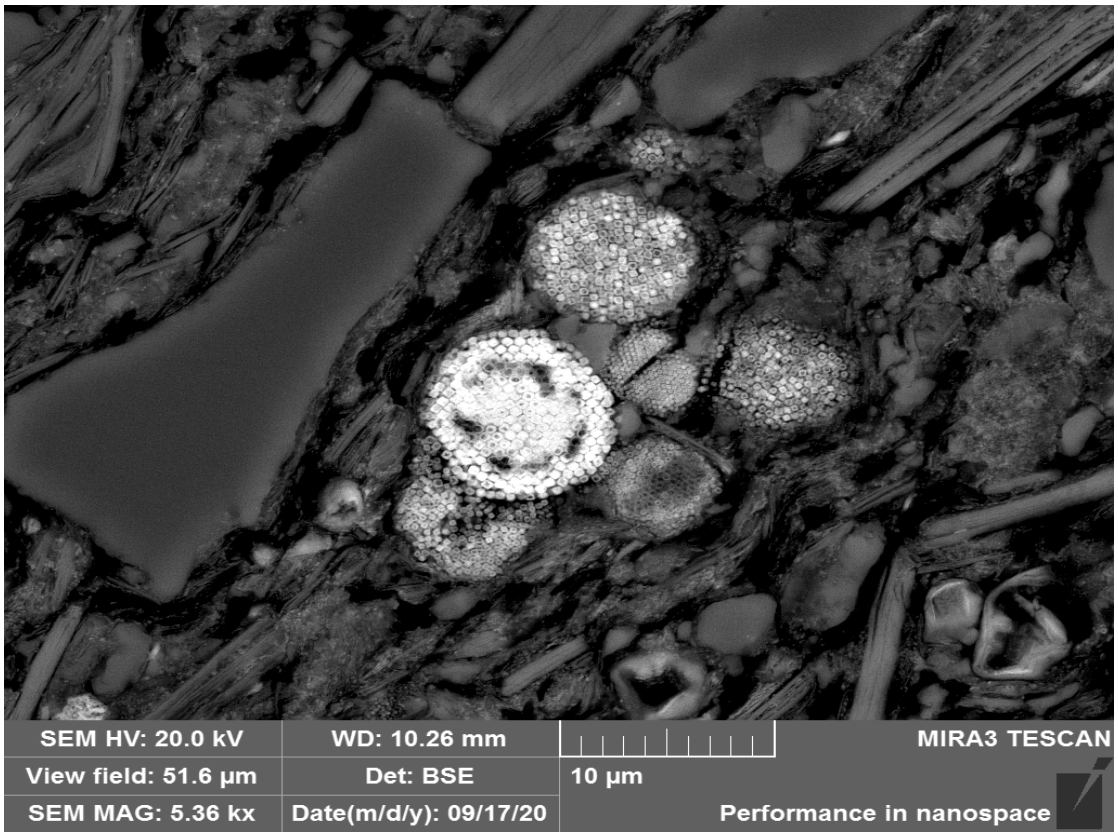




Client Sample No.: **AECOM-DOLO - +2 – 073020**

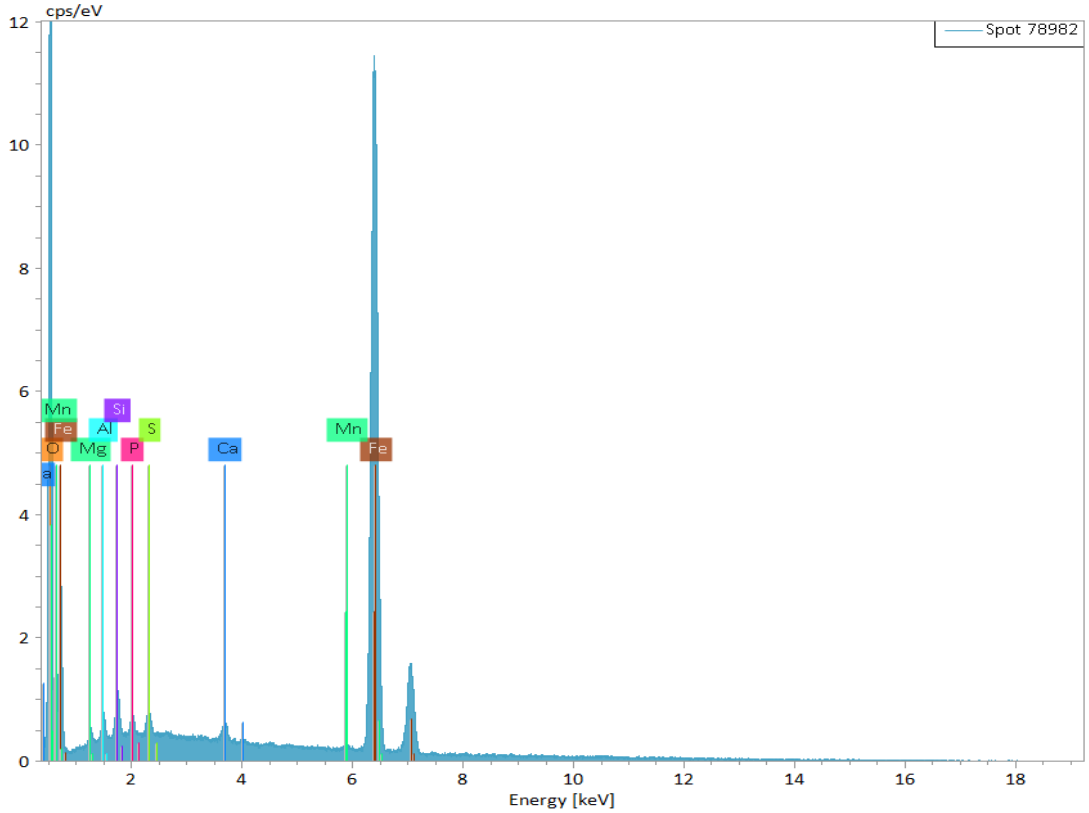
Backscatter image of a small pit on the exterior of a quartz grain filled with iron oxide – 3,020X

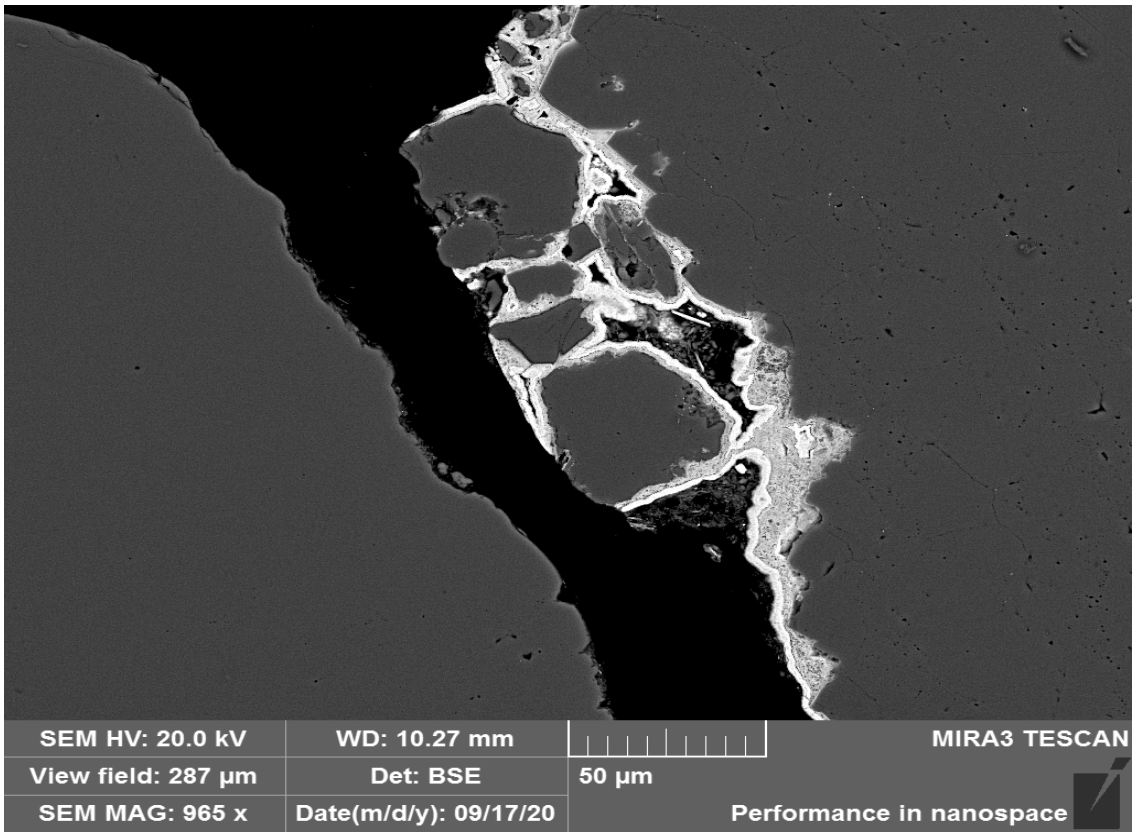




Client Sample No.: **AECOM-DOLO - +2 – 073020**

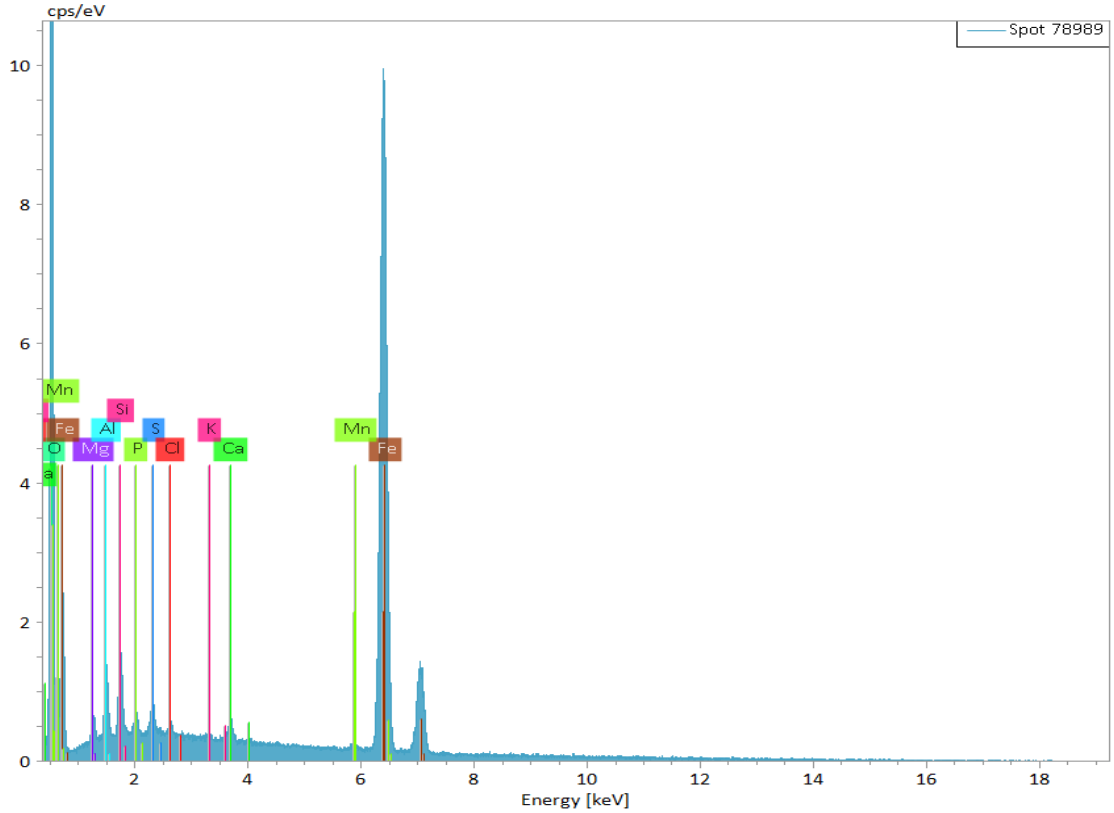
Backscatter image of goethite pseudomorphs after pyrite framboids – 5,360X

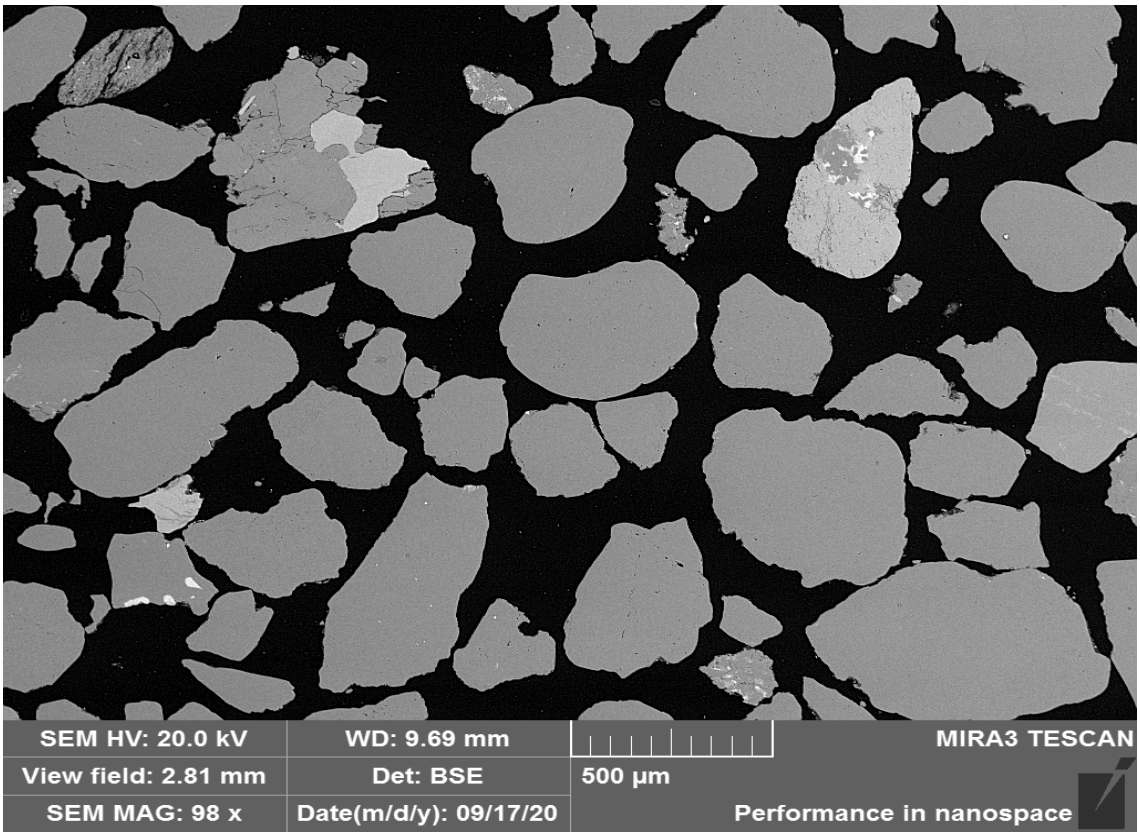




Client Sample No.: **AECOM-DOLO - +2 – 073020**

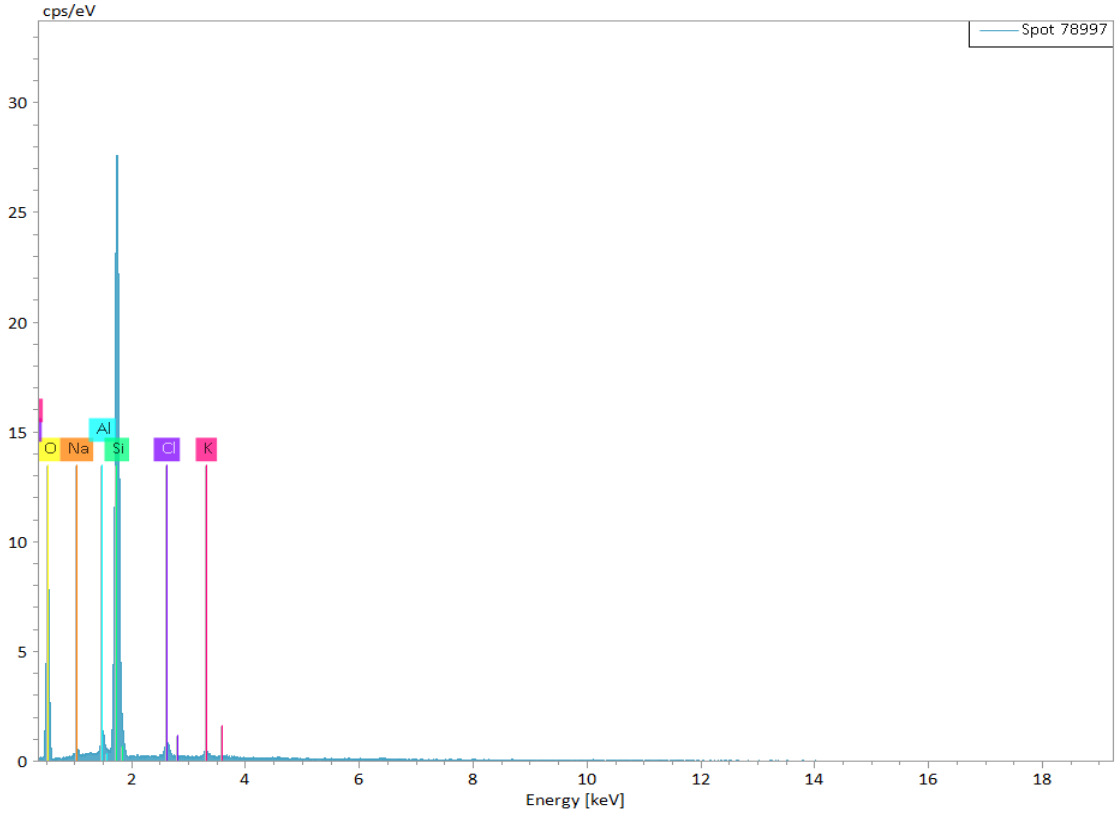
Backscatter image of bright iron oxide rimming and cementing quartz fragments – 965X





Client Sample No.: **AECOM-DOLO - +2 – 073020**

Low magnification backscatter image showing grain morphology and size variation – 98X



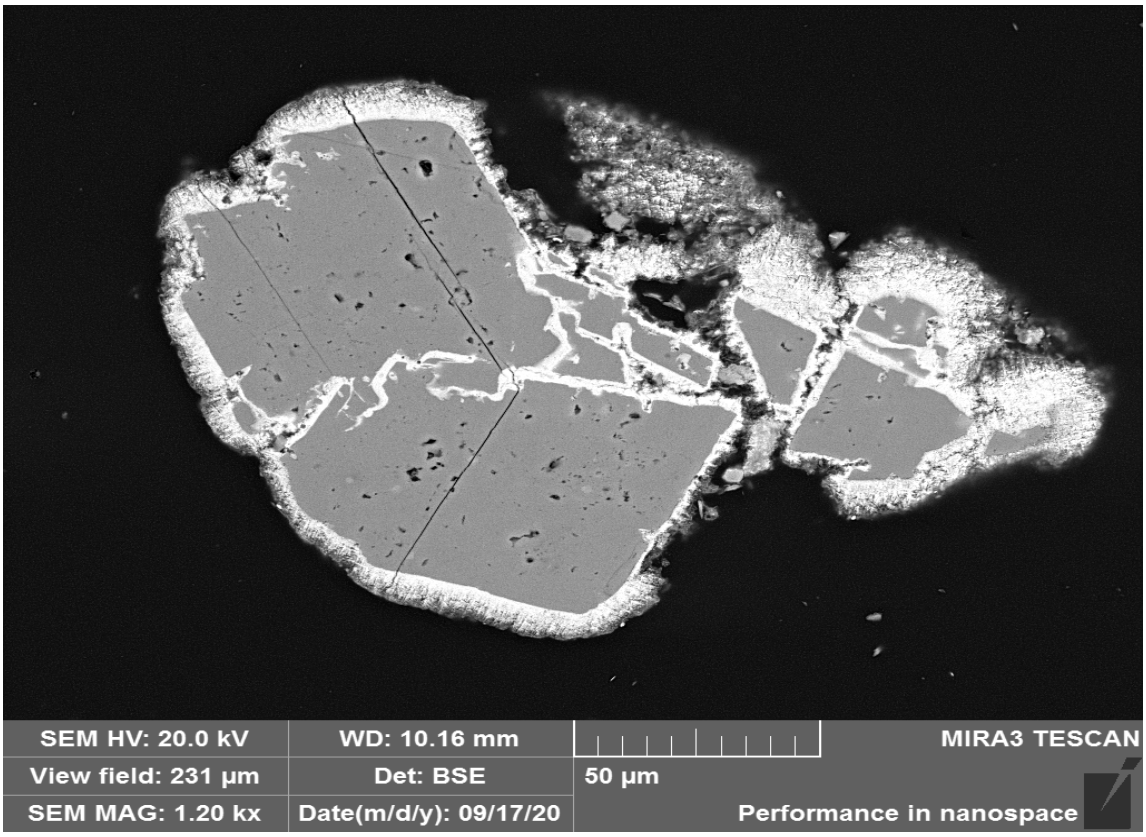
Client Sample No.: **AECOM-CONTROL -+2 – 073020**

Major Mineralogy by XRD: Quartz 63%, Plagioclase 15% K-spar 11% Mica 4% Chlorite 4% Amphibole 1%

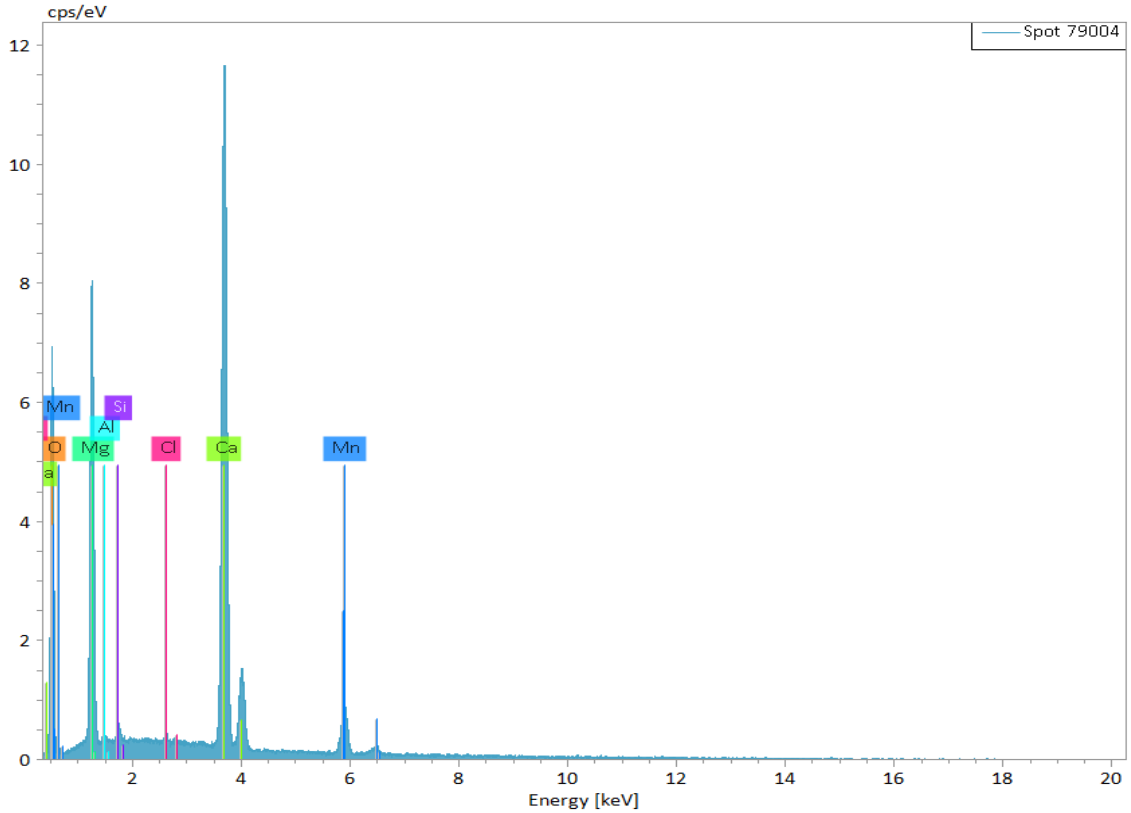
Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite

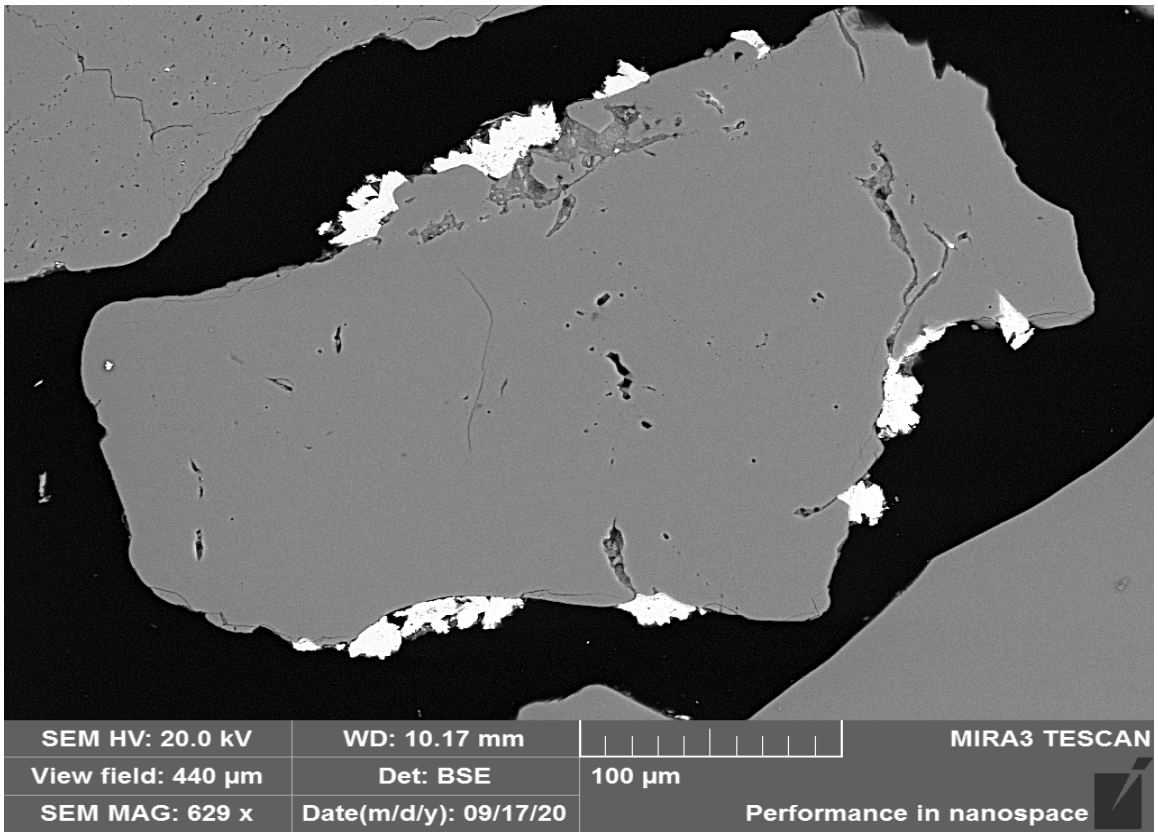
Microscopic Description by FE-SEM

This sample is a brown colored, fine to coarse sand composed primarily of subrounded to rounded quartz/feldspar and lesser amounts of mica and amphibole. A small population of the clasts show secondary coatings composed primarily of Fe/Mn oxide. Calcite/dolomite is commonly seen with Mn rich bands along crystal boundaries and fractures. Although uncertain, the bands may be an oxide or a secondary Mn carbonate. Some silicate grains have small exterior pits and grain boundaries coated with thin skins of secondary Fe oxide. Contained in rock fragments with significant clay content are goethite pseudomorphs after pyrite framboids. In rounded grains of quartz, goethite pseudomorphs after pyrite cubes occur as a trace.

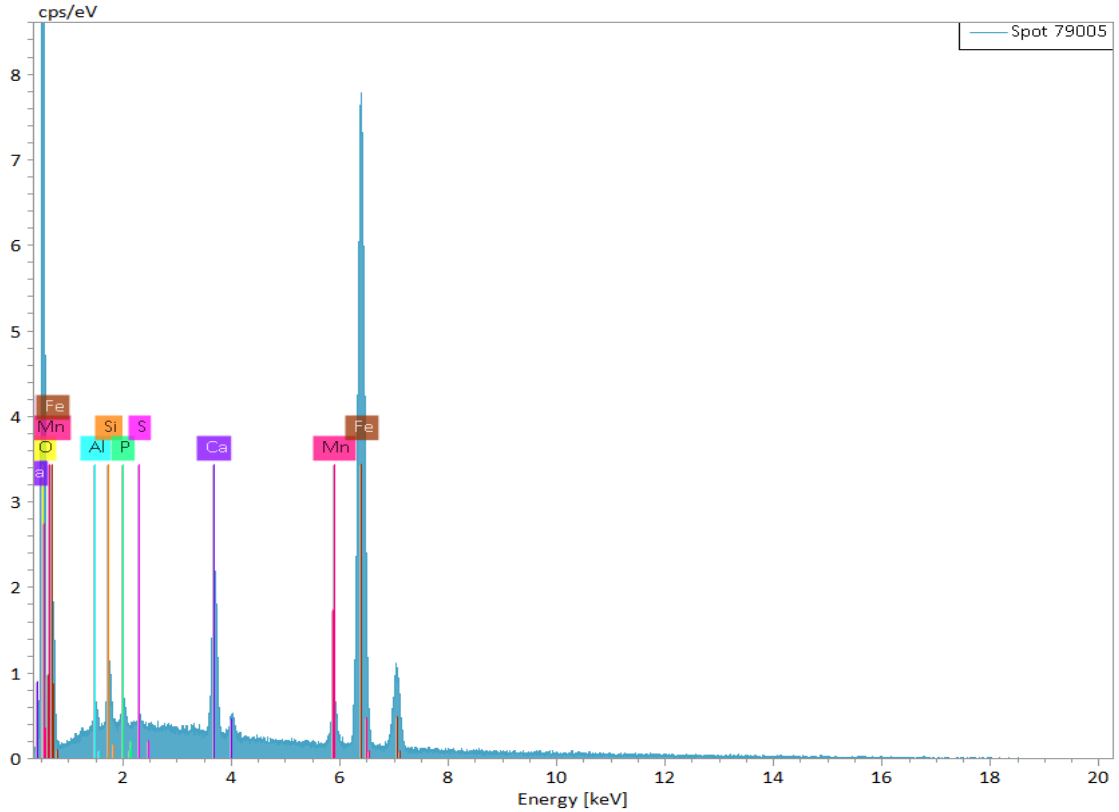


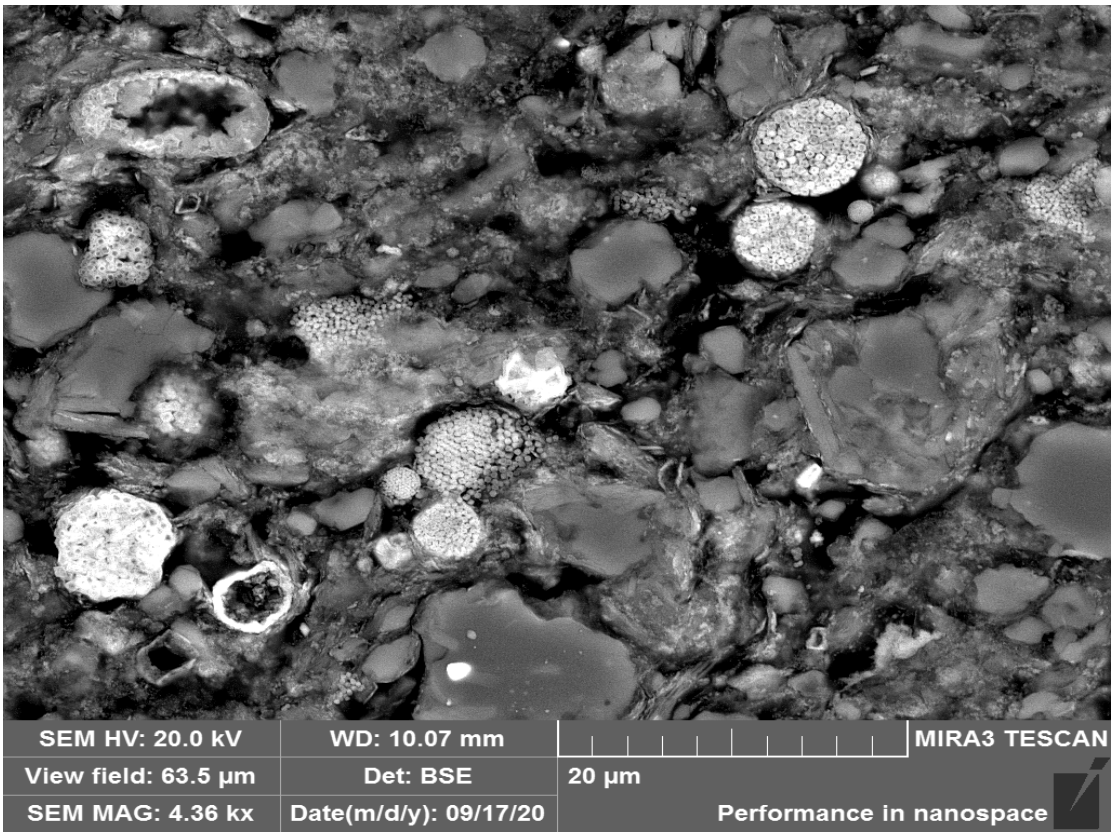
Client Sample No.: **AECOM-CONTROL -+2 – 073020**
Backscatter image of dolomite with bright Mn rich rinds – 1,200X



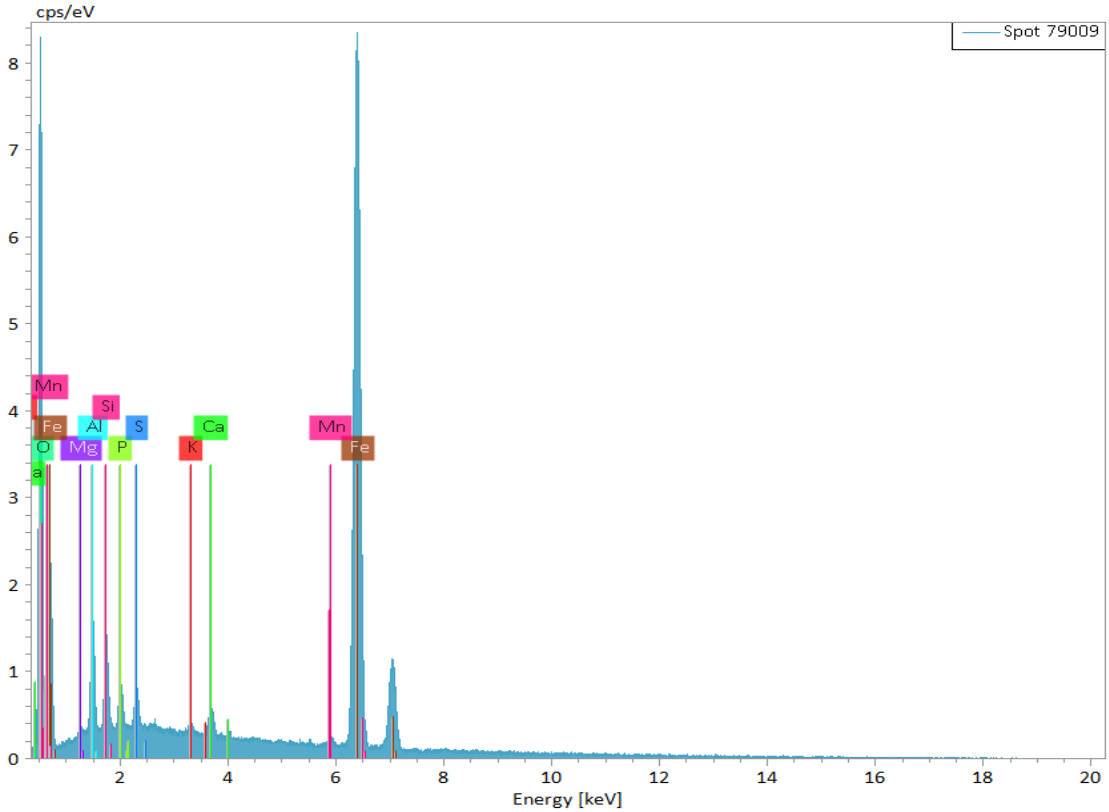


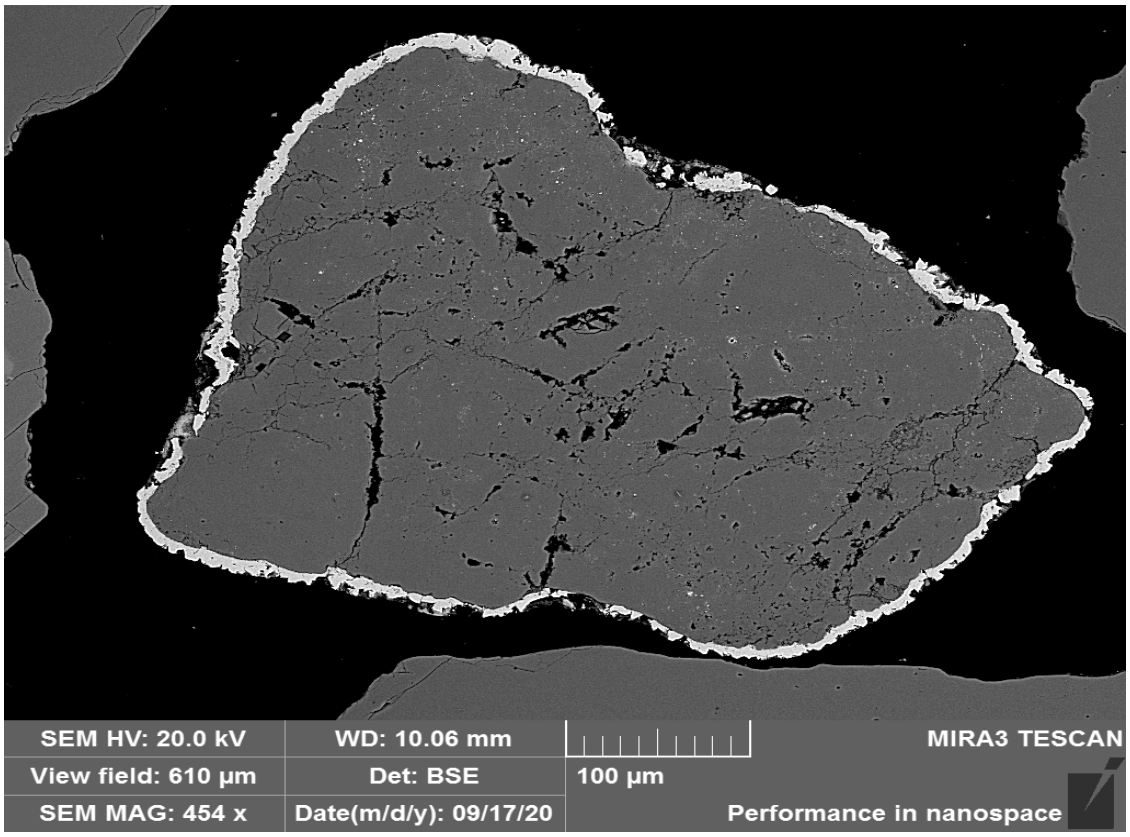
Client Sample No.: **AECOM-CONTROL -+2 – 073020**
Backscatter image of bright iron oxide attached to quartz – 629X





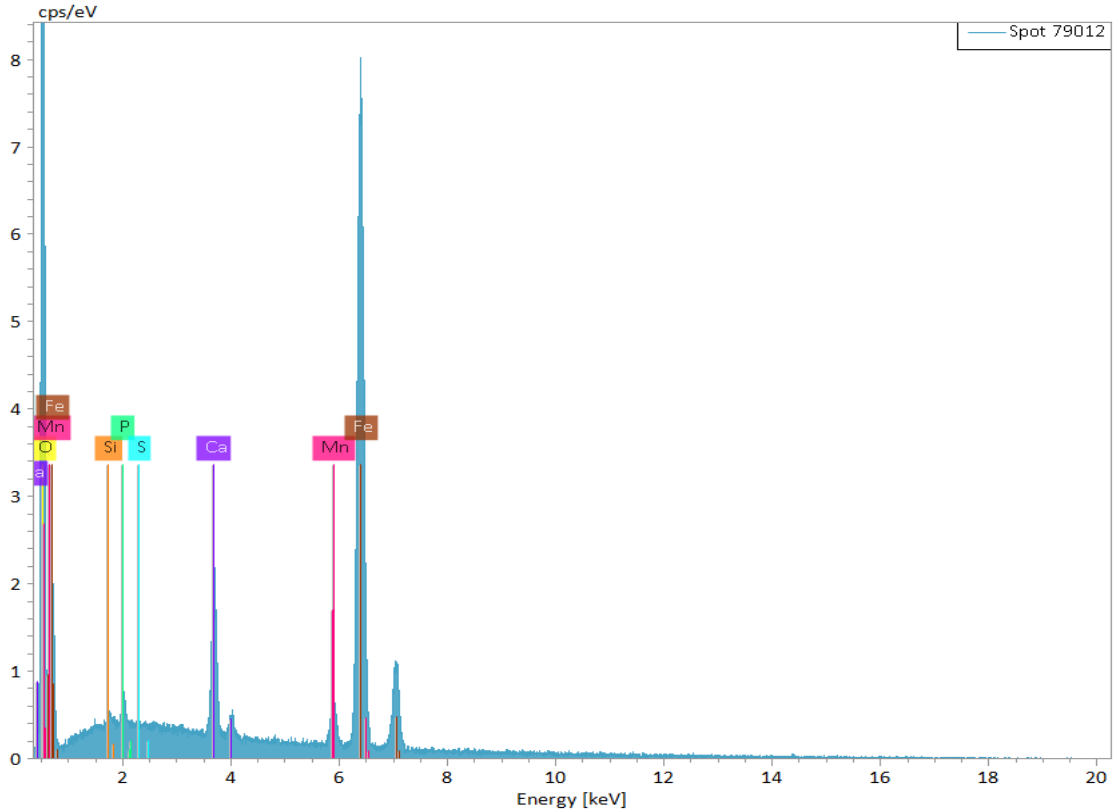
Client Sample No.: **AECOM-CONTROL -+2 – 073020**
Backscatter image of goethite replaced pyrite framboids – 4,360X

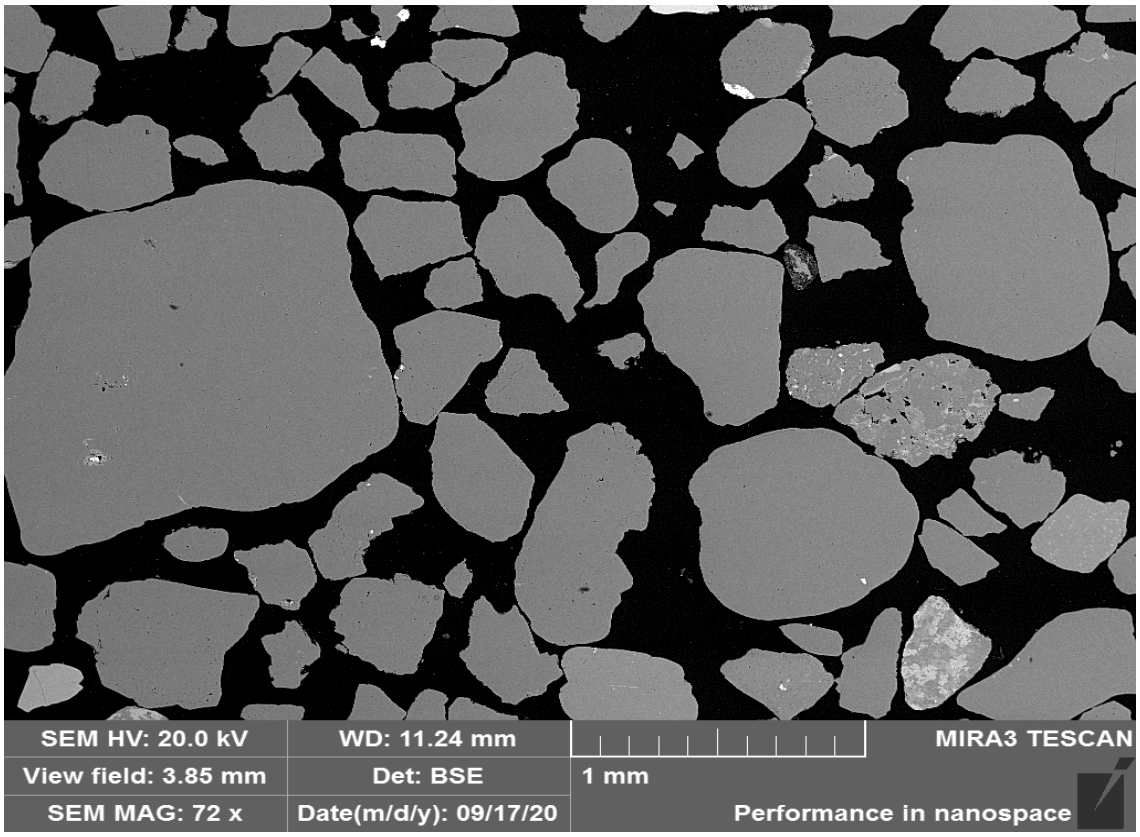




Client Sample No.: **AECOM-CONTROL -+2 – 073020**

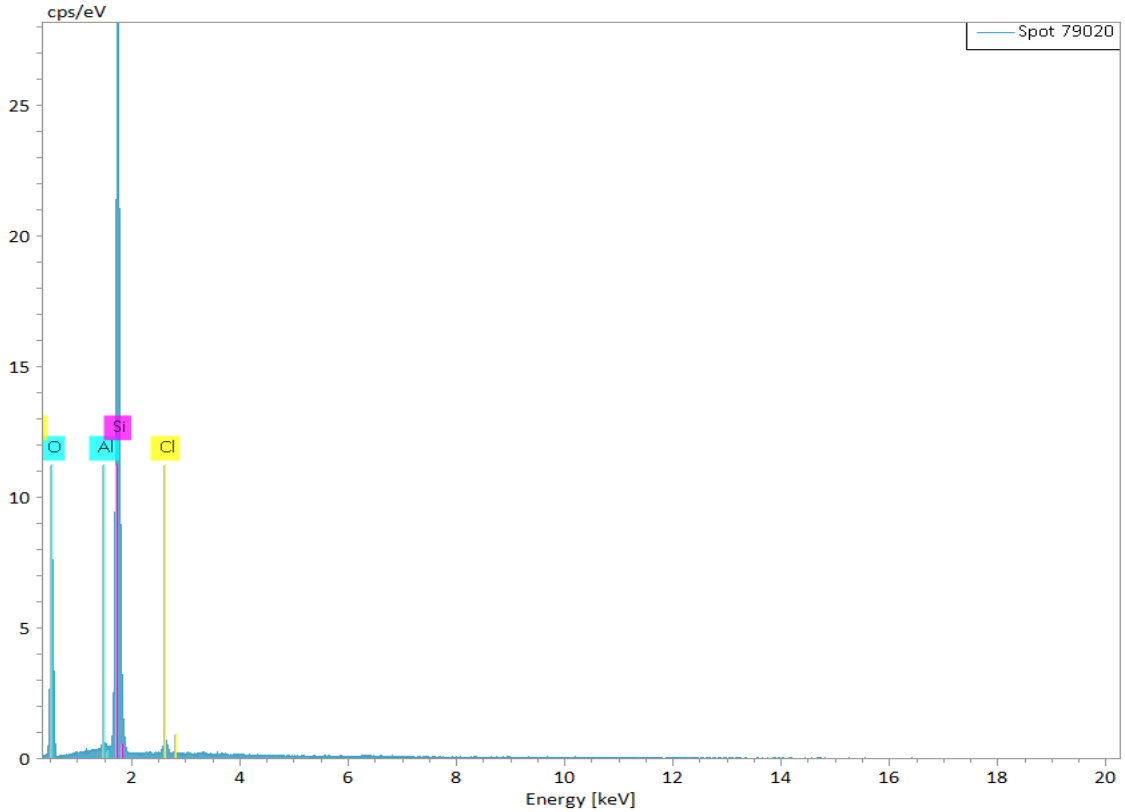
Backscatter image of a quartz grain with continuous rind of iron oxide – 454X





Client Sample No.: **AECOM-CONTROL -+2 – 073020**

Low magnification backscatter image showing grain morphology and size variation – 72X



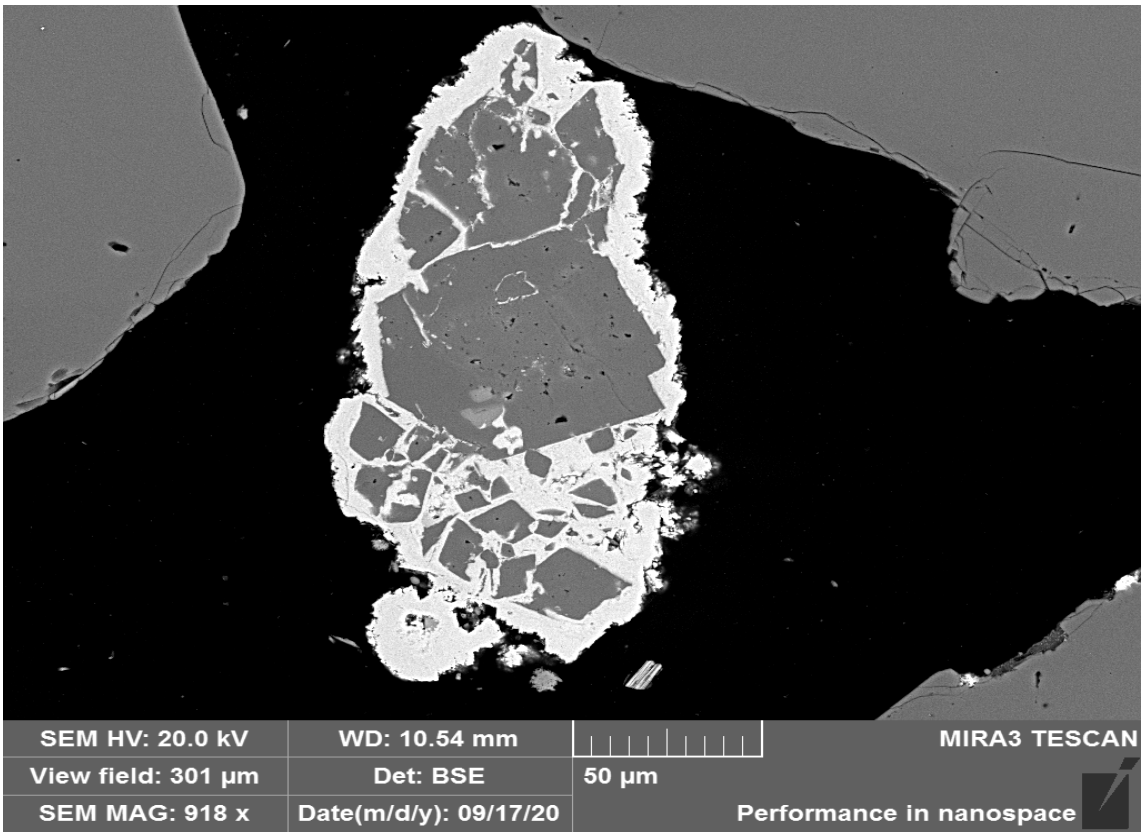
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**

Major Mineralogy by XRD: Quartz 61%, Plagioclase 14% K-spar 13% Mica 4% Chlorite 3% Amphibole 3%

Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite, Gypsum

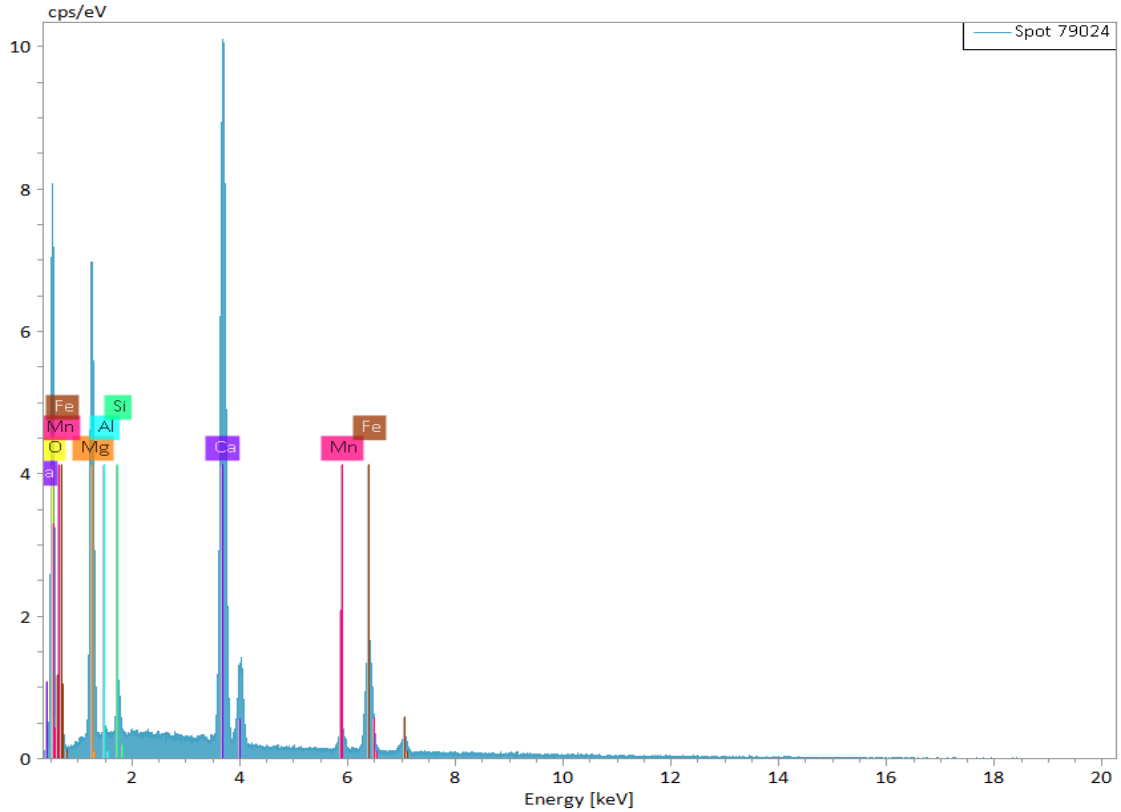
Microscopic Description by FE-SEM

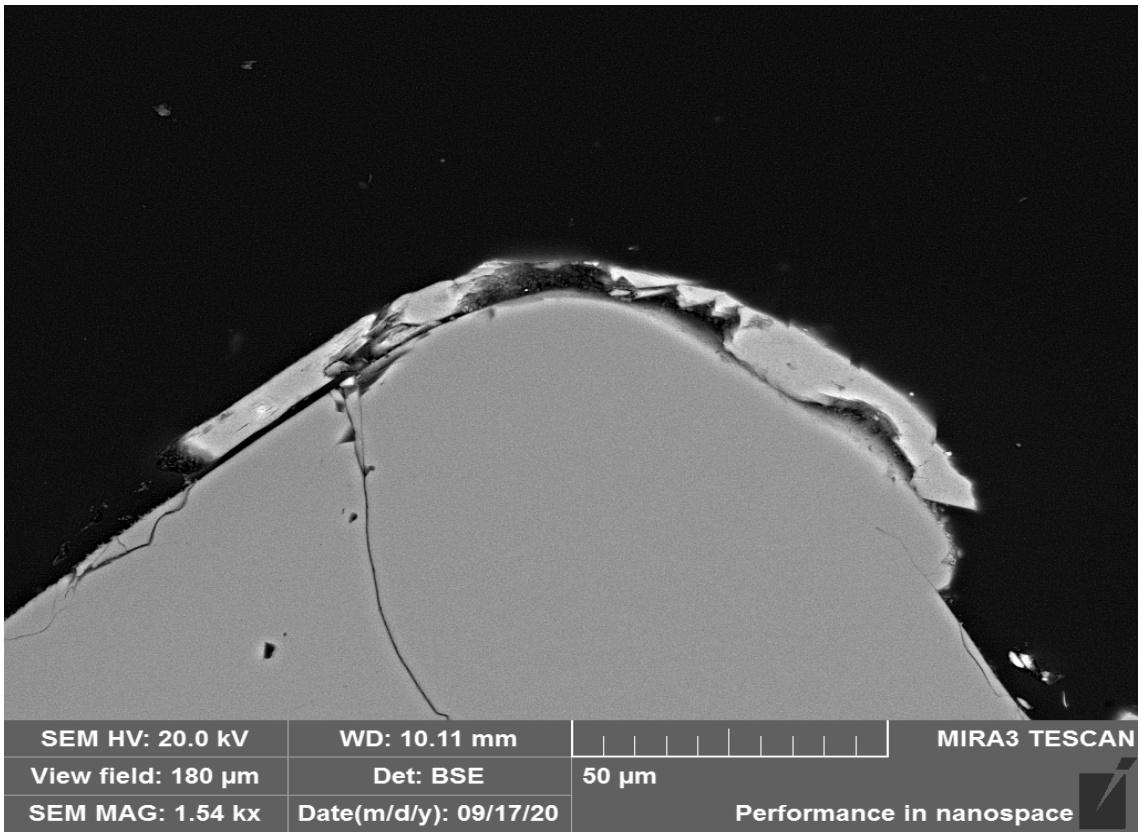
This sample a fine to coarse grained, brown colored unconsolidated sand and is essentially the same as the previous samples. XRD and FE-SEM identify the main phases as subrounded to rounded quartz/feldspar with lesser amounts of mica and amphibole. In thin section a minor population of the clasts shows coatings of secondary phases. Most common is calcite/dolomite with fairly thick coats of iron oxide. Iron oxide also occurs as thin coats on silicates and as liberated masses. In rock fragments with significant clay content, goethite pseudomorphs after pyrite cubes and pyrite framboids are common. A few rare quartz grains show discontinuous rinds of secondary gypsum.



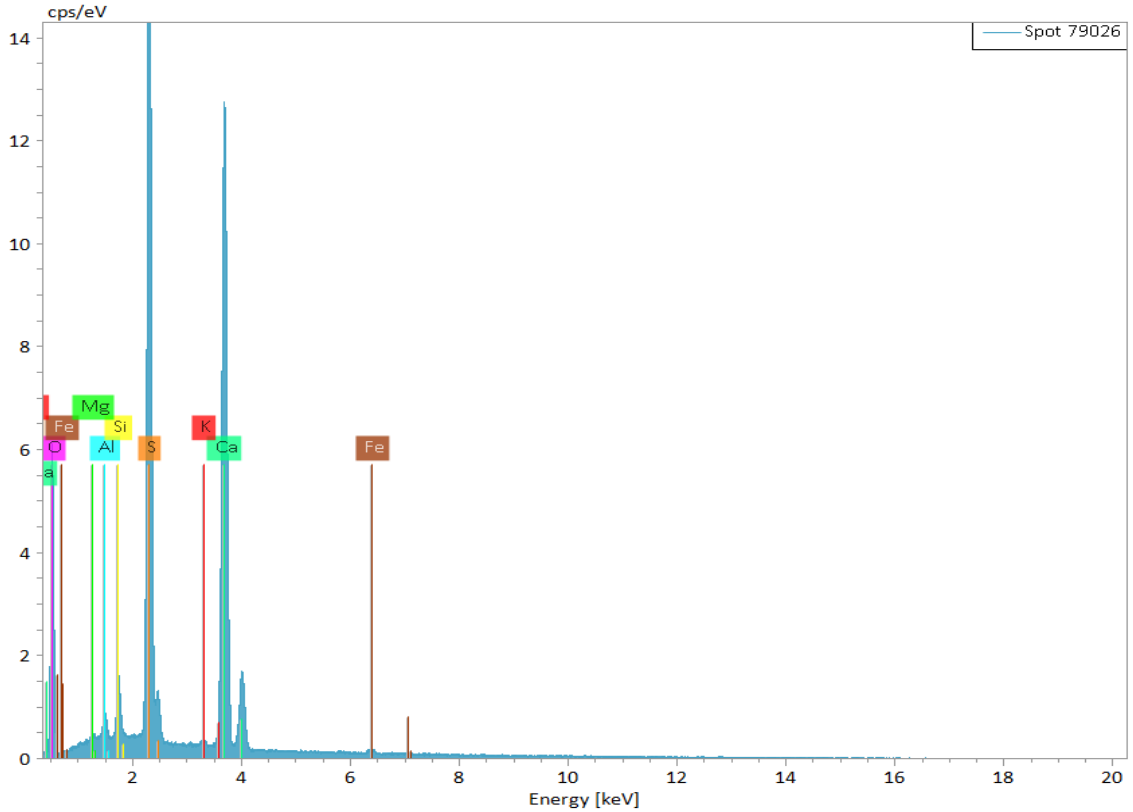
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**

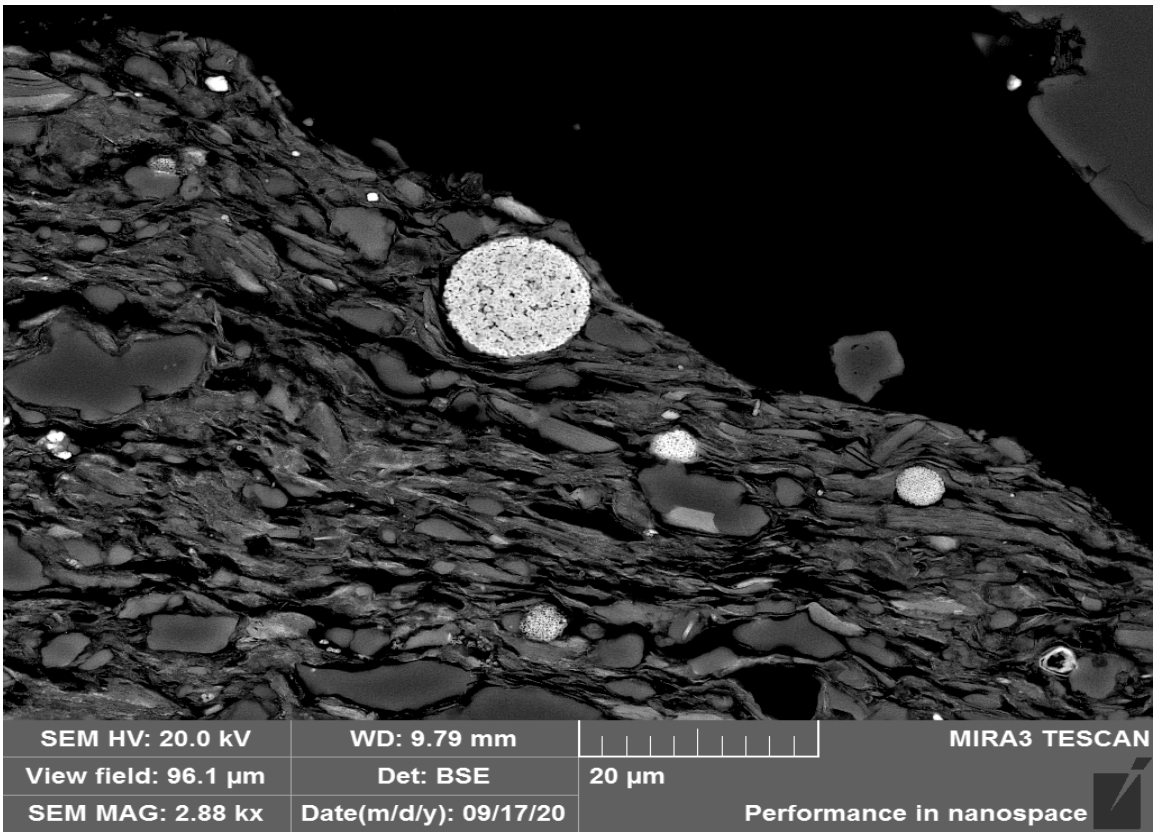
Backscatter image of dolomite cemented by secondary iron oxide – 918X



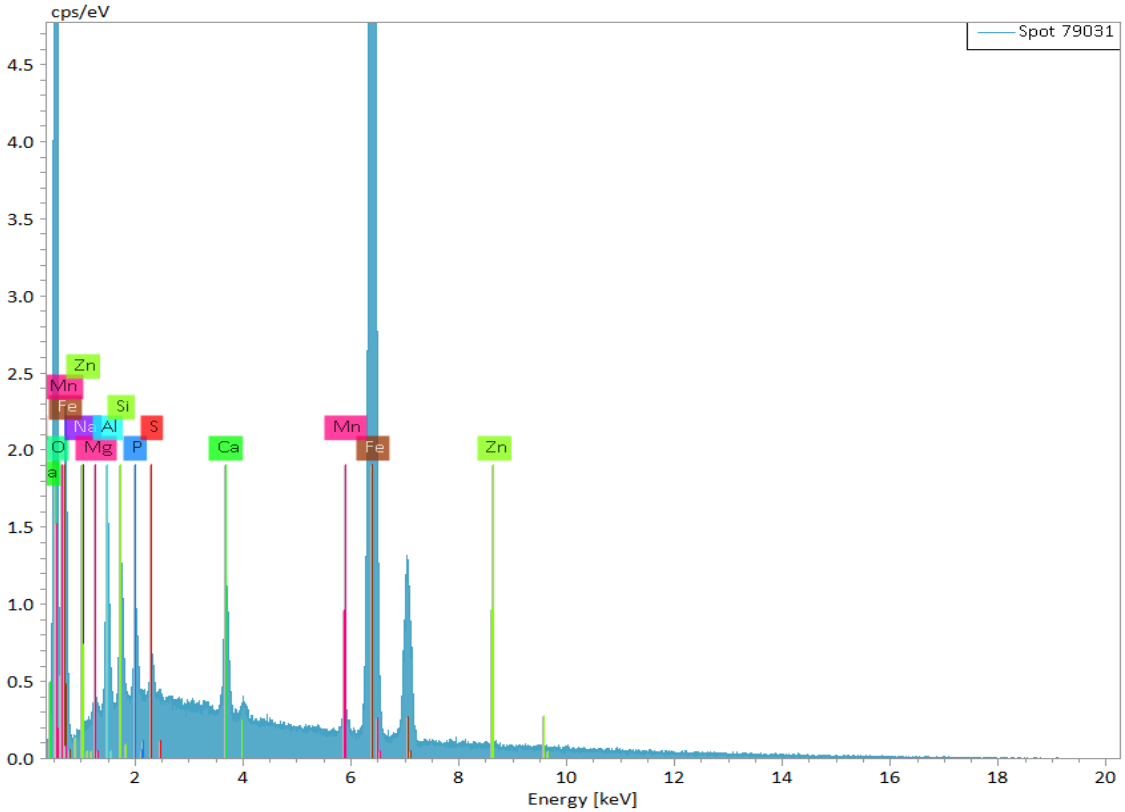


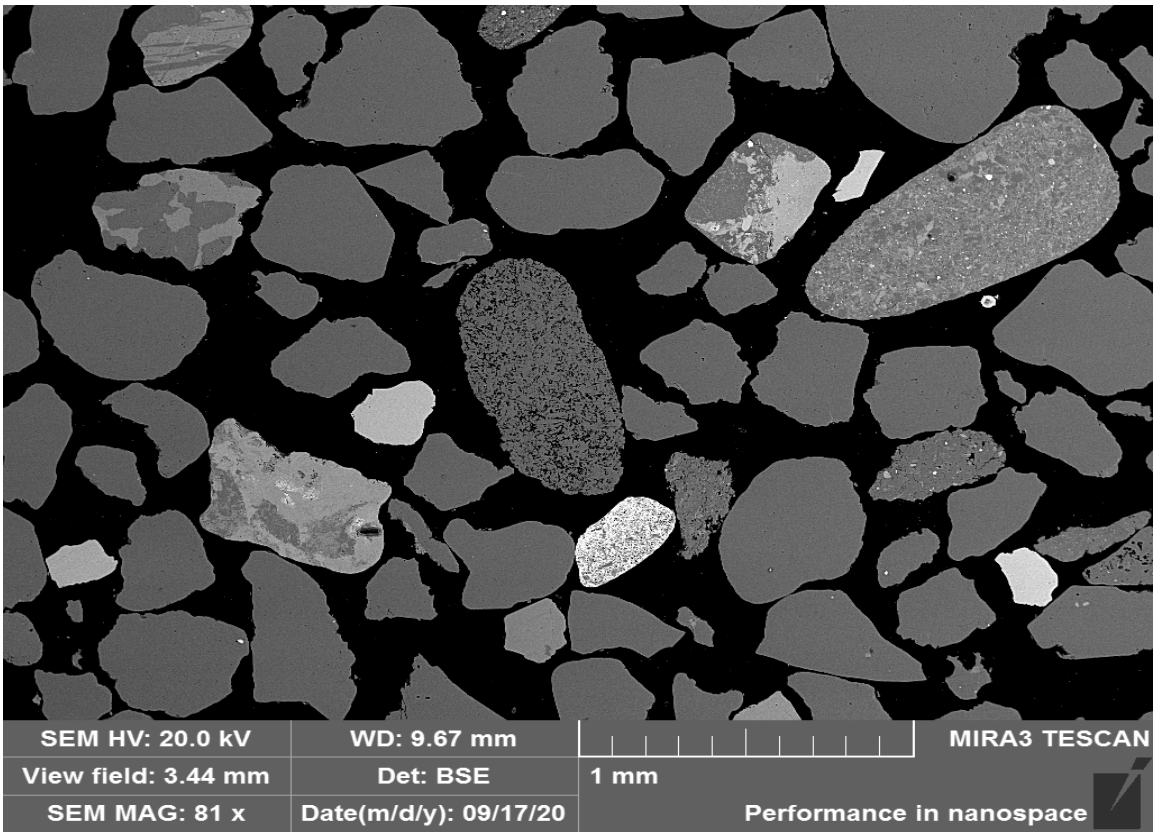
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**
Backscatter image of quartz with a rind of secondary gypsum – 1,540X





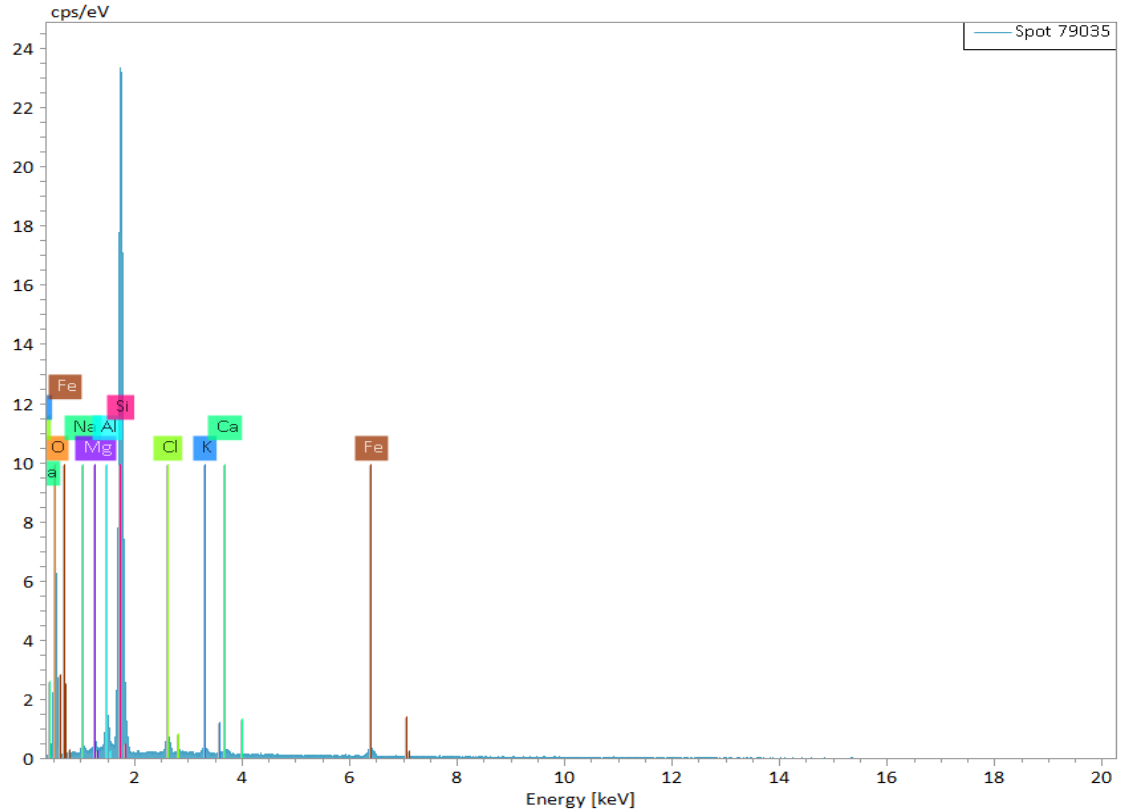
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**
Backscatter image of goethite replaced pyrite framboids – 2,880X

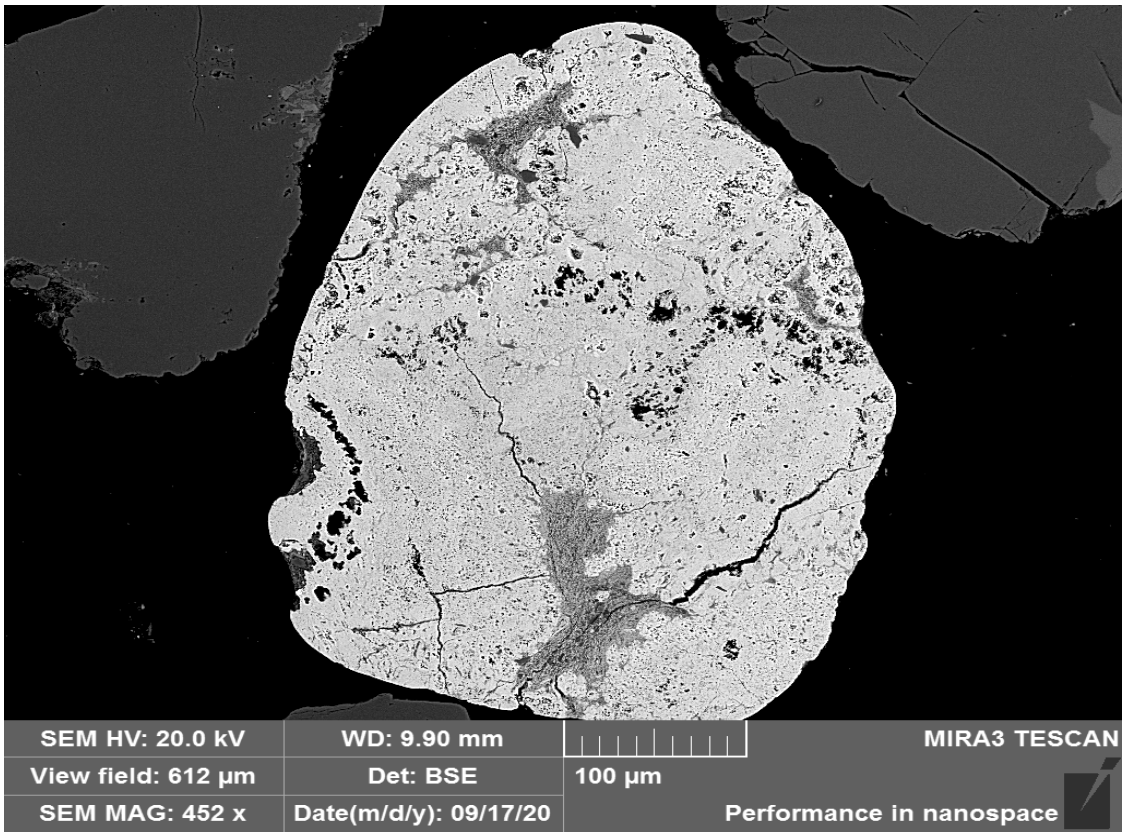




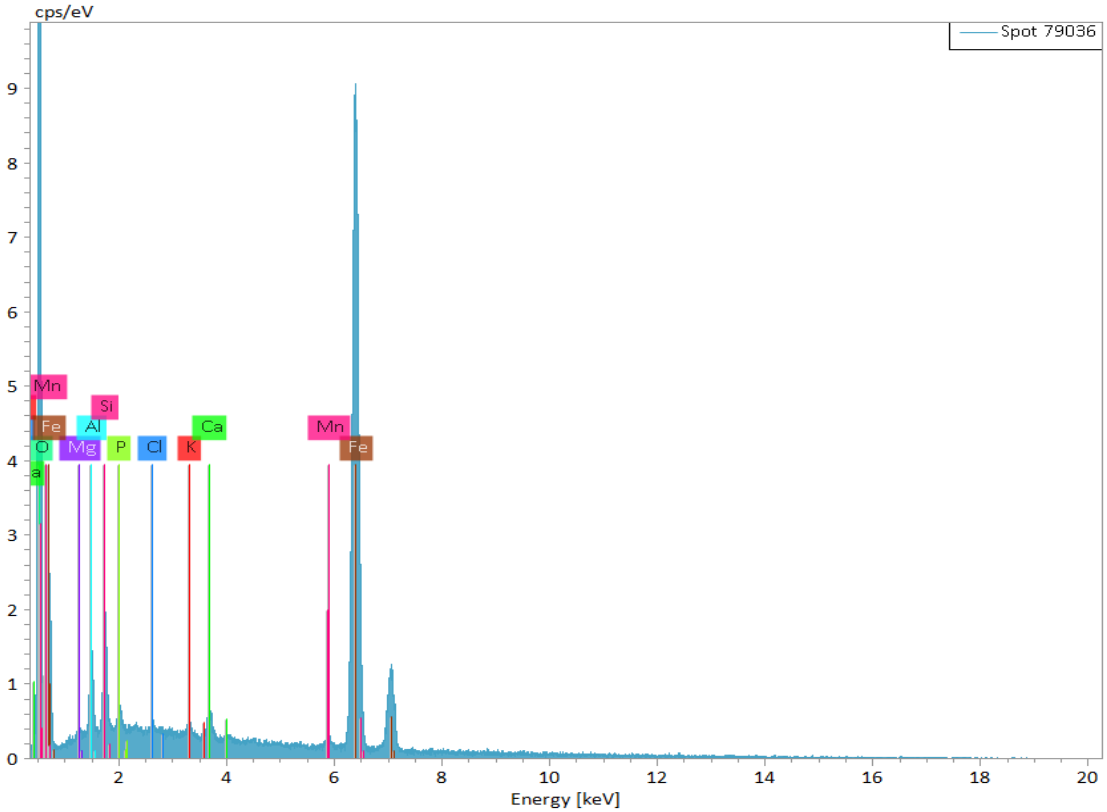
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**

Low magnification backscatter image showing grain morphology and size variation – 81X





Client Sample No.: **AECOM-Hi CAL -+2 – 073020**
Backscatter image of a large iron oxide mass – 452X



Appendix F Laboratory Reports

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-105162-1
Laboratory Sample Delivery Group: GAF NRS Treatability
Client Project/Site: TVA GAF AECOM Lab
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:17:05 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-105162-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-105162-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 4/30/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.2º C.

Metals
Method 3005A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-BKT-PHI-FB22-T1 (180-105162-2), GAF-GW-BKT-PHI-SOILCONTROL-T1 (180-105162-8) and GAF-GW-BKT-PHI-FB22 SOIL-T1 (180-105162-9). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-26-20
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
Oregon	NELAP	PA-2151	07-01-20
Pennsylvania	NELAP	02-00416	05-21-20
Rhode Island	State	LAO00362	12-31-20
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Water	04/29/20 12:00	04/30/20 08:15	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Water	04/29/20 12:00	04/30/20 08:15	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-BKT-PHI-CONTROL-T1

Lab Sample ID: 180-105162-1
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:20	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:04	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:17	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 01:53	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-FB22-T1

Lab Sample ID: 180-105162-2
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:24	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:07	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-DOLO-T1

Lab Sample ID: 180-105162-3
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:27	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:10	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:31	WTR	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:14	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:34	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:17	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-WC-PHI-NAOH-ZEOLITE-T1

Lab Sample ID: 180-105162-6
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:41	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:24	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:37	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:21	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:55	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:31	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:51	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:28	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 18:02	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:45	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:58	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:35	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-FB22 SOIL-T1

Lab Sample ID: 180-105162-9
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 18:09	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:52	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 18:05	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:49	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney

Batch Type: Analysis

RSK = Robert Kurtz

WTR = Bill Reinheimer

Client Sample ID: GAF-GW-BKT-PHI-CONTROL-T1

Lab Sample ID: 180-105162-1
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000597	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 01:53	1
Cadmium	0.00257		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:17	1
Lithium	0.0219	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 01:53	1
Nickel	0.0834		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:17	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:04	1
Cadmium	0.00216		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:20	1
Lithium	0.0184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:04	1
Nickel	0.0639		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:20	1

Client Sample ID: GAF-GW-BKT-PHI-FB22-T1

Lab Sample ID: 180-105162-2
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:07	1
Cadmium	0.00263	J	0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 17:24	1
Lithium	0.0475	B	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:07	1
Nickel	0.0544		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 17:24	1

Client Sample ID: GAF-GW-BKT-PHI-DOLO-T1

Lab Sample ID: 180-105162-3
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000991	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:10	1
Cadmium	0.000720	J	0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:27	1
Lithium	0.0112	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:10	1
Nickel	0.0569		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:27	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000265	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:14	1
Cadmium	0.000390	J	0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:31	1
Lithium	0.0106	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:14	1
Nickel	0.0200		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:31	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000562	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:17	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00747		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:34	1
Lithium	0.0283	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:17	1
Nickel	0.0543		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:34	1

Client Sample ID: GAF-GW-WC-PHI-NAOH-ZEOLITE-T1

Lab Sample ID: 180-105162-6
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:21	1
Cadmium	0.00191		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:37	1
Lithium	0.286	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:21	1
Nickel	0.0674		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:37	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:24	1
Cadmium	0.00166		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:41	1
Lithium	0.300	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:24	1
Nickel	0.0697		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:41	1

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:28	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:51	1
Lithium	0.184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:28	1
Nickel	0.000603	J	0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:51	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:31	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:55	1
Lithium	0.184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:31	1
Nickel	ND		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:55	1

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00808		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:35	1
Cadmium	0.0128		0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 17:58	1
Lithium	0.0897	B	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:35	1
Nickel	0.323		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 17:58	1

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:45	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 18:02	1
Lithium	**0.0112**	**B**	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:45	1
Nickel	**0.000545**	**J**	0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 18:02	1

Client Sample ID: GAF-GW-BKT-PHI-FB22 SOIL-T1

Lab Sample ID: 180-105162-9
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0105**		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:49	1
Cadmium	**0.0314**		0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 18:05	1
Lithium	**0.127**	**B**	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:49	1
Nickel	**1.02**		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 18:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0145**		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:52	1
Cadmium	**0.0785**		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 18:09	1
Lithium	**0.150**	**B**	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:52	1
Nickel	**1.93**		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 18:09	1

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

Lab Sample ID: MB 180-314367/1-A
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 16:28	1
Nickel	ND		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 16:28	1

Lab Sample ID: MB 180-314367/1-A
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 01:04	1
Lithium	0.004190	J	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 01:04	1

Lab Sample ID: LCS 180-314367/2-A
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.4964		mg/L		99	80 - 120
Nickel	0.500	0.4945		mg/L		99	80 - 120

Lab Sample ID: LCS 180-314367/2-A
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.4915		mg/L		98	80 - 120
Lithium	0.500	0.4770		mg/L		95	80 - 120

Lab Sample ID: 180-105129-C-3-B MS
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		0.500	0.5064		mg/L		101	75 - 125
Nickel	0.00138		0.500	0.4950		mg/L		99	75 - 125

Lab Sample ID: 180-105129-C-3-B MS
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.4881		mg/L		98	75 - 125
Lithium	0.00497	J B	0.500	0.4746		mg/L		94	75 - 125

Lab Sample ID: 180-105129-C-3-C MSD
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		0.500	0.5022		mg/L		100	75 - 125	1	20
Nickel	0.00138		0.500	0.4921		mg/L		98	75 - 125	1	20

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

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

Lab Sample ID: 180-105129-C-3-C MSD
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.4837		mg/L		97	75 - 125	1	20
Lithium	0.00497	J B	0.500	0.4660		mg/L		92	75 - 125	2	20

Metals

Prep Batch: 314367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	3005A	
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	3005A	
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	3005A	
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	3005A	
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	3005A	
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	3005A	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	3005A	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	3005A	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	3005A	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	3005A	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	3005A	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	3005A	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	3005A	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	3005A	
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 314621

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	EPA 6020A	314367
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	314367
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	314367

Analysis Batch: 314781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	EPA 6020A	314367

Metals (Continued)

Analysis Batch: 314781 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	EPA 6020A	314367
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	314367
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	314367

Chain of Custody Record 420758

eurofins | Environment Testing TestAmerica

Address: Pittsburgh, PA

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date: 4/28/2020	COC No:
Company Name: Jennifer Gables	Tel/Email: Craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: Environmental Standards, Inc.	Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS			Sampler:
City/State/Zip:	TAT if different from Below ____			For Lab Use Only:
Phone: 610.935.5577 x414	☐ 2 weeks			Walk-in Client:
Fax:	☒ 1 week			Lab Sampling:
Project Name: TVA Gallatin EIP	☐ 2 days			
Site: GAF-NRS-Treatability	☐ 1 day			Job / SDG No.:
PO#				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	6020A - total - Be, Li, Cd, Ni	6020A - dis - Be, Li, Cd, Ni	Sample Specific Notes:
GAF-GW-Bkt-PHI-Control-+1	4/27/20	1400	G	GW	2	Y/N		✓	✓	Dissolved has been filtered
GAF-GW-Bkt-PHI-FB22-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-Dolo-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-HiCal-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-HiCal-CaCl2-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-WC-PHI-NaOH-zeolite-+1	4/27/20	1400	G	|	2	Y/N		✓	✓	Dissolved has been filtered
GAF-GW-WC-PHI-444u-+1	4/27/20	1400	G	↓	2	Y/N		✓	✓	"
GAF-GW-Bkt-PHI-Soil control-+1	4/27/20	1200	G	|	2	Y/N		✓	✓	"
GAF-GW-Bkt-PHI-FB22 soil-+1	4/27/20	1200	G	↓	2	Y/N		✓	✓	"
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____								4	4	

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 sampl

☐ Return to Client ☑ Disposal by Lab

180-105162 Chain of Custody

Special Instructions/QC Requirements & Comments: total bottles were not filtered

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 4/29/20 1300 4/28/20 1600	Received by:	Company: EMPiv	Date/Time: 4/30/20 815
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-105162-1
SDG Number: GAF NRS Treatability

Login Number: 105162
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins 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	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-106977-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA GAF EIP

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
7/6/2020 2:33:14 PM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

LINKS

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Have a Question? Ask The Expert

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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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Case Narrative

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Job ID: 180-106977-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-106977-1

Receipt
The samples were received on 6/12/2020 8:30 AM; the samples arrived in good condition properly preserved and on ice. The temperature of the cooler at receipt was 3.8º C.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

The client requested the results to be run by ICP metals in order to achieve lower reporting limits on 6/19/20. Both metals runs are reported.

Metals
Method 6010D: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following samples: GAF-GW-Bkt-PHII-Control-441uSoil-19R (180-106977-1), GAF-GW-Bkt-PHII-Control-441uSoil-19R (180-106977-3) and (180-106977-A-1-B SD ^50). All analytes referencing the yttrium internal standards required dilution due to the yttrium internal standard counts being high and outside the 70%-130% control limits.

Method 6020A: The following samples were diluted due to the nature of the sample matrix on the internal standard: GAF-GW-Bkt-PHII-Control-441uSoil-19R (180-106977-1), GAF-GW-Bkt-PHII-HiCal-441uSoil-19R (180-106977-2), GAF-GW-Bkt-PHII-Control-441uSoil-19R (180-106977-3), GAF-GW-Bkt-PHII-HiCal-441uSoil-19R (180-106977-4) and (180-106977-A-4-A SD ^250). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	05-23-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-106977-1	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Water	06/11/20 13:00	06/12/20 08:30	
180-106977-2	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Water	06/11/20 13:00	06/12/20 08:30	
180-106977-3	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Water	06/11/20 13:00	06/12/20 08:30	
180-106977-4	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Water	06/11/20 13:00	06/12/20 08:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6010D	Metals (ICP)	SW846	TAL PIT
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-Bkt-PHII-Control-441uSoil-19R
Lab Sample ID: 180-106977-1
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	EPA 6010D		1			319958	06/29/20 16:20	RJG	TAL PIT
	Instrument ID: C									
Total Recoverable	Prep	3005A			50 mL	50 mL	320002	06/30/20 09:28	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6010D		10			320118	06/30/20 09:25	RJG	TAL PIT
	Instrument ID: C									
Total Recoverable	Prep	3005A			50 mL	50 mL	320002	06/30/20 09:28	KEM	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	318353	06/12/20 17:18	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		50			318620	06/16/20 09:40	RJR	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-Bkt-PHII-HiCal-441uSoil-19R
Lab Sample ID: 180-106977-2
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	EPA 6010D		1			319958	06/29/20 16:30	RJG	TAL PIT
	Instrument ID: C									
Total Recoverable	Prep	3005A			50 mL	50 mL	320002	06/30/20 09:28	KEM	TAL PIT
Total Recoverable	Prep	3005A			50 mL	50 mL	318353	06/12/20 17:18	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		50			318620	06/16/20 09:43	RJR	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-Bkt-PHII-Control-441uSoil-19R
Lab Sample ID: 180-106977-3
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	EPA 6010D		1			319958	06/29/20 16:35	RJG	TAL PIT
	Instrument ID: C									
Dissolved	Prep	3005A			50 mL	50 mL	320002	06/30/20 09:28	KEM	TAL PIT
Dissolved	Prep	3005A			50 mL	50 mL	320002	06/30/20 09:28	KEM	TAL PIT
Dissolved	Analysis	EPA 6010D		10			320118	06/30/20 09:35	RJG	TAL PIT
	Instrument ID: C									
Dissolved	Prep	3005A			50 mL	50 mL	318353	06/12/20 17:18	JL	TAL PIT
Dissolved	Analysis	EPA 6020A		50			318620	06/16/20 09:47	RJR	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-Bkt-PHII-HiCal-441uSoil-19R
Lab Sample ID: 180-106977-4
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	EPA 6010D		1			319958	06/29/20 16:41	RJG	TAL PIT
	Instrument ID: C									
Dissolved	Prep	3005A			50 mL	50 mL	320002	06/30/20 09:28	KEM	TAL PIT

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-Bkt-PHII-HiCal-441uSoil-19R

Lab Sample ID: 180-106977-4

Date Collected: 06/11/20 13:00

Matrix: Water

Date Received: 06/12/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	318353	06/12/20 17:18	JL	TAL PIT
Dissolved	Analysis	EPA 6020A		50			318620	06/16/20 09:50	RJR	TAL PIT
	Instrument ID: A									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

JL = James Lyu

KEM = Kimberly Mahoney

Batch Type: Analysis

RJG = Rob Good

RJR = Ron Rosenbaum

Client Sample ID: GAF-GW-Bkt-PHII-Control-441uSoil-19R

Lab Sample ID: 180-106977-1
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Method: EPA 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0558		0.0400	0.00333	mg/L		06/30/20 09:28	06/30/20 09:25	10
Cadmium	0.0118	J	0.0500	0.00279	mg/L		06/30/20 09:28	06/30/20 09:25	10
Iron	324		1.00	0.305	mg/L		06/30/20 09:28	06/30/20 09:25	10
Nickel	1.44		0.0400	0.00152	mg/L		06/30/20 09:28	06/29/20 16:20	1
Lithium	0.113	J	0.500	0.0860	mg/L		06/30/20 09:28	06/30/20 09:25	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	53.9		50.0	9.10	ug/L		06/12/20 17:18	06/16/20 09:40	50
Cadmium	17.8	J	50.0	10.9	ug/L		06/12/20 17:18	06/16/20 09:40	50
Lithium	ND		250	170	ug/L		06/12/20 17:18	06/16/20 09:40	50
Nickel	1470		50.0	16.8	ug/L		06/12/20 17:18	06/16/20 09:40	50

Client Sample ID: GAF-GW-Bkt-PHII-HiCal-441uSoil-19R

Lab Sample ID: 180-106977-2
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Method: EPA 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00400	0.000333	mg/L		06/30/20 09:28	06/29/20 16:30	1
Cadmium	0.000460	J	0.00500	0.000279	mg/L		06/30/20 09:28	06/29/20 16:30	1
Iron	0.458		0.100	0.0305	mg/L		06/30/20 09:28	06/29/20 16:30	1
Nickel	0.00511	J	0.0400	0.00152	mg/L		06/30/20 09:28	06/29/20 16:30	1
Lithium	0.0109	J	0.0500	0.00860	mg/L		06/30/20 09:28	06/29/20 16:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		50.0	9.10	ug/L		06/12/20 17:18	06/16/20 09:43	50
Cadmium	ND		50.0	10.9	ug/L		06/12/20 17:18	06/16/20 09:43	50
Lithium	ND		250	170	ug/L		06/12/20 17:18	06/16/20 09:43	50
Nickel	ND		50.0	16.8	ug/L		06/12/20 17:18	06/16/20 09:43	50

Client Sample ID: GAF-GW-Bkt-PHII-Control-441uSoil-19R

Lab Sample ID: 180-106977-3
Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Method: EPA 6010D - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0528		0.0400	0.00333	mg/L		06/30/20 09:28	06/30/20 09:35	10
Cadmium	0.0114	J	0.0500	0.00279	mg/L		06/30/20 09:28	06/30/20 09:35	10
Iron	305		1.00	0.305	mg/L		06/30/20 09:28	06/30/20 09:35	10
Nickel	1.41		0.0400	0.00152	mg/L		06/30/20 09:28	06/29/20 16:35	1
Lithium	0.105	J	0.500	0.0860	mg/L		06/30/20 09:28	06/30/20 09:35	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	48.0	J	50.0	9.10	ug/L		06/12/20 17:18	06/16/20 09:47	50
Cadmium	15.4	J	50.0	10.9	ug/L		06/12/20 17:18	06/16/20 09:47	50
Lithium	ND		250	170	ug/L		06/12/20 17:18	06/16/20 09:47	50
Nickel	1390		50.0	16.8	ug/L		06/12/20 17:18	06/16/20 09:47	50

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-106977-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-Bkt-PHII-HiCal-441uSoil-19R

Lab Sample ID: 180-106977-4

Date Collected: 06/11/20 13:00
Matrix: Water
Date Received: 06/12/20 08:30

Method: EPA 6010D - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00400	0.000333	mg/L		06/30/20 09:28	06/29/20 16:41	1
Cadmium	**0.000300**	**J**	0.00500	0.000279	mg/L		06/30/20 09:28	06/29/20 16:41	1
Iron	ND		0.100	0.0305	mg/L		06/30/20 09:28	06/29/20 16:41	1
Nickel	**0.00376**	**J**	0.0400	0.00152	mg/L		06/30/20 09:28	06/29/20 16:41	1
Lithium	**0.0107**	**J**	0.0500	0.00860	mg/L		06/30/20 09:28	06/29/20 16:41	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		50.0	9.10	ug/L		06/12/20 17:18	06/16/20 09:50	50
Cadmium	ND		50.0	10.9	ug/L		06/12/20 17:18	06/16/20 09:50	50
Lithium	ND		250	170	ug/L		06/12/20 17:18	06/16/20 09:50	50
Nickel	ND		50.0	16.8	ug/L		06/12/20 17:18	06/16/20 09:50	50

Method: EPA 6010D - Metals (ICP)

Lab Sample ID: MB 180-320002/1-A
Matrix: Water
Analysis Batch: 319958

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 320002

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00400	0.000333	mg/L		06/30/20 09:28	06/29/20 16:05	1
Cadmium	ND		0.00500	0.000279	mg/L		06/30/20 09:28	06/29/20 16:05	1
Iron	ND		0.100	0.0305	mg/L		06/30/20 09:28	06/29/20 16:05	1
Nickel	ND		0.0400	0.00152	mg/L		06/30/20 09:28	06/29/20 16:05	1
Lithium	ND		0.0500	0.00860	mg/L		06/30/20 09:28	06/29/20 16:05	1

Lab Sample ID: LCS 180-320002/2-A
Matrix: Water
Analysis Batch: 319958

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 320002

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.5016		mg/L		100	80 - 120
Cadmium	0.500	0.4973		mg/L		99	80 - 120
Iron	5.00	4.994		mg/L		100	80 - 120
Nickel	0.500	0.4953		mg/L		99	80 - 120
Lithium	0.500	0.4902		mg/L		98	80 - 120

Lab Sample ID: LCSD 180-320002/3-A
Matrix: Water
Analysis Batch: 319958

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 320002

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	0.500	0.5056		mg/L		101	80 - 120	1	20
Cadmium	0.500	0.5034		mg/L		101	80 - 120	1	20
Iron	5.00	5.050		mg/L		101	80 - 120	1	20
Nickel	0.500	0.5016		mg/L		100	80 - 120	1	20
Lithium	0.500	0.4935		mg/L		99	80 - 120	1	20

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

Lab Sample ID: MB 180-318353/1-A
Matrix: Water
Analysis Batch: 318620

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 318353

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		06/12/20 17:18	06/16/20 09:14	1
Cadmium	ND		1.00	0.217	ug/L		06/12/20 17:18	06/16/20 09:14	1
Lithium	ND		5.00	3.39	ug/L		06/12/20 17:18	06/16/20 09:14	1
Nickel	ND		1.00	0.336	ug/L		06/12/20 17:18	06/16/20 09:14	1

Lab Sample ID: LCS 180-318353/2-A
Matrix: Water
Analysis Batch: 318620

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 318353

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	500	458.1		ug/L		92	80 - 120
Cadmium	500	519.0		ug/L		104	80 - 120
Lithium	500	466.8		ug/L		93	80 - 120
Nickel	500	453.2		ug/L		91	80 - 120

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

Lab Sample ID: LCSD 180-318353/3-A
Matrix: Water
Analysis Batch: 318620

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 318353

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			500	461.7		ug/L		92	80 - 120	1	20
Cadmium			500	532.4		ug/L		106	80 - 120	3	20
Lithium			500	479.6		ug/L		96	80 - 120	3	20
Nickel			500	456.1		ug/L		91	80 - 120	1	20

Metals

Prep Batch: 318353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106977-1	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Total Recoverable	Water	3005A	
180-106977-2	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Total Recoverable	Water	3005A	
180-106977-3	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Dissolved	Water	3005A	
180-106977-4	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Dissolved	Water	3005A	
MB 180-318353/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-318353/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-318353/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Analysis Batch: 318620

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106977-1	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Total Recoverable	Water	EPA 6020A	318353
180-106977-2	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Total Recoverable	Water	EPA 6020A	318353
180-106977-3	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Dissolved	Water	EPA 6020A	318353
180-106977-4	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Dissolved	Water	EPA 6020A	318353
MB 180-318353/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	318353
LCS 180-318353/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	318353
LCSD 180-318353/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	318353

Analysis Batch: 319958

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106977-1	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Total Recoverable	Water	EPA 6010D	320002
180-106977-2	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Total Recoverable	Water	EPA 6010D	320002
180-106977-3	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Dissolved	Water	EPA 6010D	320002
180-106977-4	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Dissolved	Water	EPA 6010D	320002
MB 180-320002/1-A	Method Blank	Total Recoverable	Water	EPA 6010D	320002
LCS 180-320002/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6010D	320002
LCSD 180-320002/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6010D	320002

Prep Batch: 320002

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106977-1	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Total Recoverable	Water	3005A	
180-106977-2	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Total Recoverable	Water	3005A	
180-106977-3	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Dissolved	Water	3005A	
180-106977-4	GAF-GW-Bkt-PHII-HiCal-441uSoil-19R	Dissolved	Water	3005A	
MB 180-320002/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-320002/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-320002/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Analysis Batch: 320118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106977-1	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Total Recoverable	Water	EPA 6010D	320002
180-106977-3	GAF-GW-Bkt-PHII-Control-441uSoil-19R	Dissolved	Water	EPA 6010D	320002

Chain of Custody Record

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TAL-8210

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/11/2020	COC No:
Company Name: Environmental Stds Inc.	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF-NRS-Treatability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	6020 totals - Be, Cd, Li, Ni	6020 dissolved Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-Bkt-PHII-Control-441uSol-19R	6/11/20	1300	G	GW	1	N	N	✓		totals - Be, Cd, Li, Ni
GAF-GW-Bkt-PHII-HiCal-441uSol-19R	6/11/20	1300	G	GW	1	N	N	✓		
GAF-GW-Bkt-PHII-Control-441uSol-19R	6/11/20	1300	G	GW	1	Y	N		✓	dissolved - Be, Cd, Li, Ni
GAF-GW-Bkt-PHII-HiCal-441uSol-19R	6/11/20	1300	G	GW	1	Y	N		✓	

180-106977 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/11/20 1400	[signature]	ETA	6-12-20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time: 8:30
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:


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Environment Testing
TestAmerica
180-106977 Waybill
ORIGIN ID:PHL
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
CAD:
0
MAN
E3911
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S18
58932
RMA:
FedEx
Express
FedEx
TRK#
0221 1680 3500 0780
FRI - 12 JUN 10:30A
PRIORITY OVERNIGHT
XH AGCA
15238
PA-US
PIT
Uncorrected temp 3.8 °C
Thermometer ID 14
CF 0 Initials TB
T-WI-SR-001 effective 7/26/13
FID: 1711129 11Jun2020 MMRA 56CG1/C7DD/05A2

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-106977-1
SDG Number: GAF-NRS-Treatability

Login Number: 106977
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins 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?	False	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-107627-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA Gallatin EIP
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:58:43 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Job ID: 180-107627-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-107627-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 6/26/2020 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.2º C.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	07-21-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-107627-1	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-3	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-4	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-5	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-6	GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-7	GAF-GW-PHII-BKT-NAOH-SAND-19R-T2	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-8	GAF-GW-PHII-BKT-DOLO-SAND-19R-T2	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-9	GAF-GW-PHII-BKT-DOLO-SAND-444U-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-10	GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-11	GAF-GW-PHII-BKT-FB22-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-12	GAF-GW-PHII-BKT-CONTROL-441USOIL-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Water	06/24/20 13:00	06/26/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2
Lab Sample ID: 180-107627-1
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:33	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2
Lab Sample ID: 180-107627-2
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:37	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2
Lab Sample ID: 180-107627-3
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Dissolved	Analysis	EPA 6020A		1			320452	07/03/20 02:40	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2
Lab Sample ID: 180-107627-4
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Dissolved	Analysis	EPA 6020A		1			320452	07/03/20 02:44	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3
Lab Sample ID: 180-107627-5
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:47	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3

Lab Sample ID: 180-107627-6
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:11	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-NAOH-SAND-19R-T2

Lab Sample ID: 180-107627-7
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:15	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-19R-T2

Lab Sample ID: 180-107627-8
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:18	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T3

Lab Sample ID: 180-107627-9
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:22	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-107627-10
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:25	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-FB22-SAND-19R-T3

Lab Sample ID: 180-107627-11
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:29	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T3

Lab Sample ID: 180-107627-12
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:32	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T3

Lab Sample ID: 180-107627-13
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:36	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

JL = James Lyu

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2

Lab Sample ID: 180-107627-1
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0802		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:33	1
Cadmium	0.0152		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:33	1
Lithium	0.118		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:33	1
Nickel	1.50		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:33	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2

Lab Sample ID: 180-107627-2
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:37	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:37	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:37	1
Nickel	0.000929	J	0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:37	1

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2

Lab Sample ID: 180-107627-3
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0817		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:40	1
Cadmium	0.0147		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:40	1
Lithium	0.117		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:40	1
Nickel	1.47		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:40	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2

Lab Sample ID: 180-107627-4
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:44	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:44	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:44	1
Nickel	0.000703	J	0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:44	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3

Lab Sample ID: 180-107627-5
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00212		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:47	1
Cadmium	0.00324		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:47	1
Lithium	0.0451		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:47	1
Nickel	0.178		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:47	1

Client Sample ID: GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3

Lab Sample ID: 180-107627-6

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.00219**		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:11	1
Cadmium	**0.00307**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:11	1
Lithium	**0.0469**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:11	1
Nickel	**0.175**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:11	1

Client Sample ID: GAF-GW-PHII-BKT-NAOH-SAND-19R-T2

Lab Sample ID: 180-107627-7

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:15	1
Cadmium	**0.00219**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:15	1
Lithium	**0.0228**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:15	1
Nickel	**0.0769**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:15	1

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-19R-T2

Lab Sample ID: 180-107627-8

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:18	1
Cadmium	**0.00276**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:18	1
Lithium	**0.0237**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:18	1
Nickel	**0.0654**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:18	1

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T3

Lab Sample ID: 180-107627-9

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:22	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:22	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:22	1
Nickel	**0.00252**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:22	1

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-107627-10

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.00715**		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:25	1
Cadmium	**0.00980**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:25	1
Lithium	**0.0694**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:25	1
Nickel	**0.521**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:25	1

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-FB22-SAND-19R-T3

Lab Sample ID: 180-107627-11
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:29	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:29	1
Lithium	**0.0460**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:29	1
Nickel	**0.0301**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:29	1

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T3

Lab Sample ID: 180-107627-12
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0843**		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:32	1
Cadmium	**0.0146**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:32	1
Lithium	**0.116**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:32	1
Nickel	**1.48**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:32	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T3

Lab Sample ID: 180-107627-13
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.000461**	**J**	0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:36	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:36	1
Lithium	**0.00541**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:36	1
Nickel	**0.00586**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:36	1

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

Lab Sample ID: MB 180-320070/1-A
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:16	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:16	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:16	1
Nickel	ND		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:16	1

Lab Sample ID: LCS 180-320070/2-A
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.5125		mg/L		102	80 - 120
Cadmium	0.500	0.5007		mg/L		100	80 - 120
Lithium	0.500	0.5116		mg/L		102	80 - 120
Nickel	0.500	0.4986		mg/L		100	80 - 120

Lab Sample ID: 180-107627-5 MS
Matrix: Water
Analysis Batch: 320452

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.00212		0.500	0.5076		mg/L		101	75 - 125
Cadmium	0.00324		0.500	0.5101		mg/L		101	75 - 125
Lithium	0.0451		0.500	0.5549		mg/L		102	75 - 125
Nickel	0.178		0.500	0.6812		mg/L		101	75 - 125

Lab Sample ID: 180-107627-5 MSD
Matrix: Water
Analysis Batch: 320452

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	0.00212		0.500	0.4919		mg/L		98	75 - 125	3	20
Cadmium	0.00324		0.500	0.4930		mg/L		98	75 - 125	3	20
Lithium	0.0451		0.500	0.5336		mg/L		98	75 - 125	4	20
Nickel	0.178		0.500	0.6460		mg/L		94	75 - 125	5	20

Metals

Prep Batch: 320070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107627-1	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Total Recoverable	Water	3005A	
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Total Recoverable	Water	3005A	
180-107627-3	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Dissolved	Water	3005A	
180-107627-4	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Dissolved	Water	3005A	
180-107627-5	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-6	GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-7	GAF-GW-PHII-BKT-NAOH-SAND-19R-T2	Total Recoverable	Water	3005A	
180-107627-8	GAF-GW-PHII-BKT-DOLO-SAND-19R-T2	Total Recoverable	Water	3005A	
180-107627-9	GAF-GW-PHII-BKT-DOLO-SAND-444U-T3	Total Recoverable	Water	3005A	
180-107627-10	GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-11	GAF-GW-PHII-BKT-FB22-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-12	GAF-GW-PHII-BKT-CONTROL-441USOIL-T3	Total Recoverable	Water	3005A	
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Total Recoverable	Water	3005A	
MB 180-320070/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-320070/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-107627-5 MS	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-5 MSD	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	3005A	

Analysis Batch: 320452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107627-1	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-3	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Dissolved	Water	EPA 6020A	320070
180-107627-4	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Dissolved	Water	EPA 6020A	320070
180-107627-5	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-6	GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-7	GAF-GW-PHII-BKT-NAOH-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-8	GAF-GW-PHII-BKT-DOLO-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-9	GAF-GW-PHII-BKT-DOLO-SAND-444U-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-10	GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-11	GAF-GW-PHII-BKT-FB22-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-12	GAF-GW-PHII-BKT-CONTROL-441USOIL-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Total Recoverable	Water	EPA 6020A	320070
MB 180-320070/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	320070
LCS 180-320070/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	320070
180-107627-5 MS	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-5 MSD	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Chain of Custody Record

420755 eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x 414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 totals - Be, Cd, Li, Ni	6020 dissolved - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PHII-Bkt-Control-441 Soil-t2	6/18/20	1300	G	GW	1	N	N	✓		totals Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441 Soil-t2	6/18/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Control-441u Soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	dissolved Be, Cd Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441u Soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	
GAF-GW-PHII-Bkt-Hi Cal-Sand-19R-t3	6/24/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Hi Cal CaCl2-Sand-19R-t3	↓	↓	↓	↓	1	N	N	✓		
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-441u-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-Control-Sand-19R-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-FB22-Sand-19R-t3					1	N	N	✓		
		RSW			1	N	N	✓		

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

☐ Return to Client ☑ Disposal by Lab ☐ Ar

180-107627 Chain of Custody

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 6/25/2020 1500	Received by:	Company: EMSL	Date/Time: 6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Chain of Custody Record

420753 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Borjas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	2 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 totals - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PH II-Bkt-Control-441u soil-t3	6/24/20	1300	G	GW	1	N	N	✓	totals Be, Cd, Li, Ni
GAF-GW-PH II-Bkt-Hi Cal-441u soil-t3	↓	↓	↓	↓	1	N	N	✓	

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/20 1500		GTN PW	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

rdw 7/6/20 rev1

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Chain of Custody Record

420755

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Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	(320 total Be, Cd, Li, Ni)	(6020 dissolved Be, Cd, Li, Ni)	Sample Specific Notes:
GAF-GW-PHII-Bkt-Control-444u Soil-t2	6/18/20	1300	G	GW	1	N	N	✓		totals Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-444u Soil-t2 (rdw 7/6/20)	6/18/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Control-444u Soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	dissolved Be, Cd Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-444u Soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	
GAF-GW-PHII-Bkt-Hi Cal-Sand-19R-t3	6/24/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Hi Cal Calib-Sand-19R-t3	↓	↓	↓	↓	1	N	N	✓		Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-444u-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-Control-Sand-19R-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-FB22-Sand-19R-t3					1	N	N	✓		to be analyzed
		rdw			1	N	N	✓		

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

☐ Return to Client ☑ Disposal by Lab ☐ Ar

180-107627 Chain of Custody

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 6/25/2020 1500	Received by:	Company: ESMan	Date/Time: 6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

rdw 7/6/20 rev1

Chain of Custody Record 420753

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301 Alpha Dr.
Address: Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Burgos	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	2 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 total 15 - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PH II-BKT-Control-44/45oil-+3	6/24/20	1300	G	GW	1	N	N	✓	totals Be, Cd, Li, Ni
GAF-GW-PH II-BKT-Hi Cal-44/45oil-+3	↓	↓	↓	↓	1	N	N	✓	

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/20 1500		GTN MTN	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

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Environment Testing
TestAmerica
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-68932
RMA:
FedEx Express
FRI - 26 JUN 10:30A
PRIORITY OVERNIGHT
15238
PA-US
PIT
FedEx TRK# 0221 1680 3500 0791
XH AGCA
Uncorrected temp 3.2 °C
Thermometer ID 14
CF 0 Initials JS
PT-WI-SR-001 effective 7/26/13
FID: 1711129 25Jun2020 MMRA 56C01/C7DD/95A2
180-107627 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-107627-1
SDG Number: GAF-NRS-Treatability

Login Number: 107627
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-107627-2
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA Gallatin EIP
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
12/1/2020 9:09:10 AM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Case Narrative

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Job ID: 180-107627-2

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-107627-2

Revised Report
This report was revised to include the chain of custody and email requesting the additional metals. This replaces the previous final report.

This data was pulled from a previous analysis of the samples. Due to quality issues with this particular batch, Mn and B could not be reported.

Receipt
The samples were received on 6/26/2020 9:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.2º C.

Metals
Method 6020A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-320070 and analytical batch 180-320452 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 6020A: The post digestion spike % recovery for Iron and Sodium associated with batch 180-320452 was outside of control limits. The associated sample is: (180-107627-A-5-A PDS).

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Qualifiers

Metals

Qualifier	Qualifier Description
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.
F1	MS and/or MSD recovery exceeds control limits.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	09-20-20
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	09-20-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	09-20-20
Kansas	NELAP	E-10350	09-20-20
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	09-20-20
Louisiana	NELAP	04041	09-20-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	09-20-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	09-20-20
New Jersey	NELAP	PA005	09-20-20
New York	NELAP	11182	09-20-20
North Carolina (WW/SW)	State	434	11-01-20
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	07-21-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	09-20-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	07-22-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Water	06/24/20 13:00	06/26/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2

Lab Sample ID: 180-107627-2

Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:37	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T3

Lab Sample ID: 180-107627-13

Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:36	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

JL = James Lyu

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2
Date Collected: 06/18/20 13:00
Date Received: 06/26/20 09:00

Lab Sample ID: 180-107627-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.530		0.0300	0.0125	mg/L		06/30/20 15:24	07/03/20 02:37	1
Antimony	0.000517	J	0.00200	0.000378	mg/L		06/30/20 15:24	07/03/20 02:37	1
Arsenic	0.000706	J	0.00100	0.000313	mg/L		06/30/20 15:24	07/03/20 02:37	1
Barium	0.0116		0.0100	0.00160	mg/L		06/30/20 15:24	07/03/20 02:37	1
Calcium	630		0.500	0.127	mg/L		06/30/20 15:24	07/03/20 02:37	1
Chromium	ND		0.00200	0.00153	mg/L		06/30/20 15:24	07/03/20 02:37	1
Cobalt	0.00106		0.000500	0.000134	mg/L		06/30/20 15:24	07/03/20 02:37	1
Copper	0.00150	J	0.00200	0.000627	mg/L		06/30/20 15:24	07/03/20 02:37	1
Iron	0.674		0.0500	0.0195	mg/L		06/30/20 15:24	07/03/20 02:37	1
Lead	0.000377	J	0.00100	0.000128	mg/L		06/30/20 15:24	07/03/20 02:37	1
Magnesium	4.69		0.500	0.0827	mg/L		06/30/20 15:24	07/03/20 02:37	1
Molybdenum	0.00809		0.00500	0.000610	mg/L		06/30/20 15:24	07/03/20 02:37	1
Potassium	3.53		0.500	0.156	mg/L		06/30/20 15:24	07/03/20 02:37	1
Selenium	ND		0.00500	0.00151	mg/L		06/30/20 15:24	07/03/20 02:37	1
Silicon	0.502		0.500	0.133	mg/L		06/30/20 15:24	07/03/20 02:37	1
Silver	ND		0.00100	0.000177	mg/L		06/30/20 15:24	07/03/20 02:37	1
Sodium	17.2		0.500	0.348	mg/L		06/30/20 15:24	07/03/20 02:37	1
Strontium	0.610		0.00500	0.000931	mg/L		06/30/20 15:24	07/03/20 02:37	1
Thallium	0.000469	J	0.00100	0.000148	mg/L		06/30/20 15:24	07/03/20 02:37	1
Vanadium	ND		0.00100	0.000991	mg/L		06/30/20 15:24	07/03/20 02:37	1
Zinc	0.00447	J	0.00500	0.00322	mg/L		06/30/20 15:24	07/03/20 02:37	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T3
Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Lab Sample ID: 180-107627-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7.82		0.0300	0.0125	mg/L		06/30/20 15:24	07/03/20 03:36	1
Antimony	0.000826	J	0.00200	0.000378	mg/L		06/30/20 15:24	07/03/20 03:36	1
Arsenic	0.00445		0.00100	0.000313	mg/L		06/30/20 15:24	07/03/20 03:36	1
Barium	0.0267		0.0100	0.00160	mg/L		06/30/20 15:24	07/03/20 03:36	1
Calcium	688		0.500	0.127	mg/L		06/30/20 15:24	07/03/20 03:36	1
Chromium	0.00544		0.00200	0.00153	mg/L		06/30/20 15:24	07/03/20 03:36	1
Cobalt	0.00345		0.000500	0.000134	mg/L		06/30/20 15:24	07/03/20 03:36	1
Copper	0.00522		0.00200	0.000627	mg/L		06/30/20 15:24	07/03/20 03:36	1
Iron	13.8		0.0500	0.0195	mg/L		06/30/20 15:24	07/03/20 03:36	1
Lead	0.00405		0.00100	0.000128	mg/L		06/30/20 15:24	07/03/20 03:36	1
Magnesium	2.28		0.500	0.0827	mg/L		06/30/20 15:24	07/03/20 03:36	1
Molybdenum	0.0362		0.00500	0.000610	mg/L		06/30/20 15:24	07/03/20 03:36	1
Potassium	3.74		0.500	0.156	mg/L		06/30/20 15:24	07/03/20 03:36	1
Selenium	ND		0.00500	0.00151	mg/L		06/30/20 15:24	07/03/20 03:36	1
Silicon	6.73		0.500	0.133	mg/L		06/30/20 15:24	07/03/20 03:36	1
Silver	ND		0.00100	0.000177	mg/L		06/30/20 15:24	07/03/20 03:36	1
Sodium	17.3		0.500	0.348	mg/L		06/30/20 15:24	07/03/20 03:36	1
Strontium	0.641		0.00500	0.000931	mg/L		06/30/20 15:24	07/03/20 03:36	1
Thallium	0.000313	J	0.00100	0.000148	mg/L		06/30/20 15:24	07/03/20 03:36	1
Vanadium	0.0142		0.00100	0.000991	mg/L		06/30/20 15:24	07/03/20 03:36	1
Zinc	0.0188		0.00500	0.00322	mg/L		06/30/20 15:24	07/03/20 03:36	1

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

Lab Sample ID: MB 180-320070/1-A
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		06/30/20 15:24	07/03/20 02:16	1
Antimony	ND		0.00200	0.000378	mg/L		06/30/20 15:24	07/03/20 02:16	1
Arsenic	ND		0.00100	0.000313	mg/L		06/30/20 15:24	07/03/20 02:16	1
Barium	ND		0.0100	0.00160	mg/L		06/30/20 15:24	07/03/20 02:16	1
Calcium	ND		0.500	0.127	mg/L		06/30/20 15:24	07/03/20 02:16	1
Chromium	ND		0.00200	0.00153	mg/L		06/30/20 15:24	07/03/20 02:16	1
Cobalt	ND		0.000500	0.000134	mg/L		06/30/20 15:24	07/03/20 02:16	1
Copper	ND		0.00200	0.000627	mg/L		06/30/20 15:24	07/03/20 02:16	1
Iron	ND		0.0500	0.0195	mg/L		06/30/20 15:24	07/03/20 02:16	1
Lead	ND		0.00100	0.000128	mg/L		06/30/20 15:24	07/03/20 02:16	1
Magnesium	ND		0.500	0.0827	mg/L		06/30/20 15:24	07/03/20 02:16	1
Molybdenum	ND		0.00500	0.000610	mg/L		06/30/20 15:24	07/03/20 02:16	1
Potassium	ND		0.500	0.156	mg/L		06/30/20 15:24	07/03/20 02:16	1
Selenium	ND		0.00500	0.00151	mg/L		06/30/20 15:24	07/03/20 02:16	1
Silicon	ND		0.500	0.133	mg/L		06/30/20 15:24	07/03/20 02:16	1
Silver	ND		0.00100	0.000177	mg/L		06/30/20 15:24	07/03/20 02:16	1
Sodium	ND		0.500	0.348	mg/L		06/30/20 15:24	07/03/20 02:16	1
Strontium	ND		0.00500	0.000931	mg/L		06/30/20 15:24	07/03/20 02:16	1
Thallium	ND		0.00100	0.000148	mg/L		06/30/20 15:24	07/03/20 02:16	1
Vanadium	ND		0.00100	0.000991	mg/L		06/30/20 15:24	07/03/20 02:16	1
Zinc	ND		0.00500	0.00322	mg/L		06/30/20 15:24	07/03/20 02:16	1

Lab Sample ID: LCS 180-320070/2-A
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.871		mg/L		97	80 - 120
Antimony	0.250	0.2616		mg/L		105	80 - 120
Arsenic	1.00	1.066		mg/L		107	80 - 120
Barium	1.00	1.001		mg/L		100	80 - 120
Calcium	25.0	28.35		mg/L		113	80 - 120
Chromium	0.500	0.5196		mg/L		104	80 - 120
Cobalt	0.500	0.5072		mg/L		101	80 - 120
Copper	0.500	0.5029		mg/L		101	80 - 120
Iron	5.00	5.096		mg/L		102	80 - 120
Lead	0.500	0.5152		mg/L		103	80 - 120
Magnesium	25.0	24.76		mg/L		99	80 - 120
Molybdenum	0.500	0.5241		mg/L		105	80 - 120
Potassium	25.0	24.23		mg/L		97	80 - 120
Selenium	1.00	1.002		mg/L		100	80 - 120
Silicon	1.00	1.020		mg/L		102	80 - 120
Silver	0.250	0.2435		mg/L		97	80 - 120
Sodium	25.0	26.65		mg/L		107	80 - 120
Strontium	0.500	0.4906		mg/L		98	80 - 120
Thallium	1.00	1.076		mg/L		108	80 - 120
Vanadium	0.500	0.4987		mg/L		100	80 - 120
Zinc	0.250	0.2521		mg/L		101	80 - 120

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

Lab Sample ID: 180-107627-A-5-B MS
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	3.41		5.00	8.018		mg/L		92	75 - 125
Antimony	0.000649	J	0.250	0.2630		mg/L		105	75 - 125
Arsenic	0.00153		1.00	1.064		mg/L		106	75 - 125
Barium	0.0575		1.00	1.058		mg/L		100	75 - 125
Calcium	786		25.0	814.3	4	mg/L		112	75 - 125
Chromium	ND		0.500	0.5201		mg/L		104	75 - 125
Cobalt	0.141		0.500	0.6554		mg/L		103	75 - 125
Copper	0.000844	J	0.500	0.5074		mg/L		101	75 - 125
Iron	6.29		5.00	11.41		mg/L		102	75 - 125
Lead	0.000195	J	0.500	0.5067		mg/L		101	75 - 125
Magnesium	72.7	F1	25.0	97.59		mg/L		99	75 - 125
Molybdenum	0.00114	J	0.500	0.5294		mg/L		106	75 - 125
Potassium	14.8		25.0	39.24		mg/L		98	75 - 125
Selenium	ND		1.00	1.001		mg/L		100	75 - 125
Silicon	11.7		1.00	12.64	4	mg/L		92	75 - 125
Silver	ND		0.250	0.2400		mg/L		96	75 - 125
Sodium	11.3		25.0	38.68		mg/L		109	75 - 125
Strontium	1.52	F1	0.500	1.999		mg/L		96	75 - 125
Thallium	0.000377	J	1.00	1.034		mg/L		103	75 - 125
Vanadium	ND		0.500	0.5119		mg/L		102	75 - 125
Zinc	0.277		0.250	0.5201		mg/L		97	75 - 125

Lab Sample ID: 180-107627-A-5-C MSD
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	3.41		5.00	7.661		mg/L		85	75 - 125	5	20
Antimony	0.000649	J	0.250	0.2544		mg/L		102	75 - 125	3	20
Arsenic	0.00153		1.00	1.006		mg/L		100	75 - 125	6	20
Barium	0.0575		1.00	1.014		mg/L		96	75 - 125	4	20
Calcium	786		25.0	749.6	4	mg/L		-147	75 - 125	8	20
Chromium	ND		0.500	0.4992		mg/L		100	75 - 125	4	20
Cobalt	0.141		0.500	0.6215		mg/L		96	75 - 125	5	20
Copper	0.000844	J	0.500	0.4789		mg/L		96	75 - 125	6	20
Iron	6.29		5.00	10.94		mg/L		93	75 - 125	4	20
Lead	0.000195	J	0.500	0.4899		mg/L		98	75 - 125	3	20
Magnesium	72.7	F1	25.0	90.77	F1	mg/L		72	75 - 125	7	20
Molybdenum	0.00114	J	0.500	0.5101		mg/L		102	75 - 125	4	20
Potassium	14.8		25.0	36.56		mg/L		87	75 - 125	7	20
Selenium	ND		1.00	0.9681		mg/L		97	75 - 125	3	20
Silicon	11.7		1.00	11.82	4	mg/L		9	75 - 125	7	20
Silver	ND		0.250	0.2305		mg/L		92	75 - 125	4	20
Sodium	11.3		25.0	37.24		mg/L		104	75 - 125	4	20
Strontium	1.52	F1	0.500	1.846	F1	mg/L		66	75 - 125	8	20
Thallium	0.000377	J	1.00	1.003		mg/L		100	75 - 125	3	20
Vanadium	ND		0.500	0.4897		mg/L		98	75 - 125	4	20
Zinc	0.277		0.250	0.4839		mg/L		83	75 - 125	7	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-2
SDG: GAF-NRS-Treatability

Metals

Prep Batch: 320070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Total Recoverable	Water	3005A	
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Total Recoverable	Water	3005A	
MB 180-320070/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-320070/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-107627-A-5-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-107627-A-5-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 320452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Total Recoverable	Water	EPA 6020A	320070
MB 180-320070/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	320070
LCS 180-320070/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	320070
180-107627-A-5-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	320070
180-107627-A-5-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	320070

Chain of Custody Record

420755 eurofins | Environment Testing TestAmerica

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x 414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 totals - Be, Cd, Li, Ni	6020 dissolved - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PHII-Bkt-Control-441 soil-t2	6/18/20	1300	G	GW	1	N	N	✓		totals Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441 soil-t2	6/18/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Control-441u soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	dissolved Be, Cd Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441u soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	
GAF-GW-PHII-Bkt-Hi Cal-Sand-19R-t3	6/24/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Hi Cal CaCl2-Sand-19R-t3	↓	↓	↓	↓	1	N	N	✓		
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-441u-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-Control-Sand-19R-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-FB22-Sand-19R-t3					1	N	N	✓		
		RDW			1	N	N	✓		

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

☐ Return to Client ☑ Disposal by Lab ☐ Ar

180-107627 Chain of Custody

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 6/25/2020 1500	Received by:	Company: ETMajor	Date/Time: 6/26/20 GW
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Chain of Custody Record

420753 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Borges	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	2 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 total IS - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PH II-Bkt-Control-44lusoil-t3	6/24/20	1300	G	GW	1	N	N	✓	totals Be, Cd, Li, Ni
GAF-GW-PH II-Bkt-Hi Cal-44lusoil-t3	↓	↓	↓	↓	1	N	N	✓	

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/20 1500		GTN PW	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

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rev1

301 Alpha Dr.

Address: Pittsburgh, PA 15238

Chain of Custody Record

420755

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x 414	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	6020 totals - Be, Cd, Li, Ni	6020 dissolved - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PHII-Bkt-Control-441u soil-t2	6/18/20	1300	G	GW	1	N	N	✓		totals Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441u soil-t2 (rdw 7/6/20)	6/18/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Control-441u soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	dissolved Be, Cd Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441u soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	
GAF-GW-PHII-Bkt-Hi Cal-Sand-19R-t3	6/24/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Hi Cal CaCl2-Sand-19R-t3	↓	↓	↓	↓	1	N	N	✓		
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-444u-t3					1	N	N	✓		total Be, Cd, Li and Ni
GAF-GW-PHII-Bkt-Control-Sand-19R-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-FB22-Sand-19R-t3					1	N	N	✓		
—	↓	rdw	↓	↓	1	N	N	✓		

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

☐ Return to Client ☑ Disposal by Lab ☐ Ar

180-107627 Chain of Custody

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/2020 1500	[signature]	[signature]	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

rdw 7/6/20 rev1

Chain of Custody Record 420753

eurofins | Environment Testing TestAmerica

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Burgos	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	2 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 total 15 - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PH II-BKT-Control-44/45oil-+3	6/24/20	1300	G	GW	1	N	N	✓	totals Be, Cd, Li, Ni
GAF-GW-PH II-BKT-Hi Cal-44/45oil-+3	↓	↓	↓	↓	1	N	N	✓	

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/20 1500		GTN NTH	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Lage, Gail

From: Rumble, Jennifer L.
Sent: Friday, November 6, 2020 2:34 PM
To: Haskell, Patrick
Cc: Kara Hagan; Lage, Gail; Veenstra, Scott
Subject: RE: Soil treatment lab report

Hi Patrick,
Can we report this as a job 2 instead of a report revision? Do you need the total, dissolved or both for 441U soil- T2? It looks like we should be able to report most analytes. Boron and Mn look to be the analytes that are going to give us trouble in reporting. Are these analytes necessary?
Jenn

Jennifer Rumble
Project Manager

Eurofins TestAmerica
Phone: 412-963-2434
E-mail: jennifer.rumble@eurofinset.com

From: Haskell, Patrick <Patrick.Haskell@aecom.com>
Sent: Thursday, November 5, 2020 12:44 PM
To: Rumble, Jennifer L. <Jennifer.Rumble@Eurofinset.com>
Cc: Kara Hagan <khagan@envstd.com>; Lage, Gail <Gail.Lage@Eurofinset.com>; Veenstra, Scott <Scott.Veenstra@aecom.com>
Subject: FW: Soil treatment lab report

EXTERNAL EMAIL*

Hi Jennifer,

Would it be possible to report a wider list of metals for samples HiCal-441Usoil-T2 and HiCal-441soil-T3? The metals list that we would like to report is the same expanded list we have been using for the other treatability samples. (See attached.) I understand that you'll have to go back and check the instrument calibration to see which analytes can be reported and which cannot, but we'll take as complete a list as you can manage.

Thanks,

Craig W. MacPhee, P.E.
Director of Engineering
Environment
D 978-905-2299
C 978-758-6174
craig.macphee@aecom.com

AECOM

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Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-107627-2
SDG Number: GAF-NRS-Treatability

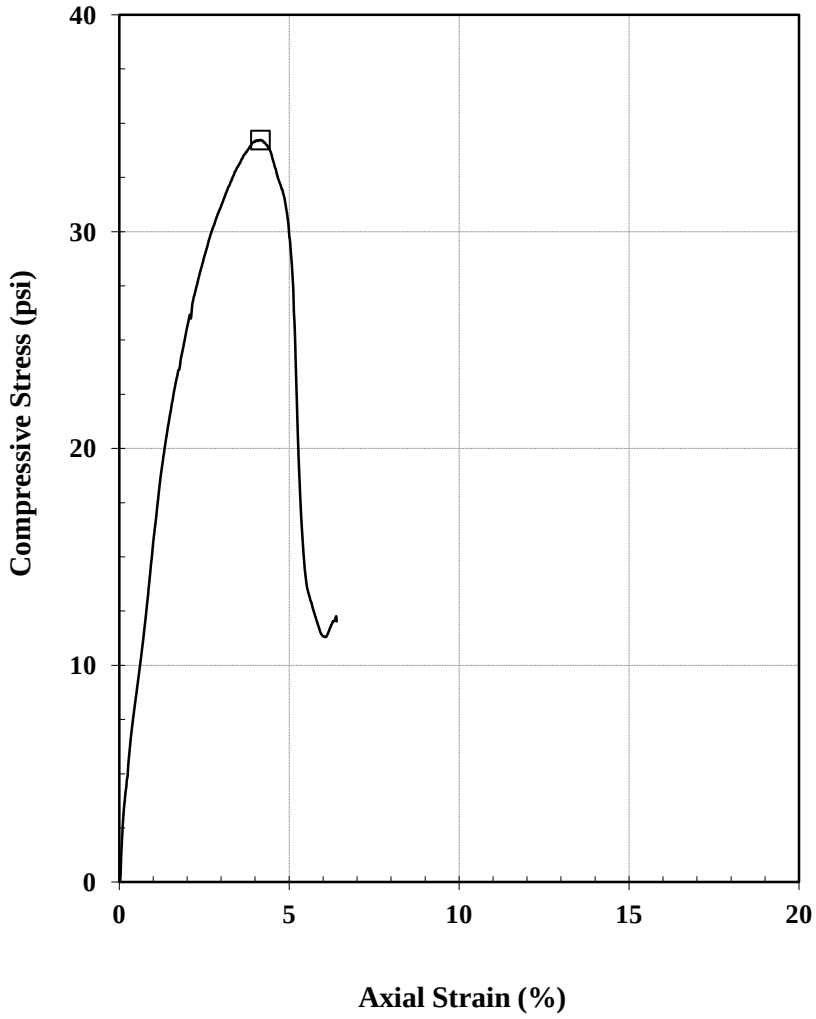
Login Number: 107627
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

Unconfined Compression Test Report

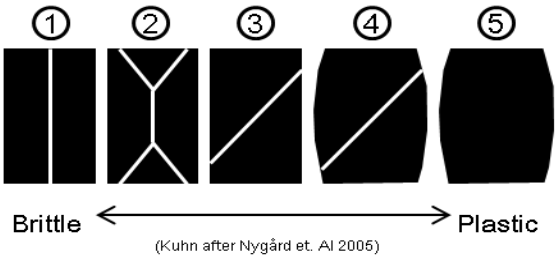
Client:	AECOM	TRI Log No.:	59783.1
Project:	60621225 - NRS Treatability	Type of Specimen:	Cast
Sample ID:	Phase 1 Lean Mix 1 (Client-Prepared, 7-Day Cure)	Test Method:	ASTM D1633



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.98
Avg. Height (in)	H_o	3.91
Avg, Water Content (%)	w_o	22.6
Bulk Density (pcf)	γ_{total}	120.6
Dry Density (pcf)	γ_{dry}	98.4
Saturation (%)	S_r	86.4
Void Ratio	e_o	0.71
Assumed Specific Gravity	G_s	2.70

Stresses at Failure	
Unconfined Compressive Strength (psi)	34.2
Axial Strain at Failure (%)	4.2
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	34.2
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	17.1

Failure Mode	4



(Kuhn after Nygård et. Al 2005)

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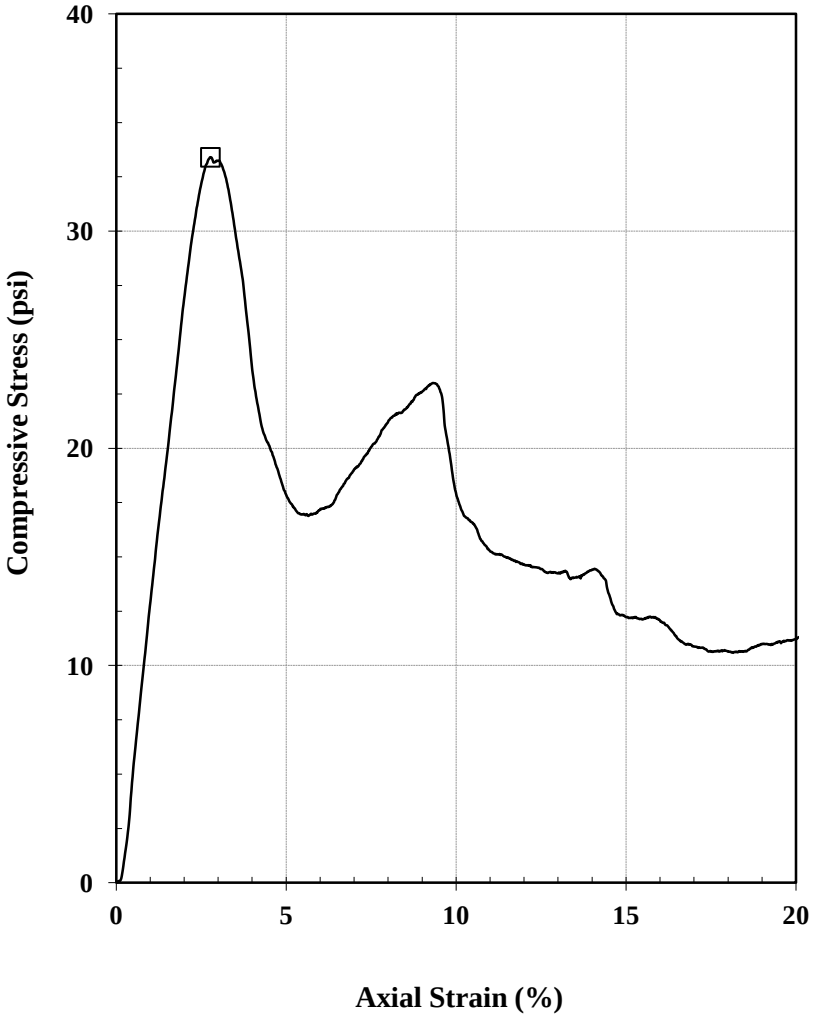
Unconfined Compression Test Report

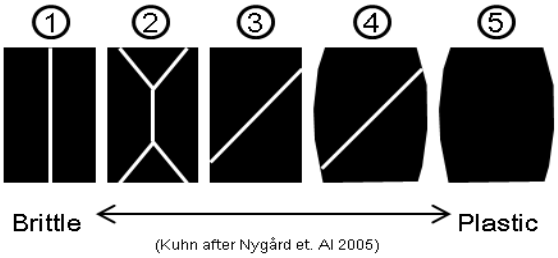
Client:	AECOM	TRI Log No.:	59783.2
Project:	60621225 - NRS Treatability	Type of Specimen:	Cast
Sample ID:	Phase 1 Lean Mix 2 (Client-Prepared, 14-Day Cure)	Test Method:	ASTM D1633



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.98
Avg. Height (in)	H_o	3.92
Avg, Water Content (%)	w_o	20.4
Bulk Density (pcf)	γ_{total}	118.6
Dry Density (pcf)	γ_{dry}	98.5
Saturation (%)	S_r	81.2
Void Ratio	e_o	0.71
Assumed Specific Gravity	G_s	2.70

Stresses at Failure	
Unconfined Compressive Strength (psi)	33.4
Axial Strain at Failure (%)	2.8
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	33.4
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	16.7

Failure Mode	2



(Kuhn after Nygård et. Al 2005)

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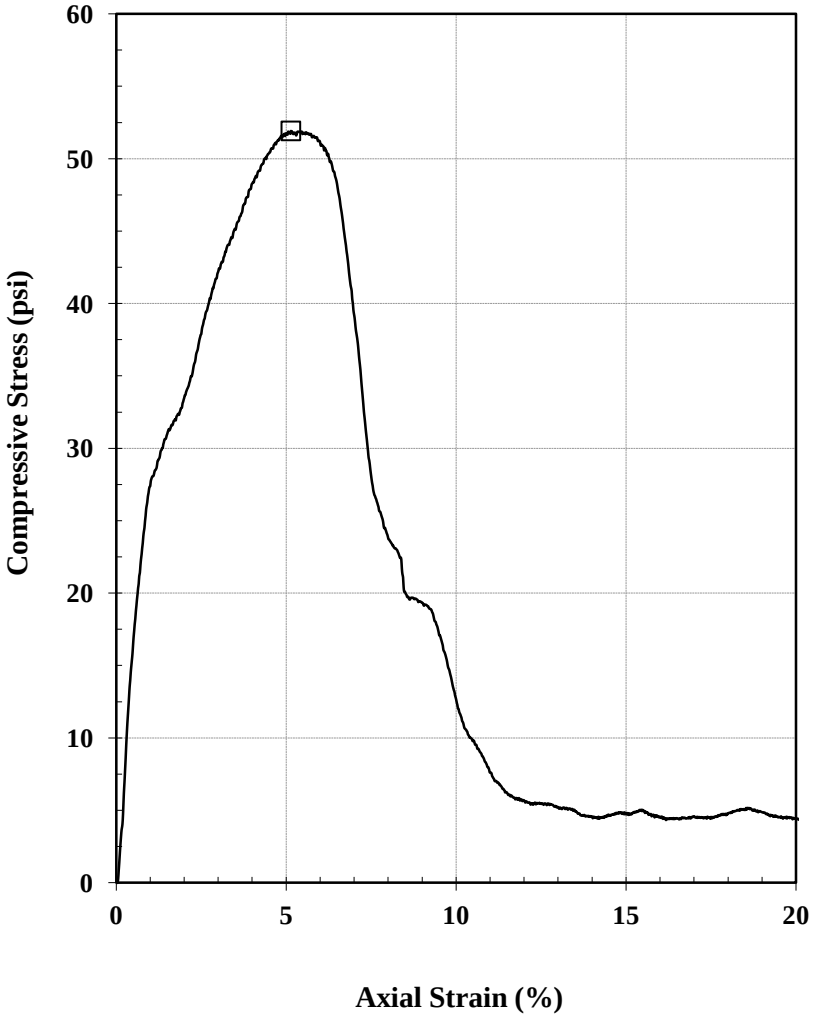
Unconfined Compression Test Report

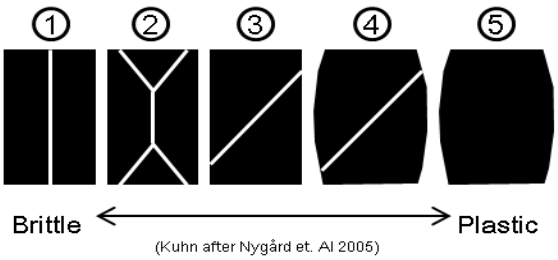
Client:	AECOM	TRI Log No.:	59783.3
Project:	60621225 - NRS Treatability	Type of Specimen:	Cast
Sample ID:	Phase 1 Lean Mix 3 (Client-Prepared, 28-Day Cure)	Test Method:	ASTM D1633



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.98
Avg. Height (in)	H_o	3.85
Avg, Water Content (%)	w_o	20.8
Bulk Density (pcf)	γ_{total}	121.9
Dry Density (pcf)	γ_{dry}	100.9
Saturation (%)	S_r	84.5
Void Ratio	e_o	0.67
Assumed Specific Gravity	G_s	2.70

Stresses at Failure	
Unconfined Compressive Strength (psi)	51.9
Axial Strain at Failure (%)	5.1
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	51.9
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	26.0

Failure Mode	1



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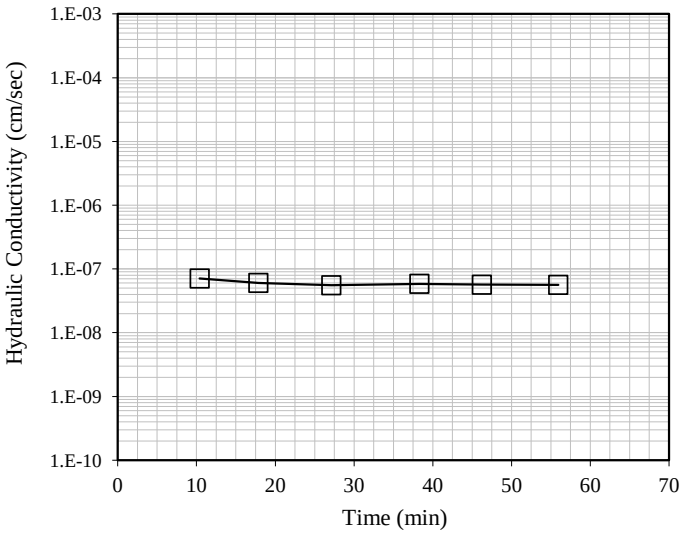
Hydraulic Conductivity

Client: AECOM
Project: 60621225 - NRS Treatability
Sample ID: HC Lean Mix

TRI Log #: 59783.4
Test Method: ASTM D5084

Sample Condition	Initial	Final
	Cast	Post-Test
Diameter (in)	1.99	1.99
Height (in)	1.78	1.75
Mass (g)	172.9	175.4
Sample Area (in^2)	3.12	3.11
Water Content (%)	21.7	24.9
Total Unit Weight (pcf)	118.7	122.7
Dry Unit Weight (pcf)	97.6	98.3
Specific Gravity (Assumed)	2.75	
Degree of Saturation	78.6	91.7
Void Ratio	0.76	0.75
Porosity	0.43	0.43
1 Pore Volume (cc)	39.2	38.1



Eff. Confining Stress (psi)	5.0
Back-Pressure	80.0
B-Value Prior to Permeation	0.98
Permeant	De-Aired Tap Water

Specimen Image



Method F—Constant Volume–Falling Head
by mercury, rising tailwater elevation

Manometer Constants		Aa (cm^2)	0.767
M1	0.0302	Ap (cm^2)	0.0314
M2	1.041	Z_p (cm)	1.7
Time, t	Trial Constant, Z_1	Gradient	K_{20}
Min	-	-	cm/s
10.4	27.7	76.9	7.1E-08
17.9	25.5	70.8	6.0E-08
27.1	24.3	67.4	5.6E-08
38.3	22.9	63.6	5.9E-08
46.2	21.3	59.1	5.7E-08
55.9	20.2	56.2	5.6E-08
-	-	-	-
-	-	-	-
-	-	-	-
Average, Last 2 Readings			**5.6E-08**

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Analysis & Quality Review/Date

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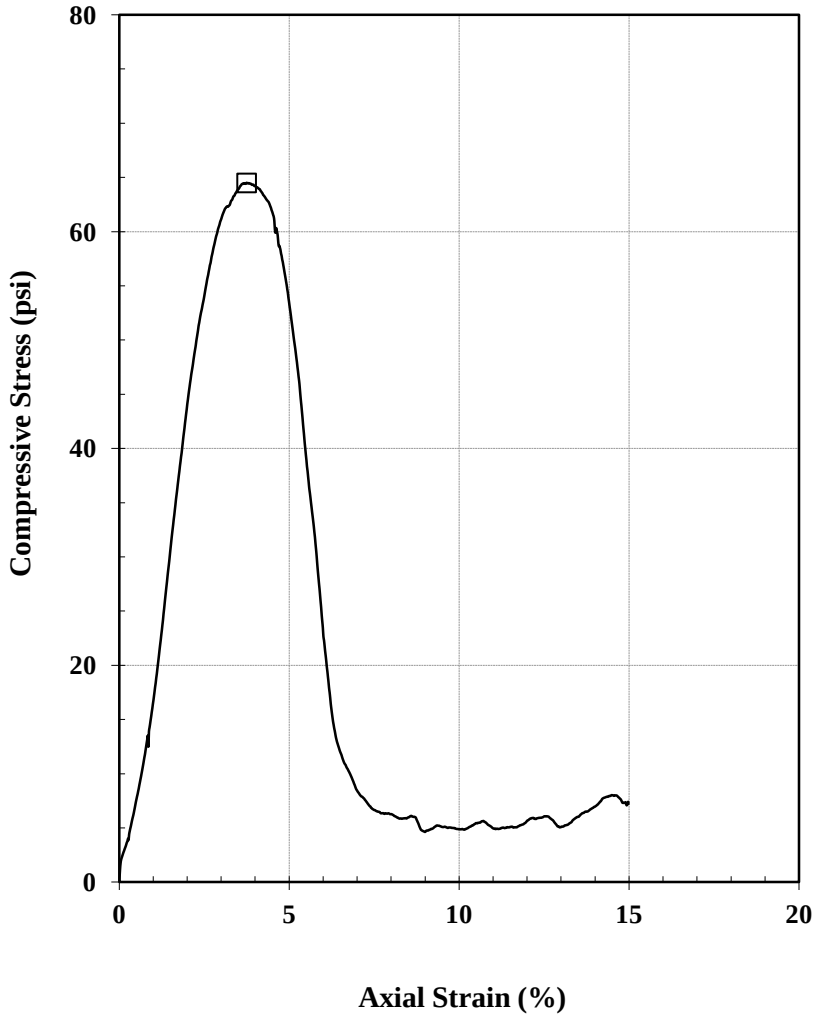
Unconfined Compression Test Report

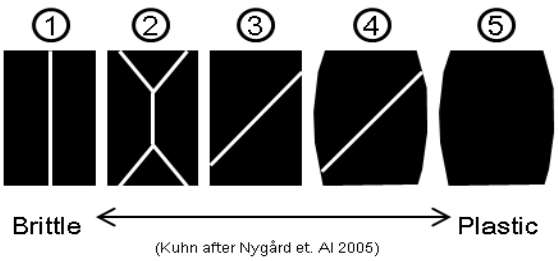
Client:	AECOM	TRI Log No.:	59783.6
Project:	60621225 - NRS Treatability	Type of Specimen:	Cast
Sample ID:	Rich Mix 1 (Client-Prepared, 7-Day Cure)	Test Method:	ASTM D2166



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.98
Avg. Height (in)	H_o	3.86
Avg, Water Content (%)	w_o	24.8
Bulk Density (pcf)	γ_{total}	117.4
Dry Density (pcf)	γ_{dry}	94.1
Saturation (%)	S_r	84.0
Void Ratio	e_o	0.79
Assumed Specific Gravity	G_s	2.70

Stresses at Failure	
Unconfined Compressive Strength (psi)	64.5
Axial Strain at Failure (%)	3.8
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	64.5
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	32.2

Failure Mode	1



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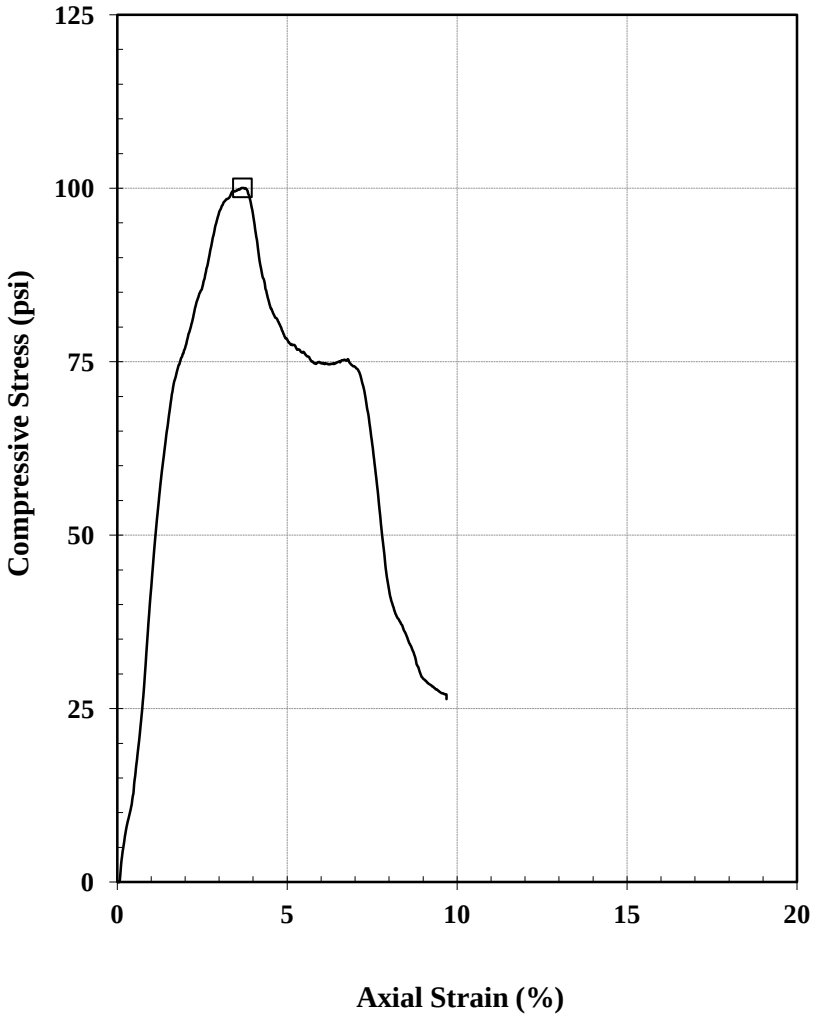
Unconfined Compression Test Report

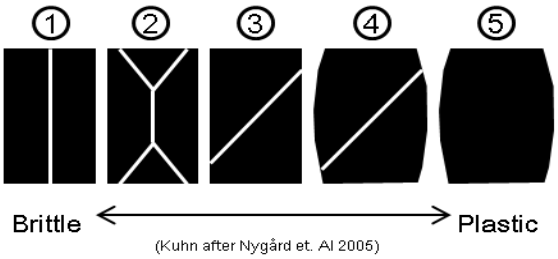
Client:	AECOM	TRI Log No.:	59783.7
Project:	60621225 - NRS Treatability	Type of Specimen:	Cast
Sample ID:	Rich Mix 2 (Client-Prepared, 14-Day Cure)	Test Method:	ASTM D1633



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.98
Avg. Height (in)	H_o	3.81
Avg, Water Content (%)	w_o	24.0
Bulk Density (pcf)	γ_{total}	115.8
Dry Density (pcf)	γ_{dry}	93.4
Saturation (%)	S_r	79.8
Void Ratio	e_o	0.80
Assumed Specific Gravity	G_s	2.70

Stresses at Failure	
Unconfined Compressive Strength (psi)	100.1
Axial Strain at Failure (%)	3.7
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	100.1
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	50.0

Failure Mode	1



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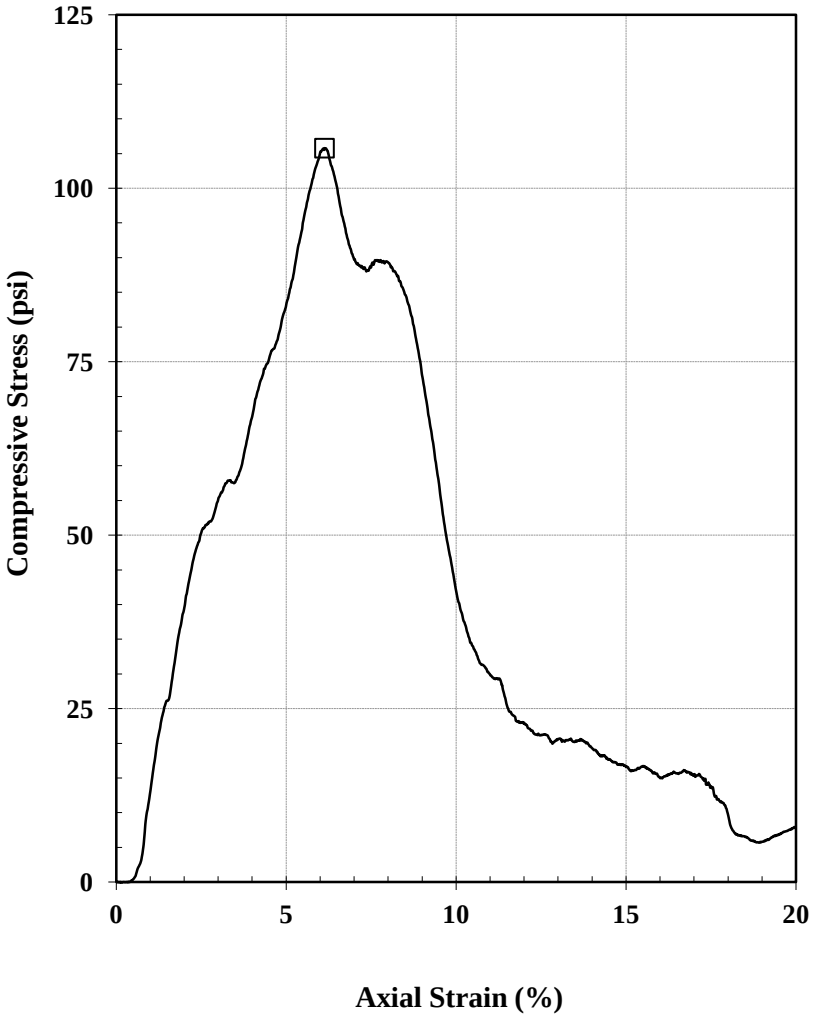
Unconfined Compression Test Report

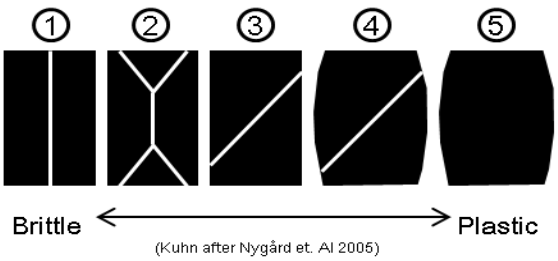
Client:	AECOM	TRI Log No.:	59783.8
Project:	60621225 - NRS Treatability	Type of Specimen:	Cast
Sample ID:	Rich Mix 3 (Client-Prepared, 28-Day Cure)	Test Method:	ASTM D1633



Specimen Condition at Time of Test		
Specimen No.		1
Avg. Diameter (in)	D_o	1.99
Avg. Height (in)	H_o	3.91
Avg, Water Content (%)	w_o	24.7
Bulk Density (pcf)	γ_{total}	113.2
Dry Density (pcf)	γ_{dry}	90.7
Saturation (%)	S_r	78.6
Void Ratio	e_o	0.86
Assumed Specific Gravity	G_s	2.70

Stresses at Failure	
Unconfined Compressive Strength (psi)	105.8
Axial Strain at Failure (%)	6.1
Total Stresses at Failure	
Major Principal Stress, σ_1 (psi)	105.8
Minor Principal Stress, σ_3 (psi)	0.0
Undrained Shear Strength, S_u (psi)	52.9

Failure Mode	2



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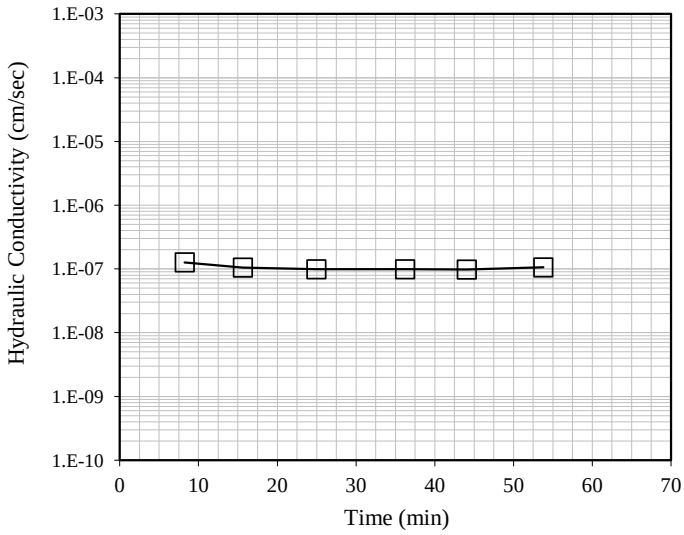
Hydraulic Conductivity

Client: AECOM
Project: 60621225 - NRS Treatability
Sample ID: HC Rich Mix

TRI Log #: 59783.9
Test Method: ASTM D5084

Sample Condition	Initial	Final
	Cast	Post-Test
Diameter (in)	1.98	1.99
Height (in)	1.58	1.57
Mass (g)	145.7	149.3
Sample Area (in^2)	3.07	3.10
Water Content (%)	22.0	26.8
Total Unit Weight (pcf)	114.6	116.9
Dry Unit Weight (pcf)	94.0	92.2
Specific Gravity (Assumed)	2.75	
Degree of Saturation	73.2	85.7
Void Ratio	0.83	0.86
Porosity	0.45	0.46
1 Pore Volume (cc)	35.9	36.8



Eff. Confining Stress (psi)	5.0
Back-Pressure	80.0
B-Value Prior to Permeation	0.96
Permeant	De-Aired Tap Water

Specimen Image



Method F—Constant Volume–Falling Head
by mercury, rising tailwater elevation

Manometer Constants		Aa (cm^2)	0.767
M1	0.0302	Ap (cm^2)	0.0314
M2	1.041	Z_p (cm)	1.7
Time, t	Trial Constant, Z_1	Gradient	K_{20}
Min	-	-	cm/s
8.2	27.8	87.1	1.3E-07
15.6	24.4	76.5	1.1E-07
25.0	22.2	69.5	9.9E-08
36.2	19.8	62.0	9.9E-08
44.1	17.2	54.0	9.8E-08
53.8	15.7	49.1	1.1E-07
-	-	-	-
-	-	-	-
-	-	-	-
Average, Last 2 Readings			**1.0E-07**

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Analysis & Quality Review/Date

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Client: AECOM

TRI Log #: 59783

Project: 60621225 - NRS Treatability

Jeffrey A. Kuhn, Ph.D., P.E., 10/9/2020

Quality Review/Date

Analytical

COC Line #	Sample Identification	Paint Filter Liquids Test
-	Test Method	EPA Method 9095B
5	Paint Lean Mix	No Free Liquids
10	Paint Rich Mix	No Free Liquids

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-105162-1
Laboratory Sample Delivery Group: GAF NRS Treatability
Client Project/Site: TVA GAF AECOM Lab
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:17:05 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

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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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Job ID: 180-105162-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-105162-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 4/30/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.2º C.

Metals
Method 3005A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-BKT-PHI-FB22-T1 (180-105162-2), GAF-GW-BKT-PHI-SOILCONTROL-T1 (180-105162-8) and GAF-GW-BKT-PHI-FB22 SOIL-T1 (180-105162-9). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-26-20
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
Oregon	NELAP	PA-2151	07-01-20
Pennsylvania	NELAP	02-00416	05-21-20
Rhode Island	State	LAO00362	12-31-20
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Water	04/29/20 12:00	04/30/20 08:15	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Water	04/29/20 12:00	04/30/20 08:15	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-BKT-PHI-CONTROL-T1

Lab Sample ID: 180-105162-1
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:20	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:04	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:17	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 01:53	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-FB22-T1

Lab Sample ID: 180-105162-2
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:24	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:07	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-DOLO-T1

Lab Sample ID: 180-105162-3
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:27	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:10	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:31	WTR	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:14	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:34	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:17	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-WC-PHI-NAOH-ZEOLITE-T1

Lab Sample ID: 180-105162-6
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:41	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:24	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:37	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:21	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:55	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:31	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:51	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:28	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 18:02	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:45	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:58	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:35	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-FB22 SOIL-T1

Lab Sample ID: 180-105162-9
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 18:09	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:52	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 18:05	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:49	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney

Batch Type: Analysis

RSK = Robert Kurtz

WTR = Bill Reinheimer

Client Sample ID: GAF-GW-BKT-PHI-CONTROL-T1

Lab Sample ID: 180-105162-1
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000597	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 01:53	1
Cadmium	0.00257		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:17	1
Lithium	0.0219	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 01:53	1
Nickel	0.0834		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:17	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:04	1
Cadmium	0.00216		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:20	1
Lithium	0.0184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:04	1
Nickel	0.0639		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:20	1

Client Sample ID: GAF-GW-BKT-PHI-FB22-T1

Lab Sample ID: 180-105162-2
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:07	1
Cadmium	0.00263	J	0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 17:24	1
Lithium	0.0475	B	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:07	1
Nickel	0.0544		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 17:24	1

Client Sample ID: GAF-GW-BKT-PHI-DOLO-T1

Lab Sample ID: 180-105162-3
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000991	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:10	1
Cadmium	0.000720	J	0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:27	1
Lithium	0.0112	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:10	1
Nickel	0.0569		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:27	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000265	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:14	1
Cadmium	0.000390	J	0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:31	1
Lithium	0.0106	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:14	1
Nickel	0.0200		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:31	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000562	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:17	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00747		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:34	1
Lithium	0.0283	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:17	1
Nickel	0.0543		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:34	1

Client Sample ID: GAF-GW-WC-PHI-NAOH-ZEOLITE-T1

Lab Sample ID: 180-105162-6
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:21	1
Cadmium	0.00191		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:37	1
Lithium	0.286	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:21	1
Nickel	0.0674		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:37	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:24	1
Cadmium	0.00166		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:41	1
Lithium	0.300	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:24	1
Nickel	0.0697		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:41	1

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:28	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:51	1
Lithium	0.184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:28	1
Nickel	0.000603	J	0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:51	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:31	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:55	1
Lithium	0.184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:31	1
Nickel	ND		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:55	1

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00808		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:35	1
Cadmium	0.0128		0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 17:58	1
Lithium	0.0897	B	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:35	1
Nickel	0.323		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 17:58	1

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:45	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 18:02	1
Lithium	**0.0112**	**B**	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:45	1
Nickel	**0.000545**	**J**	0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 18:02	1

Client Sample ID: GAF-GW-BKT-PHI-FB22 SOIL-T1

Lab Sample ID: 180-105162-9
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0105**		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:49	1
Cadmium	**0.0314**		0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 18:05	1
Lithium	**0.127**	**B**	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:49	1
Nickel	**1.02**		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 18:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0145**		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:52	1
Cadmium	**0.0785**		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 18:09	1
Lithium	**0.150**	**B**	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:52	1
Nickel	**1.93**		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 18:09	1

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

Lab Sample ID: MB 180-314367/1-A
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 16:28	1
Nickel	ND		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 16:28	1

Lab Sample ID: MB 180-314367/1-A
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 01:04	1
Lithium	0.004190	J	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 01:04	1

Lab Sample ID: LCS 180-314367/2-A
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.4964		mg/L		99	80 - 120
Nickel	0.500	0.4945		mg/L		99	80 - 120

Lab Sample ID: LCS 180-314367/2-A
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.4915		mg/L		98	80 - 120
Lithium	0.500	0.4770		mg/L		95	80 - 120

Lab Sample ID: 180-105129-C-3-B MS
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		0.500	0.5064		mg/L		101	75 - 125
Nickel	0.00138		0.500	0.4950		mg/L		99	75 - 125

Lab Sample ID: 180-105129-C-3-B MS
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.4881		mg/L		98	75 - 125
Lithium	0.00497	J B	0.500	0.4746		mg/L		94	75 - 125

Lab Sample ID: 180-105129-C-3-C MSD
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		0.500	0.5022		mg/L		100	75 - 125	1	20
Nickel	0.00138		0.500	0.4921		mg/L		98	75 - 125	1	20

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

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

Lab Sample ID: 180-105129-C-3-C MSD
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.4837		mg/L		97	75 - 125	1	20
Lithium	0.00497	J B	0.500	0.4660		mg/L		92	75 - 125	2	20

Metals

Prep Batch: 314367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	3005A	
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	3005A	
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	3005A	
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	3005A	
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	3005A	
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	3005A	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	3005A	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	3005A	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	3005A	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	3005A	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	3005A	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	3005A	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	3005A	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	3005A	
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 314621

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	EPA 6020A	314367
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	314367
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	314367

Analysis Batch: 314781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	EPA 6020A	314367

Metals (Continued)

Analysis Batch: 314781 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	EPA 6020A	314367
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	314367
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	314367

Chain of Custody Record 420758

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Address: Pittsburgh, PA

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date: 4/28/2020	COC No:
Company Name: Jennifer Gables	Tel/Email: Craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: Environmental Standards, Inc.	Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS			Sampler:
City/State/Zip:	TAT if different from Below ____			For Lab Use Only:
Phone: 610.935.5577 x414	☐ 2 weeks			Walk-in Client:
Fax:	☒ 1 week			Lab Sampling:
Project Name: TVA Gallatin EIP	☐ 2 days			
Site: GAF-NRS-Treatability	☐ 1 day			Job / SDG No.:
PO#				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	6020A - total - Be, Li, Cd, Ni	6020A - dis - Be, Li, Cd, Ni	Sample Specific Notes:
GAF-GW-Bkt-PHI-Control-+1	4/27/20	1400	G	GW	2	Y/N		✓	✓	Dissolved has been filtered
GAF-GW-Bkt-PHI-FB22-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-Dolo-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-HiCal-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-HiCal-CaCl2-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-WC-PHI-NaOH-zeolite-+1	4/27/20	1400	G	|	2	Y/N		✓	✓	Dissolved has been filtered
GAF-GW-WC-PHI-444u-+1	4/27/20	1400	G	↓	2	Y/N		✓	✓	"
GAF-GW-Bkt-PHI-Soil control-+1	4/27/20	1200	G	|	2	Y/N		✓	✓	"
GAF-GW-Bkt-PHI-FB22 soil-+1	4/27/20	1200	G	↓	2	Y/N		✓	✓	"
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____								4	4	

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 sampl

☐ Return to Client ☑ Disposal by Lab

180-105162 Chain of Custody

Special Instructions/QC Requirements & Comments: total bottles were not filtered

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 4/29/20 1300 4/28/20 1600	Received by:	Company: EMPiv	Date/Time: 4/30/20 815
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-105162-1
SDG Number: GAF NRS Treatability

Login Number: 105162
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins 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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-106348-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA GAF AECOM Lab
Revision: 1

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:29:01 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Case Narrative

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Job ID: 180-106348-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-106348-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 5/29/2020 8:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2º C.

Metals
Methods 6020A: The ICVL recovered below 80% recovery for nickel(actual 77%) for 6020B method but passes for 6020A method with accompanying QC passing.

Methods 6020A: The following samples were diluted due to the high concentration of sodium in the sample matrix: (CCVL 180-317494/108), (180-106149-E-3-A ^10), (180-106149-E-3-B MS ^10) and (180-106149-E-3-A SD ^50). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-26-20
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	07-01-20
Pennsylvania	NELAP	02-00416	07-21-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-106348-1	GAF-BKT-PHII-CONTROL-T1-19R-SAND	Water	05/28/20 13:00	05/29/20 08:45	
180-106348-2	GAF-BKT-PHII-FB22-T1-SAND	Water	05/28/20 13:00	05/29/20 08:45	
180-106348-3	GAF-BKT-PHII-HICAL-T1-SAND	Water	05/28/20 13:00	05/29/20 08:45	
180-106348-4	GAF-BKT-PHII-HICAL-CACL2-T1-SAND	Water	05/28/20 13:00	05/29/20 08:45	
180-106348-5	GAF-BKT-PHII-DOLO-T1-444U-SAND	Water	05/28/20 13:00	05/29/20 08:45	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-19R-SAND — Lab Sample ID: 180-106348-1

Date Collected: 05/28/20 13:00 — **Matrix: Water**
Date Received: 05/29/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317358	06/03/20 05:15	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317494	06/04/20 02:10	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-BKT-PHII-FB22-T1-SAND — Lab Sample ID: 180-106348-2

Date Collected: 05/28/20 13:00 — **Matrix: Water**
Date Received: 05/29/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317358	06/03/20 05:18	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317494	06/04/20 02:13	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-BKT-PHII-HICAL-T1-SAND — Lab Sample ID: 180-106348-3

Date Collected: 05/28/20 13:00 — **Matrix: Water**
Date Received: 05/29/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317358	06/03/20 05:22	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317494	06/04/20 02:17	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-BKT-PHII-HICAL-CACL2-T1-SAND — Lab Sample ID: 180-106348-4

Date Collected: 05/28/20 13:00 — **Matrix: Water**
Date Received: 05/29/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317358	06/03/20 05:25	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317494	06/04/20 02:20	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-BKT-PHII-DOLO-T1-444U-SAND

Lab Sample ID: 180-106348-5

Date Collected: 05/28/20 13:00

Matrix: Water

Date Received: 05/29/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317358	06/03/20 05:36	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	316937	05/29/20 15:06	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			317494	06/04/20 02:24	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

JL = James Lyu

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-19R-SAND

Lab Sample ID: 180-106348-1
Date Collected: 05/28/20 13:00
Matrix: Water
Date Received: 05/29/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00308		0.00100	0.000182	mg/L		05/29/20 15:06	06/03/20 05:15	1
Cadmium	0.00853		0.00100	0.000217	mg/L		05/29/20 15:06	06/03/20 05:15	1
Lithium	0.0605		0.00500	0.00339	mg/L		05/29/20 15:06	06/03/20 05:15	1
Nickel	0.292		0.00100	0.000336	mg/L		05/29/20 15:06	06/04/20 02:10	1

Client Sample ID: GAF-BKT-PHII-FB22-T1-SAND

Lab Sample ID: 180-106348-2
Date Collected: 05/28/20 13:00
Matrix: Water
Date Received: 05/29/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/29/20 15:06	06/03/20 05:18	1
Cadmium	ND		0.00100	0.000217	mg/L		05/29/20 15:06	06/03/20 05:18	1
Lithium	0.0203		0.00500	0.00339	mg/L		05/29/20 15:06	06/03/20 05:18	1
Nickel	0.0102		0.00100	0.000336	mg/L		05/29/20 15:06	06/04/20 02:13	1

Client Sample ID: GAF-BKT-PHII-HICAL-T1-SAND

Lab Sample ID: 180-106348-3
Date Collected: 05/28/20 13:00
Matrix: Water
Date Received: 05/29/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/29/20 15:06	06/03/20 05:22	1
Cadmium	0.000344	J	0.00100	0.000217	mg/L		05/29/20 15:06	06/03/20 05:22	1
Lithium	0.0133		0.00500	0.00339	mg/L		05/29/20 15:06	06/03/20 05:22	1
Nickel	0.0104		0.00100	0.000336	mg/L		05/29/20 15:06	06/04/20 02:17	1

Client Sample ID: GAF-BKT-PHII-HICAL-CACL2-T1-SAND

Lab Sample ID: 180-106348-4
Date Collected: 05/28/20 13:00
Matrix: Water
Date Received: 05/29/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/29/20 15:06	06/03/20 05:25	1
Cadmium	0.00138		0.00100	0.000217	mg/L		05/29/20 15:06	06/03/20 05:25	1
Lithium	0.0134		0.00500	0.00339	mg/L		05/29/20 15:06	06/03/20 05:25	1
Nickel	0.00844		0.00100	0.000336	mg/L		05/29/20 15:06	06/04/20 02:20	1

Client Sample ID: GAF-BKT-PHII-DOLO-T1-444U-SAND

Lab Sample ID: 180-106348-5
Date Collected: 05/28/20 13:00
Matrix: Water
Date Received: 05/29/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/29/20 15:06	06/03/20 05:36	1
Cadmium	ND		0.00100	0.000217	mg/L		05/29/20 15:06	06/03/20 05:36	1
Lithium	ND		0.00500	0.00339	mg/L		05/29/20 15:06	06/03/20 05:36	1
Nickel	0.00369		0.00100	0.000336	mg/L		05/29/20 15:06	06/04/20 02:24	1

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

Lab Sample ID: MB 180-316937/1-A
Matrix: Water
Analysis Batch: 317358

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 316937

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/29/20 15:06	06/03/20 04:37	1
Cadmium	ND		0.00100	0.000217	mg/L		05/29/20 15:06	06/03/20 04:37	1
Lithium	ND		0.00500	0.00339	mg/L		05/29/20 15:06	06/03/20 04:37	1

Lab Sample ID: MB 180-316937/1-A
Matrix: Water
Analysis Batch: 317614

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 316937

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	ND		0.00100	0.000336	mg/L		05/29/20 15:06	06/04/20 19:12	1

Lab Sample ID: LCS 180-316937/2-A
Matrix: Water
Analysis Batch: 317358

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 316937

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.4863		mg/L		97	80 - 120
Cadmium	0.500	0.4863		mg/L		97	80 - 120
Lithium	0.500	0.4538		mg/L		91	80 - 120

Lab Sample ID: LCS 180-316937/2-A
Matrix: Water
Analysis Batch: 317494

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 316937

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	0.500	0.4891		mg/L		98	80 - 120

Lab Sample ID: 180-106149-E-3-B MS
Matrix: Water
Analysis Batch: 317358

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 316937

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.00138		0.500	0.4955		mg/L		99	75 - 125
Cadmium	0.000395	J	0.500	0.4793		mg/L		96	75 - 125
Lithium	ND		0.500	0.4722		mg/L		94	75 - 125

Lab Sample ID: 180-106149-E-3-C MSD
Matrix: Water
Analysis Batch: 317358

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 316937

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	0.00138		0.500	0.4779		mg/L		95	75 - 125	4	20
Cadmium	0.000395	J	0.500	0.4695		mg/L		94	75 - 125	2	20
Lithium	ND		0.500	0.4570		mg/L		91	75 - 125	3	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-106348-1
SDG: GAF-NRS-Treatability

Metals

Prep Batch: 316937

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106348-1	GAF-BKT-PHII-CONTROL-T1-19R-SAND	Total Recoverable	Water	3005A	
180-106348-2	GAF-BKT-PHII-FB22-T1-SAND	Total Recoverable	Water	3005A	
180-106348-3	GAF-BKT-PHII-HICAL-T1-SAND	Total Recoverable	Water	3005A	
180-106348-4	GAF-BKT-PHII-HICAL-CACL2-T1-SAND	Total Recoverable	Water	3005A	
180-106348-5	GAF-BKT-PHII-DOLO-T1-444U-SAND	Total Recoverable	Water	3005A	
MB 180-316937/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-316937/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-106149-E-3-B MS	Matrix Spike	Dissolved	Water	3005A	
180-106149-E-3-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	

Analysis Batch: 317358

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106348-1	GAF-BKT-PHII-CONTROL-T1-19R-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-2	GAF-BKT-PHII-FB22-T1-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-3	GAF-BKT-PHII-HICAL-T1-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-4	GAF-BKT-PHII-HICAL-CACL2-T1-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-5	GAF-BKT-PHII-DOLO-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	316937
MB 180-316937/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	316937
LCS 180-316937/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	316937
180-106149-E-3-B MS	Matrix Spike	Dissolved	Water	EPA 6020A	316937
180-106149-E-3-C MSD	Matrix Spike Duplicate	Dissolved	Water	EPA 6020A	316937

Analysis Batch: 317494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106348-1	GAF-BKT-PHII-CONTROL-T1-19R-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-2	GAF-BKT-PHII-FB22-T1-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-3	GAF-BKT-PHII-HICAL-T1-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-4	GAF-BKT-PHII-HICAL-CACL2-T1-SAND	Total Recoverable	Water	EPA 6020A	316937
180-106348-5	GAF-BKT-PHII-DOLO-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	316937
LCS 180-316937/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	316937

Analysis Batch: 317614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-316937/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	316937

Chain of Custody Record

420757 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Burgos	Date: 5/28/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF-NRS-Treatability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	6020 totals - Be, Cd, Ni, V	Sample Specific Notes:
GAF-Bkt-PHII-Control-+1-19R-Sand	5/28/20	1300	G	GW	1	N	N	✓	
GAF-Bkt-PHII-FB22-+1-Sand	5/28/20	1300	G					✓	
GAF-Bkt-PHII-Hi.Cal-+1-Sand	5/28/20	1300	G					✓	
GAF-Bkt-PHII-Hi.Cal-CaCl2-+1-Sand	5/28/20	1300	G					✓	only Be, Cd, Ni, V
GAF-Bkt-PHII-Dolo-+1-444u-Sand	5/28/20	1300	G	↓	↓	↓	↓	✓	
								4	

180-106348 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

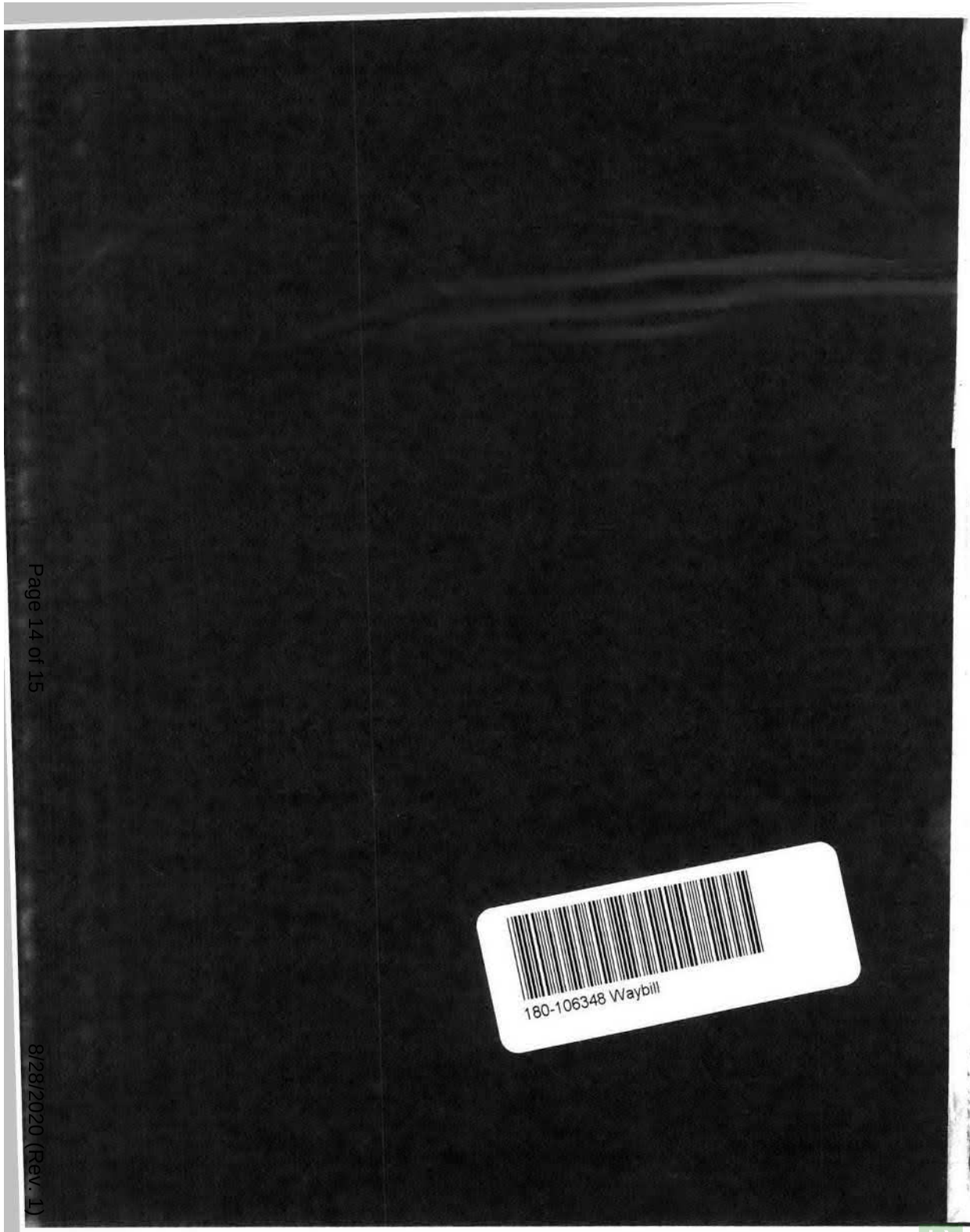
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	5/28/20 1400			5/29/20 845
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:



180-106348 Waybill

eurofins | Environment Testing TestAmerica

ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTUN, TX 78729
UNITED STATES US

SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311

TO

EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58963

RMA:

FedEx Express

RETURNS MON-SAT

FedEx TRK# 0221 1680 3500 1559

FRI - 29 MAY 10:30A
PRIORITY OVERNIGHT

XH AGCA

15238
PA-US
PIT

Uncorrected temp 22 °C
Thermometer ID 17

CF 0 Initials TB

PT-WI-SR-001 effective 7/26/13

FID 1711129 28MAY20 MMRA 56BC32925/0

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8/28/2020 (Rev. 1)

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-106348-1
SDG Number: GAF-NRS-Treatability

Login Number: 106348
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-106806-1
Client Project/Site: GAF NRS Treatability
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:39:39 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Case Narrative

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Job ID: 180-106806-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-106806-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 6/10/2020 10:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.3º C.

Metals
Method 6020A: The low level continuing calibration verification (CCVL) associated with batch 180-318395 recovered above the upper control limit for boron. The samples associated with this CCVL were 10X the RL for the affected analytes; therefore, the data have been reported.

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

Definitions/Glossary

Client: Environmental Standards Inc. Job ID: 180-106806-1
Project/Site: GAF NRS Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Job ID: 180-106806-1
Project/Site: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-26-20
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	07-01-20
Pennsylvania	NELAP	02-00416	07-21-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-106806-1	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Water	06/04/20 11:30	06/10/20 10:30	
180-106806-2	GAF-GW-BKT-PHII-CONTROL-19R-SAND-T2	Water	06/04/20 11:30	06/10/20 10:30	
180-106806-3	GAF-GW-BKT-PHII-DOLO-444U-SAND-T2	Water	06/04/20 11:30	06/10/20 10:30	
180-106806-4	GAF-GW-BKT-PHII-FB22-SAND-19R-T2	Water	06/04/20 11:30	06/10/20 10:30	
180-106806-5	GAF-GW-BKT-PHII-HICAL-SAND-19R-T2	Water	06/04/20 11:45	06/10/20 10:30	
180-106806-6	GAF-GW-BKT-PHII-DOLO-19R-SAND-T1	Water	06/04/20 11:45	06/10/20 10:30	
180-106806-7	GAF-GW-BKT-PHII-NAOH-SAND-19R-T1	Water	06/04/20 11:45	06/10/20 10:30	
180-106806-8	GAF-GW-BKT-PHII-HICAL-CACL2-SAND-19R-T2	Water	06/04/20 11:45	06/10/20 10:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-444U-SAND

Lab Sample ID: 180-106806-1
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 02:50	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318395	06/13/20 02:26	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHII-CONTROL-19R-SAND-T2

Lab Sample ID: 180-106806-2
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:07	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318395	06/13/20 02:43	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHII-DOLO-444U-SAND-T2

Lab Sample ID: 180-106806-3
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:11	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318395	06/13/20 02:47	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHII-FB22-SAND-19R-T2

Lab Sample ID: 180-106806-4
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:14	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318395	06/13/20 02:50	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Client Sample ID: GAF-GW-BKT-PHII-HICAL-SAND-19R-T2

Lab Sample ID: 180-106806-5
Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:18	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318395	06/13/20 02:54	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHII-DOLO-19R-SAND-T1

Lab Sample ID: 180-106806-6
Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:28	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHII-NAOH-SAND-19R-T1

Lab Sample ID: 180-106806-7
Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:32	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHII-HICAL-CACL2-SAND-19R-T2

Lab Sample ID: 180-106806-8
Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	318073	06/10/20 14:33	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			318327	06/12/20 03:35	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

JL = James Lyu

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-444U-SAND

Lab Sample ID: 180-106806-1
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	7.70		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 02:50	1
Cadmium	0.481	J	1.00	0.217	ug/L		06/10/20 14:33	06/13/20 02:26	1
Lithium	6.88		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 02:50	1
Nickel	8.69		1.00	0.336	ug/L		06/10/20 14:33	06/13/20 02:26	1

Client Sample ID: GAF-GW-BKT-PHII-CONTROL-19R-SAND-T2

Lab Sample ID: 180-106806-2
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.574	J	1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:07	1
Cadmium	10.6		1.00	0.217	ug/L		06/10/20 14:33	06/13/20 02:43	1
Lithium	44.4		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:07	1
Nickel	414		1.00	0.336	ug/L		06/10/20 14:33	06/13/20 02:43	1

Client Sample ID: GAF-GW-BKT-PHII-DOLO-444U-SAND-T2

Lab Sample ID: 180-106806-3
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:11	1
Cadmium	0.256	J	1.00	0.217	ug/L		06/10/20 14:33	06/13/20 02:47	1
Lithium	ND		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:11	1
Nickel	8.16		1.00	0.336	ug/L		06/10/20 14:33	06/13/20 02:47	1

Client Sample ID: GAF-GW-BKT-PHII-FB22-SAND-19R-T2

Lab Sample ID: 180-106806-4
Date Collected: 06/04/20 11:30
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.220	J	1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:14	1
Cadmium	0.749	J	1.00	0.217	ug/L		06/10/20 14:33	06/13/20 02:50	1
Lithium	42.0		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:14	1
Nickel	24.6		1.00	0.336	ug/L		06/10/20 14:33	06/13/20 02:50	1

Client Sample ID: GAF-GW-BKT-PHII-HICAL-SAND-19R-T2

Lab Sample ID: 180-106806-5
Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:18	1
Cadmium	0.551	J	1.00	0.217	ug/L		06/10/20 14:33	06/13/20 02:54	1
Lithium	18.0		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:18	1
Nickel	25.2		1.00	0.336	ug/L		06/10/20 14:33	06/13/20 02:54	1

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Client Sample ID: GAF-GW-BKT-PHII-DOLO-19R-SAND-T1

Lab Sample ID: 180-106806-6

Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.09		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:28	1
Cadmium	1.95		1.00	0.217	ug/L		06/10/20 14:33	06/12/20 03:28	1
Lithium	18.5		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:28	1
Nickel	56.2		1.00	0.336	ug/L		06/10/20 14:33	06/12/20 03:28	1

Client Sample ID: GAF-GW-BKT-PHII-NAOH-SAND-19R-T1

Lab Sample ID: 180-106806-7

Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.09		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:32	1
Cadmium	1.36		1.00	0.217	ug/L		06/10/20 14:33	06/12/20 03:32	1
Lithium	13.1		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:32	1
Nickel	51.8		1.00	0.336	ug/L		06/10/20 14:33	06/12/20 03:32	1

Client Sample ID: GAF-GW-BKT-PHII-HICAL-CACL2-SAND-19R-T2

Lab Sample ID: 180-106806-8

Date Collected: 06/04/20 11:45
Matrix: Water
Date Received: 06/10/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 03:35	1
Cadmium	0.590	J	1.00	0.217	ug/L		06/10/20 14:33	06/12/20 03:35	1
Lithium	22.8		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 03:35	1
Nickel	15.7		1.00	0.336	ug/L		06/10/20 14:33	06/12/20 03:35	1

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

Lab Sample ID: MB 180-318073/1-A
Matrix: Water
Analysis Batch: 318327

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		06/10/20 14:33	06/12/20 02:33	1
Lithium	ND		5.00	3.39	ug/L		06/10/20 14:33	06/12/20 02:33	1

Lab Sample ID: MB 180-318073/1-A
Matrix: Water
Analysis Batch: 318395

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		06/10/20 14:33	06/13/20 02:05	1
Nickel	ND		1.00	0.336	ug/L		06/10/20 14:33	06/13/20 02:05	1

Lab Sample ID: LCS 180-318073/2-A
Matrix: Water
Analysis Batch: 318327

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	500	524.4		ug/L		105	80 - 120
Lithium	500	517.2		ug/L		103	80 - 120

Lab Sample ID: LCS 180-318073/2-A
Matrix: Water
Analysis Batch: 318395

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	500	552.1		ug/L		110	80 - 120
Nickel	500	539.5		ug/L		108	80 - 120

Lab Sample ID: 180-106806-1 MS
Matrix: Water
Analysis Batch: 318327

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-444U-SAND
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	7.70		500	527.5		ug/L		104	75 - 125
Lithium	6.88		500	531.5		ug/L		105	75 - 125

Lab Sample ID: 180-106806-1 MS
Matrix: Water
Analysis Batch: 318395

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-444U-SAND
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.481	J	500	540.7		ug/L		108	75 - 125
Nickel	8.69		500	542.6		ug/L		107	75 - 125

Lab Sample ID: 180-106806-1 MSD
Matrix: Water
Analysis Batch: 318327

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-444U-SAND
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	7.70		500	529.8		ug/L		104	75 - 125	0	20
Lithium	6.88		500	533.4		ug/L		105	75 - 125	0	20

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

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

Lab Sample ID: 180-106806-1 MSD
Matrix: Water
Analysis Batch: 318395

Client Sample ID: GAF-BKT-PHII-CONTROL-T1-444U-SAND
Prep Type: Total Recoverable
Prep Batch: 318073

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.481	J	500	538.5		ug/L		108	75 - 125	0	20
Nickel	8.69		500	536.6		ug/L		106	75 - 125	1	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-106806-1

Metals

Prep Batch: 318073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106806-1	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	3005A	
180-106806-2	GAF-GW-BKT-PHII-CONTROL-19R-SAND-T2	Total Recoverable	Water	3005A	
180-106806-3	GAF-GW-BKT-PHII-DOLO-444U-SAND-T2	Total Recoverable	Water	3005A	
180-106806-4	GAF-GW-BKT-PHII-FB22-SAND-19R-T2	Total Recoverable	Water	3005A	
180-106806-5	GAF-GW-BKT-PHII-HICAL-SAND-19R-T2	Total Recoverable	Water	3005A	
180-106806-6	GAF-GW-BKT-PHII-DOLO-19R-SAND-T1	Total Recoverable	Water	3005A	
180-106806-7	GAF-GW-BKT-PHII-NAOH-SAND-19R-T1	Total Recoverable	Water	3005A	
180-106806-8	GAF-GW-BKT-PHII-HICAL-CACL2-SAND-19R-T	Total Recoverable	Water	3005A	
MB 180-318073/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-318073/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-106806-1 MS	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	3005A	
180-106806-1 MSD	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	3005A	

Analysis Batch: 318327

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106806-1	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	318073
180-106806-2	GAF-GW-BKT-PHII-CONTROL-19R-SAND-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-3	GAF-GW-BKT-PHII-DOLO-444U-SAND-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-4	GAF-GW-BKT-PHII-FB22-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-5	GAF-GW-BKT-PHII-HICAL-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-6	GAF-GW-BKT-PHII-DOLO-19R-SAND-T1	Total Recoverable	Water	EPA 6020A	318073
180-106806-7	GAF-GW-BKT-PHII-NAOH-SAND-19R-T1	Total Recoverable	Water	EPA 6020A	318073
180-106806-8	GAF-GW-BKT-PHII-HICAL-CACL2-SAND-19R-T	Total Recoverable	Water	EPA 6020A	318073
MB 180-318073/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	318073
LCS 180-318073/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	318073
180-106806-1 MS	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	318073
180-106806-1 MSD	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	318073

Analysis Batch: 318395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-106806-1	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	318073
180-106806-2	GAF-GW-BKT-PHII-CONTROL-19R-SAND-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-3	GAF-GW-BKT-PHII-DOLO-444U-SAND-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-4	GAF-GW-BKT-PHII-FB22-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	318073
180-106806-5	GAF-GW-BKT-PHII-HICAL-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	318073
MB 180-318073/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	318073
LCS 180-318073/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	318073
180-106806-1 MS	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	318073
180-106806-1 MSD	GAF-BKT-PHII-CONTROL-T1-444U-SAND	Total Recoverable	Water	EPA 6020A	318073

Chain of Custody Record 420756

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Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/4/2020	COC No:
Company Name: Environmental	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610. 935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 Metals - Be, Cd, Ni, Tl	Sample Specific Notes:
GAF-Bkt-PHII-Control-t1-444u-Sand	6/4/20	1130	G	GW	1	N	N	✓	
GAF-GW-Bkt-PHII-Control-19R-Sand-t2	6/4/20	1130	↓	↓	↓	N	N	✓	
GAF-GW-Bkt-PHII-Dolo-444u-Sand-t2	6/4/20	1130				N	N	✓	
GAF-GW-Bkt-PHII-FB22-Sand-19R-t2	6/4/20	1130				N	N	✓	
GAF-GW-Bkt-PHII-Hi.Cal-Sand-19R-t2	6/4/20	1145				N	N	✓	
GAF-GW-Bkt-PHII-Dolo-19R-Sand-t1	6/4/20	1145				N	N	✓	
GAF-GW-Bkt-PHII-NaOH-Sand-19R-t1	6/4/20	1145				N	N	✓	
GAF-GW-Bkt-PHII-Hi.Cal-CaCl2-Sand-19R-t2	6/4/20	1145				N	N	✓	

180-106806 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/9/20 1400		ESSI/IV	6/10/20 1030
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Do Not Use This Tag
eurofins
Environment Testing
TestAmerica
Part # 159470-434 KIT2 EXP 01/21
ORIGIN ID: HOA (512) 454-4797
FRANCISCO BRINAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: $180-58963
RMA:
FedEx Express
FedEx
TRK# 0221 1680 3500 1560
WED - 10 JUN 10:30A
PRIORITY OVERNIGHT
XH AGCA
15238
PA-US
PIT
Uncorrected temp 4.3 °C
Thermometer ID 14
CF 0
Initials JJ
PT-WI-SR-001 effective 7/26/13
180-106806 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-106806-1

Login Number: 106806 **List Source: Eurofins TestAmerica, Pittsburgh**
List Number: 1
Creator: Say, Thomas C

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-107627-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA Gallatin EIP
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:58:43 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-107627-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-107627-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 6/26/2020 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.2º C.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	07-21-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-107627-1	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-3	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-4	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Water	06/18/20 13:00	06/26/20 09:00	
180-107627-5	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-6	GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-7	GAF-GW-PHII-BKT-NAOH-SAND-19R-T2	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-8	GAF-GW-PHII-BKT-DOLO-SAND-19R-T2	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-9	GAF-GW-PHII-BKT-DOLO-SAND-444U-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-10	GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-11	GAF-GW-PHII-BKT-FB22-SAND-19R-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-12	GAF-GW-PHII-BKT-CONTROL-441USOIL-T3	Water	06/24/20 13:00	06/26/20 09:00	
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Water	06/24/20 13:00	06/26/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2
Lab Sample ID: 180-107627-1
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:33	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2
Lab Sample ID: 180-107627-2
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:37	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2
Lab Sample ID: 180-107627-3
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Dissolved	Analysis	EPA 6020A		1			320452	07/03/20 02:40	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2
Lab Sample ID: 180-107627-4
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Dissolved	Analysis	EPA 6020A		1			320452	07/03/20 02:44	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3
Lab Sample ID: 180-107627-5
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 02:47	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3

Lab Sample ID: 180-107627-6
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:11	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-NAOH-SAND-19R-T2

Lab Sample ID: 180-107627-7
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:15	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-19R-T2

Lab Sample ID: 180-107627-8
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:18	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T3

Lab Sample ID: 180-107627-9
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:22	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-107627-10
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:25	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-FB22-SAND-19R-T3

Lab Sample ID: 180-107627-11
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:29	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T3

Lab Sample ID: 180-107627-12
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:32	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T3

Lab Sample ID: 180-107627-13
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320070	06/30/20 15:24	JL	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			320452	07/03/20 03:36	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

JL = James Lyu

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2

Lab Sample ID: 180-107627-1
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0802		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:33	1
Cadmium	0.0152		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:33	1
Lithium	0.118		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:33	1
Nickel	1.50		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:33	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2

Lab Sample ID: 180-107627-2
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:37	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:37	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:37	1
Nickel	0.000929	J	0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:37	1

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T2

Lab Sample ID: 180-107627-3
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0817		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:40	1
Cadmium	0.0147		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:40	1
Lithium	0.117		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:40	1
Nickel	1.47		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:40	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T2

Lab Sample ID: 180-107627-4
Date Collected: 06/18/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:44	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:44	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:44	1
Nickel	0.000703	J	0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:44	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3

Lab Sample ID: 180-107627-5
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00212		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:47	1
Cadmium	0.00324		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:47	1
Lithium	0.0451		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:47	1
Nickel	0.178		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:47	1

Client Sample ID: GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3

Lab Sample ID: 180-107627-6

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.00219**		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:11	1
Cadmium	**0.00307**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:11	1
Lithium	**0.0469**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:11	1
Nickel	**0.175**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:11	1

Client Sample ID: GAF-GW-PHII-BKT-NAOH-SAND-19R-T2

Lab Sample ID: 180-107627-7

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:15	1
Cadmium	**0.00219**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:15	1
Lithium	**0.0228**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:15	1
Nickel	**0.0769**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:15	1

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-19R-T2

Lab Sample ID: 180-107627-8

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:18	1
Cadmium	**0.00276**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:18	1
Lithium	**0.0237**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:18	1
Nickel	**0.0654**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:18	1

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T3

Lab Sample ID: 180-107627-9

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:22	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:22	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:22	1
Nickel	**0.00252**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:22	1

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-107627-10

Date Collected: 06/24/20 13:00
Date Received: 06/26/20 09:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.00715**		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:25	1
Cadmium	**0.00980**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:25	1
Lithium	**0.0694**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:25	1
Nickel	**0.521**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:25	1

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-107627-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-FB22-SAND-19R-T3

Lab Sample ID: 180-107627-11
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:29	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:29	1
Lithium	**0.0460**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:29	1
Nickel	**0.0301**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:29	1

Client Sample ID: GAF-GW-PHII-BKT-CONTROL-441USOIL-T3

Lab Sample ID: 180-107627-12
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0843**		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:32	1
Cadmium	**0.0146**		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:32	1
Lithium	**0.116**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:32	1
Nickel	**1.48**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:32	1

Client Sample ID: GAF-GW-PHII-BKT-HICAL-441USOIL-T3

Lab Sample ID: 180-107627-13
Date Collected: 06/24/20 13:00
Matrix: Water
Date Received: 06/26/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.000461**	**J**	0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 03:36	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 03:36	1
Lithium	**0.00541**		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 03:36	1
Nickel	**0.00586**		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 03:36	1

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

Lab Sample ID: MB 180-320070/1-A
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		06/30/20 15:24	07/03/20 02:16	1
Cadmium	ND		0.00100	0.000217	mg/L		06/30/20 15:24	07/03/20 02:16	1
Lithium	ND		0.00500	0.00339	mg/L		06/30/20 15:24	07/03/20 02:16	1
Nickel	ND		0.00100	0.000336	mg/L		06/30/20 15:24	07/03/20 02:16	1

Lab Sample ID: LCS 180-320070/2-A
Matrix: Water
Analysis Batch: 320452

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.5125		mg/L		102	80 - 120
Cadmium	0.500	0.5007		mg/L		100	80 - 120
Lithium	0.500	0.5116		mg/L		102	80 - 120
Nickel	0.500	0.4986		mg/L		100	80 - 120

Lab Sample ID: 180-107627-5 MS
Matrix: Water
Analysis Batch: 320452

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.00212		0.500	0.5076		mg/L		101	75 - 125
Cadmium	0.00324		0.500	0.5101		mg/L		101	75 - 125
Lithium	0.0451		0.500	0.5549		mg/L		102	75 - 125
Nickel	0.178		0.500	0.6812		mg/L		101	75 - 125

Lab Sample ID: 180-107627-5 MSD
Matrix: Water
Analysis Batch: 320452

Client Sample ID: GAF-GW-PHII-BKT-HICAL-SAND-19R-T3
Prep Type: Total Recoverable
Prep Batch: 320070

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	0.00212		0.500	0.4919		mg/L		98	75 - 125	3	20
Cadmium	0.00324		0.500	0.4930		mg/L		98	75 - 125	3	20
Lithium	0.0451		0.500	0.5336		mg/L		98	75 - 125	4	20
Nickel	0.178		0.500	0.6460		mg/L		94	75 - 125	5	20

Metals

Prep Batch: 320070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107627-1	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Total Recoverable	Water	3005A	
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Total Recoverable	Water	3005A	
180-107627-3	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Dissolved	Water	3005A	
180-107627-4	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Dissolved	Water	3005A	
180-107627-5	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-6	GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-7	GAF-GW-PHII-BKT-NAOH-SAND-19R-T2	Total Recoverable	Water	3005A	
180-107627-8	GAF-GW-PHII-BKT-DOLO-SAND-19R-T2	Total Recoverable	Water	3005A	
180-107627-9	GAF-GW-PHII-BKT-DOLO-SAND-444U-T3	Total Recoverable	Water	3005A	
180-107627-10	GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-11	GAF-GW-PHII-BKT-FB22-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-12	GAF-GW-PHII-BKT-CONTROL-441USOIL-T3	Total Recoverable	Water	3005A	
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Total Recoverable	Water	3005A	
MB 180-320070/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-320070/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-107627-5 MS	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-107627-5 MSD	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	3005A	

Analysis Batch: 320452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107627-1	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-2	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-3	GAF-GW-PHII-BKT-CONTROL-441USOIL-T2	Dissolved	Water	EPA 6020A	320070
180-107627-4	GAF-GW-PHII-BKT-HICAL-441USOIL-T2	Dissolved	Water	EPA 6020A	320070
180-107627-5	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-6	GAF-GW-PHII-BKT-HICALCACL2-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-7	GAF-GW-PHII-BKT-NAOH-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-8	GAF-GW-PHII-BKT-DOLO-SAND-19R-T2	Total Recoverable	Water	EPA 6020A	320070
180-107627-9	GAF-GW-PHII-BKT-DOLO-SAND-444U-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-10	GAF-GW-PHII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-11	GAF-GW-PHII-BKT-FB22-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-12	GAF-GW-PHII-BKT-CONTROL-441USOIL-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-13	GAF-GW-PHII-BKT-HICAL-441USOIL-T3	Total Recoverable	Water	EPA 6020A	320070
MB 180-320070/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	320070
LCS 180-320070/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	320070
180-107627-5 MS	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070
180-107627-5 MSD	GAF-GW-PHII-BKT-HICAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	320070

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Chain of Custody Record

420755 eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x 414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 totals - Be, Cd, Li, Ni	6020 dissolved - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PHII-Bkt-Control-441 soil-t2	6/18/20	1300	G	GW	1	N	N	✓		totals Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441 soil-t2	6/18/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Control-441u soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	dissolved Be, Cd Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-441u soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	
GAF-GW-PHII-Bkt-Hi Cal-Sand-19R-t3	6/24/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Hi Cal CaCl2-Sand-19R-t3	↓	↓	↓	↓	1	N	N	✓		
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-441u-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-Control-Sand-19R-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-FB22-Sand-19R-t3					1	N	N	✓		
		rdw			1	N	N	✓		

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

☐ Return to Client ☑ Disposal by Lab ☐ Ar

180-107627 Chain of Custody

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 6/25/2020 1500	Received by:	Company: ETMajor	Date/Time: 6/26/20 GW
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Chain of Custody Record

420753 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Borjas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	2 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 totals - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PH II-Bkt-Control-441u soil-t3	6/24/20	1300	G	GW	1	N	N	✓	totals Be, Cd, Li, Ni
GAF-GW-PH II-Bkt-Hi Cal-441u soil-t3	↓	↓	↓	↓	1	N	N	✓	

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/20 1500		GTN PW	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

rdw 7/6/20 rev1

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Chain of Custody Record

420755

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	(320 total Be, Cd, Li, Ni)	(6020 dissolved Be, Cd, Li, Ni)	Sample Specific Notes:
GAF-GW-PHII-Bkt-Control-444u Soil-t2	6/18/20	1300	G	GW	1	N	N	✓		totals Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-444u Soil-t2 (rdw 7/6/20)	6/18/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Control-444u Soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	dissolved Be, Cd Li, Ni
GAF-GW-PHII-Bkt-Hi Cal-444u Soil-t2	6/18/20	1300	G	GW	1	Y	N		✓	
GAF-GW-PHII-Bkt-Hi Cal-Sand-19R-t3	6/24/20	1300	G	GW	1	N	N	✓		
GAF-GW-PHII-Bkt-Hi Cal Calib-Sand-19R-t3	↓	↓	↓	↓	1	N	N	✓		Be, Cd, Li, Ni
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t2					1	N	N	✓		
GAF-GW-PHII-Bkt-Dolo-Sand-444u-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-Control-Sand-19R-t3					1	N	N	✓		
GAF-GW-PHII-Bkt-FB22-Sand-19R-t3					1	N	N	✓		to be analyzed
		rdw			1	N	N	✓		

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

☐ Return to Client ☑ Disposal by Lab ☐ Ar

180-107627 Chain of Custody

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 6/25/2020 1500	Received by:	Company: ESMan	Date/Time: 6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

rdw 7/6/20 rev1

Chain of Custody Record 420753

eurofins | Environment Testing TestAmerica

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Burgos	Date: 6/25/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	2 of 2 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020 total 15 - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PH II-BKT-Control-44/45oil-+3	6/24/20	1300	G	GW	1	N	N	✓	totals Be, Cd, Li, Ni
GAF-GW-PH II-BKT-Hi Cal-44/45oil-+3	↓	↓	↓	↓	1	N	N	✓	

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	6/25/20 1500		GTN MTN	6/26/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

eurofins
Environment Testing
TestAmerica
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-68932
RMA:
FedEx Express
FRI - 26 JUN 10:30A
PRIORITY OVERNIGHT
15238
PA-US
PIT
FedEx TRK# 0221 1680 3500 0791
XH AGCA
Uncorrected temp 3.2 °C
Thermometer ID 14
CF 0 Initials JS
PT-WI-SR-001 effective 7/26/13
FID: 1711129 25Jun2020 MMRA 56C01/C7DD/95A2
180-107627 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-107627-1
SDG Number: GAF-NRS-Treatability

Login Number: 107627
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-107846-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA GAF EIP

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
7/10/2020 3:23:49 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Job ID: 180-107846-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-107846-1

Receipt
The samples were received on 7/2/2020 8:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 11.0º C.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

Metals
Methods 6020A: The continuing calibration blank (CCB) associated with batch 180-321088 recovered above the upper control limit for sodium. The samples associated with this CCB were 10X the RL for the affected analytes; therefore, the data have been reported.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	08-01-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	05-23-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-107846-1	GAF-GW-PHII-Bkt-HiCal-Sand-19R-t4	Water	07/01/20 10:00	07/02/20 08:30	
180-107846-2	GAF-GW-PHII-Bkt-HiCalCaCl2-Sand-19R-t4	Water	07/01/20 10:00	07/02/20 08:30	
180-107846-3	GAF-GW-PHII-Bkt-NaOH-Sand-19R-t3	Water	07/01/20 10:00	07/02/20 08:30	
180-107846-4	GAF-GW-PHII-Bkt-Dolo-Sand-19R-t3	Water	07/01/20 10:00	07/02/20 08:30	
180-107846-5	GAF-GW-PHII-Bkt-Dolo-Sand-444a-t4	Water	07/01/20 10:00	07/02/20 08:30	
180-107846-6	GAF-GW-PHII-Bkt-Control-Sand-19R-t4	Water	07/01/20 10:00	07/02/20 08:30	
180-107846-7	GAF-GW-PHII-Bkt-FB22-Sand-19R-t4	Water	07/01/20 10:00	07/02/20 08:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-Bkt-HiCal-Sand-19R-t4
Lab Sample ID: 180-107846-1
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:28	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHII-Bkt-HiCalCaCl2-Sand-19R-t4
Lab Sample ID: 180-107846-2
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:32	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHII-Bkt-NaOH-Sand-19R-t3
Lab Sample ID: 180-107846-3
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:35	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHII-Bkt-Dolo-Sand-19R-t3
Lab Sample ID: 180-107846-4
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:38	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHII-Bkt-Dolo-Sand-444a-t4
Lab Sample ID: 180-107846-5
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:42	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-Bkt-Control-Sand-19R-t4

Lab Sample ID: 180-107846-6
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:45	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHII-Bkt-FB22-Sand-19R-t4

Lab Sample ID: 180-107846-7
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	320829	07/08/20 08:20	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321088	07/09/20 01:49	RSK	TAL PIT
	Instrument ID: A									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

TJO = Tyler Oliver

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample ID: GAF-GW-PHII-Bkt-HiCal-Sand-19R-t4

Lab Sample ID: 180-107846-1
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	6.08		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:28	1
Beryllium	4.24		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:28	1
Nickel	295		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:28	1
Lithium	51.4		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:28	1

Client Sample ID: GAF-GW-PHII-Bkt-HiCalCaCl2-Sand-19R-t4

Lab Sample ID: 180-107846-2
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	6.57		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:32	1
Beryllium	5.37		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:32	1
Nickel	351		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:32	1
Lithium	59.9		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:32	1

Client Sample ID: GAF-GW-PHII-Bkt-NaOH-Sand-19R-t3

Lab Sample ID: 180-107846-3
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	3.61		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:35	1
Beryllium	ND		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:35	1
Nickel	142		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:35	1
Lithium	23.0		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:35	1

Client Sample ID: GAF-GW-PHII-Bkt-Dolo-Sand-19R-t3

Lab Sample ID: 180-107846-4
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	9.25		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:38	1
Beryllium	7.63		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:38	1
Nickel	345		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:38	1
Lithium	56.8		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:38	1

Client Sample ID: GAF-GW-PHII-Bkt-Dolo-Sand-444a-t4

Lab Sample ID: 180-107846-5
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:42	1
Beryllium	ND		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:42	1
Nickel	2.12		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:42	1
Lithium	ND		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:42	1

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-Bkt-Control-Sand-19R-t4

Lab Sample ID: 180-107846-6
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**8.63**		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:45	1
Beryllium	**5.49**		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:45	1
Nickel	**502**		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:45	1
Lithium	**50.9**		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:45	1

Client Sample ID: GAF-GW-PHII-Bkt-FB22-Sand-19R-t4

Lab Sample ID: 180-107846-7
Date Collected: 07/01/20 10:00
Matrix: Water
Date Received: 07/02/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 01:49	1
Beryllium	ND		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 01:49	1
Nickel	**50.1**		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 01:49	1
Lithium	**46.4**		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 01:49	1

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

Lab Sample ID: MB 180-320829/1-A
Matrix: Water
Analysis Batch: 321088

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 320829

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		07/08/20 08:20	07/09/20 03:26	1
Beryllium	ND		1.00	0.182	ug/L		07/08/20 08:20	07/09/20 03:26	1
Nickel	ND		1.00	0.336	ug/L		07/08/20 08:20	07/09/20 03:26	1
Lithium	ND		5.00	3.39	ug/L		07/08/20 08:20	07/09/20 03:26	1

Lab Sample ID: LCS 180-320829/2-A
Matrix: Water
Analysis Batch: 321088

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 320829

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	500	486.8		ug/L		97	80 - 120
Beryllium	500	457.0		ug/L		91	80 - 120
Nickel	500	496.7		ug/L		99	80 - 120
Lithium	500	463.2		ug/L		93	80 - 120

Lab Sample ID: 180-107308-D-2-C MS
Matrix: Water
Analysis Batch: 321088

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 320829

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		500	463.9		ug/L		93	75 - 125
Beryllium	0.265	J	500	485.0		ug/L		97	75 - 125
Nickel	2.15		500	457.0		ug/L		91	75 - 125
Lithium	34.8		500	501.2		ug/L		93	75 - 125

Lab Sample ID: 180-107308-D-2-D MSD
Matrix: Water
Analysis Batch: 321088

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 320829

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		500	476.5		ug/L		95	75 - 125	3	20
Beryllium	0.265	J	500	501.8		ug/L		100	75 - 125	3	20
Nickel	2.15		500	468.3		ug/L		93	75 - 125	2	20
Lithium	34.8		500	521.6		ug/L		97	75 - 125	4	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-107846-1
SDG: GAF-NRS-Treatability

Metals

Prep Batch: 320829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107846-1	GAF-GW-PHII-Bkt-HiCal-Sand-19R-t4	Total Recoverable	Water	3005A	
180-107846-2	GAF-GW-PHII-Bkt-HiCalCaCl2-Sand-19R-t4	Total Recoverable	Water	3005A	
180-107846-3	GAF-GW-PHII-Bkt-NaOH-Sand-19R-t3	Total Recoverable	Water	3005A	
180-107846-4	GAF-GW-PHII-Bkt-Dolo-Sand-19R-t3	Total Recoverable	Water	3005A	
180-107846-5	GAF-GW-PHII-Bkt-Dolo-Sand-444a-t4	Total Recoverable	Water	3005A	
180-107846-6	GAF-GW-PHII-Bkt-Control-Sand-19R-t4	Total Recoverable	Water	3005A	
180-107846-7	GAF-GW-PHII-Bkt-FB22-Sand-19R-t4	Total Recoverable	Water	3005A	
MB 180-320829/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-320829/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-107308-D-2-C MS	Matrix Spike	Total Recoverable	Water	3005A	
180-107308-D-2-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 321088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-107846-1	GAF-GW-PHII-Bkt-HiCal-Sand-19R-t4	Total Recoverable	Water	EPA 6020A	320829
180-107846-2	GAF-GW-PHII-Bkt-HiCalCaCl2-Sand-19R-t4	Total Recoverable	Water	EPA 6020A	320829
180-107846-3	GAF-GW-PHII-Bkt-NaOH-Sand-19R-t3	Total Recoverable	Water	EPA 6020A	320829
180-107846-4	GAF-GW-PHII-Bkt-Dolo-Sand-19R-t3	Total Recoverable	Water	EPA 6020A	320829
180-107846-5	GAF-GW-PHII-Bkt-Dolo-Sand-444a-t4	Total Recoverable	Water	EPA 6020A	320829
180-107846-6	GAF-GW-PHII-Bkt-Control-Sand-19R-t4	Total Recoverable	Water	EPA 6020A	320829
180-107846-7	GAF-GW-PHII-Bkt-FB22-Sand-19R-t4	Total Recoverable	Water	EPA 6020A	320829
MB 180-320829/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	320829
LCS 180-320829/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	320829
180-107308-D-2-C MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	320829
180-107308-D-2-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	320829

Chain of Custody Record

420752 eurofins Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 7/1/2020	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x 414	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF-NRS-Treatability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	6020 totals - Be, Cd, Li, Ni	Sample Specific Notes:
GAF-GW-PHII-Bkt-HiCal-Sand-19R-t4	7/1/20	1000	G	GW	1	N	N	✓	
GAF-GW-PHII-Bkt-HiCal CaCl2-Sand-19R-t4	↓	↓	↓	↓	1	↓	↓	✓	
GAF-GW-PHII-Bkt-NaOH-Sand-19R-t3	↓	↓	↓	↓	1	↓	↓	✓	
GAF-GW-PHII-Bkt-Dolo-Sand-19R-t3	↓	↓	↓	↓	1	↓	↓	✓	
GAF-GW-PHII-Bkt-Dolo-Sand-444u-t4	↓	↓	↓	↓	1	↓	↓	✓	Be, Cd, Li, Ni Only
GAF-GW-PHII-Bkt-Control-Sand-19R-t4	↓	↓	↓	↓	1	↓	↓	✓	
GAF-GW-PHII-Bkt-FB22-Sand-19R-t4	↓	↓	↓	↓	1	↓	↓	✓	

180-107846 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 s.

☐ Return to Client ☑ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Daniel Young	AECOM	7/1/20 1415	Rachel Watkins	AECOM	7/1/20 1416
Rachel Watkins	AECOM	7/1/20 1600	[signature]	FTAPitt	7-2-20 8:30



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180-107846 Waybill

ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US

SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311

TO

EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58932

RMA:

FedEx Express

FedEx
TRK# 0221 1680 3500 0806

RETURNS MON-SAT
THU - 02 JUL 10:30A
PRIORITY OVERNIGHT

XH AGCA

15238
PA-US
PIT

Uncorrected temp 11.0 °C
Thermometer ID 14
CF 0 No Ice Initials JB

PT-WI-SR-001 effective 7/26/13

FID 5068232 01JUL20 MMRA 56BC2/17B7/05A2
FID: 1711129 01Jul2020 MMRA 56CG2/17B7/05A2

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-107846-1
SDG Number: GAF-NRS-Treatability

Login Number: 107846
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins 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?	False	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-108130-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA GAF EIP
Revision: 1

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 9:10:50 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Job ID: 180-108130-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-108130-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 7/10/2020 9:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.4° C.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	07-21-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-108130-2	GAF-GW-PHII-BKT-DOLO-SAND-444U-T5	Water	07/08/20 13:00	07/10/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T5

Date Collected: 07/08/20 13:00
Date Received: 07/10/20 09:00

Lab Sample ID: 180-108130-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	321541	07/14/20 08:05	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			321761	07/14/20 22:36	RSK	TAL PIT
	Instrument ID: A									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

TJO = Tyler Oliver

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T5

Lab Sample ID: 180-108130-2

Date Collected: 07/08/20 13:00
Matrix: Water
Date Received: 07/10/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		07/14/20 08:05	07/14/20 22:36	1
Beryllium	ND		1.00	0.182	ug/L		07/14/20 08:05	07/14/20 22:36	1
Nickel	**2.03**		1.00	0.336	ug/L		07/14/20 08:05	07/14/20 22:36	1
Lithium	**5.38**		5.00	3.39	ug/L		07/14/20 08:05	07/14/20 22:36	1

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

Lab Sample ID: MB 180-321541/1-A
Matrix: Water
Analysis Batch: 321761

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 321541

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		07/14/20 08:05	07/14/20 21:40	1
Beryllium	ND		1.00	0.182	ug/L		07/14/20 08:05	07/14/20 21:40	1
Nickel	ND		1.00	0.336	ug/L		07/14/20 08:05	07/14/20 21:40	1
Lithium	ND		5.00	3.39	ug/L		07/14/20 08:05	07/14/20 21:40	1

Lab Sample ID: LCS 180-321541/2-A
Matrix: Water
Analysis Batch: 321761

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 321541

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cadmium			500	489.1		ug/L		98	80 - 120		
Beryllium			500	478.9		ug/L		96	80 - 120		
Nickel			500	501.5		ug/L		100	80 - 120		
Lithium			500	484.3		ug/L		97	80 - 120		

Lab Sample ID: 180-107974-C-4-B MS
Matrix: Water
Analysis Batch: 321761

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 321541

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cadmium	ND		500	481.1		ug/L		96	75 - 125		
Beryllium	ND		500	485.1		ug/L		97	75 - 125		
Nickel	2.33		500	524.1		ug/L		104	75 - 125		
Lithium	ND		500	463.4		ug/L		93	75 - 125		

Lab Sample ID: 180-107974-C-4-C MSD
Matrix: Water
Analysis Batch: 321761

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 321541

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		500	486.7		ug/L		97	75 - 125	1	20
Beryllium	ND		500	485.4		ug/L		97	75 - 125	0	20
Nickel	2.33		500	516.3		ug/L		103	75 - 125	2	20
Lithium	ND		500	469.1		ug/L		94	75 - 125	1	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-108130-1
SDG: GAF-NRS-Treatability

Metals

Prep Batch: 321541

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108130-2	GAF-GW-PHII-BKT-DOLO-SAND-444U-T5	Total Recoverable	Water	3005A	
MB 180-321541/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-321541/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-107974-C-4-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-107974-C-4-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 321761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108130-2	GAF-GW-PHII-BKT-DOLO-SAND-444U-T5	Total Recoverable	Water	EPA 6020A	321541
MB 180-321541/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	321541
LCS 180-321541/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	321541
180-107974-C-4-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	321541
180-107974-C-4-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	321541

REV 1
7/15/20 PH

Chain of Custody Record

420751

eurofins | Environment Testing TestAmerica

301 Alpha Dr.
Address: Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 7/9/20	COC No:
Company Name: Environmental Standards	Tel/Email: Craig.MacPhee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	____ of ____ COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610. 935.5577 x414	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Tratability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	6020 totals-Be,Cd,Li,Ni	6020 totals other *	9056A - Cl, F, SO4	2320B - Alkalinity**	TDS 2540 C	353.2 NO2/NO3	4500 - Phosphate	SM4500 - Sulfide	5310 C - TOC	351.2 - TKN	6020A dissolved***	Sample Specific Notes:
~~GAF-GW-PHII-BKT-NaOH-Sand-19R-T4~~	7/8/20	1300	G	GW	1	N	N	✓											7/15/20 PH
GAF-GW-PHII-BKT-Dolo-Sand-444U-T5	7/8/20	1300	G	GW	1	N	N	✓											Be, Cd, Li, Ni only
~~GAF-GW-PHII-BKT-Dolo-Sand-19R-T4~~	7/9/20	0830	G	GW	10	N	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	7/15/20 PH

180-108130 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ~~Zinc Acetate~~ /NaOH — 4 4 1 1 1 3 3 6 3 3 4

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: 6020 totals other * Sb, As, Ba, Cr, Co, Pb, Hg, Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B
Alkalinity** - Total, hydroxide, bicarbonate, carbonate ↑ 7470A
*** Run all metals that were run for totals, dissolved filtered by AECOM

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: ____ Corr'd: ____	Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	7/9/20 1200		EQA PH	7-10-20 9:00
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Chain of Custody Record

420751 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 7/9/20	COC No:
Company Name: Environmental Standards	Tel/Email: Craig.MacPhee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	____ of ____ COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610. 935.5577 x 414	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Tratability	☐ 2 days			Job / SDG No.:
PO#	☐ 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)	6020 totals - Be, Cd, Li, Ni	6020 totals other *	9056A - Cl, F, SO4	2320B - Alkalinity**	TDS 2540 C	353.2 NO2/NO3	4500 - Phosphate	SM4500 - Sulfide	5310 C - TOC	351.2 - TKN	6020A dissolved***	Sample Specific Notes:
GAF-GW-PHII-BKT-NaOH-Sand-19R-T4	7/8/20	1300	G	GW	1	N	N	✓											Be, Cd, Li, Ni only
GAF-GW-PHII-BKT-Dolo-Sand-444U-T5	7/8/20	1300	G	GW	1	N	N	✓											
GAF-GW-PHII-BKT-Dolo-Sand-19R-T4	7/9/20	0830	G	GW	10	N	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

180-108130 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ~~Zinc Acetate~~ / NaOH

								4	4	1	1	1	3	3	6	3	3	4	

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: 6020 totals other * Sb, As, Ba, Cr, Co, Pb, Hg, Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B
Alkalinity** - Total, hydroxide, bicarbonate, carbonate (↑ 7470A)
*** Run all metals that were run for totals, dissolved filtered by AECOM

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ | Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	7/9/20 1200	[signature]	EA PA	7-10-20 9:00
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:



180-108130 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-108130-1
SDG Number: GAF-NRS-Treatability

Login Number: 108130
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins 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?	False	
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.	False	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-108727-1
Laboratory Sample Delivery Group: GAF- NRS-Treatability
Client Project/Site: TVA Gallatin EIP

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/5/2020 5:21:10 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

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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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Job ID: 180-108727-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-108727-1

Receipt
The samples were received on 7/24/2020 8:45 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.2º C.

Receipt Exceptions
The Chain-of-Custody (COC) was incomplete as received. There is no relinquished by year listed on the COC, nor was the Field Sampler listed on the Chain of Custody.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-108727-1	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T1	Water	07/23/20 14:00	07/24/20 08:45	
180-108727-2	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1	Water	07/23/20 14:00	07/24/20 08:45	
180-108727-3	GAF-GW-PHIII-BKT-HICAL-SAND-19R-T1	Water	07/23/20 14:00	07/24/20 08:45	
180-108727-4	GAF-GW-PHIII-BKT-HICAL-SAND-444U-T1	Water	07/23/20 14:00	07/24/20 08:45	
180-108727-5	GAF-GW-PHII-BKT-DOLO-SAND-444U-T6	Water	07/16/20 08:30	07/24/20 08:45	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T1

Lab Sample ID: 180-108727-1
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	323431	07/29/20 08:57	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			323857	07/30/20 22:49	NAM	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1

Lab Sample ID: 180-108727-2
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	323431	07/29/20 08:57	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			323857	07/30/20 22:52	NAM	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHIII-BKT-HICAL-SAND-19R-T1

Lab Sample ID: 180-108727-3
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	323431	07/29/20 08:57	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			323857	07/30/20 22:56	NAM	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHIII-BKT-HICAL-SAND-444U-T1

Lab Sample ID: 180-108727-4
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	323431	07/29/20 08:57	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			323857	07/30/20 22:59	NAM	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T6

Lab Sample ID: 180-108727-5
Date Collected: 07/16/20 08:30
Matrix: Water
Date Received: 07/24/20 08:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	323431	07/29/20 08:57	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			323857	07/30/20 23:03	NAM	TAL PIT
	Instrument ID: A									

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

Analyst References:

Lab: TAL PIT

Batch Type: Prep

TJO = Tyler Oliver

Batch Type: Analysis

NAM = Nicole Marfisi

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T1

Lab Sample ID: 180-108727-1
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**1.50**		1.00	0.182	ug/L		07/29/20 08:57	07/30/20 22:49	1
Cadmium	**2.26**		1.00	0.217	ug/L		07/29/20 08:57	07/30/20 22:49	1
Lithium	**5.26**		5.00	3.39	ug/L		07/29/20 08:57	07/30/20 22:49	1
Nickel	**71.5**		1.00	0.336	ug/L		07/29/20 08:57	07/30/20 22:49	1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1

Lab Sample ID: 180-108727-2
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		07/29/20 08:57	07/30/20 22:52	1
Cadmium	**2.12**		1.00	0.217	ug/L		07/29/20 08:57	07/30/20 22:52	1
Lithium	**16.0**		5.00	3.39	ug/L		07/29/20 08:57	07/30/20 22:52	1
Nickel	**58.3**		1.00	0.336	ug/L		07/29/20 08:57	07/30/20 22:52	1

Client Sample ID: GAF-GW-PHIII-BKT-HICAL-SAND-19R-T1

Lab Sample ID: 180-108727-3
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		07/29/20 08:57	07/30/20 22:56	1
Cadmium	ND		1.00	0.217	ug/L		07/29/20 08:57	07/30/20 22:56	1
Lithium	ND		5.00	3.39	ug/L		07/29/20 08:57	07/30/20 22:56	1
Nickel	**42.9**		1.00	0.336	ug/L		07/29/20 08:57	07/30/20 22:56	1

Client Sample ID: GAF-GW-PHIII-BKT-HICAL-SAND-444U-T1

Lab Sample ID: 180-108727-4
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/24/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		07/29/20 08:57	07/30/20 22:59	1
Cadmium	ND		1.00	0.217	ug/L		07/29/20 08:57	07/30/20 22:59	1
Lithium	ND		5.00	3.39	ug/L		07/29/20 08:57	07/30/20 22:59	1
Nickel	**62.7**		1.00	0.336	ug/L		07/29/20 08:57	07/30/20 22:59	1

Client Sample ID: GAF-GW-PHII-BKT-DOLO-SAND-444U-T6

Lab Sample ID: 180-108727-5
Date Collected: 07/16/20 08:30
Matrix: Water
Date Received: 07/24/20 08:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.588**	**J**	1.00	0.182	ug/L		07/29/20 08:57	07/30/20 23:03	1
Cadmium	**2.84**		1.00	0.217	ug/L		07/29/20 08:57	07/30/20 23:03	1
Lithium	**12.4**		5.00	3.39	ug/L		07/29/20 08:57	07/30/20 23:03	1
Nickel	**134**		1.00	0.336	ug/L		07/29/20 08:57	07/30/20 23:03	1

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

Lab Sample ID: MB 180-323431/1-A
Matrix: Water
Analysis Batch: 323857

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 323431

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		07/29/20 08:57	07/30/20 22:42	1
Cadmium	ND		1.00	0.217	ug/L		07/29/20 08:57	07/30/20 22:42	1
Lithium	ND		5.00	3.39	ug/L		07/29/20 08:57	07/30/20 22:42	1
Nickel	ND		1.00	0.336	ug/L		07/29/20 08:57	07/30/20 22:42	1

Lab Sample ID: LCS 180-323431/2-A
Matrix: Water
Analysis Batch: 323857

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 323431

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	500	504.9		ug/L		101	80 - 120
Cadmium	500	513.9		ug/L		103	80 - 120
Lithium	500	484.0		ug/L		97	80 - 120
Nickel	500	498.5		ug/L		100	80 - 120

Lab Sample ID: 180-108781-I-1-E MS
Matrix: Water
Analysis Batch: 323857

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 323431

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		500	493.9		ug/L		99	75 - 125
Cadmium	ND		500	521.6		ug/L		104	75 - 125
Lithium	ND		500	501.7		ug/L		100	75 - 125
Nickel	4.15		500	493.0		ug/L		98	75 - 125

Lab Sample ID: 180-108781-I-1-F MSD
Matrix: Water
Analysis Batch: 323857

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 323431

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		500	493.4		ug/L		99	75 - 125	0	20
Cadmium	ND		500	519.6		ug/L		104	75 - 125	0	20
Lithium	ND		500	506.1		ug/L		101	75 - 125	1	20
Nickel	4.15		500	495.1		ug/L		98	75 - 125	0	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-108727-1
SDG: GAF- NRS-Treatability

Metals

Prep Batch: 323431

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108727-1	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T1	Total Recoverable	Water	3005A	
180-108727-2	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1	Total Recoverable	Water	3005A	
180-108727-3	GAF-GW-PHIII-BKT-HICAL-SAND-19R-T1	Total Recoverable	Water	3005A	
180-108727-4	GAF-GW-PHIII-BKT-HICAL-SAND-444U-T1	Total Recoverable	Water	3005A	
180-108727-5	GAF-GW-PHII-BKT-DOLO-SAND-444U-T6	Total Recoverable	Water	3005A	
MB 180-323431/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-323431/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-108781-I-1-E MS	Matrix Spike	Total Recoverable	Water	3005A	
180-108781-I-1-F MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 323857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108727-1	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T1	Total Recoverable	Water	EPA 6020A	323431
180-108727-2	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1	Total Recoverable	Water	EPA 6020A	323431
180-108727-3	GAF-GW-PHIII-BKT-HICAL-SAND-19R-T1	Total Recoverable	Water	EPA 6020A	323431
180-108727-4	GAF-GW-PHIII-BKT-HICAL-SAND-444U-T1	Total Recoverable	Water	EPA 6020A	323431
180-108727-5	GAF-GW-PHII-BKT-DOLO-SAND-444U-T6	Total Recoverable	Water	EPA 6020A	323431
MB 180-323431/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	323431
LCS 180-323431/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	323431
180-108781-I-1-E MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	323431
180-108781-I-1-F MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	323431

301 Alpha Dr.

Address: Pittsburgh, PA 15238

Chain of Custody Record

420750 eurofins Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 7/23/2020	COC No:
Company Name: Environmental Standards	Tel/Email: Craig.MacPhee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	____ of ____ COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610. 935.5577 x 414	TAT if different from Below ____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: EAF-NRS- Treatability	☐ 2 days			Job / SDG No.:
P O #	☐ 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)	6020 Totals-Be, Cd, Ni, Li	Sample Specific Notes:
GAF-GW-PHIII-Bkt-Dolo-Sand-19R-t1	7/23/20	1400	G	GW	1	N	N	✓	Be, Cd, Li, Ni only
GAF-GW-PHIII-Bkt-Control-Sand-19R-t1	7/23/20	1400	G	GW	1	N	N	✓	
GAF-GW-PHIII-Bkt-Hical-Sand-19R-t1	7/23/20	1400	G	GW	1	N	N	✓	
GAF-GW-PHIII-Bkt-Hical-Sand-444u-t1	7/23/20	1400	G	GW	1	N	N	✓	
GAF-GW-PHII-Bkt-Dolo-Sand-444u-t6	7/16/20	0830	G	GW	1	N	N	✓	
								4	

180-108727 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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Ad Schaner	AECOM	7/23 1400	[signature]	ETAPH	7-24-20 8:45
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:


eur RT97
1
10:30 A
0828
07.24 Testing
FZ
merica
ORIGIN ID (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58932
RMA:
FedEx Express
FedEx.
TRK# 0221 1680 3500.0828
FRI - 24 JUL 10:30A
PRIORITY OVERNIGHT
15238
PA-US
PIT
XH ACCA
Uncorrected temp
Thermometer ID
3.2 °C
14
CF 0
Initials
PT-WI-SR-001 effective 7/26/13
FID: 1711129 23Jul2020 MMRA 56CG3/C6A6/85A2
180-108727 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-108727-1
SDG Number: GAF- NRS-Treatability

Login Number: 108727
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins 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.	False	
Is the Field Sampler's name present on COC?	False	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-108987-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: GAF-NRS-Treatability
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
9/4/2020 2:10:53 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-108987-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-108987-1

Revised Report
This report was revised to correct the metals MS/MSD reporting. This replaces the previous final report.

Receipt
The samples were received on 7/31/2020 10:30 AM; the samples arrived in good condition. The temperatures of the 2 coolers at receipt time were 14.4º C and 18.5º C.

Receipt Exceptions
The all samples were received at the laboratory outside the required temperature criteria. The client was contacted regarding this issue, and the laboratory was instructed to cancel analysis for 2540C, 351.2, 353.2. 4500_P_E, 5310C, 9056A and 4500S2F.

The Field Sampler was not listed on the Chain of Custody.

The container received for GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1 (180-108987-3) and GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2 (180-108987-5). The COC lists dissolved metals; however the label does not have dissolved written on it.

Metals
Method 3005A: A deviation from the Standard Operating Procedure (SOP) occurred. Due to limited sample volume, GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1 (180-108987-1), GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1 (180-108987-2), GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1 (180-108987-3) and GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1 (180-108987-4) were digested for metals analysis 25ml to 25ml so as to avoid any elevated reporting limits (RL).

Method 7470A: A deviation from the Standard Operating Procedure (SOP) occurred. Due to severely limited sample provided by the client for analysis, samples GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1 (180-108987-1), GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1 (180-108987-2), GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1 (180-108987-3) and GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1 (180-108987-4) were prepped and digested for mercury analysis 25ml to 25ml so as to avoid any elevated reporting limits (RL). All reagents were reduced appropriately and the digestion time was carefully monitored so as not to cook the samples dry.

Method 6020A: The serial dilution performed for GAF-GW-PHIII-BKT-SAND (180-108987-9) associated with batch 180-325523 was outside control limits for arsenic and Barium.

Method 6020A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 180-324566 and analytical batch 180-325523 were outside control limits for aluminum and silicon. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 6020A: GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2 (180-108987-5) and GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2 (180-108987-6) have some analytes that higher in the dissolved sample than the total. The results were confirmed by scanning the raw sample.

Method 6020A: Boron was not reported for the matrix spike and matrix spike duplicate due to the ending CCV recovery above the control limits. The sample chosen for the batch QC had a short list of elements reported which did not include boron; therefore the sample was not reanalyzed for boron. GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2 (180-108987-8)

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Qualifiers

Metals

Qualifier	Qualifier Description
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.
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-108987-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Water	07/23/20 14:00	07/31/20 10:30	
180-108987-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1	Water	07/23/20 14:00	07/31/20 10:30	
180-108987-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1	Water	07/23/20 14:00	07/31/20 10:30	
180-108987-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1	Water	07/23/20 14:00	07/31/20 10:30	
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Water	07/30/20 12:00	07/31/20 10:30	
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Water	07/30/20 12:00	07/31/20 10:30	
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Water	07/30/20 12:00	07/31/20 10:30	
180-108987-8	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Water	07/30/20 12:00	07/31/20 10:30	
180-108987-9	GAF-GW-PHIII-BKT-SAND	Solid	07/30/20 12:00	07/31/20 10:30	
180-108987-10	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Solid	07/30/20 12:00	07/31/20 10:30	
180-108987-11	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Solid	07/30/20 12:00	07/31/20 10:30	
180-108987-12	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Solid	07/30/20 12:00	07/31/20 10:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 7470A	Mercury (CVAA)	SW846	TAL PIT
EPA 7471B	Mercury (CVAA)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
SM2320 B	Alkalinity, Total	SM18	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
3050B	Preparation, Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT
7471B	Preparation, Mercury	SW846	TAL PIT

Protocol References:

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1

Lab Sample ID: 180-108987-1

Date Collected: 07/23/20 14:00
Date Received: 07/31/20 10:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 13:51	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:19	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 11:35	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1

Lab Sample ID: 180-108987-2

Date Collected: 07/23/20 14:00
Date Received: 07/31/20 10:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 13:54	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:20	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 11:50	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1

Lab Sample ID: 180-108987-3

Date Collected: 07/23/20 14:00
Date Received: 07/31/20 10:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 13:58	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			25 mL	25 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:21	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 11:58	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1

Lab Sample ID: 180-108987-4

Date Collected: 07/23/20 14:00
Date Received: 07/31/20 10:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			25 mL	25 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 14:01	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1

Lab Sample ID: 180-108987-4
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/31/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	7470A			25 mL	25 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:22	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 12:05	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2

Lab Sample ID: 180-108987-5
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 14:08	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325682	08/14/20 14:05	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			50 mL	50 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:09	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			50 mL	50 mL	324610	08/07/20 06:29	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			324894	08/10/20 13:12	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 12:12	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2

Lab Sample ID: 180-108987-6
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 14:18	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325682	08/14/20 14:12	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			50 mL	50 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:10	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			50 mL	50 mL	324610	08/07/20 06:29	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			324894	08/10/20 13:13	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 12:20	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2

Lab Sample ID: 180-108987-7
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325682	08/14/20 14:39	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			325932	08/15/20 12:19	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325682	08/14/20 14:35	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325932	08/15/20 12:15	RSK	TAL PIT
	Instrument ID: DORY									
Dissolved	Prep	7470A			50 mL	50 mL	324610	08/07/20 06:29	RJR	TAL PIT
Dissolved	Analysis	EPA 7470A		1			324894	08/10/20 13:11	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	7470A			50 mL	50 mL	324610	08/07/20 06:29	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			324894	08/10/20 13:13	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Analysis	SM2320 B		1			324222	08/04/20 12:27	AVS	TAL PIT
	Instrument ID: PCTITRATOR									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2

Lab Sample ID: 180-108987-8
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	324292	08/05/20 10:35	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325682	08/14/20 14:42	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHIII-BKT-SAND

Lab Sample ID: 180-108987-9
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30

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			324359	08/05/20 18:26	PMH	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-SAND

Lab Sample ID: 180-108987-9
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 96.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.18 g	100 mL	324566	08/06/20 16:45	TJO	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325523	08/13/20 18:22	RSK	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-SAND
Lab Sample ID: 180-108987-9
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 96.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7471B			0.60 g	100 mL	325293	08/13/20 05:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			325604	08/14/20 10:44	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2
Lab Sample ID: 180-108987-10
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30

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			324359	08/05/20 18:26	PMH	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2
Lab Sample ID: 180-108987-10
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 85.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.38 g	100 mL	324566	08/06/20 16:45	TJO	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325523	08/13/20 18:35	RSK	TAL PIT
	Instrument ID: NEMO									
Total/NA	Prep	7471B			0.60 g	100 mL	325293	08/13/20 05:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			325604	08/14/20 10:47	RJR	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2
Lab Sample ID: 180-108987-11
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30

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			324359	08/05/20 18:26	PMH	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2
Lab Sample ID: 180-108987-11
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 85.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.24 g	100 mL	324566	08/06/20 16:45	TJO	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325523	08/13/20 18:38	RSK	TAL PIT
	Instrument ID: NEMO									
Total/NA	Prep	7471B			0.61 g	100 mL	325293	08/13/20 05:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			325604	08/14/20 10:48	RJR	TAL PIT
	Instrument ID: HGZ									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2

Lab Sample ID: 180-108987-12
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30

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			324359	08/05/20 18:26	PMH	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2

Lab Sample ID: 180-108987-12
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 83.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.27 g	100 mL	324566	08/06/20 16:45	TJO	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325523	08/13/20 18:41	RSK	TAL PIT
	Instrument ID: NEMO									
Total/NA	Prep	7471B			0.74 g	100 mL	325293	08/13/20 05:03	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			325604	08/14/20 10:49	RJR	TAL PIT
	Instrument ID: HGZ									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney
RJR = Ron Rosenbaum
TJO = Tyler Oliver

Batch Type: Analysis

AVS = Abbey Smith
PMH = Paloma Hoelzle
RJR = Ron Rosenbaum
RSK = Robert Kurtz

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T1

Lab Sample ID: 180-108987-1

Date Collected: 07/23/20 14:00
Date Received: 07/31/20 10:30

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0271**	**J**	0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 13:51	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 13:51	1
Arsenic	**0.000608**	**J**	0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 13:51	1
Barium	**0.0649**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 13:51	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 13:51	1
Boron	**2.68**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 13:51	1
Cadmium	**0.00281**		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 13:51	1
Calcium	**760**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 13:51	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 13:51	1
Cobalt	**0.00163**		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 13:51	1
Copper	**0.000713**	**J**	0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 13:51	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 13:51	1
Lead	**0.000290**	**J**	0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 13:51	1
Lithium	**0.0189**		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 13:51	1
Magnesium	**88.7**		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 13:51	1
Manganese	**7.39**		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 13:51	1
Molybdenum	ND		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 13:51	1
Nickel	**0.0647**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 13:51	1
Potassium	**20.5**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 13:51	1
Selenium	ND		0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 13:51	1
Silicon	**8.50**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 13:51	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 13:51	1
Sodium	**12.7**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 13:51	1
Strontium	**1.73**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 13:51	1
Thallium	**0.000592**	**J**	0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 13:51	1
Vanadium	ND		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 13:51	1
Zinc	**0.0561**		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 13:51	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**176**		5.00	5.00	mg/L			08/04/20 11:35	1
Bicarbonate Alkalinity as CaCO3	**176**		5.00	5.00	mg/L			08/04/20 11:35	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 11:35	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			08/04/20 11:35	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1

Lab Sample ID: 180-108987-2

Date Collected: 07/23/20 14:00
Date Received: 07/31/20 10:30

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0518**		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 13:54	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 13:54	1
Arsenic	**0.00308**		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 13:54	1
Barium	**0.132**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 13:54	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1

Lab Sample ID: 180-108987-2
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 13:54	1
Boron	**0.319**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 13:54	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 13:54	1
Calcium	**642**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 13:54	1
Chromium	**0.00444**		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 13:54	1
Cobalt	**0.00421**		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 13:54	1
Copper	**0.102**		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 13:54	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 13:54	1
Lead	**0.000202**	**J**	0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 13:54	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 13:54	1
Magnesium	**0.229**	**J**	0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 13:54	1
Manganese	**0.00302**	**J**	0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 13:54	1
Molybdenum	**0.0242**		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 13:54	1
Nickel	**0.0470**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 13:54	1
Potassium	**23.4**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 13:54	1
Selenium	**0.00462**	**J**	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 13:54	1
Silicon	**2.06**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 13:54	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 13:54	1
Sodium	**6.46**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 13:54	1
Strontium	**0.977**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 13:54	1
Thallium	**0.000199**	**J**	0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 13:54	1
Vanadium	**0.00326**		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 13:54	1
Zinc	**0.00394**	**J**	0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 13:54	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**234**		5.00	5.00	mg/L			08/04/20 11:50	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 11:50	1
Carbonate Alkalinity as CaCO3	**61.6**		5.00	5.00	mg/L			08/04/20 11:50	1
Hydroxide Alkalinity	**172**		5.00	5.00	mg/L			08/04/20 11:50	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1

Lab Sample ID: 180-108987-3
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 13:58	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 13:58	1
Arsenic	**0.00365**		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 13:58	1
Barium	**0.104**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 13:58	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 13:58	1
Boron	**0.687**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 13:58	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 13:58	1
Calcium	**655**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 13:58	1
Chromium	**0.00258**		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 13:58	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1

Lab Sample ID: 180-108987-3
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.00430		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 13:58	1
Copper	0.0522		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 13:58	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 13:58	1
Lead	ND		0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 13:58	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 13:58	1
Magnesium	0.901		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 13:58	1
Manganese	ND		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 13:58	1
Molybdenum	0.0211		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 13:58	1
Nickel	0.0338		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 13:58	1
Potassium	5.16		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 13:58	1
Selenium	0.00322	J	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 13:58	1
Silicon	2.02		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 13:58	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 13:58	1
Sodium	12.7		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 13:58	1
Strontium	1.07		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 13:58	1
Thallium	ND		0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 13:58	1
Vanadium	0.00370		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 13:58	1
Zinc	0.00495	J	0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 13:58	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	164		5.00	5.00	mg/L			08/04/20 11:58	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 11:58	1
Carbonate Alkalinity as CaCO3	45.9		5.00	5.00	mg/L			08/04/20 11:58	1
Hydroxide Alkalinity	118		5.00	5.00	mg/L			08/04/20 11:58	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1

Lab Sample ID: 180-108987-4
Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.239		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:01	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:01	1
Arsenic	0.00311		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:01	1
Barium	0.107		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:01	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:01	1
Boron	0.318		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 14:01	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:01	1
Calcium	514		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:01	1
Chromium	0.00539		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:01	1
Cobalt	0.0101		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:01	1
Copper	0.0958		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:01	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:01	1
Lead	0.000201	J	0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:01	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:01	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1

Lab Sample ID: 180-108987-4

Date Collected: 07/23/20 14:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	ND		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:01	1
Manganese	**0.000952**	**J**	0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:01	1
Molybdenum	**0.0322**		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:01	1
Nickel	**0.0569**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:01	1
Potassium	**5.23**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:01	1
Selenium	**0.00418**	**J**	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:01	1
Silicon	**2.51**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:01	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:01	1
Sodium	**29.2**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:01	1
Strontium	**0.898**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:01	1
Thallium	ND		0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:01	1
Vanadium	**0.00373**		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:01	1
Zinc	**0.00365**	**J**	0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:01	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.000139**	**J**	0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**333**		5.00	5.00	mg/L			08/04/20 12:05	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 12:05	1
Carbonate Alkalinity as CaCO3	**68.3**		5.00	5.00	mg/L			08/04/20 12:05	1
Hydroxide Alkalinity	**264**		5.00	5.00	mg/L			08/04/20 12:05	1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2

Lab Sample ID: 180-108987-5

Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0503**		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:05	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:05	1
Arsenic	**0.000378**	**J**	0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:05	1
Barium	**0.0582**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:05	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:05	1
Boron	**3.16**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 14:05	1
Cadmium	**0.00397**		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:05	1
Calcium	**773**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:05	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:05	1
Cobalt	**0.0225**		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:05	1
Copper	**0.000659**	**J**	0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:05	1
Iron	**0.0387**	**J**	0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:05	1
Lead	**0.000197**	**J**	0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:05	1
Lithium	**0.0364**		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:05	1
Magnesium	**100**		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:05	1
Manganese	**17.6**		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:05	1
Molybdenum	ND		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:05	1
Nickel	**0.134**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:05	1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2
Lab Sample ID: 180-108987-5
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	**11.1**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:05	1
Selenium	ND		0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:05	1
Silicon	**12.1**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:05	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:05	1
Sodium	**12.1**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:05	1
Strontium	**1.72**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:05	1
Thallium	**0.000223**	**J**	0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:05	1
Vanadium	ND		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:05	1
Zinc	**0.0960**		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0271**	**J**	0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:08	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:08	1
Arsenic	ND		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:08	1
Barium	**0.0596**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:08	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:08	1
Boron	**3.26**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 14:08	1
Cadmium	**0.00567**		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:08	1
Calcium	**758**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:08	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:08	1
Cobalt	**0.0277**		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:08	1
Copper	ND		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:08	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:08	1
Lead	ND		0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:08	1
Lithium	**0.0450**		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:08	1
Magnesium	**98.7**		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:08	1
Manganese	**22.0**		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:08	1
Molybdenum	ND		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:08	1
Nickel	**0.170**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:08	1
Potassium	**11.9**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:08	1
Selenium	ND		0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:08	1
Silicon	**13.1**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:08	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:08	1
Sodium	**11.6**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:08	1
Strontium	**1.73**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:08	1
Thallium	**0.000264**	**J**	0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:08	1
Vanadium	ND		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:08	1
Zinc	**0.139**		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:08	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:12	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:09	1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2

Lab Sample ID: 180-108987-5

Date Collected: 07/30/20 12:00
Date Received: 07/31/20 10:30

Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**151**		5.00	5.00	mg/L			08/04/20 12:12	1
Bicarbonate Alkalinity as CaCO3	**151**		5.00	5.00	mg/L			08/04/20 12:12	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 12:12	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			08/04/20 12:12	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2

Lab Sample ID: 180-108987-6

Date Collected: 07/30/20 12:00
Date Received: 07/31/20 10:30

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:12	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:12	1
Arsenic	**0.00139**		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:12	1
Barium	**0.165**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:12	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:12	1
Boron	**0.815**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 14:12	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:12	1
Calcium	**790**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:12	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:12	1
Cobalt	**0.00244**		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:12	1
Copper	**0.0336**		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:12	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:12	1
Lead	ND		0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:12	1
Lithium	**0.00602**		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:12	1
Magnesium	**12.6**		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:12	1
Manganese	**0.00509**		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:12	1
Molybdenum	**0.0139**		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:12	1
Nickel	**0.0217**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:12	1
Potassium	**11.0**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:12	1
Selenium	**0.00252**	**J**	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:12	1
Silicon	**2.36**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:12	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:12	1
Sodium	**8.99**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:12	1
Strontium	**1.27**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:12	1
Thallium	ND		0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:12	1
Vanadium	**0.00343**		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:12	1
Zinc	**0.00346**	**J**	0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.179**		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:18	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:18	1
Arsenic	**0.00298**		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:18	1
Barium	**0.162**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:18	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:18	1
Boron	**0.592**		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 14:18	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:18	1
Calcium	**811**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:18	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2

Lab Sample ID: 180-108987-6
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.00172	J	0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:18	1
Cobalt	0.00261		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:18	1
Copper	0.0431		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:18	1
Iron	0.121		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:18	1
Lead	0.000349	J	0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:18	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:18	1
Magnesium	17.5		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:18	1
Manganese	0.0140		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:18	1
Molybdenum	0.0175		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:18	1
Nickel	0.0282		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:18	1
Potassium	10.3		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:18	1
Selenium	0.00303	J	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:18	1
Silicon	3.13		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:18	1
Silver	0.000370	J	0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:18	1
Sodium	9.18		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:18	1
Strontium	1.27		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:18	1
Thallium	ND		0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:18	1
Vanadium	0.00473		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:18	1
Zinc	ND		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:18	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:13	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000301		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	95.4		5.00	5.00	mg/L			08/04/20 12:20	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 12:20	1
Carbonate Alkalinity as CaCO3	55.1		5.00	5.00	mg/L			08/04/20 12:20	1
Hydroxide Alkalinity	40.3		5.00	5.00	mg/L			08/04/20 12:20	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2

Lab Sample ID: 180-108987-7
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.103		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:35	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:35	1
Arsenic	0.00348		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:35	1
Barium	0.150		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:35	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:35	1
Boron	1.28		0.0800	0.0386	mg/L		08/05/20 10:35	08/15/20 12:15	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:35	1
Calcium	781		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:35	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:35	1
Cobalt	0.00282		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:35	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2
Date Collected: 07/30/20 12:00
Date Received: 07/31/20 10:30

Lab Sample ID: 180-108987-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Copper	**0.0264**		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:35	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:35	1
Lead	**0.000245**	**J**	0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:35	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:35	1
Magnesium	**4.63**		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:35	1
Manganese	**0.00649**		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:35	1
Molybdenum	**0.0149**		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:35	1
Nickel	**0.0195**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:35	1
Potassium	**8.89**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:35	1
Selenium	**0.00209**	**J**	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:35	1
Silicon	**2.76**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:35	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:35	1
Sodium	**23.8**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:35	1
Strontium	**1.32**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:35	1
Thallium	**0.000257**	**J**	0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:35	1
Vanadium	**0.00473**		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:35	1
Zinc	ND		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:35	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 14:39	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 14:39	1
Arsenic	**0.00246**		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 14:39	1
Barium	**0.144**		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 14:39	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:39	1
Boron	**1.42**		0.0800	0.0386	mg/L		08/05/20 10:35	08/15/20 12:19	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:39	1
Calcium	**751**		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 14:39	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 14:39	1
Cobalt	**0.00264**		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 14:39	1
Copper	**0.0215**		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 14:39	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 14:39	1
Lead	ND		0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 14:39	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:39	1
Magnesium	**4.88**		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 14:39	1
Manganese	ND		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 14:39	1
Molybdenum	**0.0125**		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 14:39	1
Nickel	**0.0168**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:39	1
Potassium	**8.93**		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 14:39	1
Selenium	**0.00206**	**J**	0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 14:39	1
Silicon	**2.74**		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 14:39	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 14:39	1
Sodium	**22.9**		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 14:39	1
Strontium	**1.27**		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 14:39	1
Thallium	ND		0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 14:39	1
Vanadium	**0.00444**		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 14:39	1
Zinc	ND		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 14:39	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2

Lab Sample ID: 180-108987-7
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:13	1

Method: EPA 7470A - Mercury (CVAA) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 13:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	**100**		5.00	5.00	mg/L			08/04/20 12:27	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 12:27	1
Carbonate Alkalinity as CaCO3	**35.7**		5.00	5.00	mg/L			08/04/20 12:27	1
Hydroxide Alkalinity	**64.3**		5.00	5.00	mg/L			08/04/20 12:27	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2

Lab Sample ID: 180-108987-8
Date Collected: 07/30/20 12:00
Matrix: Water
Date Received: 07/31/20 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 14:42	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 14:42	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 14:42	1
Nickel	**0.0345**		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 14:42	1

Client Sample ID: GAF-GW-PHIII-BKT-SAND

Lab Sample ID: 180-108987-9
Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 96.9

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1280**	**F1**	5.25	5.08	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Antimony	**0.0410**	**J**	0.175	0.0376	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Arsenic	**2.54**		0.0874	0.0280	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Barium	**18.9**		0.874	0.112	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Beryllium	**0.129**		0.0874	0.0621	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Boron	**4.56**	**J**	7.00	1.18	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Cadmium	**0.110**	**B**	0.0874	0.0149	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Calcium	**1130**		43.7	6.66	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Chromium	**3.15**		0.175	0.0726	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Cobalt	**3.35**		0.0437	0.0114	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Copper	**1.22**		0.262	0.179	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Iron	**5260**		4.37	4.18	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Lead	**2.58**		0.0874	0.0874	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Lithium	**1.69**		0.437	0.348	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Magnesium	**678**		43.7	13.7	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Manganese	**242**		0.437	0.375	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Molybdenum	**0.233**	**J**	0.437	0.143	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Nickel	**7.68**		0.0874	0.0813	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Potassium	**145**		43.7	35.2	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Selenium	ND		0.437	0.107	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Silicon	**119**	**F1**	43.7	14.5	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1

Client Sample ID: GAF-GW-PHIII-BKT-SAND

Lab Sample ID: 180-108987-9

Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 96.9

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.0874	0.0236	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Sodium	**33.8**	**J**	43.7	17.4	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Strontium	**3.26**		0.437	0.0472	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Thallium	ND		0.0874	0.0603	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Vanadium	**4.22**		0.0874	0.0813	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1
Zinc	**16.7**		0.437	0.421	mg/Kg	☼	08/06/20 16:45	08/13/20 18:22	1

Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0341	0.0219	mg/Kg	☼	08/13/20 05:03	08/14/20 10:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**3.1**		0.1	0.1	%			08/05/20 18:26	1
Percent Solids	**96.9**		0.1	0.1	%			08/05/20 18:26	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2

Lab Sample ID: 180-108987-10

Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 85.3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1400**		5.10	4.94	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Antimony	**0.0777**	**J**	0.170	0.0365	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Arsenic	**3.87**		0.0850	0.0272	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Barium	**23.5**		0.850	0.109	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Beryllium	**0.168**		0.0850	0.0603	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Boron	**7.77**		6.80	1.15	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Cadmium	**0.120**	**B**	0.0850	0.0144	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Calcium	**1310**		42.5	6.47	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Chromium	**3.99**		0.170	0.0705	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Cobalt	**4.24**		0.0425	0.0110	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Copper	**1.46**		0.255	0.174	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Iron	**6740**		4.25	4.06	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Lead	**2.98**		0.0850	0.0850	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Lithium	**2.08**		0.425	0.338	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Magnesium	**1160**		42.5	13.3	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Manganese	**321**		0.425	0.364	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Molybdenum	**0.266**	**J**	0.425	0.138	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Nickel	**9.40**		0.0850	0.0790	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Potassium	**156**		42.5	34.2	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Selenium	ND		0.425	0.104	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Silicon	**118**		42.5	14.1	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Silver	ND		0.0850	0.0229	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Sodium	**35.2**	**J**	42.5	16.9	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Strontium	**3.68**		0.425	0.0459	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Thallium	**0.0637**	**J**	0.0850	0.0586	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Vanadium	**4.48**		0.0850	0.0790	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1
Zinc	**19.6**		0.425	0.409	mg/Kg	☼	08/06/20 16:45	08/13/20 18:35	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2

Lab Sample ID: 180-108987-10

Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 85.3

Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0387	0.0249	mg/Kg	☼	08/13/20 05:03	08/14/20 10:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.7		0.1	0.1	%			08/05/20 18:26	1
Percent Solids	85.3		0.1	0.1	%			08/05/20 18:26	1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T2

Lab Sample ID: 180-108987-11

Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 85.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1610		5.67	5.49	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Antimony	0.0568	J	0.189	0.0406	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Arsenic	2.72		0.0944	0.0302	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Barium	15.1		0.944	0.121	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Beryllium	0.155		0.0944	0.0670	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Boron	5.11	J	7.55	1.27	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Cadmium	0.102	B	0.0944	0.0161	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Calcium	842		47.2	7.20	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Chromium	4.67		0.189	0.0784	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Cobalt	4.34		0.0472	0.0123	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Copper	1.47		0.283	0.194	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Iron	7160		4.72	4.51	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Lead	2.73		0.0944	0.0944	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Lithium	2.24		0.472	0.376	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Magnesium	961		47.2	14.8	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Manganese	200		0.472	0.405	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Molybdenum	0.250	J	0.472	0.154	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Nickel	9.91		0.0944	0.0878	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Potassium	162		47.2	38.1	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Selenium	ND		0.472	0.115	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Silicon	174		47.2	15.7	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Silver	ND		0.0944	0.0255	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Sodium	35.4	J	47.2	18.8	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Strontium	3.00		0.472	0.0510	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Thallium	ND		0.0944	0.0652	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Vanadium	5.72		0.0944	0.0878	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1
Zinc	18.9		0.472	0.455	mg/Kg	☼	08/06/20 16:45	08/13/20 18:38	1

Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0380	0.0244	mg/Kg	☼	08/13/20 05:03	08/14/20 10:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.6		0.1	0.1	%			08/05/20 18:26	1
Percent Solids	85.4		0.1	0.1	%			08/05/20 18:26	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2

Lab Sample ID: 180-108987-12

Date Collected: 07/30/20 12:00
Matrix: Solid
Date Received: 07/31/20 10:30
Percent Solids: 83.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1660		5.65	5.47	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Antimony	0.0664	J	0.188	0.0405	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Arsenic	3.89		0.0942	0.0301	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Barium	22.0		0.942	0.121	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Beryllium	0.170		0.0942	0.0669	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Boron	6.06	J	7.53	1.27	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Cadmium	0.127	B	0.0942	0.0160	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Calcium	1610		47.1	7.18	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Chromium	6.81		0.188	0.0782	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Cobalt	5.22		0.0471	0.0122	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Copper	1.81		0.283	0.193	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Iron	8060		4.71	4.50	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Lead	2.93		0.0942	0.0942	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Lithium	2.41		0.471	0.375	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Magnesium	971		47.1	14.8	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Manganese	301		0.471	0.404	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Molybdenum	0.384	J	0.471	0.153	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Nickel	11.7		0.0942	0.0876	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Potassium	167		47.1	37.9	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Selenium	ND		0.471	0.115	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Silicon	161		47.1	15.6	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Silver	ND		0.0942	0.0254	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Sodium	50.5		47.1	18.7	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Strontium	4.72		0.471	0.0509	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Thallium	ND		0.0942	0.0650	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Vanadium	6.43		0.0942	0.0876	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1
Zinc	23.2		0.471	0.454	mg/Kg	☼	08/06/20 16:45	08/13/20 18:41	1

Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0320	0.0206	mg/Kg	☼	08/13/20 05:03	08/14/20 10:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.4		0.1	0.1	%			08/05/20 18:26	1
Percent Solids	83.6		0.1	0.1	%			08/05/20 18:26	1

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

Lab Sample ID: MB 180-324566/1-A
Matrix: Solid
Analysis Batch: 325523

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 324566

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		6.00	5.81	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Antimony	ND		0.200	0.0430	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Arsenic	ND		0.100	0.0320	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Barium	ND		1.00	0.128	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Beryllium	ND		0.100	0.0710	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Boron	ND		8.00	1.35	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Cadmium	0.03700	J	0.100	0.0170	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Calcium	ND		50.0	7.62	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Chromium	ND		0.200	0.0830	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Cobalt	ND		0.0500	0.0130	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Copper	ND		0.300	0.205	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Iron	ND		5.00	4.78	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Lead	ND		0.100	0.100	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Lithium	ND		0.500	0.398	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Magnesium	ND		50.0	15.7	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Manganese	ND		0.500	0.429	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Molybdenum	ND		0.500	0.163	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Nickel	ND		0.100	0.0930	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Potassium	ND		50.0	40.3	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Selenium	ND		0.500	0.122	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Silicon	ND		50.0	16.6	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Silver	ND		0.100	0.0270	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Sodium	ND		50.0	19.9	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Strontium	ND		0.500	0.0540	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Thallium	ND		0.100	0.0690	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Vanadium	ND		0.100	0.0930	mg/Kg		08/06/20 16:45	08/13/20 18:17	1
Zinc	ND		0.500	0.482	mg/Kg		08/06/20 16:45	08/13/20 18:17	1

Lab Sample ID: LCS 180-324566/2-A
Matrix: Solid
Analysis Batch: 325523

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 324566

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	500	494.3		mg/Kg		99	80 - 120
Antimony	25.0	25.73		mg/Kg		103	80 - 120
Arsenic	100	100.1		mg/Kg		100	80 - 120
Barium	100	101.1		mg/Kg		101	80 - 120
Beryllium	50.0	49.71		mg/Kg		99	80 - 120
Boron	125	122.9		mg/Kg		98	80 - 120
Cadmium	50.0	52.28		mg/Kg		105	80 - 120
Calcium	2500	2574		mg/Kg		103	80 - 120
Chromium	50.0	48.89		mg/Kg		98	80 - 120
Cobalt	50.0	49.17		mg/Kg		98	80 - 120
Copper	50.0	49.21		mg/Kg		98	80 - 120
Iron	500	528.5		mg/Kg		106	80 - 120
Lead	50.0	51.58		mg/Kg		103	80 - 120
Lithium	50.0	48.34		mg/Kg		97	80 - 120
Magnesium	2500	2562		mg/Kg		102	80 - 120
Manganese	50.0	47.56		mg/Kg		95	80 - 120

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

Lab Sample ID: LCS 180-324566/2-A
Matrix: Solid
Analysis Batch: 325523

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 324566

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Molybdenum	50.0	51.45		mg/Kg		103	80 - 120
Nickel	50.0	48.56		mg/Kg		97	80 - 120
Potassium	2500	2463		mg/Kg		99	80 - 120
Selenium	100	100.6		mg/Kg		101	80 - 120
Silicon	100	94.54		mg/Kg		95	80 - 120
Silver	25.0	24.84		mg/Kg		99	80 - 120
Sodium	2500	2527		mg/Kg		101	80 - 120
Strontium	50.0	47.89		mg/Kg		96	80 - 120
Thallium	100	103.8		mg/Kg		104	80 - 120
Vanadium	50.0	49.20		mg/Kg		98	80 - 120
Zinc	25.0	24.33		mg/Kg		97	80 - 120

Lab Sample ID: 180-108987-9 MS
Matrix: Solid
Analysis Batch: 325523

Client Sample ID: GAF-GW-PHIII-BKT-SAND
Prep Type: Total/NA
Prep Batch: 324566

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	1280	F1	437	1970	F1	mg/Kg	☼	158	75 - 125
Antimony	0.0410	J	21.9	19.60		mg/Kg	☼	89	75 - 125
Arsenic	2.54		87.4	83.91		mg/Kg	☼	93	75 - 125
Barium	18.9		87.4	97.39		mg/Kg	☼	90	75 - 125
Beryllium	0.129		43.7	39.38		mg/Kg	☼	90	75 - 125
Boron	4.56	J	109	99.79		mg/Kg	☼	87	75 - 125
Cadmium	0.110	B	43.7	41.80		mg/Kg	☼	95	75 - 125
Calcium	1130		2190	3467		mg/Kg	☼	107	75 - 125
Chromium	3.15		43.7	43.96		mg/Kg	☼	93	75 - 125
Cobalt	3.35		43.7	43.94		mg/Kg	☼	93	75 - 125
Copper	1.22		43.7	40.84		mg/Kg	☼	91	75 - 125
Iron	5260		437	6564	4	mg/Kg	☼	298	75 - 125
Lead	2.58		43.7	43.86		mg/Kg	☼	94	75 - 125
Lithium	1.69		43.7	40.80		mg/Kg	☼	89	75 - 125
Magnesium	678		2190	2974		mg/Kg	☼	105	75 - 125
Manganese	242		43.7	352.7	4	mg/Kg	☼	252	75 - 125
Molybdenum	0.233	J	43.7	40.65		mg/Kg	☼	92	75 - 125
Nickel	7.68		43.7	47.78		mg/Kg	☼	92	75 - 125
Potassium	145		2190	2131		mg/Kg	☼	91	75 - 125
Selenium	ND		87.4	77.77		mg/Kg	☼	89	75 - 125
Silicon	119	F1	87.4	173.1	F1	mg/Kg	☼	62	75 - 125
Silver	ND		21.9	20.22		mg/Kg	☼	92	75 - 125
Sodium	33.8	J	2190	2066		mg/Kg	☼	93	75 - 125
Strontium	3.26		43.7	42.69		mg/Kg	☼	90	75 - 125
Thallium	ND		87.4	81.73		mg/Kg	☼	93	75 - 125
Vanadium	4.22		43.7	43.39		mg/Kg	☼	90	75 - 125
Zinc	16.7		21.9	37.86		mg/Kg	☼	97	75 - 125

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

Lab Sample ID: 180-108987-9 MSD
Matrix: Solid
Analysis Batch: 325523

Client Sample ID: GAF-GW-PHIII-BKT-SAND
Prep Type: Total/NA
Prep Batch: 324566

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	1280	F1	445	2420	F1	mg/Kg	☼	256	75 - 125	20	20
Antimony	0.0410	J	22.2	19.73		mg/Kg	☼	89	75 - 125	1	20
Arsenic	2.54		89.0	86.34		mg/Kg	☼	94	75 - 125	3	20
Barium	18.9		89.0	100.2		mg/Kg	☼	91	75 - 125	3	20
Beryllium	0.129		44.5	39.69		mg/Kg	☼	89	75 - 125	1	20
Boron	4.56	J	111	103.1		mg/Kg	☼	89	75 - 125	3	20
Cadmium	0.110	B	44.5	43.14		mg/Kg	☼	97	75 - 125	3	20
Calcium	1130		2220	3874		mg/Kg	☼	123	75 - 125	11	20
Chromium	3.15		44.5	44.51		mg/Kg	☼	93	75 - 125	1	20
Cobalt	3.35		44.5	45.11		mg/Kg	☼	94	75 - 125	3	20
Copper	1.22		44.5	42.21		mg/Kg	☼	92	75 - 125	3	20
Iron	5260		445	7593	4	mg/Kg	☼	524	75 - 125	15	20
Lead	2.58		44.5	44.92		mg/Kg	☼	95	75 - 125	2	20
Lithium	1.69		44.5	41.89		mg/Kg	☼	90	75 - 125	3	20
Magnesium	678		2220	3117		mg/Kg	☼	110	75 - 125	5	20
Manganese	242		44.5	306.5	4	mg/Kg	☼	144	75 - 125	14	20
Molybdenum	0.233	J	44.5	41.45		mg/Kg	☼	93	75 - 125	2	20
Nickel	7.68		44.5	50.88		mg/Kg	☼	97	75 - 125	6	20
Potassium	145		2220	2187		mg/Kg	☼	92	75 - 125	3	20
Selenium	ND		89.0	79.88		mg/Kg	☼	90	75 - 125	3	20
Silicon	119	F1	89.0	205.4		mg/Kg	☼	97	75 - 125	17	20
Silver	ND		22.2	20.78		mg/Kg	☼	93	75 - 125	3	20
Sodium	33.8	J	2220	2082		mg/Kg	☼	92	75 - 125	1	20
Strontium	3.26		44.5	42.53		mg/Kg	☼	88	75 - 125	0	20
Thallium	ND		89.0	83.23		mg/Kg	☼	94	75 - 125	2	20
Vanadium	4.22		44.5	44.77		mg/Kg	☼	91	75 - 125	3	20
Zinc	16.7		22.2	41.91		mg/Kg	☼	113	75 - 125	10	20

Lab Sample ID: MB 180-324292/1-A
Matrix: Water
Analysis Batch: 325682

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 324292

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		08/05/20 10:35	08/14/20 13:44	1
Antimony	ND		0.00200	0.000378	mg/L		08/05/20 10:35	08/14/20 13:44	1
Arsenic	ND		0.00100	0.000313	mg/L		08/05/20 10:35	08/14/20 13:44	1
Barium	ND		0.0100	0.00160	mg/L		08/05/20 10:35	08/14/20 13:44	1
Beryllium	ND		0.00100	0.000182	mg/L		08/05/20 10:35	08/14/20 13:44	1
Boron	ND		0.0800	0.0386	mg/L		08/05/20 10:35	08/14/20 13:44	1
Cadmium	ND		0.00100	0.000217	mg/L		08/05/20 10:35	08/14/20 13:44	1
Calcium	ND		0.500	0.127	mg/L		08/05/20 10:35	08/14/20 13:44	1
Chromium	ND		0.00200	0.00153	mg/L		08/05/20 10:35	08/14/20 13:44	1
Cobalt	ND		0.000500	0.000134	mg/L		08/05/20 10:35	08/14/20 13:44	1
Copper	ND		0.00200	0.000627	mg/L		08/05/20 10:35	08/14/20 13:44	1
Iron	ND		0.0500	0.0195	mg/L		08/05/20 10:35	08/14/20 13:44	1
Lead	ND		0.00100	0.000128	mg/L		08/05/20 10:35	08/14/20 13:44	1
Lithium	ND		0.00500	0.00339	mg/L		08/05/20 10:35	08/14/20 13:44	1
Magnesium	ND		0.500	0.0827	mg/L		08/05/20 10:35	08/14/20 13:44	1
Manganese	ND		0.00500	0.000866	mg/L		08/05/20 10:35	08/14/20 13:44	1

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

Lab Sample ID: MB 180-324292/1-A
Matrix: Water
Analysis Batch: 325682

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 324292

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		0.00500	0.000610	mg/L		08/05/20 10:35	08/14/20 13:44	1
Nickel	ND		0.00100	0.000336	mg/L		08/05/20 10:35	08/14/20 13:44	1
Potassium	ND		0.500	0.156	mg/L		08/05/20 10:35	08/14/20 13:44	1
Selenium	ND		0.00500	0.00151	mg/L		08/05/20 10:35	08/14/20 13:44	1
Silicon	ND		0.500	0.133	mg/L		08/05/20 10:35	08/14/20 13:44	1
Silver	ND		0.00100	0.000177	mg/L		08/05/20 10:35	08/14/20 13:44	1
Sodium	ND		0.500	0.348	mg/L		08/05/20 10:35	08/14/20 13:44	1
Strontium	ND		0.00500	0.000931	mg/L		08/05/20 10:35	08/14/20 13:44	1
Thallium	ND		0.00100	0.000148	mg/L		08/05/20 10:35	08/14/20 13:44	1
Vanadium	ND		0.00100	0.000991	mg/L		08/05/20 10:35	08/14/20 13:44	1
Zinc	ND		0.00500	0.00322	mg/L		08/05/20 10:35	08/14/20 13:44	1

Lab Sample ID: LCS 180-324292/2-A
Matrix: Water
Analysis Batch: 325682

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 324292

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.814		mg/L		96	80 - 120
Antimony	0.250	0.2700		mg/L		108	80 - 120
Arsenic	1.00	1.053		mg/L		105	80 - 120
Barium	1.00	1.046		mg/L		105	80 - 120
Beryllium	0.500	0.5132		mg/L		103	80 - 120
Boron	1.25	1.163		mg/L		93	80 - 120
Cadmium	0.500	0.5277		mg/L		106	80 - 120
Calcium	25.0	27.83		mg/L		111	80 - 120
Chromium	0.500	0.5170		mg/L		103	80 - 120
Cobalt	0.500	0.5275		mg/L		105	80 - 120
Copper	0.500	0.5288		mg/L		106	80 - 120
Iron	5.00	4.929		mg/L		99	80 - 120
Lead	0.500	0.5319		mg/L		106	80 - 120
Lithium	0.500	0.5087		mg/L		102	80 - 120
Magnesium	25.0	24.80		mg/L		99	80 - 120
Manganese	0.500	0.5095		mg/L		102	80 - 120
Molybdenum	0.500	0.5316		mg/L		106	80 - 120
Nickel	0.500	0.5228		mg/L		105	80 - 120
Potassium	25.0	24.41		mg/L		98	80 - 120
Selenium	1.00	1.051		mg/L		105	80 - 120
Silicon	1.00	1.028		mg/L		103	80 - 120
Silver	0.250	0.2403		mg/L		96	80 - 120
Sodium	25.0	23.74		mg/L		95	80 - 120
Strontium	0.500	0.5107		mg/L		102	80 - 120
Thallium	1.00	1.043		mg/L		104	80 - 120
Vanadium	0.500	0.5344		mg/L		107	80 - 120
Zinc	0.250	0.2407		mg/L		96	80 - 120

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

Lab Sample ID: 180-108987-8 MS
Matrix: Water
Analysis Batch: 325682

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2
Prep Type: Total Recoverable
Prep Batch: 324292

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	0.0641		5.00	5.024		mg/L		99	75 - 125
Antimony	ND		0.250	0.2759		mg/L		110	75 - 125
Arsenic	0.00300		1.00	1.077		mg/L		107	75 - 125
Barium	0.154		1.00	1.238		mg/L		108	75 - 125
Beryllium	ND		0.500	0.5266		mg/L		105	75 - 125
Cadmium	ND		0.500	0.5437		mg/L		109	75 - 125
Calcium	595		25.0	652.6	4	mg/L		231	75 - 125
Chromium	0.00197	J	0.500	0.5408		mg/L		108	75 - 125
Cobalt	0.00619		0.500	0.5487		mg/L		109	75 - 125
Copper	0.0466		0.500	0.6077		mg/L		112	75 - 125
Iron	ND		5.00	4.988		mg/L		100	75 - 125
Lead	ND		0.500	0.5391		mg/L		108	75 - 125
Lithium	ND		0.500	0.5215		mg/L		104	75 - 125
Magnesium	6.80		25.0	33.08		mg/L		105	75 - 125
Manganese	0.00670		0.500	0.5246		mg/L		104	75 - 125
Molybdenum	0.0197		0.500	0.5768		mg/L		111	75 - 125
Nickel	0.0345		0.500	0.5709		mg/L		107	75 - 125
Potassium	7.31		25.0	31.80		mg/L		98	75 - 125
Selenium	0.00228	J	1.00	1.079		mg/L		108	75 - 125
Silicon	3.20		1.00	4.426		mg/L		123	75 - 125
Silver	ND		0.250	0.2449		mg/L		98	75 - 125
Sodium	43.1		25.0	69.09		mg/L		104	75 - 125
Strontium	1.04		0.500	1.619		mg/L		116	75 - 125
Thallium	ND		1.00	1.084		mg/L		108	75 - 125
Vanadium	0.00528		0.500	0.5481		mg/L		109	75 - 125
Zinc	ND		0.250	0.2331		mg/L		93	75 - 125

Lab Sample ID: 180-108987-8 MSD
Matrix: Water
Analysis Batch: 325682

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2
Prep Type: Total Recoverable
Prep Batch: 324292

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.0641		5.00	5.023		mg/L		99	75 - 125	0	20
Antimony	ND		0.250	0.2746		mg/L		110	75 - 125	0	20
Arsenic	0.00300		1.00	1.058		mg/L		105	75 - 125	2	20
Barium	0.154		1.00	1.215		mg/L		106	75 - 125	2	20
Beryllium	ND		0.500	0.5176		mg/L		104	75 - 125	2	20
Cadmium	ND		0.500	0.5335		mg/L		107	75 - 125	2	20
Calcium	595		25.0	657.0	4	mg/L		248	75 - 125	1	20
Chromium	0.00197	J	0.500	0.5489		mg/L		109	75 - 125	1	20
Cobalt	0.00619		0.500	0.5396		mg/L		107	75 - 125	2	20
Copper	0.0466		0.500	0.6015		mg/L		111	75 - 125	1	20
Iron	ND		5.00	4.887		mg/L		98	75 - 125	2	20
Lead	ND		0.500	0.5353		mg/L		107	75 - 125	1	20
Lithium	ND		0.500	0.5146		mg/L		103	75 - 125	1	20
Magnesium	6.80		25.0	33.56		mg/L		107	75 - 125	1	20
Manganese	0.00670		0.500	0.5265		mg/L		104	75 - 125	0	20
Molybdenum	0.0197		0.500	0.5697		mg/L		110	75 - 125	1	20
Nickel	0.0345		0.500	0.5597		mg/L		105	75 - 125	2	20

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

Lab Sample ID: 180-108987-8 MSD
Matrix: Water
Analysis Batch: 325682

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2
Prep Type: Total Recoverable
Prep Batch: 324292

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Potassium	7.31		25.0	31.87		mg/L		98	75 - 125	0	20
Selenium	0.00228	J	1.00	1.068		mg/L		107	75 - 125	1	20
Silicon	3.20		1.00	4.404		mg/L		121	75 - 125	0	20
Silver	ND		0.250	0.2427		mg/L		97	75 - 125	1	20
Sodium	43.1		25.0	68.25		mg/L		100	75 - 125	1	20
Strontium	1.04		0.500	1.636		mg/L		119	75 - 125	1	20
Thallium	ND		1.00	1.082		mg/L		108	75 - 125	0	20
Vanadium	0.00528		0.500	0.5369		mg/L		106	75 - 125	2	20
Zinc	ND		0.250	0.2318		mg/L		93	75 - 125	1	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-324610/1-A
Matrix: Water
Analysis Batch: 324894

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 324610

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/07/20 06:29	08/10/20 12:59	1

Lab Sample ID: LCS 180-324610/2-A
Matrix: Water
Analysis Batch: 324894

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 324610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00250	0.002611		mg/L		104	80 - 120

Lab Sample ID: 180-108986-E-3-C MS
Matrix: Water
Analysis Batch: 324894

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 324610

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00100	0.001015		mg/L		102	75 - 125

Lab Sample ID: 180-108986-E-3-D MSD
Matrix: Water
Analysis Batch: 324894

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 324610

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.001012		mg/L		101	75 - 125	0	20

Method: EPA 7471B - Mercury (CVAA)

Lab Sample ID: MB 180-325293/1-A
Matrix: Solid
Analysis Batch: 325604

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 325293

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0330	0.0212	mg/Kg		08/13/20 05:03	08/14/20 10:42	1

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

Lab Sample ID: LCS 180-325293/2-A
Matrix: Solid
Analysis Batch: 325604

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 325293

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.417	0.4458		mg/Kg		107	80 - 120		

Lab Sample ID: 180-108987-9 MS
Matrix: Solid
Analysis Batch: 325604

Client Sample ID: GAF-GW-PHIII-BKT-SAND
Prep Type: Total/NA
Prep Batch: 325293

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND		0.159	0.1700		mg/Kg	☼	107	80 - 120		

Lab Sample ID: 180-108987-9 MSD
Matrix: Solid
Analysis Batch: 325604

Client Sample ID: GAF-GW-PHIII-BKT-SAND
Prep Type: Total/NA
Prep Batch: 325293

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.159	0.1699		mg/Kg	☼	107	80 - 120	0	20

Method: 2540G - SM 2540G

Lab Sample ID: 180-108975-A-2 DU
Matrix: Solid
Analysis Batch: 324359

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	60.3		59.2		%		2	10
Percent Solids	39.7		40.8		%		3	10

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-324222/5
Matrix: Water
Analysis Batch: 324222

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			08/04/20 10:21	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 10:21	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/04/20 10:21	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			08/04/20 10:21	1

Lab Sample ID: LCS 180-324222/4
Matrix: Water
Analysis Batch: 324222

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Alkalinity as CaCO3 to pH 4.5			250	229.7		mg/L		92	90 - 110		

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-108987-1
SDG: GAF-NRS-Treatability

Method: SM2320 B - Alkalinity, Total (Continued)

Lab Sample ID: 180-108987-1 DU
Matrix: Water
Analysis Batch: 324222

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	176			172.8		mg/L				2	20
Bicarbonate Alkalinity as CaCO3	176			172.8		mg/L				2	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Metals

Prep Batch: 324292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Dissolved	Water	3005A	
180-108987-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1	Dissolved	Water	3005A	
180-108987-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1	Dissolved	Water	3005A	
180-108987-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1	Dissolved	Water	3005A	
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Dissolved	Water	3005A	
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total Recoverable	Water	3005A	
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Dissolved	Water	3005A	
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total Recoverable	Water	3005A	
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Dissolved	Water	3005A	
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total Recoverable	Water	3005A	
180-108987-8	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Total Recoverable	Water	3005A	
MB 180-324292/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-324292/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-108987-8 MS	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Total Recoverable	Water	3005A	
180-108987-8 MSD	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Total Recoverable	Water	3005A	

Prep Batch: 324566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-9	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	3050B	
180-108987-10	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Solid	3050B	
180-108987-11	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Solid	3050B	
180-108987-12	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Solid	3050B	
MB 180-324566/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 180-324566/2-A	Lab Control Sample	Total/NA	Solid	3050B	
180-108987-9 MS	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	3050B	
180-108987-9 MSD	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	3050B	

Prep Batch: 324610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Dissolved	Water	7470A	
180-108987-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1	Dissolved	Water	7470A	
180-108987-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1	Dissolved	Water	7470A	
180-108987-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1	Dissolved	Water	7470A	
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Dissolved	Water	7470A	
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Water	7470A	
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Dissolved	Water	7470A	
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Water	7470A	
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Dissolved	Water	7470A	
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Water	7470A	
MB 180-324610/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-324610/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-108986-E-3-C MS	Matrix Spike	Total/NA	Water	7470A	
180-108986-E-3-D MSD	Matrix Spike Duplicate	Total/NA	Water	7470A	

Analysis Batch: 324894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Dissolved	Water	EPA 7470A	324610
180-108987-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1	Dissolved	Water	EPA 7470A	324610
180-108987-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1	Dissolved	Water	EPA 7470A	324610
180-108987-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1	Dissolved	Water	EPA 7470A	324610
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Dissolved	Water	EPA 7470A	324610

Metals (Continued)

Analysis Batch: 324894 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Water	EPA 7470A	324610
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Dissolved	Water	EPA 7470A	324610
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Water	EPA 7470A	324610
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Dissolved	Water	EPA 7470A	324610
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Water	EPA 7470A	324610
MB 180-324610/1-A	Method Blank	Total/NA	Water	EPA 7470A	324610
LCS 180-324610/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	324610
180-108986-E-3-C MS	Matrix Spike	Total/NA	Water	EPA 7470A	324610
180-108986-E-3-D MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 7470A	324610

Prep Batch: 325293

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-9	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	7471B	
180-108987-10	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Solid	7471B	
180-108987-11	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Solid	7471B	
180-108987-12	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Solid	7471B	
MB 180-325293/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 180-325293/2-A	Lab Control Sample	Total/NA	Solid	7471B	
180-108987-9 MS	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	7471B	
180-108987-9 MSD	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	7471B	

Analysis Batch: 325523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-9	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	EPA 6020A	324566
180-108987-10	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Solid	EPA 6020A	324566
180-108987-11	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Solid	EPA 6020A	324566
180-108987-12	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Solid	EPA 6020A	324566
MB 180-324566/1-A	Method Blank	Total/NA	Solid	EPA 6020A	324566
LCS 180-324566/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	324566
180-108987-9 MS	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	EPA 6020A	324566
180-108987-9 MSD	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	EPA 6020A	324566

Analysis Batch: 325604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-9	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	EPA 7471B	325293
180-108987-10	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Solid	EPA 7471B	325293
180-108987-11	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Solid	EPA 7471B	325293
180-108987-12	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Solid	EPA 7471B	325293
MB 180-325293/1-A	Method Blank	Total/NA	Solid	EPA 7471B	325293
LCS 180-325293/2-A	Lab Control Sample	Total/NA	Solid	EPA 7471B	325293
180-108987-9 MS	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	EPA 7471B	325293
180-108987-9 MSD	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	EPA 7471B	325293

Analysis Batch: 325682

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Dissolved	Water	EPA 6020A	324292
180-108987-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1	Dissolved	Water	EPA 6020A	324292
180-108987-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1	Dissolved	Water	EPA 6020A	324292
180-108987-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1	Dissolved	Water	EPA 6020A	324292
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Dissolved	Water	EPA 6020A	324292
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total Recoverable	Water	EPA 6020A	324292

Metals (Continued)

Analysis Batch: 325682 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Dissolved	Water	EPA 6020A	324292
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total Recoverable	Water	EPA 6020A	324292
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Dissolved	Water	EPA 6020A	324292
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total Recoverable	Water	EPA 6020A	324292
180-108987-8	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Total Recoverable	Water	EPA 6020A	324292
MB 180-324292/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	324292
LCS 180-324292/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	324292
180-108987-8 MS	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Total Recoverable	Water	EPA 6020A	324292
180-108987-8 MSD	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T2	Total Recoverable	Water	EPA 6020A	324292

Analysis Batch: 325932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Dissolved	Water	EPA 6020A	324292
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total Recoverable	Water	EPA 6020A	324292

General Chemistry

Analysis Batch: 324222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Total/NA	Water	SM2320 B	
180-108987-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T1	Total/NA	Water	SM2320 B	
180-108987-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T1	Total/NA	Water	SM2320 B	
180-108987-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U- T1	Total/NA	Water	SM2320 B	
180-108987-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Water	SM2320 B	
180-108987-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Water	SM2320 B	
180-108987-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Water	SM2320 B	
MB 180-324222/5	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-324222/4	Lab Control Sample	Total/NA	Water	SM2320 B	
180-108987-1 DU	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T1	Total/NA	Water	SM2320 B	

Analysis Batch: 324359

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-108987-9	GAF-GW-PHIII-BKT-SAND	Total/NA	Solid	2540G	
180-108987-10	GAF-GW-PHIII-BKT-DOLO-SAND-19R- T2	Total/NA	Solid	2540G	
180-108987-11	GAF-GW-PHIII-BKT-CONTROL-SAND-19R- T2	Total/NA	Solid	2540G	
180-108987-12	GAF-GW-PHIII-BKT-HI CAL-SAND-19R- T2	Total/NA	Solid	2540G	
180-108975-A-2 DU	Duplicate	Total/NA	Solid	2540G	

Chain of Custody Record

420749 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 7/30/2020	COC No:
Company Name: AECOM	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: 9400 Amberglen Blvd	Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS			Sampler:
City/State/Zip: Austin, Tx 78729	TAT if different from Below: ☐ 2 weeks ☑ 1 week ☐ 2 days ☐ 1 day			For Lab Use Only: Walk-in Client: Lab Sampling:
Phone: 512-872-0579				
Fax:				Job / SDG No.:
Project Name: TVA Gallatin Treatability Study				
Site: GAF - NRS - Treatability				
PO#				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	6020 totals-Be,Cd,Li,Ni	6020 totals*	6020 dissolved**	9056A - Cl, F, SO4	2320B - Alkalinity***	TDS 2540C	353.2 NO2/NO3	4500 - Phosphate	SM4500 - Sulfide	5310C - TOC	351.2 - TKN	6020A / 7471B	Sample Specific Notes:
GAF-GW-PHIII-Bkt-Control-Sand-19R-t1	7/23/20	1400	G	GW	7		N			✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Dolo-Sand-19R-t1	7/23/20	1400	↓	↓	7		N			✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-19R-t1	7/23/20	1400			7		N			✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-444u-t1	7/23/20	1400			7		N			✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Control-Sand-19R-t2	7/30/20	1200					N		✓	✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Dolo-Sand-19R-t2	7/30/20	1200			9		N		✓	✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-19R-t2	7/30/20	1200			9		N		✓	✓	✓	✓	✓	✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-444u-t2	7/30/20	1200		↓	1		N	✓												
GAF-GW-PHIII-Bkt-Sand	7/30/20	1200	↓	S	1	N	N												✓	
GAF-GW-PHIII-Bkt-Dolo-Sand-AR-t2	7/30/20	1200	G	S	1	N	N												✓	
GAF-GW-PHIII-Bkt-~~Hi.Cal~~ raw Control-Sand-AR-t2	7/30/20	1200	↓	S	1	N	N												✓	
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-19R-t2	7/30/20	1200	↓	S	1	N	N												✓	

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: * totals 6020 = Sb, As, Ba, Cr, Co, Pb, Hg, Mo, Se, Tl, Cu, Ag, V, Be, Cd, Li, Ni, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B (7470A) ** Dissolved 6020 were filtered by AECOM w/0.2um filter, no other splits were filtered *** Alkalinity = total, hydroxide, carbonate bicarbonate

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	7/30/20 1400	Debbie Walton	TAL PIT	7-31-20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time: 10:30
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

180-108987 Chain of Custody

Chain of Custody Record

420749 eurofins | Environment Testi TestAmerica

Address: 301 Alpha Dr. Pittsburgh

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-821

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barraza	Date: 7/30/2020	COC No:
Company Name: AECOM	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: 9400 Amberglen Blvd	Analysis Turnaround Time			Sampler:
City/State/Zip: Austin, TX 78729	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 512-872-0579	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin Treatability Study	☑ 1 week			Job / SDG No.:
Site: GAF - NPS - Treatability	☐ 2 days			
PO#	☐ 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)	6020 totals* Be, Cd, Li, Ni	6020 totals*	6020 dissolved**	9056A Cl, F, SO4	2320B - Alkalinity***	TDS 2540C	353.2 NO2/NO3	4500 Phosphate	SM4500 - Sulfide	5310C - TOC	351.2 - TKN	6020A 17 Al	Sample Specific Notes:
GAF-GW-PHIII-Bkt-Control-Sand-19R-t1	7/23/20	1400	G	GW	7		N			✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Dolo-Sand-19R-t1	7/23/20	1400			7		N			✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-19R-t1	7/23/20	1400			7		N			✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-444u-t1	7/23/20	1400			7		N			✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Control-Sand-19R-t2	7/30/20	1200					N		✓	✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Dolo-Sand-19R-t2	7/30/20	1200			9		N		✓	✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-19R-t2	7/30/20	1200			9		N		✓	✓	✓	✓		✓	✓		✓	✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-444u-t2	7/30/20	1200		↓	1		N	✓	RW 8-7-2020					RB 8-7-2020						
GAF-GW-PHIII-Bkt-Sand	7/30/20	1200	↓	S	1	N	N		8-7-2020									✓		
GAF-GW-PHIII-Bkt-Dolo-Sand-19R-t2	7/30/20	1200	G	S	1	N	N											✓		
GAF-GW-PHIII-Bkt-~~Hi.Cal~~ Control-Sand-19R-t2	7/30/20	1200		S	1	N	N											✓		
GAF-GW-PHIII-Bkt-Hi.Cal-Sand-19R-t2	7/30/20	1200	↓	S	1	N	N											✓		

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

180-108987 Chain of Custody

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: * totals 6020 = Sb, As, Ba, Cr, Co, Pb, Hg, Mo, Se, Tl, Cu, Ag, V, Be, Cd, Li, Ni, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B (7470A) ** Dissolved 6020 were filtered by AECOM w/0.2um filter, no other splits were filtered *** Alkalinity = total, hydroxide, carbonate bicarbonate

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: Corr'd: | Therm ID No.:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	7/30/20 1400	Debbie Wilson	FEDEX	7-31-20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time: 10:30
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Rev-1 August 7, 2020 Pat Hall - remove all analyses except alkalinity & metals

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-405717.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Jennifer.Rumble@Eurofinset.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-108987-1
Address: 3355 McLemore Drive, ,	Due Date Requested: 8/12/2020			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-NRS-Treatability	Project #: 18022206			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	351.2/351.2_Prep NRS Treatability TKN	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +1 (180-108987-1)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +1 (180-108987-2)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +1 (180-108987-3)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-444U- +1 (180-108987-4)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +2 (180-108987-5)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +2 (180-108987-6)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +2 (180-108987-7)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		8/4/20 1100	Pit			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

9/4/2020 (Rev. 2)

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-405720.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Jennifer.Rumble@Eurofinset.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-108987-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 8/13/2020			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-NRS-Treatability	Project #: 18022206			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	4500_P_E/ NRS Treatability PO4	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +1 (180-108987-1)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +1 (180-108987-2)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +1 (180-108987-3)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-444U- +1 (180-108987-4)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +2 (180-108987-5)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +2 (180-108987-6)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +2 (180-108987-7)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	8/4/20 1700				
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019


HOT
ULINE 800-295-5510
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152
(412) 963-7058
REF: S180-58932
RMA:
180-108987 Waybill
FedEx Express
FedEx
TRK# 0221 1680 3500 0839
XH AGCA
Uncorrected temp 14.4 °C
Thermometer ID 14
blue ice
CF 0 Initials
PT-WI-SR-001 effective 11/8/18
FID: 1711129 30Jul2020 MMRA 56CG3/C6A6/05A2
Blue Ice pack
Environment Testing
TestAmerica
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
TO
EUROFINS TESTAMERICA
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58932
RMA:
FedEx Express
FedEx
TRK# 0221 1680 3500 0840
FRI - 31 JUL 10:30A
PRIORITY OVERNIGHT
XH AGCA
15238
PA-US
PIT
Uncorrected temp 18.5 °C
Thermometer ID 14
blue ice
CF 0 Initials
PT-WI-SR-001 effective 11/8/18
FID: 1711129 30Jul2020 MMRA 56CG3/C6A6/05A2
Ice packs

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-405720.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Jennifer.Rumble@Eurofinset.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-108987-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 8/13/2020			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-NRS-Treatability	Project #: 18022206			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

W91

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	4500_P_E/ NRS Treatability PO4	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +1 (180-108987-1)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +1 (180-108987-2)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +1 (180-108987-3)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-444U- +1 (180-108987-4)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +2 (180-108987-5)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +2 (180-108987-6)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +2 (180-108987-7)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		8/4/20 1700			8-5-20 1020	ETA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client FTA Pittsburgh Site Name _____ Cooler unpacked by: Matt Snyder

Cooler Received on 8-5-20 Opened on 8-5-20

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TA Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-10 (CF **+0.7** °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
   IR GUN #IR-11 (CF **+0.9**°C) Observed Cooler Temp. 3.8 °C Corrected Cooler Temp. 4.4 °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1	Yes	No
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No MS 8-5-20
8. Could all bottle labels be reconciled with the COC?	Yes	No
9. Were correct bottle(s) used for the test(s) indicated?	Yes	No
10. Sufficient quantity received to perform indicated analyses?	Yes	No
11. Are these work share samples?	Yes	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No NA pH Strip Lot# HC911298
13. Were VOAs on the COC?	Yes	No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

Tests that are not checked for pH by Receiving:
VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: MC

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-405717.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Jennifer.Rumble@Eurofinset.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-108987-1
Address: 3355 McLemore Drive,	Due Date Requested: 8/12/2020			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-NRS-Treatability	Project #: 18022206			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	351.2/351.2_Prep NRS Treatability TKN	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +1 (180-108987-1)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +1 (180-108987-2)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +1 (180-108987-3)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-444U- +1 (180-108987-4)	7/23/20	14:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-CONTROL-SAND-19R- +2 (180-108987-5)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-DOLO-SAND-19R- +2 (180-108987-6)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PH111-BKT-HI CAL-SAND-19R- +2 (180-108987-7)	7/30/20	12:00 Central		Water			X	1	Analysis Must follow TVA Protocol

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		8/4/20 1700	PLT		8/5/20 918	
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 2.5°C IR9

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-108987-1
SDG Number: GAF-NRS-Treatability

Login Number: 108987
List Number: 1
Creator: Abernathy, Eric

List Source: Eurofins 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.	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?	False	
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.	False	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-109312-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: GAF-NRS-Treatability
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
9/14/2020 5:17:50 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-109312-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-109312-1

Revised Report
This report was revised to correct the metals MS/MSD reporting. This replaces the previous final report.

Receipt
The samples were received on 8/7/2020 8:30 AM; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 2.8º C and 3.3º C.

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

Metals
Method 6020A: The serial dilution performed for the following sample associated with batch 180-325932 was outside control limits for multiple analytes: GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3 (180-109312-4)

Method 6020A: The following sample was diluted to bring the concentration of target analytes within the calibration range: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (180-109312-1). Elevated reporting limits (RLs) are provided.

General Chemistry
Method SM 4500 S2 F: The following samples were diluted due to the nature of the sample matrix: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (180-109312-1) and GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 (180-109312-2). Elevated reporting limits (RLs) are provided. Sample appeared to react with the Iodine that was being added when sample was not diluted.

Method 353.2: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for Analytical Batch 180-325380 were outside control limits, high. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 353.2: The native sample, matrix spike, and matrix spike duplicate (MS/MSD) associated with analytical batch 180-325380 were performed at the same dilution. Due to the additional level of analyte present in the spiked samples, the concentration of Nitrate Nitrite in the MS/MSD was above the instrument calibration range. The data have been reported.

Method SM 5310C: The RPD between the duplicate analyses was >10%.The difference between the results was less than the reporting limit; therefore the results are reported with this NCM. GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (180-109312-1)

Method SM 5310C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 180-325492. LCS/LCSD analyzed.
Method SM 4500 S2 F: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 (180-109312-3) was diluted due to the nature of the sample matrix. Elevated reporting limits (RLs) are provided. When sample was run originally undiluted the results had a negative value greater than the RL (> -3 mg/L).

Method 351.2: The method blank for preparation batch 400-500216 and analytical batch 400-500432 contained Nitrogen, Kjeldahl above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method 351.2: The matrix spike duplicate (MSD) recoveries for preparation batch 400-500216 and analytical batch 400-500432 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 351.2: The matrix spike duplicate (MSD) recoveries for preparation batch 400-500691 and analytical batch 400-500931 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Job ID: 180-109312-1 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (Continued)

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

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
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
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.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-21
Connecticut	State	PH-0590	12-31-21
Florida	NELAP	E87225	06-30-21
Georgia	State	4062	02-23-21
Illinois	NELAP	004498	07-31-20 *
Iowa	State	421	06-01-21
Kansas	NELAP	E-10336	04-30-21
Kentucky (UST)	State	112225	02-23-21
Kentucky (WW)	State	KY98016	12-31-20
Minnesota	NELAP	OH00048	12-31-20
Minnesota (Petrofund)	State	3506	08-01-21
New Jersey	NELAP	OH001	06-30-21
New York	NELAP	10975	03-31-21
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-24-21
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-18-00281	09-17-21
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-21
West Virginia DEP	State	210	12-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-21
ANAB	ISO/IEC 17025	L2471	02-23-23
Arizona	State	AZ0710	01-13-21
Arkansas DEQ	State	88-0689	09-01-20
California	State	2510	06-30-21
Florida	NELAP	E81010	06-30-21
Georgia	State	E81010(FL)	06-30-21
Illinois	NELAP	004586	10-09-20
Iowa	State	367	08-01-21
Kansas	NELAP	E-10253	10-31-20
Kentucky (UST)	State	53	06-30-21
Kentucky (WW)	State	KY98030	12-31-20
Louisiana	NELAP	30976	06-30-21
Louisiana (DW)	State	LA017	12-31-20
Maryland	State	233	09-30-20
Massachusetts	State	M-FL094	06-30-21
Michigan	State	9912	06-30-21
Minnesota	NELAP	012-999-481	12-31-20
New Jersey	NELAP	FL006	06-30-21
New York	NELAP	12115	04-01-21
North Carolina (WW/SW)	State	314	12-31-20
Oklahoma	State	9810-186	08-31-20
Pennsylvania	NELAP	68-00467	01-31-21
Rhode Island	State	LAO00307	12-30-20
South Carolina	State	96026002	06-30-21
Tennessee	State	TN02907	06-30-21
Texas	NELAP	T104704286	09-30-20
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-18-00148	05-17-21
Virginia	NELAP	460166	06-14-21
Washington	State	C915	05-15-21
West Virginia DEP	State	136	09-30-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Water	08/06/20 11:00	08/07/20 08:30	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Water	08/06/20 11:00	08/07/20 08:30	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Water	08/06/20 11:00	08/07/20 08:30	
180-109312-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Water	08/06/20 11:00	08/07/20 08:30	
180-109312-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Solid	08/06/20 11:00	08/07/20 08:30	
180-109312-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Solid	08/06/20 11:00	08/07/20 08:30	
180-109312-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Solid	08/06/20 11:00	08/07/20 08:30	
180-109312-8	GAF-GW-PHIII-BKT-SAND-T3	Solid	08/06/20 11:00	08/07/20 08:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

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
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL PEN
EPA 353.2	Nitrogen, Nitrate-Nitrite	EPA	TAL PIT
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL PIT
SM 5310C	Total Organic Carbon	SM	TAL PIT
SM2320 B	Alkalinity, Total	SM18	TAL PIT
SM4500 P E-2011	Phosphorus	SM	TAL CAN
SM4500-S-2 F.	Sulfide	SM21	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
3050B	Preparation, Metals	SW846	TAL PIT
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL PEN
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.

SM21 = Standard Methods For The Examination Of Water And Wastewater, 21st Edition

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 CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-109312-1

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			325093	08/12/20 06:43	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			325093	08/12/20 06:59	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325932	08/15/20 15:25	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			326139	08/18/20 13:48	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			326139	08/18/20 13:51	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Prep	7470A			50 mL	50 mL	324942	08/11/20 05:59	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			325094	08/11/20 14:18	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	351.2			25 mL	25 mL	500216	08/13/20 12:08	KJR	TAL PEN
Total/NA	Analysis	351.2		1			500432	08/14/20 18:40	KJR	TAL PEN
	Instrument ID: Lachat 2									
Total/NA	Analysis	EPA 353.2		1	8 mL	8 mL	325380	08/13/20 10:02	CAK	TAL PIT
	Instrument ID: ASTORIA2									
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	324746	08/08/20 06:31	AVS	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 5310C		1			325492	08/13/20 04:54	TAM	TAL PIT
	Instrument ID: TOC1030									
Total/NA	Analysis	SM2320 B		1			325108	08/11/20 13:19	AVS	TAL PIT
	Instrument ID: PCTITRATOR									
Total/NA	Analysis	SM4500 P E-2011		1	5 mL	5 mL	446944	08/13/20 08:42	TPH	TAL CAN
	Instrument ID: ERNIE									
Total/NA	Analysis	SM4500-S-2 F.		1	10 mL	50 mL	325234	08/12/20 14:01	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 180-109312-2

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			325093	08/12/20 07:15	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			325093	08/12/20 07:32	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325932	08/15/20 15:29	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 180-109312-2
Date Collected: 08/06/20 11:00
Matrix: Water
Date Received: 08/07/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			326139	08/18/20 13:55	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Prep	7470A			50 mL	50 mL	324942	08/11/20 05:59	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			325094	08/11/20 14:21	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	351.2			25 mL	25 mL	500216	08/13/20 12:08	KJR	TAL PEN
Total/NA	Analysis	351.2		1			500432	08/14/20 18:41	KJR	TAL PEN
	Instrument ID: Lachat 2									
Total/NA	Analysis	EPA 353.2		1	8 mL	8 mL	325380	08/13/20 10:06	CAK	TAL PIT
	Instrument ID: ASTORIA2									
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	324746	08/08/20 06:31	AVS	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 5310C		1			325492	08/13/20 05:12	TAM	TAL PIT
	Instrument ID: TOC1030									
Total/NA	Analysis	SM2320 B		1			325108	08/11/20 13:26	AVS	TAL PIT
	Instrument ID: PCTITRATOR									
Total/NA	Analysis	SM4500 P E-2011		1	5 mL	5 mL	446944	08/13/20 08:49	TPH	TAL CAN
	Instrument ID: ERNIE									
Total/NA	Analysis	SM4500-S-2 F.		1	10 mL	50 mL	325234	08/12/20 14:08	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 180-109312-3
Date Collected: 08/06/20 11:00
Matrix: Water
Date Received: 08/07/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			325093	08/12/20 07:48	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			325093	08/12/20 08:05	EPS	TAL PIT
	Instrument ID: CHICS2100B									
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325932	08/15/20 15:32	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			326139	08/18/20 13:59	RSK	TAL PIT
	Instrument ID: DORY									
Total/NA	Prep	7470A			50 mL	50 mL	324942	08/11/20 05:59	RJR	TAL PIT
Total/NA	Analysis	EPA 7470A		1			325094	08/11/20 14:22	RJR	TAL PIT
	Instrument ID: HGZ									
Total/NA	Prep	351.2			25 mL	25 mL	500691	08/18/20 11:21	KJR	TAL PEN
Total/NA	Analysis	351.2		1			500931	08/19/20 16:02	KJR	TAL PEN
	Instrument ID: Lachat 2									
Total/NA	Analysis	EPA 353.2		1	8 mL	8 mL	325380	08/13/20 10:07	CAK	TAL PIT
	Instrument ID: ASTORIA2									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 180-109312-3
Date Collected: 08/06/20 11:00
Matrix: Water
Date Received: 08/07/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	50 mL	100 mL	324746	08/08/20 06:31	AVS	TAL PIT
Total/NA	Analysis	SM 5310C		1			325492	08/13/20 05:31	TAM	TAL PIT
	Instrument ID: TOC1030									
Total/NA	Analysis	SM2320 B		1			325108	08/11/20 13:33	AVS	TAL PIT
	Instrument ID: PCTITRATOR									
Total/NA	Analysis	SM4500 P E-2011		1	5 mL	5 mL	446944	08/13/20 08:56	TPH	TAL CAN
	Instrument ID: ERNIE									
Total/NA	Analysis	SM4500-S-2 F.		1	10 mL	50 mL	325454	08/13/20 13:46	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3

Lab Sample ID: 180-109312-4
Date Collected: 08/06/20 11:00
Matrix: Water
Date Received: 08/07/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	325018	08/11/20 11:45	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			325932	08/15/20 15:36	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-109312-5
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 08:30

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			325073	08/11/20 16:49	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 180-109312-5
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 08:30
Percent Solids: 84.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.50 g	100 mL	325164	08/12/20 09:03	KEM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325932	08/15/20 19:32	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 180-109312-6
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 08:30

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			325073	08/11/20 16:49	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 — Lab Sample ID: 180-109312-6

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 08:30 — **Percent Solids: 86.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.65 g	100 mL	325164	08/12/20 09:03	KEM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325932	08/15/20 19:49	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 — Lab Sample ID: 180-109312-7

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 08:30

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			325073	08/11/20 16:49	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 — Lab Sample ID: 180-109312-7

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 08:30 — **Percent Solids: 84.5**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.44 g	100 mL	325164	08/12/20 09:03	KEM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325932	08/15/20 19:53	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3 — Lab Sample ID: 180-109312-8

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 08:30

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			325073	08/11/20 16:49	TAM	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3 — Lab Sample ID: 180-109312-8

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 08:30 — **Percent Solids: 97.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			1.47 g	100 mL	325164	08/12/20 09:03	KEM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			325932	08/15/20 19:56	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396
TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001
TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Analyst References:

Lab: TAL CAN
- Batch Type: Analysis
  - TPH = Tom Harshman

Lab: TAL PEN
- Batch Type: Prep
  - KJR = Kimberly Reicht
- Batch Type: Analysis
  - KJR = Kimberly Reicht

Lab: TAL PIT
- Batch Type: Prep
  - KEM = Kimberly Mahoney
  - RJR = Ron Rosenbaum
- Batch Type: Analysis
  - AVS = Abbey Smith
  - CAK = Chuck Kieda
  - CMR = Carl Reagle
  - EPS = Evan Scheuer
  - RJR = Ron Rosenbaum
  - RSK = Robert Kurtz
  - TAM = Tessa Mastalski

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-1
Matrix: Water

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.60		2.50	0.800	mg/L			08/12/20 06:43	2.5
Fluoride	0.230	J	0.250	0.0658	mg/L			08/12/20 06:43	2.5
Sulfate	2240		25.0	9.51	mg/L			08/12/20 06:59	25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.580		0.0300	0.0125	mg/L		08/11/20 11:45	08/15/20 15:25	1
Antimony	ND		0.00200	0.000378	mg/L		08/11/20 11:45	08/15/20 15:25	1
Arsenic	0.000635	J	0.00100	0.000313	mg/L		08/11/20 11:45	08/15/20 15:25	1
Barium	0.0664		0.0100	0.00160	mg/L		08/11/20 11:45	08/15/20 15:25	1
Beryllium	0.000328	J	0.00100	0.000182	mg/L		08/11/20 11:45	08/15/20 15:25	1
Boron	3.83		0.0800	0.0386	mg/L		08/11/20 11:45	08/18/20 13:48	1
Cadmium	0.00821		0.00100	0.000217	mg/L		08/11/20 11:45	08/15/20 15:25	1
Calcium	749		0.500	0.127	mg/L		08/11/20 11:45	08/15/20 15:25	1
Chromium	ND		0.00200	0.00153	mg/L		08/11/20 11:45	08/15/20 15:25	1
Cobalt	0.278		0.000500	0.000134	mg/L		08/11/20 11:45	08/15/20 15:25	1
Copper	0.00133	J	0.00200	0.000627	mg/L		08/11/20 11:45	08/15/20 15:25	1
Iron	0.420		0.0500	0.0195	mg/L		08/11/20 11:45	08/15/20 15:25	1
Lead	0.000606	J	0.00100	0.000128	mg/L		08/11/20 11:45	08/15/20 15:25	1
Lithium	0.0374		0.00500	0.00339	mg/L		08/11/20 11:45	08/15/20 15:25	1
Magnesium	99.4		0.500	0.0827	mg/L		08/11/20 11:45	08/15/20 15:25	1
Manganese	43.5		0.0500	0.00866	mg/L		08/11/20 11:45	08/18/20 13:51	10
Molybdenum	ND		0.00500	0.000610	mg/L		08/11/20 11:45	08/15/20 15:25	1
Nickel	0.294		0.00100	0.000336	mg/L		08/11/20 11:45	08/15/20 15:25	1
Potassium	13.5		0.500	0.156	mg/L		08/11/20 11:45	08/15/20 15:25	1
Selenium	ND		0.00500	0.00151	mg/L		08/11/20 11:45	08/15/20 15:25	1
Silicon	12.2		0.500	0.133	mg/L		08/11/20 11:45	08/15/20 15:25	1
Silver	ND		0.00100	0.000177	mg/L		08/11/20 11:45	08/15/20 15:25	1
Sodium	25.8		0.500	0.348	mg/L		08/11/20 11:45	08/15/20 15:25	1
Strontium	1.68		0.00500	0.000931	mg/L		08/11/20 11:45	08/15/20 15:25	1
Thallium	0.000451	J	0.00100	0.000148	mg/L		08/11/20 11:45	08/15/20 15:25	1
Vanadium	ND		0.00100	0.000991	mg/L		08/11/20 11:45	08/15/20 15:25	1
Zinc	0.302		0.00500	0.00322	mg/L		08/11/20 11:45	08/15/20 15:25	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/11/20 05:59	08/11/20 14:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	1.02	B	0.500	0.260	mg/L		08/13/20 12:08	08/14/20 18:40	1
Nitrate Nitrite Nitrogen	2.89	F1	0.100	0.0650	mg/L			08/13/20 10:02	1
Total Dissolved Solids	2180		20.0	20.0	mg/L			08/08/20 06:31	1
Total Organic Carbon - Duplicates	2.58		1.00	0.508	mg/L			08/13/20 04:54	1
Total Alkalinity as CaCO3 to pH 4.5	99.8		5.00	5.00	mg/L			08/11/20 13:19	1
Bicarbonate Alkalinity as CaCO3	99.8		5.00	5.00	mg/L			08/11/20 13:19	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/11/20 13:19	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			08/11/20 13:19	1
Phosphate as PO4	ND		0.307	0.114	mg/L			08/13/20 08:42	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID:
GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-1
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		15.0	6.70	mg/L			08/12/20 14:01	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 180-109312-2

Date Collected: 08/06/20 11:00

Matrix: Water

Date Received: 08/07/20 08:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.21		2.50	0.800	mg/L			08/12/20 07:15	2.5
Fluoride	0.134	J	0.250	0.0658	mg/L			08/12/20 07:15	2.5
Sulfate	2100		25.0	9.51	mg/L			08/12/20 07:32	25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0626		0.0300	0.0125	mg/L		08/11/20 11:45	08/15/20 15:29	1
Antimony	ND		0.00200	0.000378	mg/L		08/11/20 11:45	08/15/20 15:29	1
Arsenic	0.00192		0.00100	0.000313	mg/L		08/11/20 11:45	08/15/20 15:29	1
Barium	0.156		0.0100	0.00160	mg/L		08/11/20 11:45	08/15/20 15:29	1
Beryllium	ND		0.00100	0.000182	mg/L		08/11/20 11:45	08/15/20 15:29	1
Boron	1.50		0.0800	0.0386	mg/L		08/11/20 11:45	08/18/20 13:55	1
Cadmium	ND		0.00100	0.000217	mg/L		08/11/20 11:45	08/15/20 15:29	1
Calcium	803		0.500	0.127	mg/L		08/11/20 11:45	08/15/20 15:29	1
Chromium	ND		0.00200	0.00153	mg/L		08/11/20 11:45	08/15/20 15:29	1
Cobalt	0.00151		0.000500	0.000134	mg/L		08/11/20 11:45	08/15/20 15:29	1
Copper	0.0185		0.00200	0.000627	mg/L		08/11/20 11:45	08/15/20 15:29	1
Iron	0.0353	J	0.0500	0.0195	mg/L		08/11/20 11:45	08/15/20 15:29	1
Lead	ND		0.00100	0.000128	mg/L		08/11/20 11:45	08/15/20 15:29	1
Lithium	0.00842		0.00500	0.00339	mg/L		08/11/20 11:45	08/15/20 15:29	1
Magnesium	45.3		0.500	0.0827	mg/L		08/11/20 11:45	08/15/20 15:29	1
Manganese	0.184		0.00500	0.000866	mg/L		08/11/20 11:45	08/15/20 15:29	1
Molybdenum	0.0123		0.00500	0.000610	mg/L		08/11/20 11:45	08/15/20 15:29	1
Nickel	0.0125		0.00100	0.000336	mg/L		08/11/20 11:45	08/15/20 15:29	1
Potassium	12.7		0.500	0.156	mg/L		08/11/20 11:45	08/15/20 15:29	1
Selenium	0.00173	J	0.00500	0.00151	mg/L		08/11/20 11:45	08/15/20 15:29	1
Silicon	3.41		0.500	0.133	mg/L		08/11/20 11:45	08/15/20 15:29	1
Silver	ND		0.00100	0.000177	mg/L		08/11/20 11:45	08/15/20 15:29	1
Sodium	25.9		0.500	0.348	mg/L		08/11/20 11:45	08/15/20 15:29	1
Strontium	1.33		0.00500	0.000931	mg/L		08/11/20 11:45	08/15/20 15:29	1
Thallium	ND		0.00100	0.000148	mg/L		08/11/20 11:45	08/15/20 15:29	1
Vanadium	0.00476		0.00100	0.000991	mg/L		08/11/20 11:45	08/15/20 15:29	1
Zinc	ND		0.00500	0.00322	mg/L		08/11/20 11:45	08/15/20 15:29	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/11/20 05:59	08/11/20 14:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	2.46	B	0.500	0.260	mg/L		08/13/20 12:08	08/14/20 18:41	1
Nitrate Nitrite Nitrogen	3.91		0.100	0.0650	mg/L			08/13/20 10:06	1
Total Dissolved Solids	2840		20.0	20.0	mg/L			08/08/20 06:31	1
Total Organic Carbon - Duplicates	5.34		1.00	0.508	mg/L			08/13/20 05:12	1
Total Alkalinity as CaCO3 to pH 4.5	57.2		5.00	5.00	mg/L			08/11/20 13:26	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/11/20 13:26	1
Carbonate Alkalinity as CaCO3	36.6		5.00	5.00	mg/L			08/11/20 13:26	1
Hydroxide Alkalinity	20.6		5.00	5.00	mg/L			08/11/20 13:26	1
Phosphate as PO4	ND		0.307	0.114	mg/L			08/13/20 08:49	1
Sulfide	ND		15.0	6.70	mg/L			08/12/20 14:08	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 180-109312-3

Date Collected: 08/06/20 11:00

Matrix: Water

Date Received: 08/07/20 08:30

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.39		2.50	0.800	mg/L			08/12/20 07:48	2.5
Fluoride	0.182	J	0.250	0.0658	mg/L			08/12/20 07:48	2.5
Sulfate	2040		25.0	9.51	mg/L			08/12/20 08:05	25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0526		0.0300	0.0125	mg/L		08/11/20 11:45	08/15/20 15:32	1
Antimony	ND		0.00200	0.000378	mg/L		08/11/20 11:45	08/15/20 15:32	1
Arsenic	0.00204		0.00100	0.000313	mg/L		08/11/20 11:45	08/15/20 15:32	1
Barium	0.167		0.0100	0.00160	mg/L		08/11/20 11:45	08/15/20 15:32	1
Beryllium	ND		0.00100	0.000182	mg/L		08/11/20 11:45	08/15/20 15:32	1
Boron	2.63		0.0800	0.0386	mg/L		08/11/20 11:45	08/18/20 13:59	1
Cadmium	ND		0.00100	0.000217	mg/L		08/11/20 11:45	08/15/20 15:32	1
Calcium	780		0.500	0.127	mg/L		08/11/20 11:45	08/15/20 15:32	1
Chromium	ND		0.00200	0.00153	mg/L		08/11/20 11:45	08/15/20 15:32	1
Cobalt	0.00247		0.000500	0.000134	mg/L		08/11/20 11:45	08/15/20 15:32	1
Copper	0.0123		0.00200	0.000627	mg/L		08/11/20 11:45	08/15/20 15:32	1
Iron	ND		0.0500	0.0195	mg/L		08/11/20 11:45	08/15/20 15:32	1
Lead	ND		0.00100	0.000128	mg/L		08/11/20 11:45	08/15/20 15:32	1
Lithium	ND		0.00500	0.00339	mg/L		08/11/20 11:45	08/15/20 15:32	1
Magnesium	22.7		0.500	0.0827	mg/L		08/11/20 11:45	08/15/20 15:32	1
Manganese	7.00		0.00500	0.000866	mg/L		08/11/20 11:45	08/15/20 15:32	1
Molybdenum	0.00874		0.00500	0.000610	mg/L		08/11/20 11:45	08/15/20 15:32	1
Nickel	0.0107		0.00100	0.000336	mg/L		08/11/20 11:45	08/15/20 15:32	1
Potassium	11.8		0.500	0.156	mg/L		08/11/20 11:45	08/15/20 15:32	1
Selenium	ND		0.00500	0.00151	mg/L		08/11/20 11:45	08/15/20 15:32	1
Silicon	3.48		0.500	0.133	mg/L		08/11/20 11:45	08/15/20 15:32	1
Silver	ND		0.00100	0.000177	mg/L		08/11/20 11:45	08/15/20 15:32	1
Sodium	38.8		0.500	0.348	mg/L		08/11/20 11:45	08/15/20 15:32	1
Strontium	1.44		0.00500	0.000931	mg/L		08/11/20 11:45	08/15/20 15:32	1
Thallium	ND		0.00100	0.000148	mg/L		08/11/20 11:45	08/15/20 15:32	1
Vanadium	0.00298		0.00100	0.000991	mg/L		08/11/20 11:45	08/15/20 15:32	1
Zinc	ND		0.00500	0.00322	mg/L		08/11/20 11:45	08/15/20 15:32	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/11/20 05:59	08/11/20 14:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	1.88		0.500	0.260	mg/L		08/18/20 11:21	08/19/20 16:02	1
Nitrate Nitrite Nitrogen	1.01		0.100	0.0650	mg/L			08/13/20 10:07	1
Total Dissolved Solids	2010		20.0	20.0	mg/L			08/08/20 06:31	1
Total Organic Carbon - Duplicates	3.94		1.00	0.508	mg/L			08/13/20 05:31	1
Total Alkalinity as CaCO3 to pH 4.5	33.4		5.00	5.00	mg/L			08/11/20 13:33	1
Bicarbonate Alkalinity as CaCO3	6.49		5.00	5.00	mg/L			08/11/20 13:33	1
Carbonate Alkalinity as CaCO3	26.9		5.00	5.00	mg/L			08/11/20 13:33	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			08/11/20 13:33	1
Phosphate as PO4	ND		0.307	0.114	mg/L			08/13/20 08:56	1
Sulfide	ND		15.0	6.70	mg/L			08/13/20 13:46	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		08/11/20 11:45	08/15/20 15:36	1
Beryllium	ND		0.00100	0.000182	mg/L		08/11/20 11:45	08/15/20 15:36	1
Nickel	**0.0281**		0.00100	0.000336	mg/L		08/11/20 11:45	08/15/20 15:36	1
Lithium	ND		0.00500	0.00339	mg/L		08/11/20 11:45	08/15/20 15:36	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID:
GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-5
Matrix: Solid
Percent Solids: 84.8

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.0429	J	0.0786	0.0134	mg/Kg	☼	08/12/20 09:03	08/15/20 19:32	1
Beryllium	0.177		0.0786	0.0558	mg/Kg	☼	08/12/20 09:03	08/15/20 19:32	1
Nickel	10.3		0.0786	0.0731	mg/Kg	☼	08/12/20 09:03	08/15/20 19:32	1
Lithium	2.38		0.393	0.313	mg/Kg	☼	08/12/20 09:03	08/15/20 19:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.2		0.1	0.1	%			08/11/20 16:49	1
Percent Solids	84.8		0.1	0.1	%			08/11/20 16:49	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-6
Matrix: Solid
Percent Solids: 86.9

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.0884		0.0697	0.0119	mg/Kg	☼	08/12/20 09:03	08/15/20 19:49	1
Beryllium	0.181		0.0697	0.0495	mg/Kg	☼	08/12/20 09:03	08/15/20 19:49	1
Nickel	11.5		0.0697	0.0649	mg/Kg	☼	08/12/20 09:03	08/15/20 19:49	1
Lithium	2.57		0.349	0.278	mg/Kg	☼	08/12/20 09:03	08/15/20 19:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.1		0.1	0.1	%			08/11/20 16:49	1
Percent Solids	86.9		0.1	0.1	%			08/11/20 16:49	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-7
Matrix: Solid
Percent Solids: 84.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.0832		0.0822	0.0140	mg/Kg	☼	08/12/20 09:03	08/15/20 19:53	1
Beryllium	0.161		0.0822	0.0584	mg/Kg	☼	08/12/20 09:03	08/15/20 19:53	1
Nickel	10.0		0.0822	0.0765	mg/Kg	☼	08/12/20 09:03	08/15/20 19:53	1
Lithium	2.28		0.411	0.327	mg/Kg	☼	08/12/20 09:03	08/15/20 19:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.5		0.1	0.1	%			08/11/20 16:49	1
Percent Solids	84.5		0.1	0.1	%			08/11/20 16:49	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-109312-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 08:30

Lab Sample ID: 180-109312-8

Matrix: Solid
Percent Solids: 97.4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.0930		0.0698	0.0119	mg/Kg	☼	08/12/20 09:03	08/15/20 19:56	1
Beryllium	0.150		0.0698	0.0496	mg/Kg	☼	08/12/20 09:03	08/15/20 19:56	1
Nickel	9.37		0.0698	0.0649	mg/Kg	☼	08/12/20 09:03	08/15/20 19:56	1
Lithium	2.05		0.349	0.278	mg/Kg	☼	08/12/20 09:03	08/15/20 19:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	2.6		0.1	0.1	%			08/11/20 16:49	1
Percent Solids	97.4		0.1	0.1	%			08/11/20 16:49	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-325093/6
Matrix: Water
Analysis Batch: 325093

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.320	mg/L			08/12/20 05:38	1
Fluoride	ND		0.100	0.0263	mg/L			08/12/20 05:38	1
Sulfate	ND		1.00	0.380	mg/L			08/12/20 05:38	1

Lab Sample ID: LCS 180-325093/5
Matrix: Water
Analysis Batch: 325093

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	50.11		mg/L		100	80 - 120
Fluoride	2.50	2.453		mg/L		98	80 - 120
Sulfate	50.0	49.93		mg/L		100	80 - 120

Lab Sample ID: 180-108986-A-2 MS
Matrix: Water
Analysis Batch: 325093

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1.75		50.0	51.49		mg/L		99	80 - 120
Fluoride	0.0497	J	2.50	2.466		mg/L		97	80 - 120
Sulfate	14.5		50.0	63.94		mg/L		99	80 - 120

Lab Sample ID: 180-108986-A-2 MSD
Matrix: Water
Analysis Batch: 325093

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1.75		50.0	51.48		mg/L		99	80 - 120	0	15
Fluoride	0.0497	J	2.50	2.483		mg/L		97	80 - 120	1	15
Sulfate	14.5		50.0	63.90		mg/L		99	80 - 120	0	15

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

Lab Sample ID: MB 180-325164/1-A
Matrix: Solid
Analysis Batch: 325932

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 325164

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.100	0.0170	mg/Kg		08/12/20 09:03	08/15/20 19:25	1
Beryllium	ND		0.100	0.0710	mg/Kg		08/12/20 09:03	08/15/20 19:25	1
Nickel	ND		0.100	0.0930	mg/Kg		08/12/20 09:03	08/15/20 19:25	1
Lithium	ND		0.500	0.398	mg/Kg		08/12/20 09:03	08/15/20 19:25	1

Lab Sample ID: LCS 180-325164/2-A
Matrix: Solid
Analysis Batch: 325932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 325164

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	50.0	51.47		mg/Kg		103	80 - 120
Beryllium	50.0	52.96		mg/Kg		106	80 - 120

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

Lab Sample ID: LCS 180-325164/2-A
Matrix: Solid
Analysis Batch: 325932

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 325164

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	50.0	50.69		mg/Kg		101	80 - 120
Lithium	50.0	50.28		mg/Kg		101	80 - 120

Lab Sample ID: 180-109312-5 MS
Matrix: Solid
Analysis Batch: 325932

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Prep Type: Total/NA
Prep Batch: 325164

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.0429	J	40.4	38.60		mg/Kg	☼	96	75 - 125
Beryllium	0.177		40.4	40.02		mg/Kg	☼	99	75 - 125
Nickel	10.3		40.4	49.51		mg/Kg	☼	97	75 - 125
Lithium	2.38		40.4	40.12		mg/Kg	☼	93	75 - 125

Lab Sample ID: 180-109312-5 MSD
Matrix: Solid
Analysis Batch: 325932

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Prep Type: Total/NA
Prep Batch: 325164

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.0429	J	40.4	36.78		mg/Kg	☼	91	75 - 125	5	20
Beryllium	0.177		40.4	38.75		mg/Kg	☼	96	75 - 125	3	20
Nickel	10.3		40.4	49.72		mg/Kg	☼	98	75 - 125	0	20
Lithium	2.38		40.4	39.32		mg/Kg	☼	92	75 - 125	2	20

Lab Sample ID: MB 180-325018/1-A
Matrix: Water
Analysis Batch: 325932

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		08/11/20 11:45	08/15/20 15:18	1
Antimony	ND		0.00200	0.000378	mg/L		08/11/20 11:45	08/15/20 15:18	1
Arsenic	ND		0.00100	0.000313	mg/L		08/11/20 11:45	08/15/20 15:18	1
Barium	ND		0.0100	0.00160	mg/L		08/11/20 11:45	08/15/20 15:18	1
Calcium	ND		0.500	0.127	mg/L		08/11/20 11:45	08/15/20 15:18	1
Chromium	ND		0.00200	0.00153	mg/L		08/11/20 11:45	08/15/20 15:18	1
Cobalt	ND		0.000500	0.000134	mg/L		08/11/20 11:45	08/15/20 15:18	1
Copper	ND		0.00200	0.000627	mg/L		08/11/20 11:45	08/15/20 15:18	1
Iron	ND		0.0500	0.0195	mg/L		08/11/20 11:45	08/15/20 15:18	1
Lead	ND		0.00100	0.000128	mg/L		08/11/20 11:45	08/15/20 15:18	1
Magnesium	ND		0.500	0.0827	mg/L		08/11/20 11:45	08/15/20 15:18	1
Manganese	ND		0.00500	0.000866	mg/L		08/11/20 11:45	08/15/20 15:18	1
Molybdenum	ND		0.00500	0.000610	mg/L		08/11/20 11:45	08/15/20 15:18	1
Potassium	ND		0.500	0.156	mg/L		08/11/20 11:45	08/15/20 15:18	1
Selenium	ND		0.00500	0.00151	mg/L		08/11/20 11:45	08/15/20 15:18	1
Silicon	ND		0.500	0.133	mg/L		08/11/20 11:45	08/15/20 15:18	1
Silver	ND		0.00100	0.000177	mg/L		08/11/20 11:45	08/15/20 15:18	1
Sodium	ND		0.500	0.348	mg/L		08/11/20 11:45	08/15/20 15:18	1
Strontium	ND		0.00500	0.000931	mg/L		08/11/20 11:45	08/15/20 15:18	1
Thallium	ND		0.00100	0.000148	mg/L		08/11/20 11:45	08/15/20 15:18	1
Vanadium	ND		0.00100	0.000991	mg/L		08/11/20 11:45	08/15/20 15:18	1

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

Lab Sample ID: MB 180-325018/1-A
Matrix: Water
Analysis Batch: 325932

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	ND		0.00500	0.00322	mg/L		08/11/20 11:45	08/15/20 15:18	1
Cadmium	ND		0.00100	0.000217	mg/L		08/11/20 11:45	08/15/20 15:18	1
Beryllium	ND		0.00100	0.000182	mg/L		08/11/20 11:45	08/15/20 15:18	1
Nickel	ND		0.00100	0.000336	mg/L		08/11/20 11:45	08/15/20 15:18	1
Lithium	ND		0.00500	0.00339	mg/L		08/11/20 11:45	08/15/20 15:18	1

Lab Sample ID: MB 180-325018/1-A
Matrix: Water
Analysis Batch: 326139

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.0800	0.0386	mg/L		08/11/20 11:45	08/18/20 13:30	1

Lab Sample ID: LCS 180-325018/2-A
Matrix: Water
Analysis Batch: 325932

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.780		mg/L		96	80 - 120
Antimony	0.250	0.2674		mg/L		107	80 - 120
Arsenic	1.00	1.070		mg/L		107	80 - 120
Barium	1.00	1.052		mg/L		105	80 - 120
Boron	1.25	1.175	^	mg/L		94	80 - 120
Calcium	25.0	28.45		mg/L		114	80 - 120
Chromium	0.500	0.5225		mg/L		105	80 - 120
Cobalt	0.500	0.5276		mg/L		106	80 - 120
Copper	0.500	0.5161		mg/L		103	80 - 120
Iron	5.00	5.029		mg/L		101	80 - 120
Lead	0.500	0.5362		mg/L		107	80 - 120
Magnesium	25.0	24.89		mg/L		100	80 - 120
Manganese	0.500	0.5184		mg/L		104	80 - 120
Molybdenum	0.500	0.5386		mg/L		108	80 - 120
Potassium	25.0	24.39		mg/L		98	80 - 120
Selenium	1.00	1.085		mg/L		109	80 - 120
Silicon	1.00	1.082		mg/L		108	80 - 120
Silver	0.250	0.2430		mg/L		97	80 - 120
Sodium	25.0	23.71		mg/L		95	80 - 120
Strontium	0.500	0.5285		mg/L		106	80 - 120
Thallium	1.00	1.084		mg/L		108	80 - 120
Vanadium	0.500	0.5292		mg/L		106	80 - 120
Zinc	0.250	0.2428		mg/L		97	80 - 120
Cadmium	0.500	0.5171		mg/L		103	80 - 120
Beryllium	0.500	0.5322		mg/L		106	80 - 120
Nickel	0.500	0.5166		mg/L		103	80 - 120
Lithium	0.500	0.5087		mg/L		102	80 - 120

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

Lab Sample ID: LCS 180-325018/2-A
Matrix: Water
Analysis Batch: 326139

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Boron			1.25	1.151		mg/L		92	80 - 120		

Lab Sample ID: 180-109312-4 MS
Matrix: Water
Analysis Batch: 325932

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum	0.0233	J	5.00	4.876		mg/L		97	75 - 125		
Antimony	ND		0.250	0.2749		mg/L		110	75 - 125		
Arsenic	0.00257		1.00	1.096		mg/L		109	75 - 125		
Barium	0.190		1.00	1.264		mg/L		107	75 - 125		
Boron	2.10	^	1.25	3.125		mg/L		82	75 - 125		
Calcium	715		25.0	721.0	4	mg/L		23	75 - 125		
Chromium	0.00179	J	0.500	0.5304		mg/L		106	75 - 125		
Cobalt	0.00516		0.500	0.5458		mg/L		108	75 - 125		
Copper	0.0341		0.500	0.5642		mg/L		106	75 - 125		
Iron	ND		5.00	5.052		mg/L		101	75 - 125		
Lead	ND		0.500	0.5347		mg/L		107	75 - 125		
Magnesium	16.0		25.0	40.82		mg/L		99	75 - 125		
Manganese	1.02		0.500	1.522		mg/L		101	75 - 125		
Molybdenum	0.0152		0.500	0.5668		mg/L		110	75 - 125		
Potassium	10.1		25.0	34.06		mg/L		96	75 - 125		
Selenium	0.00154	J	1.00	1.081		mg/L		108	75 - 125		
Silicon	4.01		1.00	5.095	4	mg/L		109	75 - 125		
Silver	ND		0.250	0.2426		mg/L		97	75 - 125		
Sodium	53.6		25.0	75.77		mg/L		89	75 - 125		
Strontium	1.29		0.500	1.792		mg/L		100	75 - 125		
Thallium	ND		1.00	1.086		mg/L		109	75 - 125		
Vanadium	0.00531		0.500	0.5511		mg/L		109	75 - 125		
Zinc	ND		0.250	0.2408		mg/L		96	75 - 125		
Cadmium	ND		0.500	0.5302		mg/L		106	75 - 125		
Beryllium	ND		0.500	0.5386		mg/L		108	75 - 125		
Nickel	0.0281		0.500	0.5574		mg/L		106	75 - 125		
Lithium	ND		0.500	0.5235		mg/L		105	75 - 125		

Lab Sample ID: 180-109312-4 MSD
Matrix: Water
Analysis Batch: 325932

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3
Prep Type: Total Recoverable
Prep Batch: 325018

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	0.0233	J	5.00	4.802		mg/L		96	75 - 125	2	20
Antimony	ND		0.250	0.2707		mg/L		108	75 - 125	2	20
Arsenic	0.00257		1.00	1.090		mg/L		109	75 - 125	1	20
Barium	0.190		1.00	1.239		mg/L		105	75 - 125	2	20
Boron	2.10	^	1.25	3.184		mg/L		87	75 - 125	2	20
Calcium	715		25.0	710.1	4	mg/L		-21	75 - 125	2	20
Chromium	0.00179	J	0.500	0.5357		mg/L		107	75 - 125	1	20
Cobalt	0.00516		0.500	0.5404		mg/L		107	75 - 125	1	20
Copper	0.0341		0.500	0.5572		mg/L		105	75 - 125	1	20

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

Lab Sample ID: 180-109312-4 MSD — **Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3**
Matrix: Water — **Prep Type: Total Recoverable**
Analysis Batch: 325932 — **Prep Batch: 325018**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	ND		5.00	5.017		mg/L		100	75 - 125	1	20
Lead	ND		0.500	0.5323		mg/L		106	75 - 125	0	20
Magnesium	16.0		25.0	40.72		mg/L		99	75 - 125	0	20
Manganese	1.02		0.500	1.504		mg/L		98	75 - 125	1	20
Molybdenum	0.0152		0.500	0.5657		mg/L		110	75 - 125	0	20
Potassium	10.1		25.0	33.91		mg/L		95	75 - 125	0	20
Selenium	0.00154	J	1.00	1.069		mg/L		107	75 - 125	1	20
Silicon	4.01		1.00	4.991	4	mg/L		98	75 - 125	2	20
Silver	ND		0.250	0.2419		mg/L		97	75 - 125	0	20
Sodium	53.6		25.0	76.41		mg/L		91	75 - 125	1	20
Strontium	1.29		0.500	1.772		mg/L		96	75 - 125	1	20
Thallium	ND		1.00	1.073		mg/L		107	75 - 125	1	20
Vanadium	0.00531		0.500	0.5403		mg/L		107	75 - 125	2	20
Zinc	ND		0.250	0.2367		mg/L		95	75 - 125	2	20
Cadmium	ND		0.500	0.5213		mg/L		104	75 - 125	2	20
Beryllium	ND		0.500	0.5316		mg/L		106	75 - 125	1	20
Nickel	0.0281		0.500	0.5481		mg/L		104	75 - 125	2	20
Lithium	ND		0.500	0.5189		mg/L		104	75 - 125	1	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-324942/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 325094 — **Prep Batch: 324942**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000130	mg/L		08/11/20 05:59	08/11/20 14:16	1

Lab Sample ID: LCS 180-324942/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 325094 — **Prep Batch: 324942**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00250	0.002498		mg/L		100	80 - 120

Lab Sample ID: 180-109312-1 MS — **Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 325094 — **Prep Batch: 324942**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00100	0.0009950		mg/L		100	75 - 125

Lab Sample ID: 180-109312-1 MSD — **Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 325094 — **Prep Batch: 324942**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00100	0.0009900		mg/L		99	75 - 125	1	20

Method: 2540G - SM 2540G

Lab Sample ID: 180-109219-B-1 DU
Matrix: Solid
Analysis Batch: 325073

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	9.0		10		%		10	10
Percent Solids	91.0		90.0		%		1	10

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 400-500216/1-A
Matrix: Water
Analysis Batch: 500432

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 500216

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	0.2859	J	0.500	0.260	mg/L		08/13/20 12:08	08/14/20 18:04	1

Lab Sample ID: LCS 400-500216/2-A
Matrix: Water
Analysis Batch: 500432

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 500216

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	10.0	10.20		mg/L		102	90 - 110

Lab Sample ID: 400-191717-C-1-B MS
Matrix: Water
Analysis Batch: 500432

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 500216

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	8.42	F1 B	4.00	12.48		mg/L		101	90 - 110

Lab Sample ID: 400-191717-C-1-C MSD
Matrix: Water
Analysis Batch: 500432

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 500216

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Kjeldahl	8.42	F1 B	4.00	12.94	F1	mg/L		113	90 - 110	4	22

Lab Sample ID: MRL 400-500432/12
Matrix: Water
Analysis Batch: 500432

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	0.500	0.6673		mg/L		133	50 - 150

Lab Sample ID: MB 400-500691/1-A
Matrix: Water
Analysis Batch: 500931

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 500691

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	ND		0.500	0.260	mg/L		08/18/20 11:21	08/19/20 15:55	1

Method: 351.2 - Nitrogen, Total Kjeldahl (Continued)

Lab Sample ID: LCS 400-500691/2-A
Matrix: Water
Analysis Batch: 500931

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 500691

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Kjeldahl			10.0	9.899		mg/L		99	90 - 110		

Lab Sample ID: 400-191968-A-2-B MS
Matrix: Water
Analysis Batch: 500931

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 500691

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Kjeldahl	7.77	F1	4.00	11.59		mg/L		95	90 - 110		

Lab Sample ID: 400-191968-A-2-C MSD
Matrix: Water
Analysis Batch: 500931

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 500691

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Kjeldahl	7.77	F1	4.00	12.74	F1	mg/L		124	90 - 110	9	22

Method: EPA 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 180-325380/21
Matrix: Water
Analysis Batch: 325380

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite Nitrogen	ND		0.100	0.0650	mg/L			08/13/20 10:00	1

Lab Sample ID: LCS 180-325380/20
Matrix: Water
Analysis Batch: 325380

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate Nitrite Nitrogen			2.00	2.013		mg/L		101	90 - 110		

Lab Sample ID: 180-109312-1 MS
Matrix: Water
Analysis Batch: 325380

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate Nitrite Nitrogen	2.89	F1	2.00	5.180	F1	mg/L		115	90 - 110		

Lab Sample ID: 180-109312-1 MSD
Matrix: Water
Analysis Batch: 325380

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite Nitrogen	2.89	F1	2.00	5.335	F1	mg/L		122	90 - 110	3	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 180-324746/2
Matrix: Water
Analysis Batch: 324746

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10.0	10.0	mg/L			08/08/20 06:31	1

Lab Sample ID: LCS 180-324746/1
Matrix: Water
Analysis Batch: 324746

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	567	514.0		mg/L		91	80 - 120

Lab Sample ID: 180-109297-A-2 DU
Matrix: Water
Analysis Batch: 324746

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	331		324.0		mg/L		2	10

Method: SM 5310C - Total Organic Carbon

Lab Sample ID: MB 180-325492/6
Matrix: Water
Analysis Batch: 325492

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		1.00	0.508	mg/L			08/12/20 23:40	1

Lab Sample ID: LCS 180-325492/4
Matrix: Water
Analysis Batch: 325492

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	20.0	18.93		mg/L		95	85 - 115

Lab Sample ID: LCSD 180-325492/5
Matrix: Water
Analysis Batch: 325492

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Duplicates	20.0	20.57		mg/L		103	85 - 115	8	20

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-325108/29
Matrix: Water
Analysis Batch: 325108

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			08/11/20 12:46	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/11/20 12:46	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			08/11/20 12:46	1

Method: SM2320 B - Alkalinity, Total (Continued)

Lab Sample ID: MB 180-325108/29
Matrix: Water
Analysis Batch: 325108

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			08/11/20 12:46	1

Lab Sample ID: LCS 180-325108/28
Matrix: Water
Analysis Batch: 325108

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Alkalinity as CaCO3 to pH 4.5			250	233.3		mg/L		93	90 - 110		

Lab Sample ID: 180-109297-B-2 DU
Matrix: Water
Analysis Batch: 325108

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	205			205.3		mg/L				0.3	20
Bicarbonate Alkalinity as CaCO3	205			205.3		mg/L				0.3	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Method: SM4500 P E-2011 - Phosphorus

Lab Sample ID: MB 240-446944/3
Matrix: Water
Analysis Batch: 446944

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphate as PO4	ND		0.307	0.114	mg/L			08/13/20 07:11	1

Lab Sample ID: LCS 240-446944/4
Matrix: Water
Analysis Batch: 446944

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphate as PO4			1.46	1.499		mg/L		103	77 - 120		

Lab Sample ID: 240-134494-R-1 MS
Matrix: Water
Analysis Batch: 446944

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphate as PO4	0.528		1.54	2.203		mg/L		109	38 - 156		

Lab Sample ID: 240-134494-R-1 MSD
Matrix: Water
Analysis Batch: 446944

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphate as PO4	0.528		1.54	2.027		mg/L		98	38 - 156	8	29

Method: SM4500-S-2 F. - Sulfide

Lab Sample ID: MB 180-325234/3
Matrix: Water
Analysis Batch: 325234

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.00	1.34	mg/L			08/12/20 13:23	1

Lab Sample ID: LCS 180-325234/4
Matrix: Water
Analysis Batch: 325234

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	13.7	13.47		mg/L		98	90 - 110

Lab Sample ID: 180-109271-K-1 MS
Matrix: Water
Analysis Batch: 325234

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		13.7	13.39		mg/L		98	75 - 125

Lab Sample ID: 180-109271-K-1 MSD
Matrix: Water
Analysis Batch: 325234

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		13.7	13.09		mg/L		95	75 - 125	2	20

Lab Sample ID: MB 180-325454/3
Matrix: Water
Analysis Batch: 325454

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.00	1.34	mg/L			08/13/20 13:43	1

Lab Sample ID: LCS 180-325454/4
Matrix: Water
Analysis Batch: 325454

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	13.3	13.05		mg/L		98	90 - 110

Lab Sample ID: 180-109500-H-6 MS
Matrix: Water
Analysis Batch: 325454

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		66.4	61.82		mg/L		93	75 - 125

Lab Sample ID: 180-109500-H-6 MSD
Matrix: Water
Analysis Batch: 325454

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		66.4	61.06		mg/L		92	75 - 125	1	20

HPLC/IC

Analysis Batch: 325093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 9056A	
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 9056A	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	EPA 9056A	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	EPA 9056A	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	EPA 9056A	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	EPA 9056A	
MB 180-325093/6	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-325093/5	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-108986-A-2 MS	Matrix Spike	Total/NA	Water	EPA 9056A	
180-108986-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 9056A	

Metals

Prep Batch: 324942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	7470A	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	7470A	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	7470A	
MB 180-324942/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-324942/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-109312-1 MS	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	7470A	
180-109312-1 MSD	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	7470A	

Prep Batch: 325018

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total Recoverable	Water	3005A	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total Recoverable	Water	3005A	
180-109312-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Total Recoverable	Water	3005A	
MB 180-325018/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-325018/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-109312-4 MS	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Total Recoverable	Water	3005A	
180-109312-4 MSD	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Total Recoverable	Water	3005A	

Analysis Batch: 325094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 7470A	324942
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	EPA 7470A	324942
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	EPA 7470A	324942
MB 180-324942/1-A	Method Blank	Total/NA	Water	EPA 7470A	324942
LCS 180-324942/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	324942
180-109312-1 MS	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 7470A	324942
180-109312-1 MSD	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 7470A	324942

Prep Batch: 325164

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	3050B	
180-109312-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	3050B	
180-109312-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	3050B	
180-109312-8	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	3050B	
MB 180-325164/1-A	Method Blank	Total/NA	Solid	3050B	

Metals (Continued)

Prep Batch: 325164 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-325164/2-A	Lab Control Sample	Total/NA	Solid	3050B	
180-109312-5 MS	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	3050B	
180-109312-5 MSD	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	3050B	

Analysis Batch: 325932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-4	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	EPA 6020A	325164
180-109312-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	EPA 6020A	325164
180-109312-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	EPA 6020A	325164
180-109312-8	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	EPA 6020A	325164
MB 180-325018/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	325018
MB 180-325164/1-A	Method Blank	Total/NA	Solid	EPA 6020A	325164
LCS 180-325018/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	325018
LCS 180-325164/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	325164
180-109312-4 MS	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-4 MSD	GAF-GW-PHIII-BKT-HI CAL-SAND-444U-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-5 MS	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	EPA 6020A	325164
180-109312-5 MSD	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	EPA 6020A	325164

Analysis Batch: 326139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total Recoverable	Water	EPA 6020A	325018
MB 180-325018/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	325018
LCS 180-325018/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	325018

General Chemistry

Analysis Batch: 324746

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	SM 2540C	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	SM 2540C	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	SM 2540C	
MB 180-324746/2	Method Blank	Total/NA	Water	SM 2540C	
LCS 180-324746/1	Lab Control Sample	Total/NA	Water	SM 2540C	
180-109297-A-2 DU	Duplicate	Total/NA	Water	SM 2540C	

Analysis Batch: 325073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-5	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	2540G	
180-109312-6	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	2540G	
180-109312-7	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	2540G	
180-109312-8	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	2540G	
180-109219-B-1 DU	Duplicate	Total/NA	Solid	2540G	

General Chemistry

Analysis Batch: 325108

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	SM2320 B	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	SM2320 B	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	SM2320 B	
MB 180-325108/29	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-325108/28	Lab Control Sample	Total/NA	Water	SM2320 B	
180-109297-B-2 DU	Duplicate	Total/NA	Water	SM2320 B	

Analysis Batch: 325234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	SM4500-S-2 F.	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	SM4500-S-2 F.	
MB 180-325234/3	Method Blank	Total/NA	Water	SM4500-S-2 F.	
LCS 180-325234/4	Lab Control Sample	Total/NA	Water	SM4500-S-2 F.	
180-109271-K-1 MS	Matrix Spike	Total/NA	Water	SM4500-S-2 F.	
180-109271-K-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM4500-S-2 F.	

Analysis Batch: 325380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 353.2	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	EPA 353.2	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	EPA 353.2	
MB 180-325380/21	Method Blank	Total/NA	Water	EPA 353.2	
LCS 180-325380/20	Lab Control Sample	Total/NA	Water	EPA 353.2	
180-109312-1 MS	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 353.2	
180-109312-1 MSD	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	EPA 353.2	

Analysis Batch: 325454

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	SM4500-S-2 F.	
MB 180-325454/3	Method Blank	Total/NA	Water	SM4500-S-2 F.	
LCS 180-325454/4	Lab Control Sample	Total/NA	Water	SM4500-S-2 F.	
180-109500-H-6 MS	Matrix Spike	Total/NA	Water	SM4500-S-2 F.	
180-109500-H-6 MSD	Matrix Spike Duplicate	Total/NA	Water	SM4500-S-2 F.	

Analysis Batch: 325492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	SM 5310C	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	SM 5310C	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	SM 5310C	
MB 180-325492/6	Method Blank	Total/NA	Water	SM 5310C	
LCS 180-325492/4	Lab Control Sample	Total/NA	Water	SM 5310C	
LCSD 180-325492/5	Lab Control Sample Dup	Total/NA	Water	SM 5310C	

Analysis Batch: 446944

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	SM4500 P E-2011	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	SM4500 P E-2011	
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	SM4500 P E-2011	

General Chemistry (Continued)

Analysis Batch: 446944 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-446944/3	Method Blank	Total/NA	Water	SM4500 P E-2011	
LCS 240-446944/4	Lab Control Sample	Total/NA	Water	SM4500 P E-2011	
240-134494-R-1 MS	Matrix Spike	Total/NA	Water	SM4500 P E-2011	
240-134494-R-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM4500 P E-2011	

Prep Batch: 500216

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	351.2	
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	351.2	
MB 400-500216/1-A	Method Blank	Total/NA	Water	351.2	
LCS 400-500216/2-A	Lab Control Sample	Total/NA	Water	351.2	
400-191717-C-1-B MS	Matrix Spike	Total/NA	Water	351.2	
400-191717-C-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	

Analysis Batch: 500432

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Water	351.2	500216
180-109312-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Water	351.2	500216
MB 400-500216/1-A	Method Blank	Total/NA	Water	351.2	500216
LCS 400-500216/2-A	Lab Control Sample	Total/NA	Water	351.2	500216
MRL 400-500432/12	Lab Control Sample	Total/NA	Water	351.2	
400-191717-C-1-B MS	Matrix Spike	Total/NA	Water	351.2	500216
400-191717-C-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	500216

Prep Batch: 500691

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	351.2	
MB 400-500691/1-A	Method Blank	Total/NA	Water	351.2	
LCS 400-500691/2-A	Lab Control Sample	Total/NA	Water	351.2	
400-191968-A-2-B MS	Matrix Spike	Total/NA	Water	351.2	
400-191968-A-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	

Analysis Batch: 500931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-109312-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Water	351.2	500691
MB 400-500691/1-A	Method Blank	Total/NA	Water	351.2	500691
LCS 400-500691/2-A	Lab Control Sample	Total/NA	Water	351.2	500691
400-191968-A-2-B MS	Matrix Spike	Total/NA	Water	351.2	500691
400-191968-A-2-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	500691

Main CoC

Page 1 of 1

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

☐ Almgren Drive
Agawam, MA 01001
(413) 789-9018

☐ 646 Camp Avenue
N. Kingstown, RI 02852
(401) 732-3400

Special Handling:

☑ TAT - Date Needed: 5-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins
Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 11= 12= Zinc + NaOH

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	6020 Totals -Be, Cd, Li, Ni, Sb, As, Ba, Cr, Co, Pb, Hg (7470A), Mo, Se, Tl, Cu, Ag, V, Zn, Al, Fe, Mn, Ca, Mg, K, Na, B	9056A - Cl, F, SO4	2320B - Alkalinity (Total hydroxide, bicarbonate, carbonate)	2420C - TDS	353.2 NO2/NO3	4500 - Phosphate	SM4500 - Sulfide	5310C - TOC	351.2 - TKN	QA/QC Reporting Notes:
						List Preservative Code below:				4				3	3	12	3	3	
	GAF-GW-PHIII-Bkt-Control-sand-19R-t3	8/6/2020	11:00 AM	G	GW	1			8	x	x	x	x	x	x	x	x	x	
	GAF-GW-PHIII-Bkt-Dolo-sand-19R-t3	8/6/2020	11:00 AM	G	GW	1			8	x	x	x	x	x	x	x	x	x	
	GAF-GW-PHIII-Bkt-Hi Cal-sand-19R-t3	8/6/2020	11:00 AM	G	GW	1			8	x	x	x	x	x	x	x	x	x	
	GAF-GW-PHIII-Bkt-Hi Cal-sand-444u-t3	8/6/2020	11:00 AM	G	GW				1	x*									* 6020 totals Be, Cd, Li and Ni only
	GAF-GW-PHIII-Bkt-Control-sand-19R-t3	8/6/2020	11:00 AM	G	S			1		x*									* 6020 totals Be, Cd, Li and Ni only
	GAF-GW-PHIII-Bkt-Dolo-sand-19R-t3	8/6/2020	11:00 AM	G	S			1		x*									* 6020 totals Be, Cd, Li and Ni only
	GAF-GW-PHIII-Bkt-Hi Cal-sand-19R-t3	8/6/2020	11:00 AM	G	S			1		x*									* 6020 totals Be, Cd, Li and Ni only
	GAF-GW-PHIII-Bkt-sand-t3	8/6/2020	11:00 AM	G	S			1		x*									* 6020 totals Be, Cd, Li and Ni only

Relinquished by:	Received by:	Date:	Time:	Temp °C
Rachel Watkins		8/6/20	1500	Observed
	Melissa Watson	8-7-20	8:30	Correction Factor
	FEDEX			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

180-109312 Chain of Custody

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

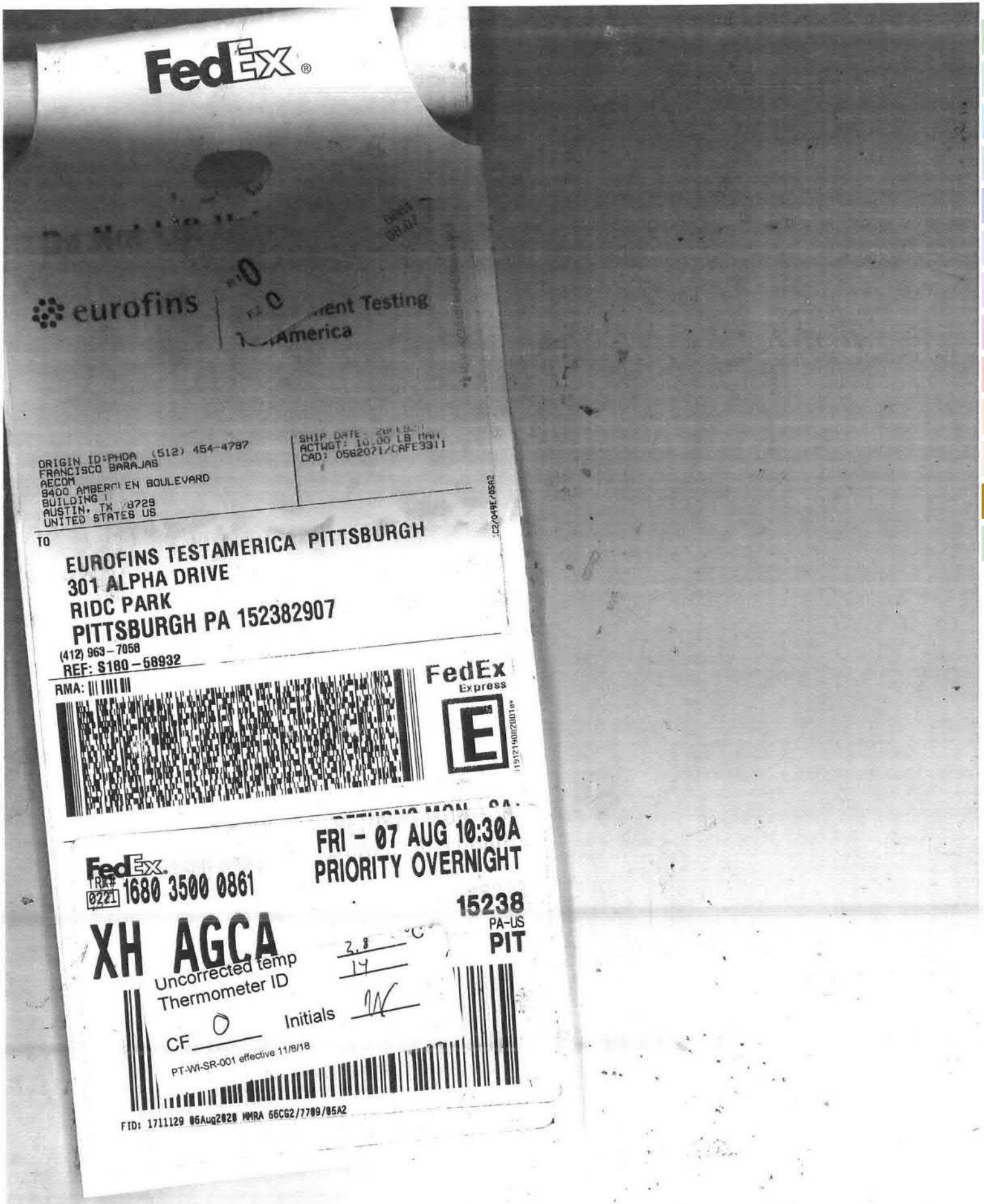
QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

9/14/2020 (Rev. 2)

www.EurofinsUS.com/Spectrum

Rev. Nov 2016


eurofins
Environment Testing
TestAmerica
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58932
RMA:
FedEx
Express
FedEx
TRK# 0221 1680 3500 0850
FRI - 07 AUG 10:30A
PRIORITY OVERNIGHT
XH AGCA
15238
PA-US
PIT
Thermometer ID
CF
Initials
PT-WI-SR-00 effective 11/8/18
FID: 1711129 06Aug2020 MMRA 66CG2/7709/06A2
180-109312 Waybill


FedEx
eurofins
America
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING I
AUSTIN, TX 8729
UNITED STATES US
SHIP DATE:
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58932
RMA:
FedEx Express
FRI - 07 AUG 10:30A
PRIORITY OVERNIGHT
TRK# 0221 1680 3500 0861
15238
PA-US
PIT
XH AGCA
Uncorrected temp
Thermometer ID
CF 0
Initials
PT-WI-SR-001 effective 11/8/18
FID: 1711129 06Aug2020 MMRA 66CG2/7709/05A2


eurofins
Environment Testing
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ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
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RMA:
FedEx
Express
FedEx.
TRK# 0221 1680 3500 0850
FRI - 07 AUG 10:30A
PRIORITY OVERNIGHT
XH AGCA
15238
PA-US
PIT
Thermometer ID
CF
Initials
3.7 °C
14
FID: 1711129 06Aug2020 MMRA 66CG2/7709/05A2
180-109312 Waybill

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-406669.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Jennifer.Rumble@Eurofinset.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-109312-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 8/14/2020			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-NRS-Treatability	Project #: 18022206			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	4500_P_E/ NRS Treatability PO4	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (180-109312-1)	8/6/20	11:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 (180-109312-2)	8/6/20	11:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 (180-109312-3)	8/6/20	11:00 Central		Water			X	1	Analysis Must follow TVA Protocol

4
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Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		08/11/2020 1700	ETA PIT		8-12-20 1100	Eurofins
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 4.9, 4.0

Ver: 01/16/2019

Eurofins TestAmerica Canton Sample Receipt Form/Narrative **Login # :** _____
Canton Facility

Client TA PITTSBURGH Site Name VARIOUS

Cooler Received on 8-12-20 Opened on 8-12-20

Cooler unpacked by: SDE

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Receipt After-hours: Drop-off Date/Time Storage Location

TestAmerica Cooler # _____ Foam Box Client Cooler Box Other _____

Packing material used: Bubble Wrap Foam Plastic Bag None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☑ See Multiple Cooler Form
   IR GUN# IR-10 (CF **+0.7** °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #IR-11 (CF **+0.9**°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 4	Yes	No	
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No	NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	No	
-Were tamper/custody seals intact and uncompromised?	Yes	No	NA
3. Shippers' packing slip attached to the cooler(s)?	Yes	No	
4. Did custody papers accompany the sample(s)?	Yes	No	
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No	
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No	
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No	
8. Could all bottle labels be reconciled with the COC?	Yes	No	
9. Were correct bottle(s) used for the test(s) indicated?	Yes	No	
10. Sufficient quantity received to perform indicated analyses?	Yes	No	
11. Are these work share samples?	Yes	No	
If yes, Questions 12-16 have been checked at the originating laboratory.			
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No	NA pH Strip Lot# HC911298
13. Were VOAs on the COC?	Yes	No	
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No	NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____	Yes	No	
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No	

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

_____

_____

_____

_____

_____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

Login # : _____

Eurofins TestAmerica Canton Sample Receipt Multiple Cooler Form

Cooler Description (Circle)	IR Gun # (Circle)	Observed Temp °C	Corrected Temp °C	Coolant (Circle)
TA (Client) Box Other	IR-10 (IR-11)	4.0	4.4	(Wet Ice) Blue Ice Dry Ice Water None
TA (Client) Box Other	IR-10 (IR-11)	3.1	4.0	(Wet Ice) Blue Ice Dry Ice Water None
TA Client Box Other	IR-10 IR-11			Wet Ice

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-406671.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Jennifer.Rumble@Eurofinset.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-109312-1
Address: 3355 McLemore Drive, ,	Due Date Requested: 8/13/2020			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-NRS-Treatability	Project #: 18022206			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	351.2/351.2_Prep NRS Treatability TKN	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (180-109312-1)	8/6/20	11:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 (180-109312-2)	8/6/20	11:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 (180-109312-3)	8/6/20	11:00 Central		Water			X	1	Analysis Must follow TVA Protocol

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	08/11/2020 1700	ETA-PITH	[signature]	8/12/20 9:26	TAPE
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ∆ Yes ∆ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.6°C IR-1

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-109312-1
SDG Number: GAF-NRS-Treatability

Login Number: 109312
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins 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	

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-109312-1
SDG Number: GAF-NRS-Treatability

Login Number: 109312
List Number: 3
Creator: Gore, Beija K

List Source: Eurofins TestAmerica, Pensacola
List Creation: 08/12/20 04:51 PM

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.	N/A	
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	0.6 °C IR 7
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.	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	

AECOM
1600 Perimeter Park
Morrisville, NC 27560
aecom.com

Project name:
NRS Treatability Study

Project ref:
60621225

To:
Jason Curtsinger, TVA

From:
Craig McPhee, AECOM

CC:
Scott Veenstra, AECOM
David Skeggs, AECOM
Patrick Haskell, AECOM

Date:
October 1, 2020

DRAFT

Memo

Subject: Minerals Analysis of Microcosm Samples

The purpose of this memorandum is to provide context for the mineralogical testing results conducted as part of the Non-Registered Site (NRS) treatability testing being completed by AECOM at TVA's Gallatin Fossil Plant (GAF). Observations and discussions are preliminary and have not been fully developed and reviewed.

1. Procedure

Mineral analysis samples were collected from the Phase III microcosm buckets as follows:

AECOM-Sand - 073020: This material is sand without addition of any reagents or any dosing with site groundwater. The sand is a natural material with limited processing (water washed and sieved to meet ASTM standards for concrete sand). The material was produced by Pine Bluff Materials Company and was provided by a supplier in the Gallatin area (Garrot Brothers).

AECOM- CONTROL +2 – 073020: This material is sand from the same source as **AECOM-Sand** that has been dosed twice with water from well 19R. The process was to dose the sand with site groundwater, wait one week, drain the water out, and repeat the dose a second time, wait one week, drain it again, and then collect a sample of sand from the approximate center of the test vessel (bucket).

AECOM-DOLO - +2 – 073020: This material is sand from the same source as **AECOM-Sand,** which has been amended with 0.2% by weight of sand dolomitic fines (dolo). The amended sand was then subjected to dosing with well 19R water and sampling as described for **AECOM-CONTROL +2**.

AECOM-Hi CAL +2 – 073020: This material is sand from the same source as **AECOM-Sand** which has been amended with 0.1% by weight of sand of high calcium fines (Hi CAL). The amended sand was then subjected to dosing with well 19R water and sampling as described for **AECOM-CONTROL +2**.

Well 19R water used for the dosing has a low pH (<4) and contains Be (approx. 13 micrograms per liter [ug/L]), Cd (approximately 6 ug/L), Li (approximately 140 ug/L) and Ni (approximately 200 ug/L).

The samples were sent to DCM Science Laboratory, Inc. (DCM) in Wheat Ridge, Colorado. DCM conducted the following tests:

- Semi-Quantitative X-Ray Diffraction (XRD)
- X-Ray Fluorescence (XRF)
- Scanning Electron Microscopy (SEM)

The nature of the samples and purpose of the study were discussed with DCM prior to analysis. In addition to standard analysis, DCM was asked to focus on the following:

- Calcite (present in the HiCal and Dolo fines)
- Dolomite
- Quartzite
- Illite and Kaolinite
- Iron Fe(OOH)x, pyrite, other iron minerals
- Al
- Cadmium – $CdCO_3$ (otavite) CdS (greennockite or hawleyite), $Cd(OH)_2$
- Beryllium (not detectable by XRF) – BeO, $Be(OH)_2$
- Nickel – NiS (millerite), NiS_2 (vaesite) Ni_3S_2 (heazlewoodite), Fe_5NiS_8/$(FeNi)_9S_8$ (greigite,/pentandite), (Fe, Ni)O(OH) (limonite), $Mg,Ni)_3(OH)_4(Si_2O_5)$(garnerite)
- Lithium (not detectable XRF) - Li minerals can be divided into three groups: silicates (spodumene-$LiAlSi_2O_6$,petalite-$LiAlSi_4O_{10}$); micas (lepidolite-$[Li,Al]_3[Al,Si]_4O_{10}[F,OH]_2$, zinnwaldite-$[Li,Al,Fe]_3[Al,Si]_4O_{10}[F,OH]_2$ and phosphates (mainly amblygonite - [Li,Na]Al[F,OH].

2. Preliminary Evaluation of Results

2.1 XRD

The results of the XRD testing is provided in **Attachment A**. All four samples were found to be predominantly quartz and silicate minerals (amphibole, K-feldspar, and plagioclase). These results are consistent with the sand that forms the base material for all four samples. Enrichment of calcite is not apparent because only 0.1 to 0.2% of calcium bearing amendments were added. Enrichment of minerals associated with the target metals was not observable by XRD, because the amount deposited by dosing with 19R groundwater is very low (parts per billion).

2.2 XRF

The results of the XRF testing is provided in **Attachment B**. As with XRD, the sensitivity of XRF makes it difficult to draw distinctions between the four samples tested. MgO appears slightly enriched in the AECOM-DOLO sample, consistent with the presence of MgO in dolomitic fines. Similarly, CaO may be slightly enriched in the amended samples. XRF results for Ni were essentially the same for all four samples. For the AECOM-DOLO and AECOM-Hi Cal samples, enrichment of nickel would be expected as nickel is removed from the groundwater during each dose and added to the sand. However, two doses of groundwater can only deposit a maximum of approximately 0.1 parts per million (ppm) of nickel. Thus, nickel enrichment from two doses of groundwater is not observable by XRF (10-15% precision/accuracy on the 1-100 ppm range).

2.3 SEM

The results of the SEM testing is provided in **Attachment C**. The sample with no amendments and no dosing with groundwater (AECOM-Sand) shows trace amounts of calcite, dolomite, apatite and iron minerals. This finding explains why the unamended sand is providing a degree of groundwater treatment. These trace minerals are consistent with sand from a marine environment (calcite/dolomite from shell fragments, apatite from remains of fish bones).

The observation by SEM of calcite/dolomite fragments with primary and secondary coatings provides some insight into the mechanisms behind removal of the target metals from groundwater.

3. Conclusion and Preliminary Recommendations

The minerology of amended sand and unamended sand are very similar. This is consistent with the relatively small doses of amendments that have been applied, the similarity of the amendments to minerals naturally present in the sand, and the low concentration of target analytes being treated in the microcosms. As anticipated in the Workplan, the mineral analysis does not have the resolution to observe the small amount of target metals deposited by application of site groundwater. It is also difficult to observe the amendments because the amount of amendments applied is very low.

These mineral results will be further considered in the context of the sequential extraction results and other site data.

Further mineral analysis with samples taken to failure (dosed with groundwater until breakthrough) or with much higher amendment doses (>1%) might provide clearer results. However, additional mineralogical testing is unlikely to change amendment selection or dosing. At this time, the practical value of further mineralogical testing seems minimal, and therefore, no further mineralogical testing is proposed.

Appendix A XRD

REVISED REPORT
CORRECT SAMPLE NO.
9-18-20

DCM SCIENCE LABORATORY, INC.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033 (303) 463-8270

Semi-Quantitative X-Ray Diffraction Analysis

Client:
AECOM
9400 Amberglen Blvd.
Austin, TX 78729

Analysis Date:	9-4-20
Reporting Date:	9-4-20
Receipt Date:	7-31-20
Client Job No.:	None Given
Client Project:	TVA - NRS Gallatin
DCMSL Project:	AECOM6

Client Sample No.:	**AECOM-SAND**	**AECOM-DOLO-+2**	**AECOM-CONTROL-+2**	**AECOM-HI CAL-+2**
	073020	**073020**	**073020**	**073020**
Phase				
Amphibole	1	2	1	3
Calcite	<2*	<2*	-	-
Chlorite	4	2	4	3
K-Feldspar	12	11	11	13
Mica	4	4	4	4
Plagioclase	14	17	15	14
Quartz	63	61	63	61
Gypsum	-	-	<2*	-
Unaccounted	<5	<5	<5	<5

*May be present

The sample(s) was/were prepared for x-ray diffraction analysis and scanned over a range of 3° to 45° 2Θ Cu radiation, 40kV, 25mA. Mineral phases were identified with the aid of computer-assisted programs accessing a powder diffraction database. Estimates of mineral concentrations are based on relative peak heights and reference intensity ratios (RIR) measured in-house.

All information provided by clients, including sample results, is considered proprietary and confidential. Client results and other information will not be released to anyone but the client except by client request. When the laboratory is required by law or authorized by contractual arrangement to release confidential information, the client or individual concerned shall, unless prohibited by law, be notified of the information provided.

Jason Barnes, Analyst

DCM SCIENCE LABORATORY, INC.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033

(303) 463-8270/(800) 852-7340
(303) 463-8267 – fax

Date/Time Received _____ DCMSL Group No. 2020 DCMSL Log No. AECOM 6

Field Data Sheet/Chain of Custody

Samples Submitted By:

Company: AECOM
Address: 9400 Amberglen Blvd
Austin, TX 78729

Contact: Francisco Barajas
Phone: 512-419-6474
Cell:
Email: Francisco.Barajas@aecom.com

Job/P.O. # _____

Project Title TVA - NRS Gallatin

Archive: Asbestos samples are archived for 6 months unless other arrangements are made. All other samples are archived for 3 months.

Turnaround Time Requested:

[ ] Standard (3 to 5 Business Days)
[ ] 24 Hour Rush
[ ] 2 Hour Rush (Asbestos Only)
[ ] Other _____

Procedure Requested:

ASBESTOS
Bulk [ ] Standard EPA
[ ] Progressive
[ ] Point Count
[ ] Other
Air [ ] NIOSH 7400
[ ] OSHA ID-160
[ ] Other

DUST & SILICA
[ ] Silica – Air NIOSH 7500
[ ] Silica – Bulk
[ ] Silica – Bulk Respirable
[ ] Dust – NIOSH 0500/0600

OTHER SERVICES
[ ] Optical Microscopy
[ ] X-ray Diffraction – Scan/Search
[ ] X-ray Diffraction – Clay/Bulk
[✓] SEM

Other Analysis: XRF, XRD, Polished Thin Section

Client Sample No.:	Sample Date	Air Volume	Other Information
1 AECOM - Sand - 073020	7/30/20		
2 AECOM - Dolo-f2-073020	7/30/20		
3 AECOM - Control-f2-073020	7/30/20		
4 AECOM - Hi Cal-f2-073020	7/30/20		
5			
6			
7			
8			
9			
10			

Relinquished By:	Date/Time	Received By:	Date/Time
Rachel Withers	7/30/20 1400	D Howery	7/31/20 9:42

Appendix B XRF

August 4, 2020
Lab no. 220181

Mr. Ron Schott
DCM Science Laboratory, Inc.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, Colorado 80033

Dear Mr. Schott:

Enclosed are the x-ray fluorescence (XRF) analytical results for, “073020” samples received with your PO no. 2021. This report will be mailed and emailed to you.

A representative portion of each sample was ground to approximately -400 mesh in a steel swing mill and then analyzed by our standard XRF procedure for 31 major, minor and trace elements. The relative precision/accuracy for this procedure is ~5–10% for major–minor elements and ~10–15% for trace elements (those elements listed in ppm) at levels greater than twice the detection limit in samples of average geologic composition. A replicate sample and a standard reference material ("GSP-2", a USGS standard rock) was analyzed with the samples to demonstrate analytical reproducibility for your samples and analytical accuracy for a geologic standard, respectively. The accepted ("known") values for the quality control standard are listed with the XRF results.

Thank you for the opportunity to be of continuing service to DCM Science Laboratory.

Sincerely,

Joy Maes

DCM Science Laboratory, Inc.
XRF Results for, "073020" Samples Received with PO# 2021

August 4, 2020
Lab no. 220181

IDENT	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	S	Cl	K_2O	CaO	TiO_2	MnO	Fe_2O_3	BaO
						Wt %							
SAND	1.17	0.39	4.38	85.8	0.09	< 0.05	< 0.02	1.10	0.73	0.18	0.06	1.56	0.04
DOLO+2	1.17	0.51	4.47	87.6	0.14	< 0.05	< 0.02	1.15	0.89	0.15	0.07	1.53	0.03
CONTROL+2	1.10	0.32	4.18	84.8	0.08	< 0.05	< 0.02	1.19	0.55	0.14	0.06	1.66	0.04
HICAL+2	1.40	0.40	4.62	84.4	0.10	< 0.05	< 0.02	1.14	0.71	0.14	0.06	1.55	0.03
Quality Control - Replicate (R) sample and standard reference material (GSP-2) analyzed with samples													
SAND(R)	1.16	0.38	4.39	85.8	0.09	< 0.05	< 0.02	1.10	0.73	0.18	0.06	1.55	0.03
GSP-2-XRF	3.16	1.11	14.7	65.7	0.33	0.07	0.06	5.48	2.16	0.60	0.04	4.24	0.14
GSP-2-known	2.78	0.96	14.9	66.6	0.29	----	----	5.38	2.10	0.66	0.04	4.90	0.15

IDENT	V	Cr	Ni	Cu	Zn	As	Sn	Pb	Mo	Sr	U
					PPM						
SAND	13	< 10	14	< 10	27	< 20	< 20	< 10	< 10	90	< 10
DOLO+2	16	< 10	13	< 10	30	< 20	< 20	< 10	< 10	92	< 10
CONTROL+2	15	< 10	14	12	27	< 20	< 20	< 10	< 10	108	< 10
HICAL+2	17	11	14	< 10	30	< 20	< 20	< 10	< 10	98	< 10
Quality Control											
SAND(R)	19	< 10	15	< 10	28	< 20	< 20	< 10	< 10	93	< 10
GSP-2-XRF	46	18	11	44	106	< 20	< 20	34	< 10	218	< 10
GSP-2-known	52	20	17	43	120	--	--	42	--	240	2

Ident	Th	Nb	Zr	Rb	Y
			PPM		
SAND	< 10	< 10	113	20	11
DOLO+2	< 10	< 10	90	24	12
CONTROL+2	< 10	< 10	99	24	< 10
HICAL+2	< 10	< 10	101	25	10
Quality Control					
SAND(R)	< 10	< 10	112	22	11
GSP-2-XRF	102	22	529	215	33
GSP-2-known	105	27	550	245	28

Initial_____

Date_____

Analysis Performed By The Mineral Lab, Inc

DCM
S·C·I·E·N·C·E
LABORATORY, INC.

September 21, 2020

Mr. Francisco Barajas
AECOM
9400 Amberglen Blvd.
Austin, TX 78729

Dear Mr. Barajas:

We have performed scanning electron microscopy on your four sand samples (client samples no. **AECOM-SAND – 073020, AECOM-DOLO - +2 – 073020, AECOM-CONTROL -+2 – 073020** and **AECOM-Hi CAL -+2 – 073020**).

Thank you for the opportunity to provide this service. If you have any questions, please call.

Sincerely,

Ron Schott
Analyst

12421 W. 49th Ave. ● Unit 6 ● Wheat Ridge, Colorado 80033
303-463-8270 ● Fax 303-463-8267 ● 800-852-7340
www.dcmsciencelab.com

Appendix C SEM

DCM SCIENCE LABORATORY, INC.

12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033 - (303) 463-8270

Scanning Electron Microscopy Analysis

Client:
AECOM
9400 Amberglen Blvd
Austin, TX 78729

Analysis Date:	9-17-20
Reporting Date:	9-21-20
Receipt Date:	7-31-20
Client Job No.:	None Given
Project Title:	TVA-NRS Gallatin
DCMSL Project:	AECOM8

The purpose of this project is to confirm the bulk mineralogy of four sand samples and determine if additional minerals have formed as coatings/rinds on major phases as a result of groundwater treatment in four sand samples (client samples no. **AECOM-SAND – 073020, AECOM-DOLO - +2 – 073020, AECOM-CONTROL -+2 – 073020** and **AECOM-Hi CAL -+2 – 073020**) by field emission scanning electron microscopy (FE-SEM) equipped with an energy dispersive system (EDS). Each sample was prepared as a standard polished thin section and carbon coated. FE-SEM/EDS analyses were performed at magnifications ranging from 100X to 20,000X, 20keV. FE-SEM images and EDS spectra are included for documentation.

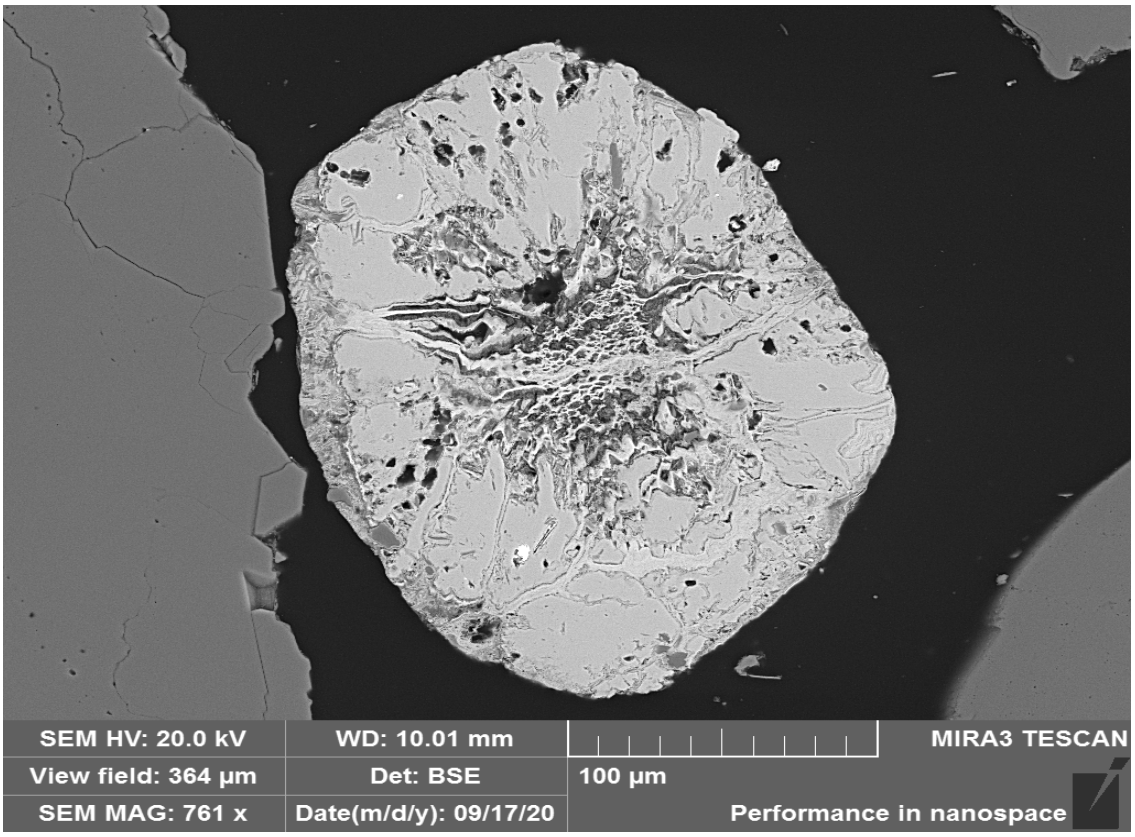
Client Sample No.: **AECOM-SAND – 073020**

Major Mineralogy by XRD: Quartz 63%, Plagioclase 14% K-spar 12% Mica 4% Chlorite 4% Amphibole 1%

Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite, Pyrite

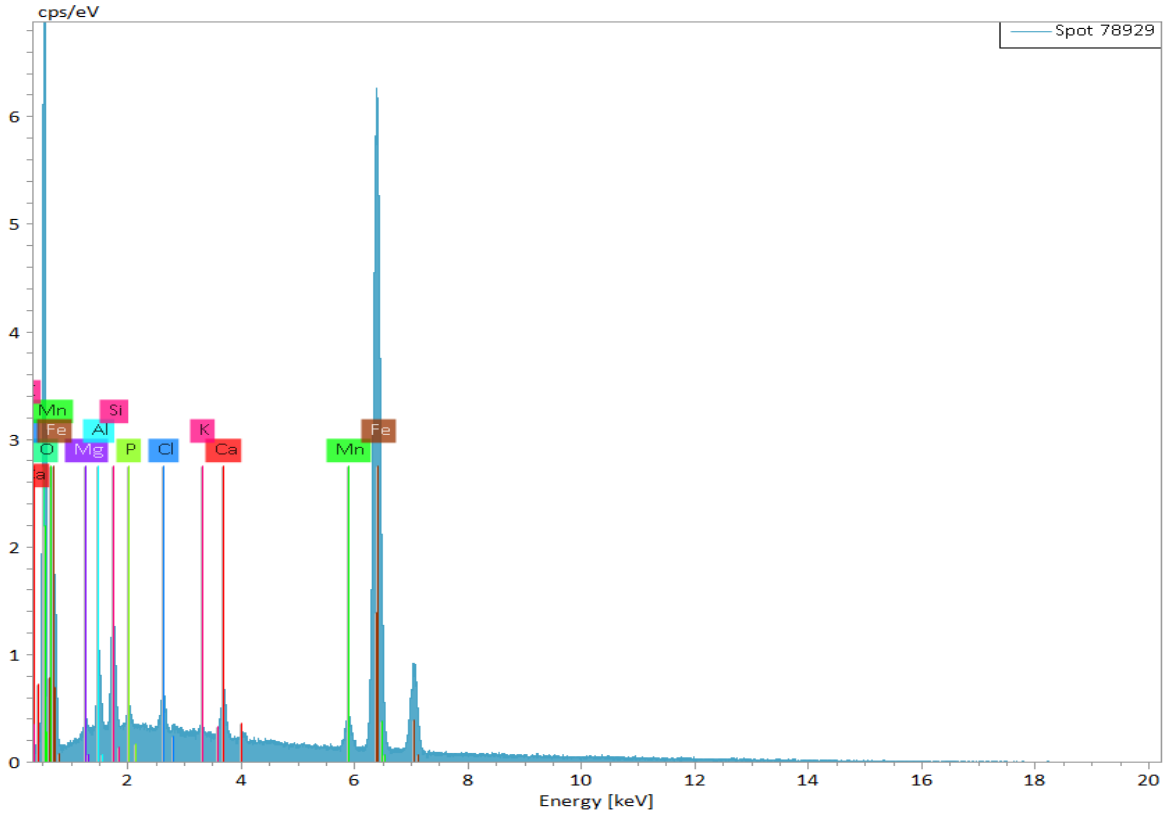
Microscopic Description by FE-SEM

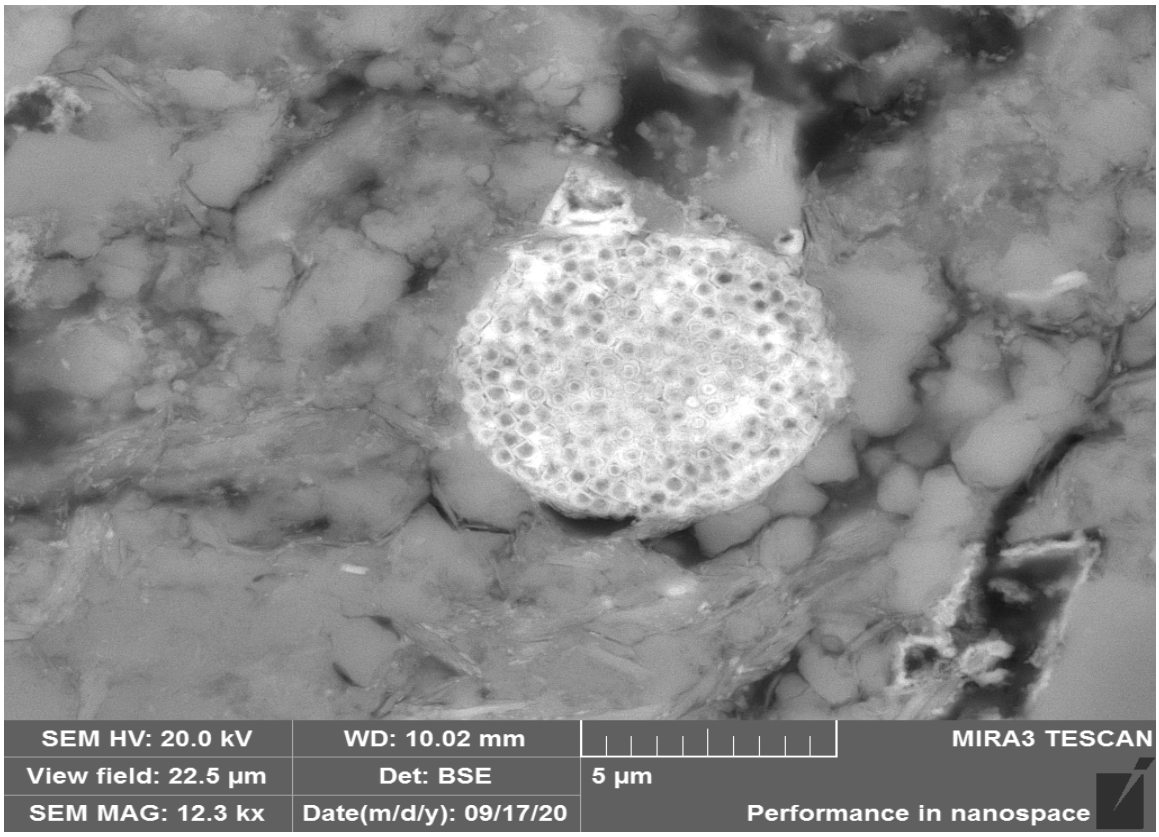
In hand specimen this sample is a brown colored fine, to coarse grained unconsolidated sand. XRD and FE-SEM indicate the sand is primarily composed of subrounded to rounded quartz, feldspar and lesser amounts of mica/chlorite and some amphibole. In thin section individual grains show little in the way of secondary coatings, however, there are a few silicate and carbonate grains that have some attachments of clay or thin rinds of iron oxide. Calcite/dolomite tends to show the most evidence of secondary alteration/coatings composed primarily of Mn. Although uncertain, the coating may represent Mn oxide or secondary Mn carbonate. Iron oxide with significant Mn content is also present as large rounded fragments and as goethite pseudomorphs after pyrite cubes and pyrite framboids. Although sulfides are rare, one small relict grain was identified in a mass of iron oxide.



Client Sample No.: **AECOM-SAND – 073020**

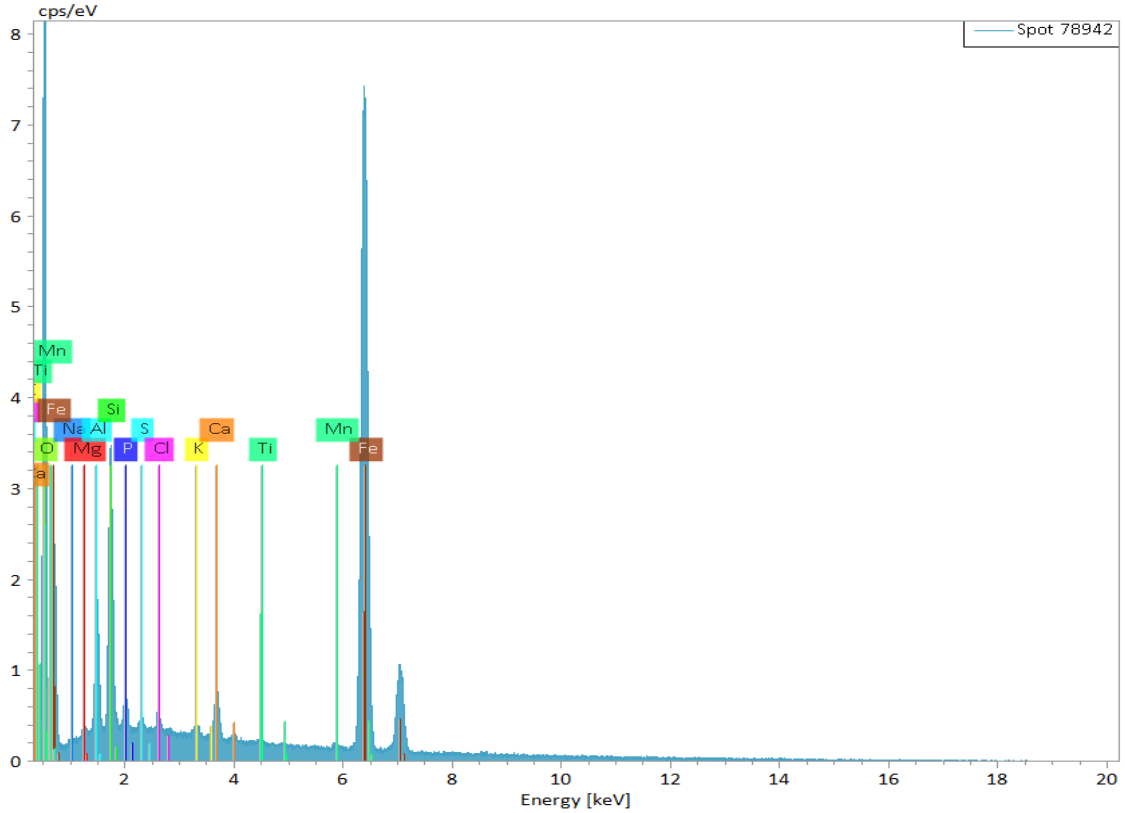
Backscatter image of a large rounded grain of iron oxide with a bright grain of pyrite in lower left – 761X

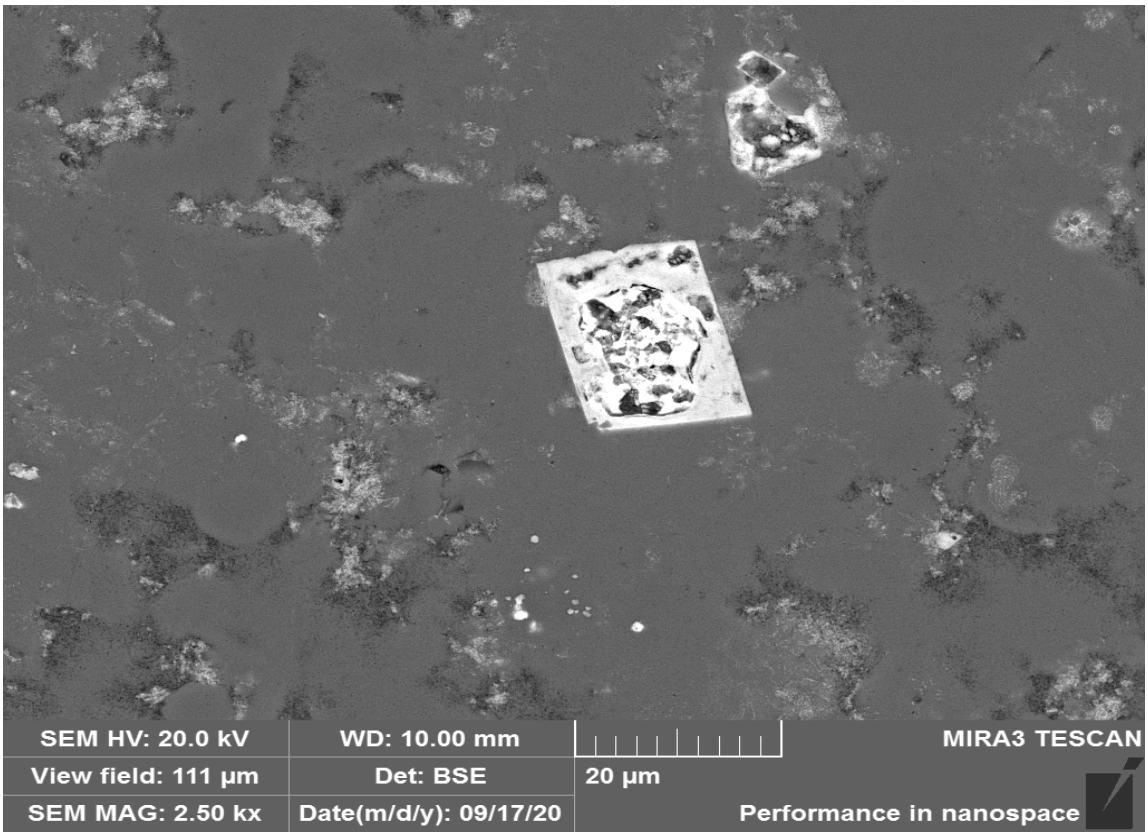




Client Sample No.: **AECOM-SAND – 073020**

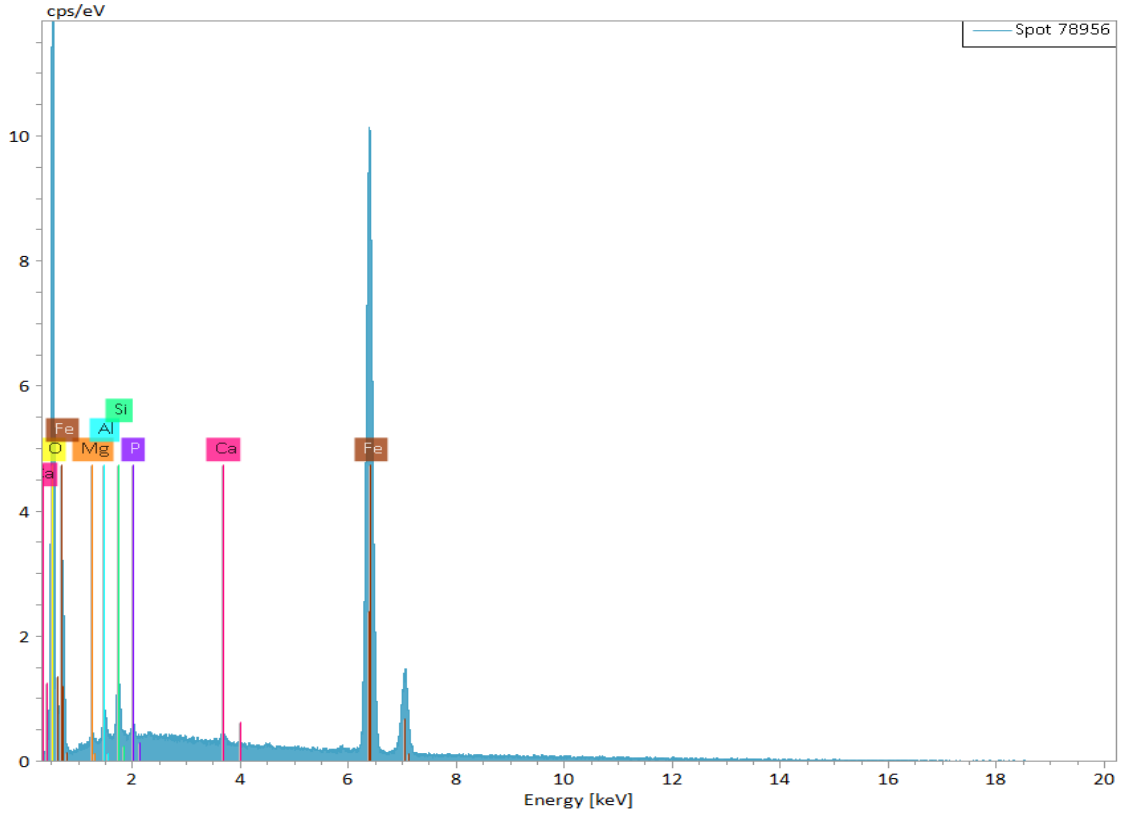
Backscatter image of a goethite pseudomorph after a pyrite framboid – 12,300X

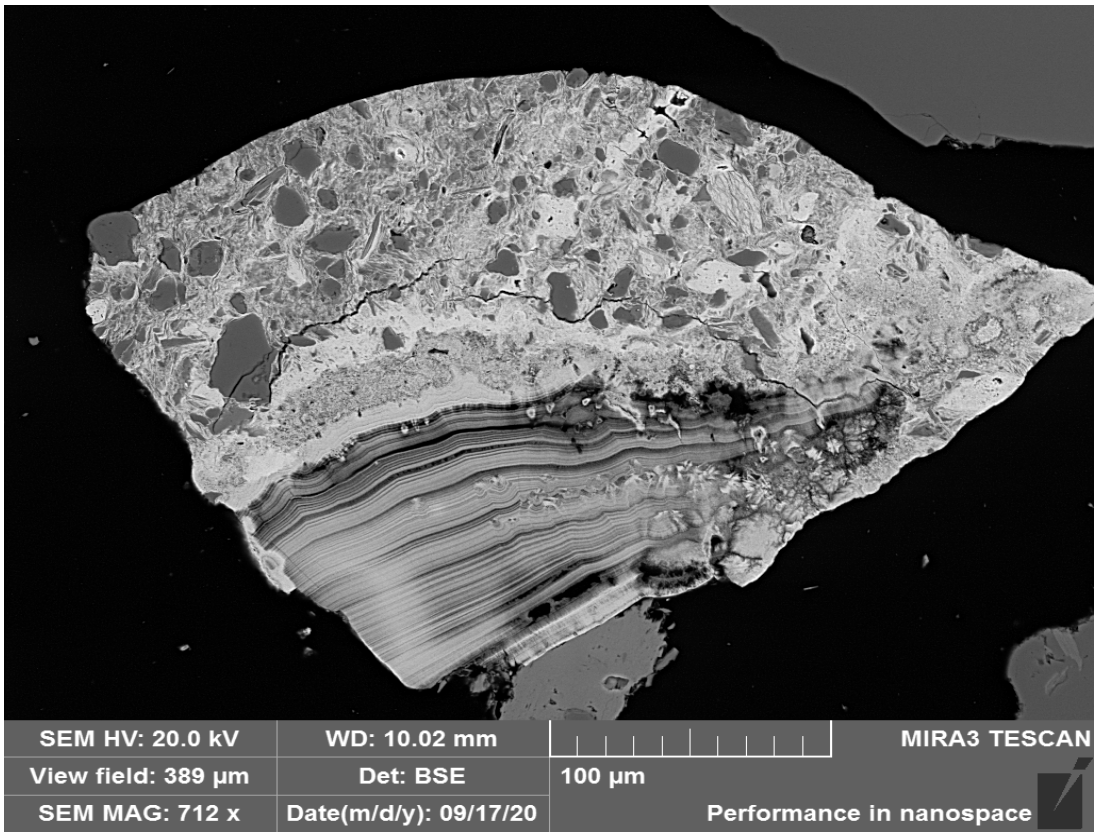




Client Sample No.: **AECOM-SAND – 073020**

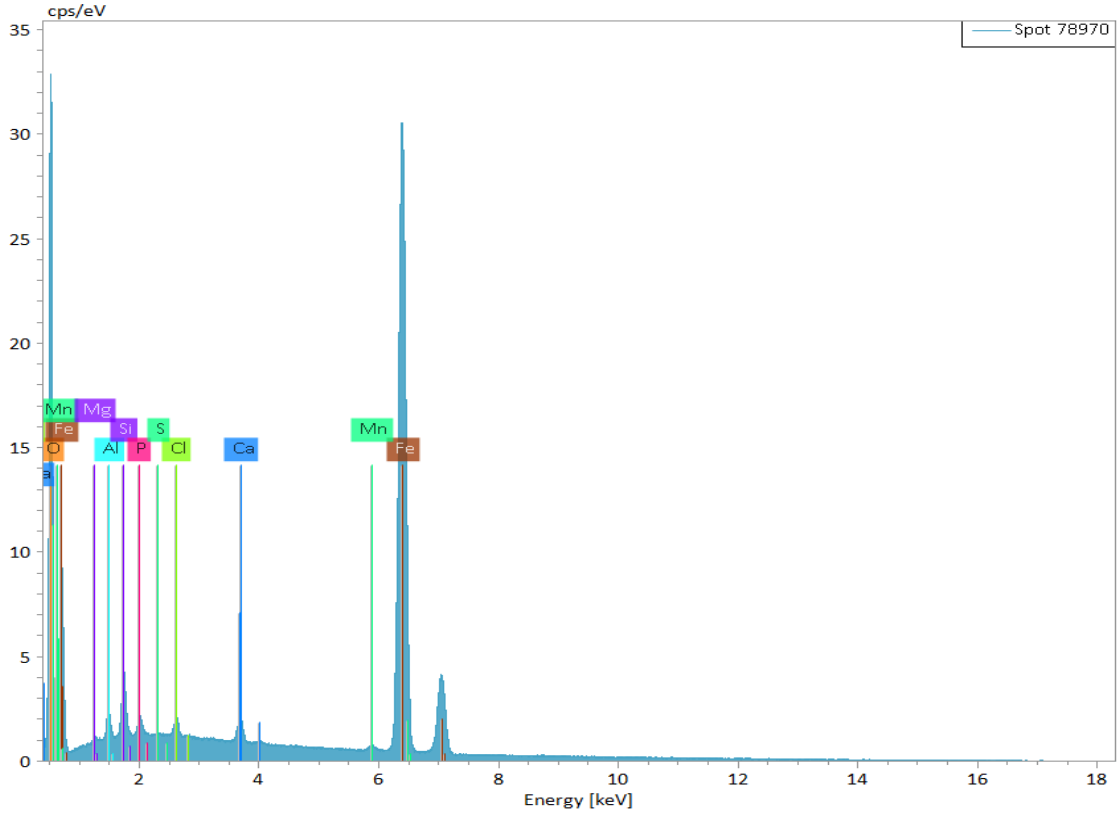
Backscatter image of goethite pseudomorph after pyrite in quartz – 2,500X

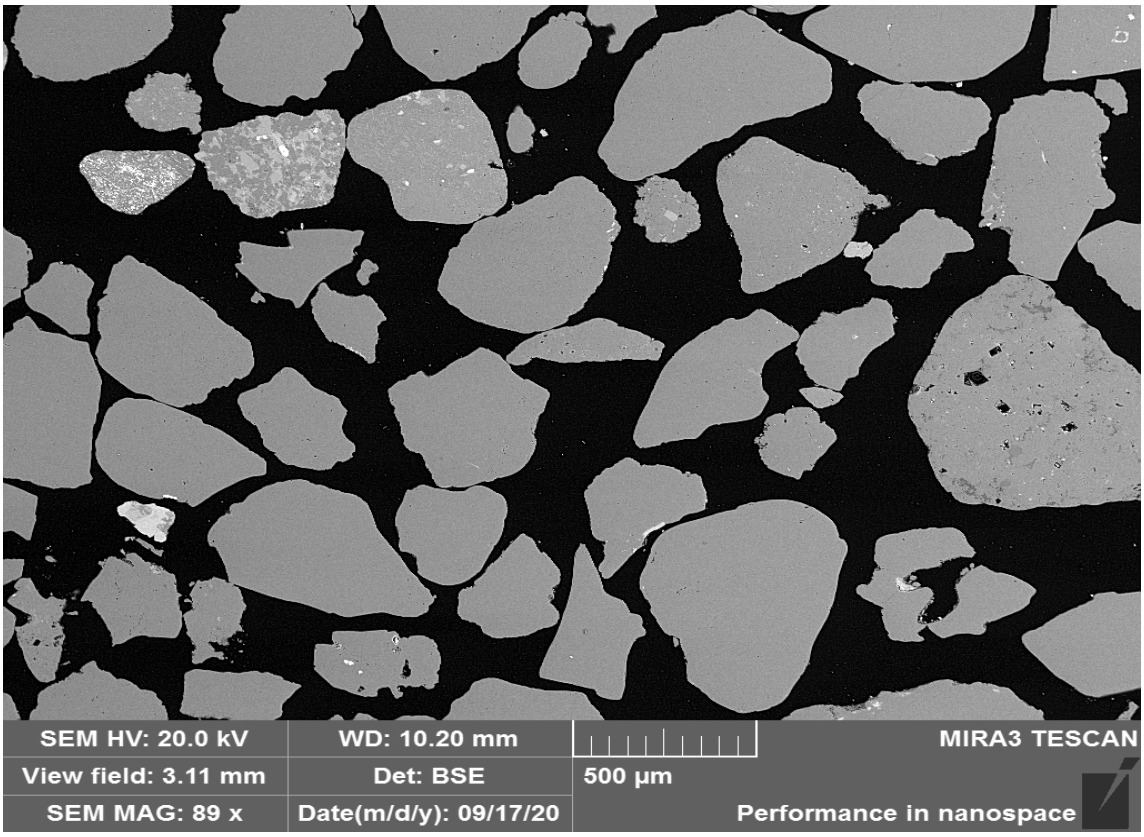




Client Sample No.: **AECOM-SAND – 073020**

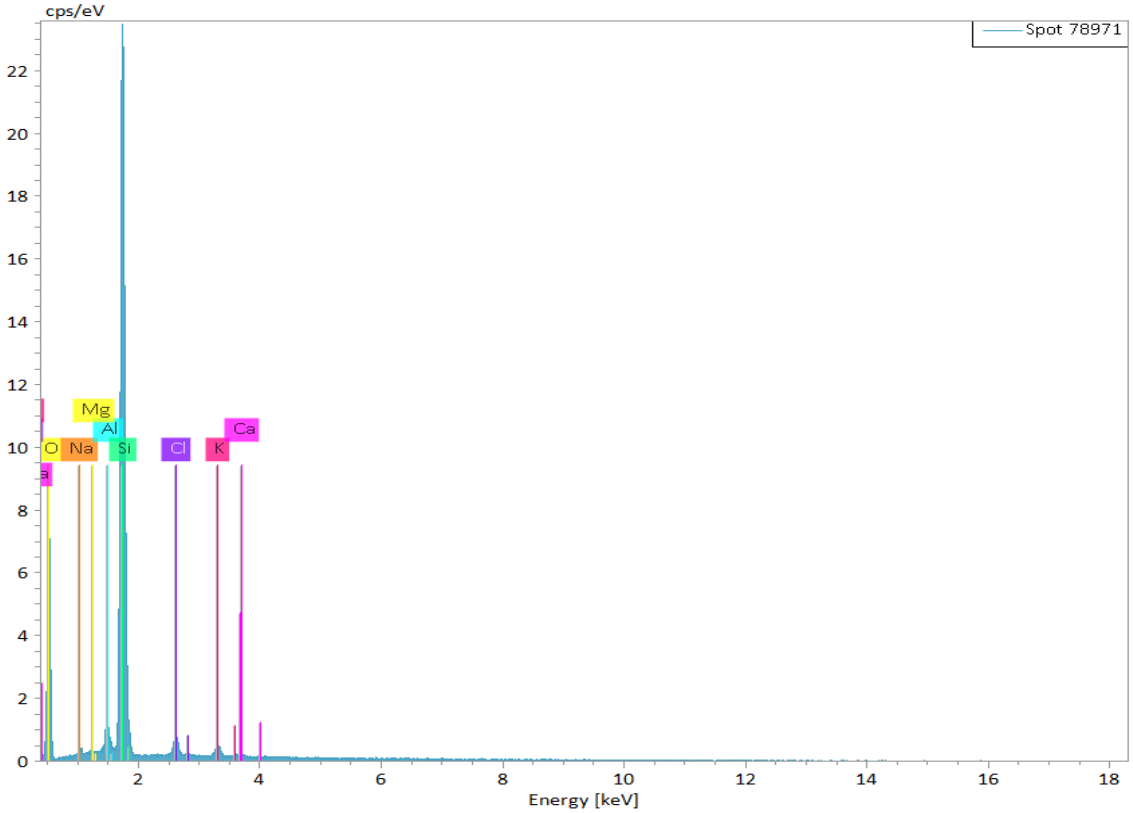
Backscatter image of iron oxide cementing small rock fragments – 712X

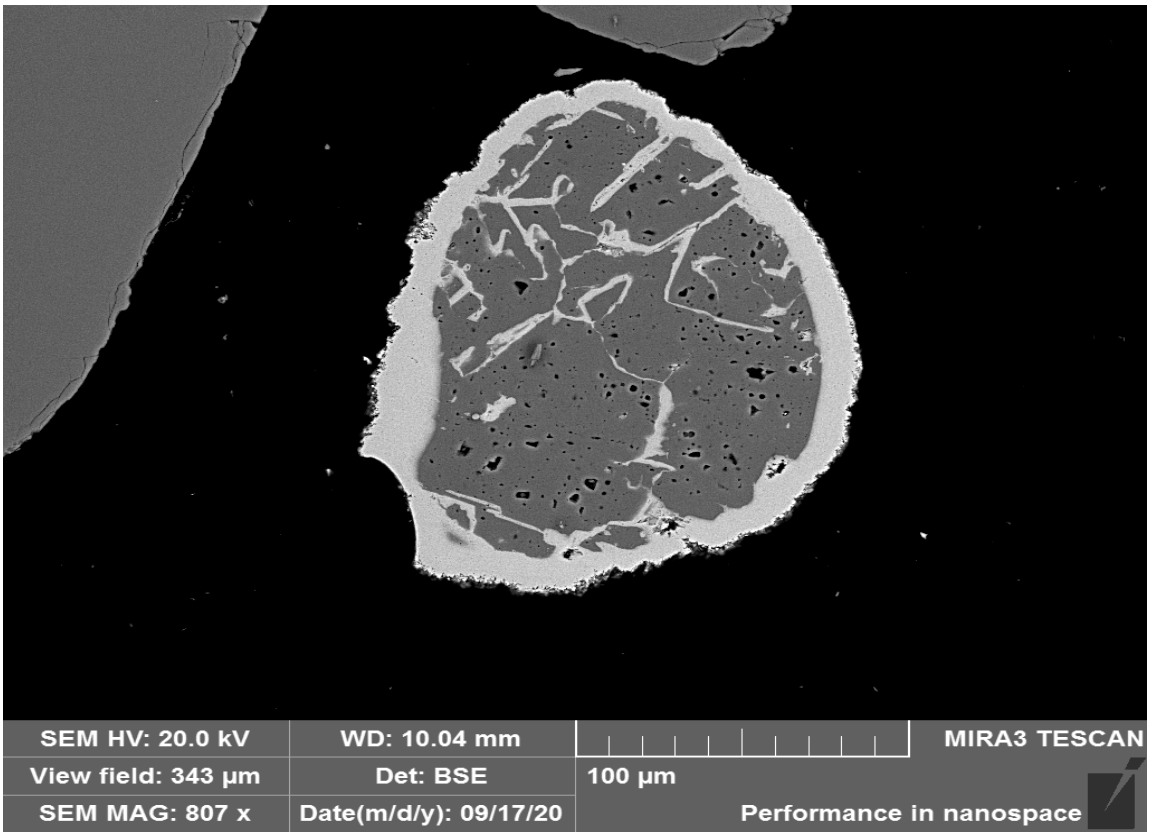




Client Sample No.: **AECOM-SAND – 073020**

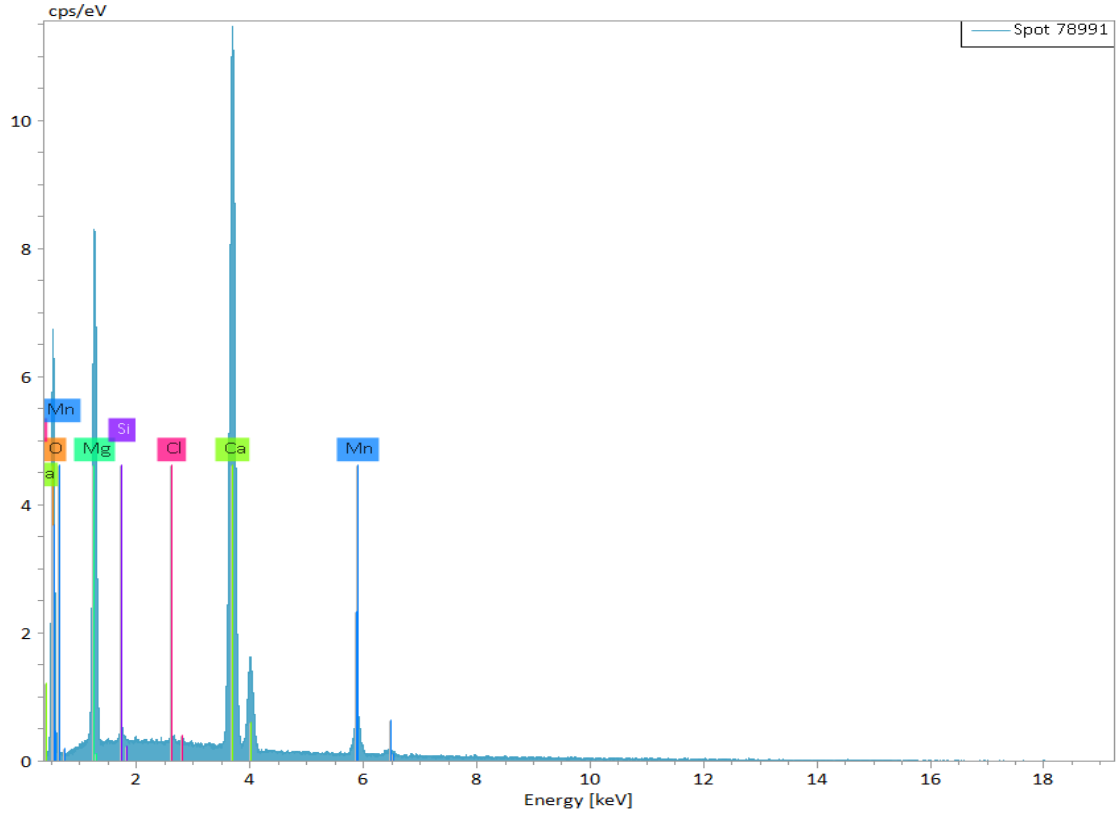
Low magnification backscatter image showing grain morphology and size variation – 89X





Client Sample No.: **AECOM-SAND – 073020**

Backscatter image of a rounded grain of dolomite with a bright Mn rich rind – 807X



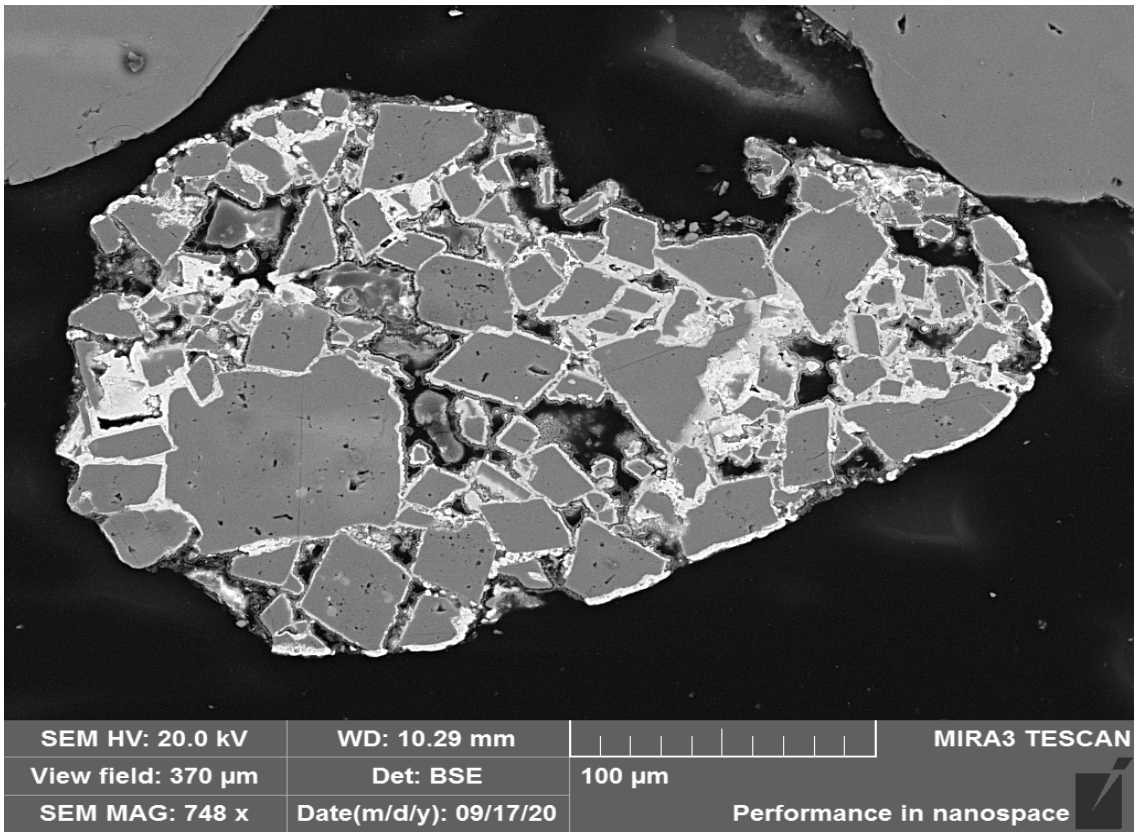
Client Sample No.: **AECOM-DOLO - +2 – 073020**

Major Mineralogy by XRD: Quartz 61%, Plagioclase 17% K-spar 11% Mica 4% Chlorite 2% Amphibole 2%

Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite, Pyrite

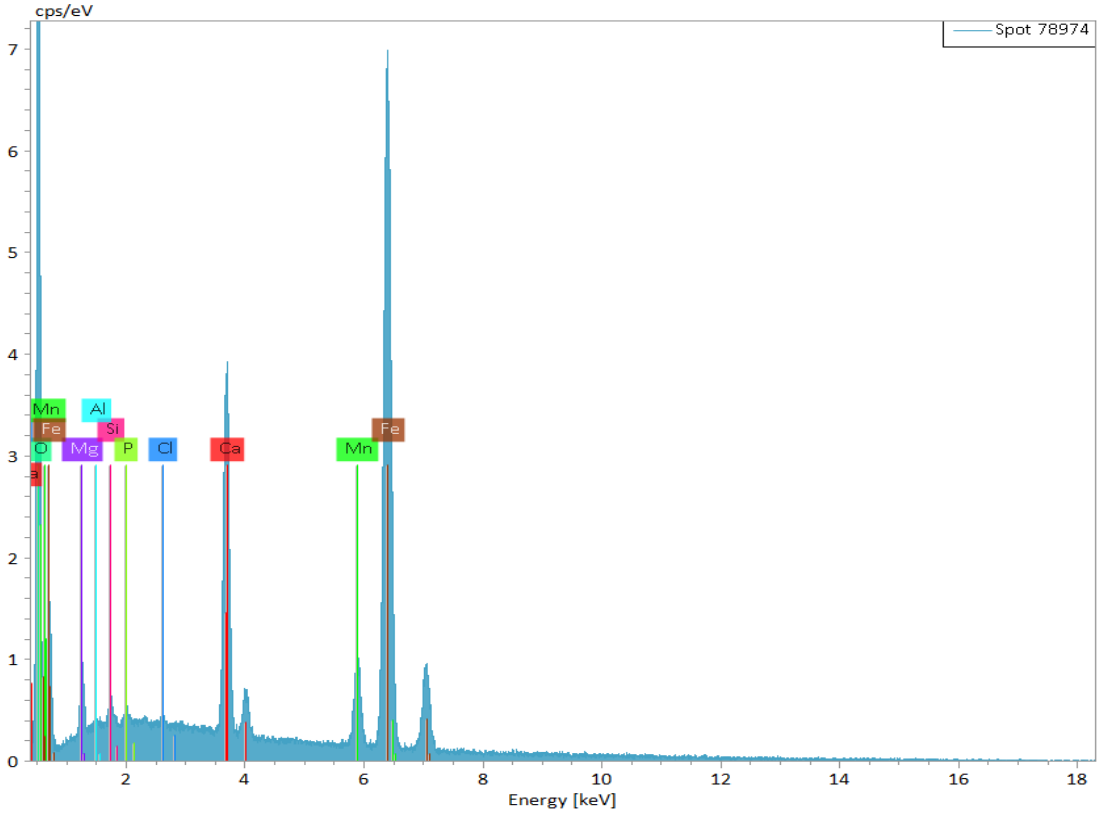
Microscopic Description by FE-SEM

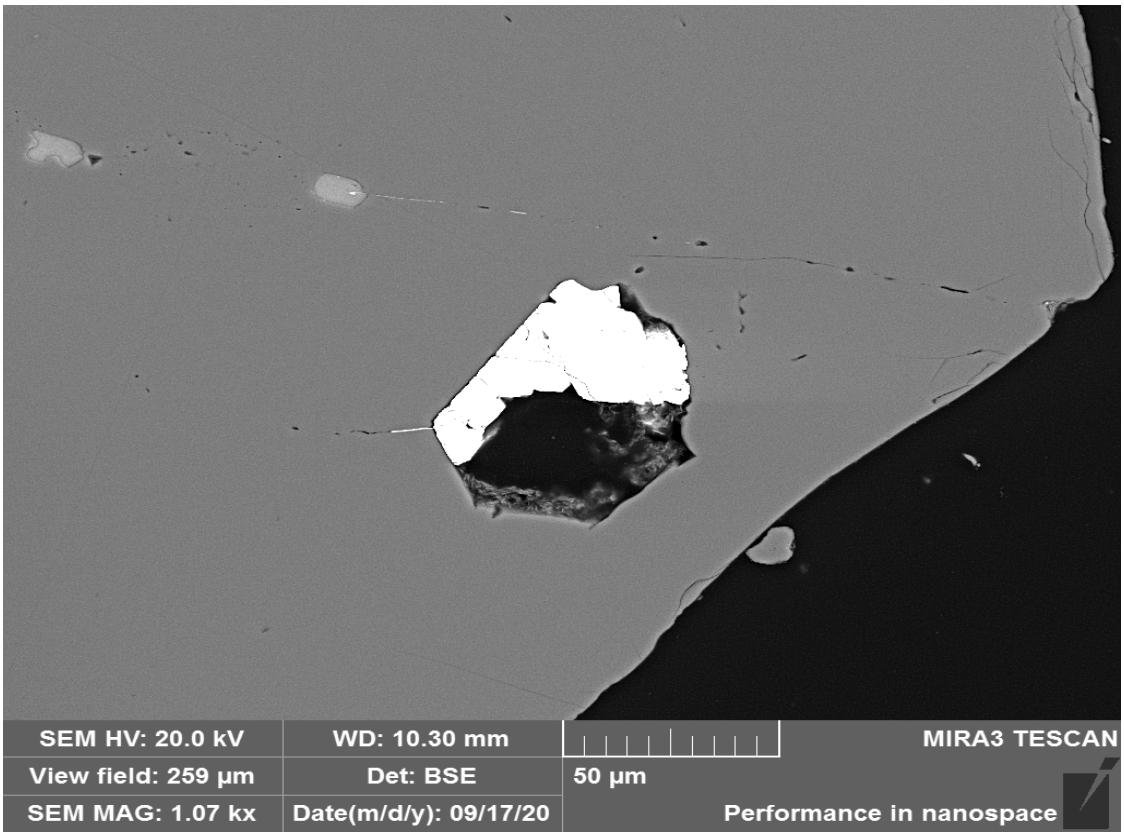
This sample is a brown colored, fine to coarse unconsolidated sand. FE-SEM and XRD confirm the sample is composed mainly of subrounded to rounded quartz/feldspar with lesser amounts of mica and amphibole. A small population of grains shows some minor banding and coatings of secondary iron oxide. Calcite/dolomite fragments show the greatest degree of secondary coatings. Iron oxide with significant Mn content is commonly seen cementing and banding euhedral grains of carbonate. When associated with silicates, iron oxide is seen filling small exterior pits and as occasional thin bands around grains. Iron oxide also occurs as goethite pseudomorphs after pyrite cubes and small pyrite framboids associated with clay. Unaltered pyrite is present as a trace in quartz.



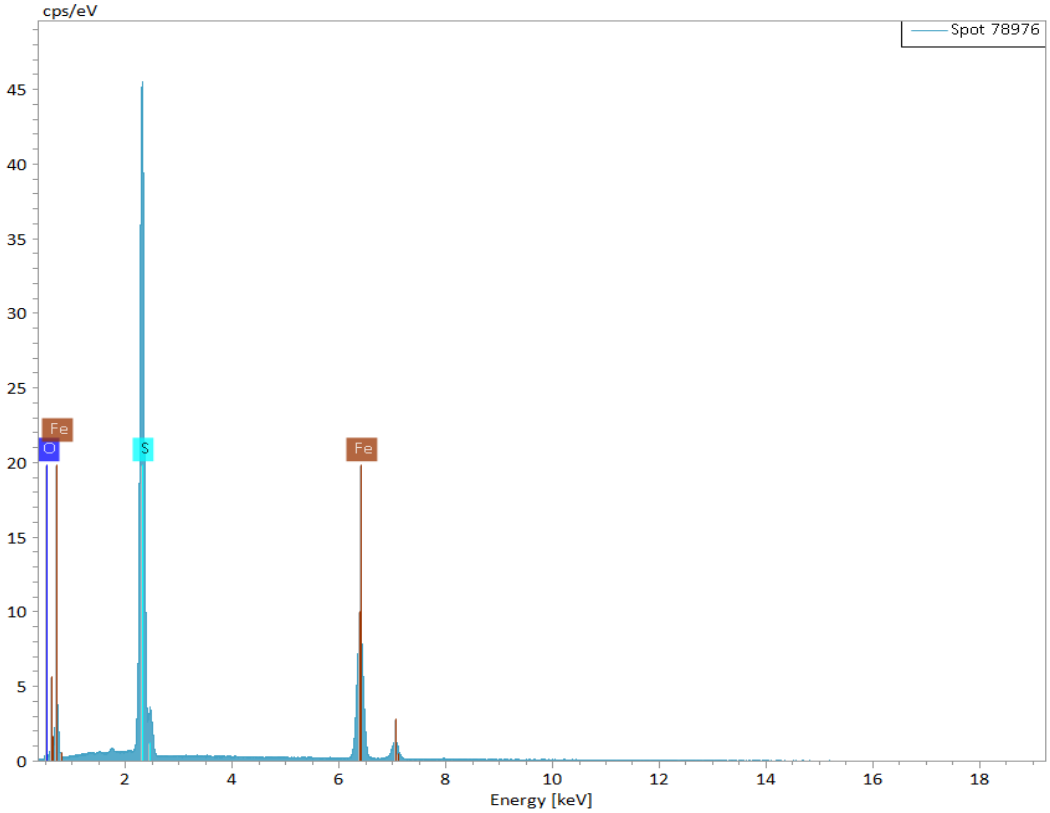
Client Sample No.: **AECOM-DOLO - +2 – 073020**

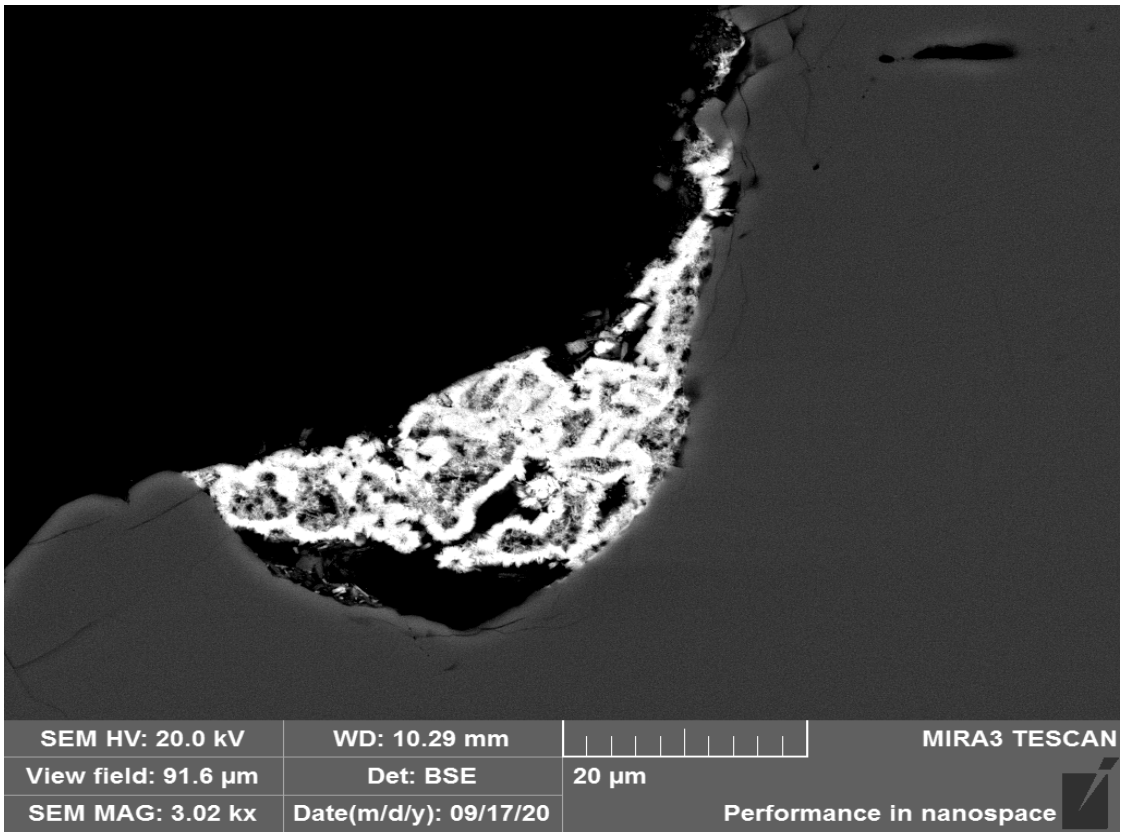
Backscatter image of dolomite grains cemented and rimmed with iron oxide – 748X





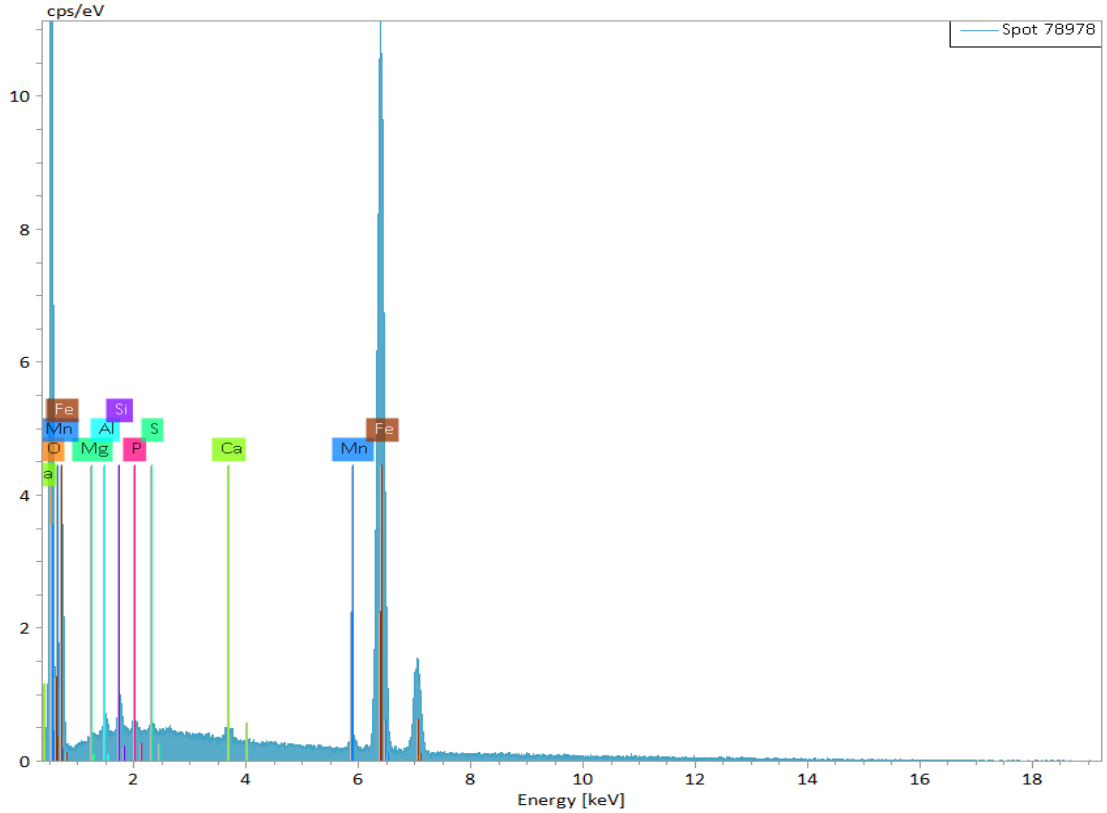
Client Sample No.: **AECOM-DOLO - +2 – 073020**
Backscatter image of quartz with inclusion of pyrite – 1,070X

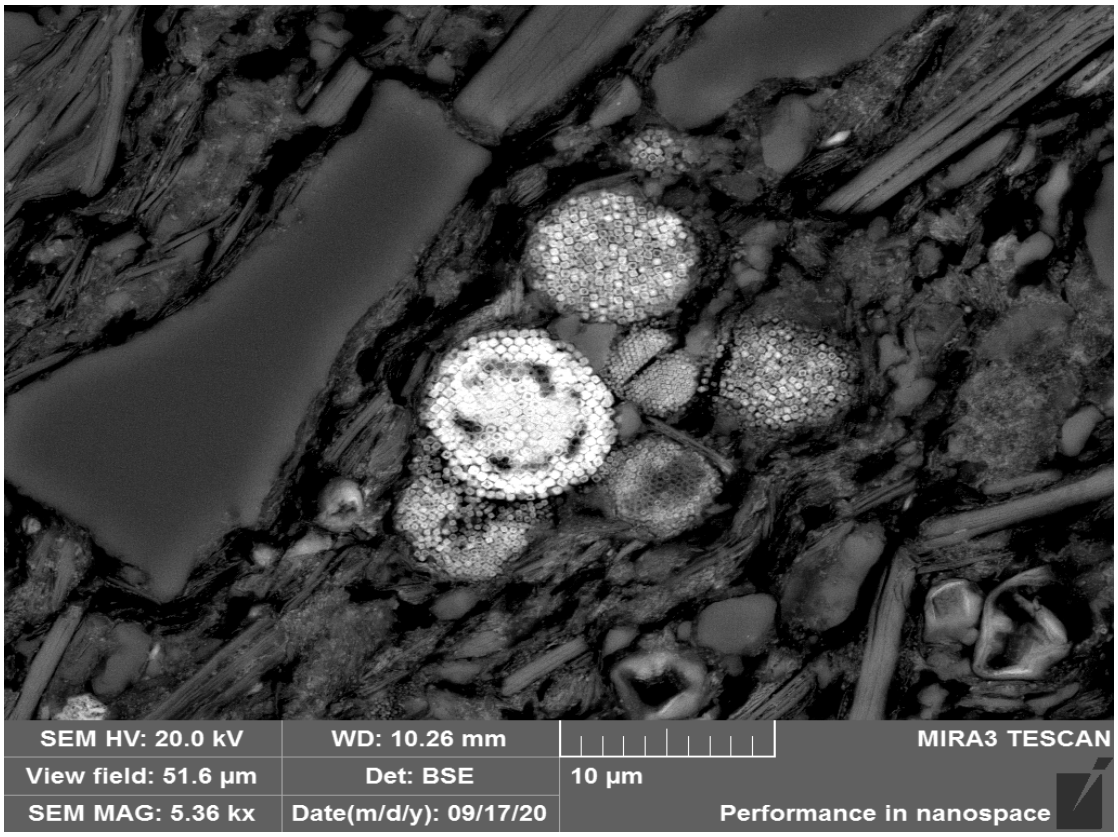




Client Sample No.: **AECOM-DOLO - +2 – 073020**

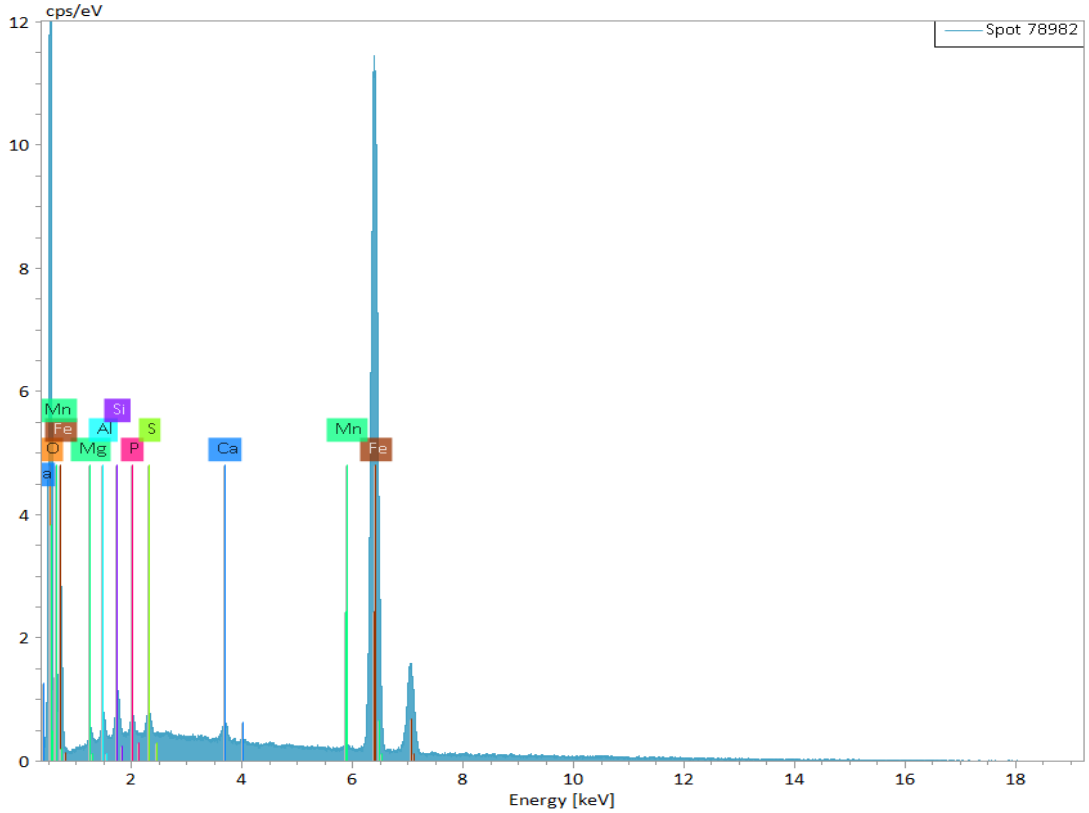
Backscatter image of a small pit on the exterior of a quartz grain filled with iron oxide – 3,020X

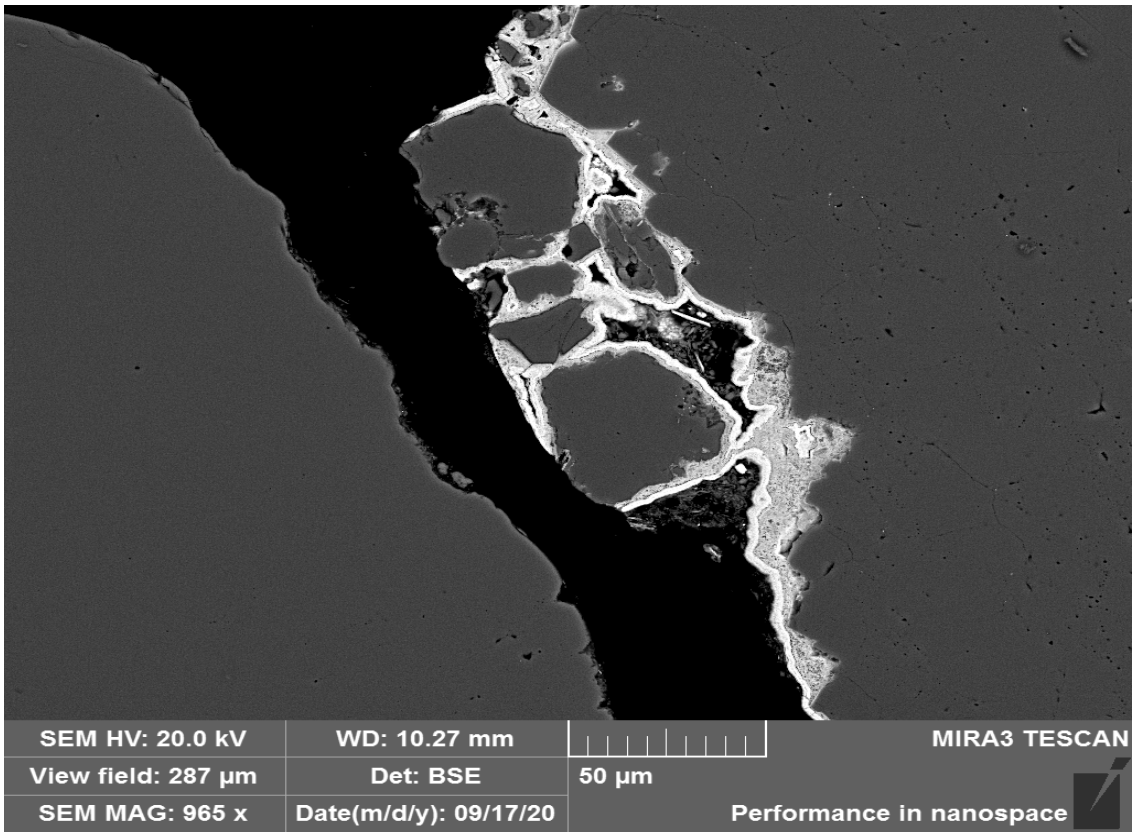




Client Sample No.: **AECOM-DOLO - +2 – 073020**

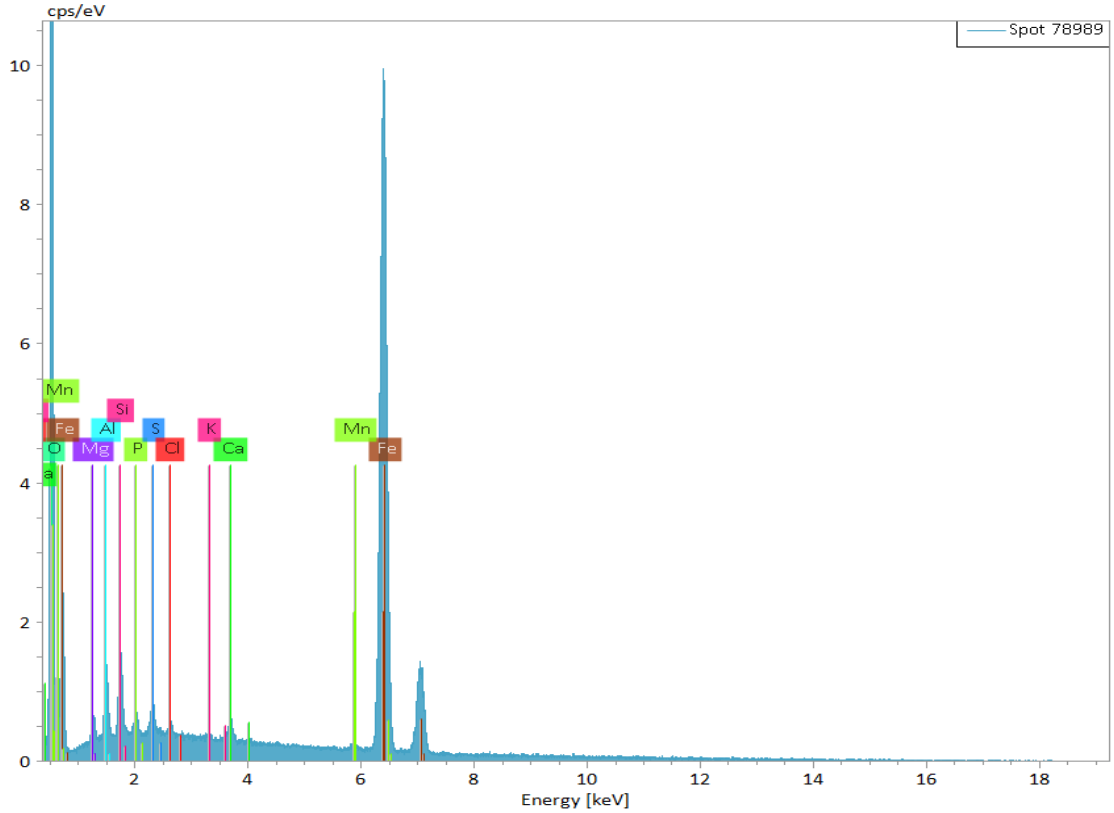
Backscatter image of goethite pseudomorphs after pyrite framboids – 5,360X

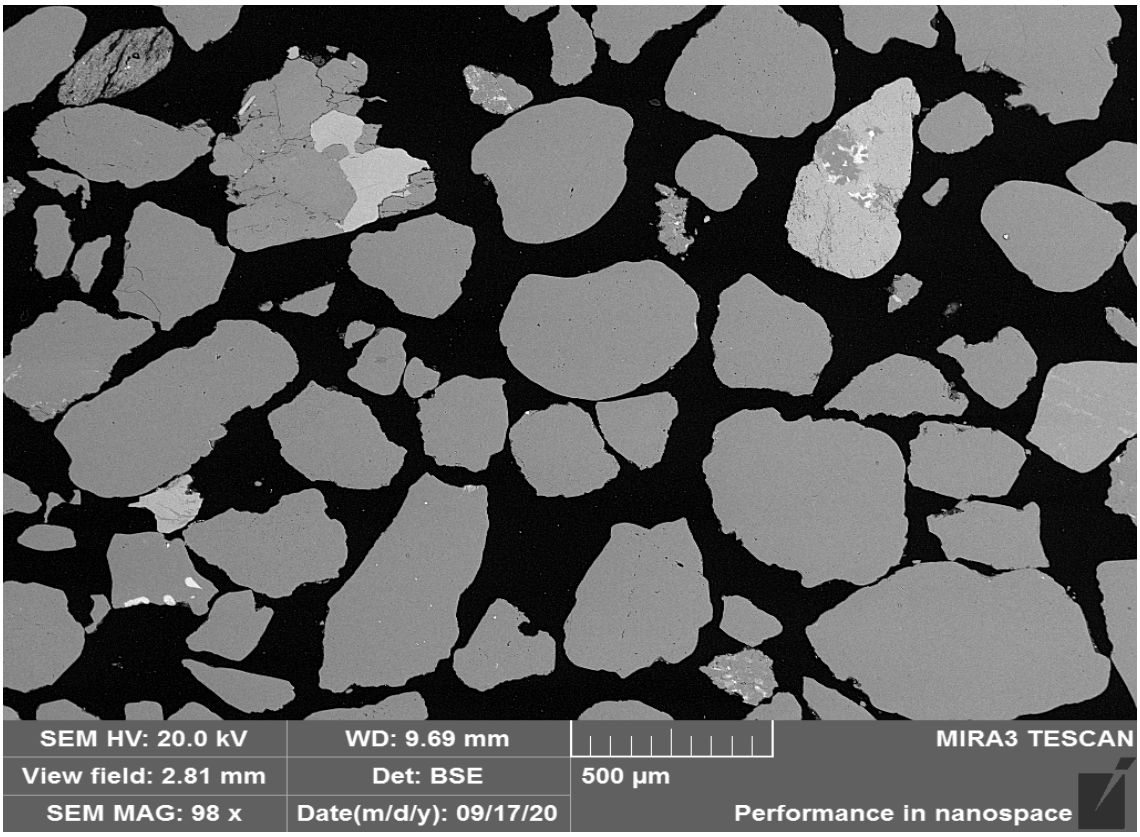




Client Sample No.: **AECOM-DOLO - +2 – 073020**

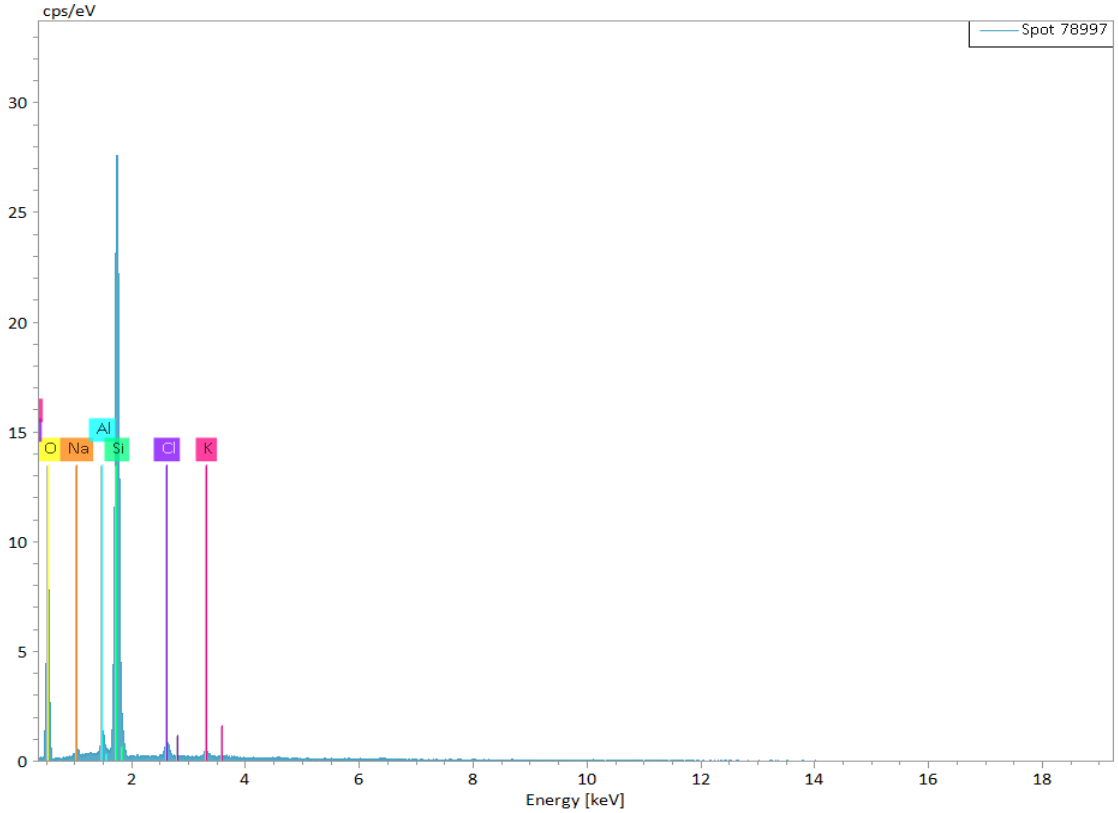
Backscatter image of bright iron oxide rimming and cementing quartz fragments – 965X





Client Sample No.: **AECOM-DOLO - +2 – 073020**

Low magnification backscatter image showing grain morphology and size variation – 98X



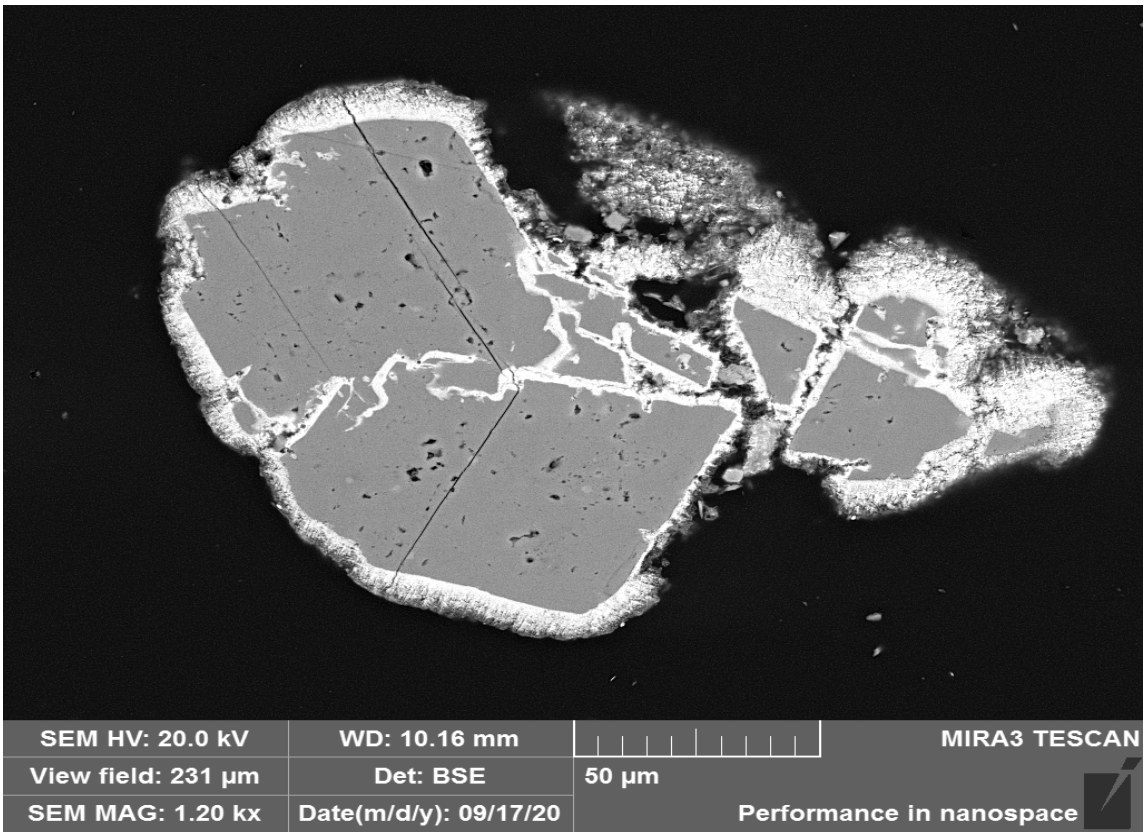
Client Sample No.: **AECOM-CONTROL -+2 – 073020**

Major Mineralogy by XRD: Quartz 63%, Plagioclase 15% K-spar 11% Mica 4% Chlorite 4% Amphibole 1%

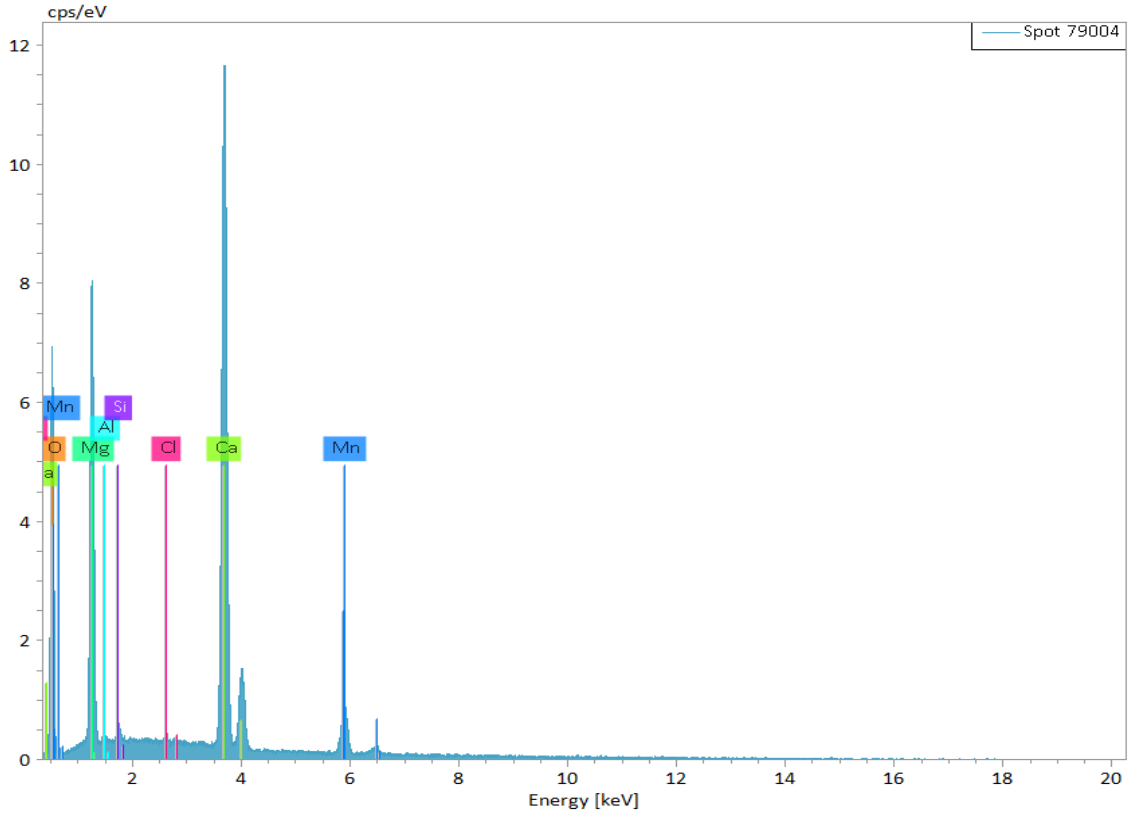
Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite

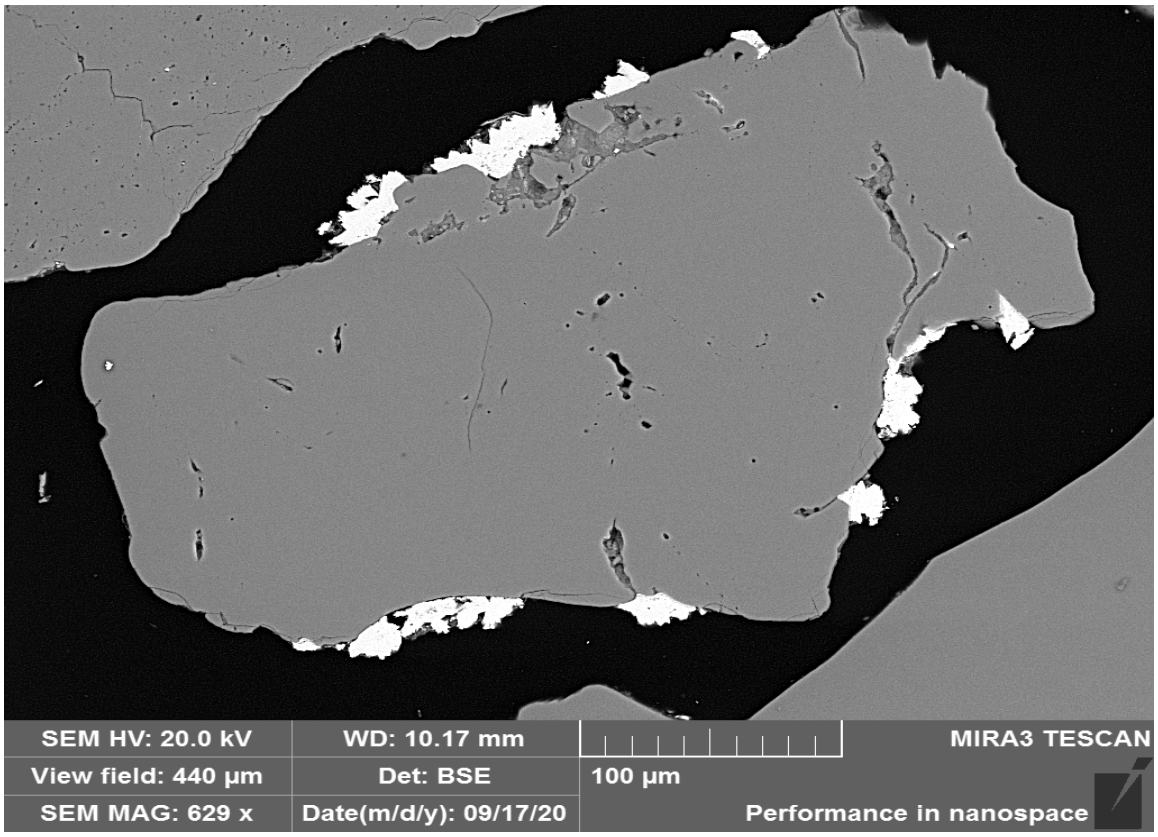
Microscopic Description by FE-SEM

This sample is a brown colored, fine to coarse sand composed primarily of subrounded to rounded quartz/feldspar and lesser amounts of mica and amphibole. A small population of the clasts show secondary coatings composed primarily of Fe/Mn oxide. Calcite/dolomite is commonly seen with Mn rich bands along crystal boundaries and fractures. Although uncertain, the bands may be an oxide or a secondary Mn carbonate. Some silicate grains have small exterior pits and grain boundaries coated with thin skins of secondary Fe oxide. Contained in rock fragments with significant clay content are goethite pseudomorphs after pyrite framboids. In rounded grains of quartz, goethite pseudomorphs after pyrite cubes occur as a trace.

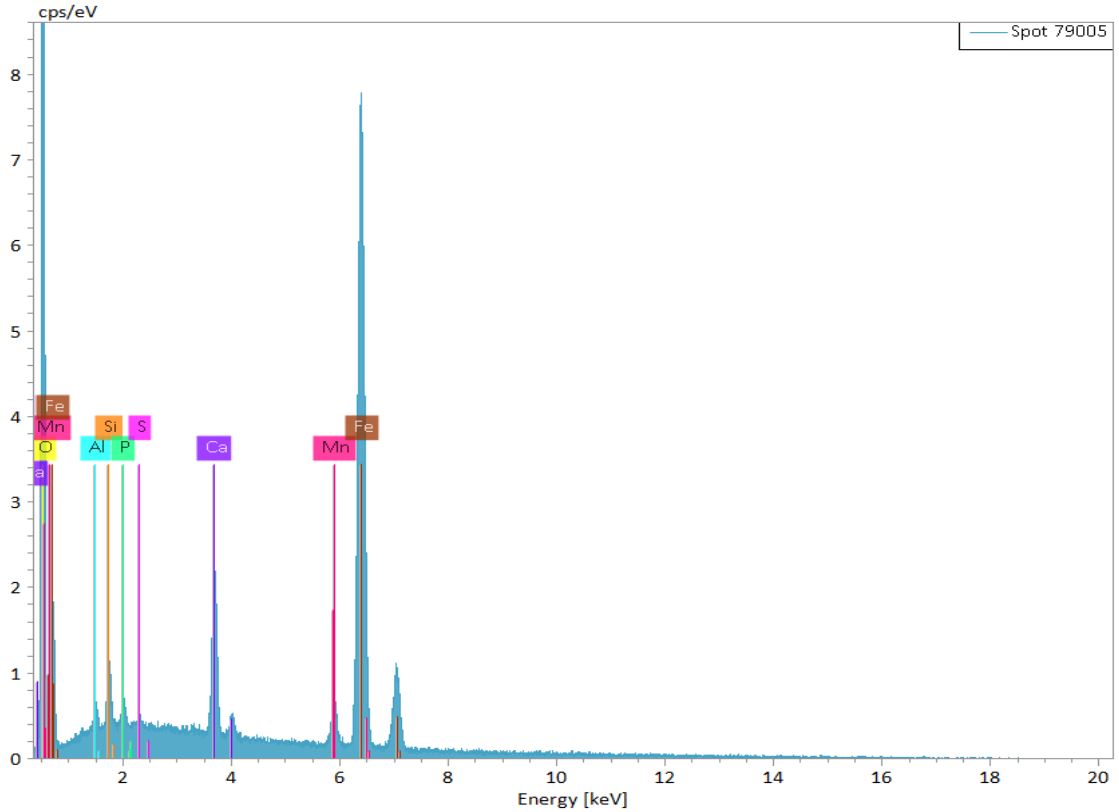


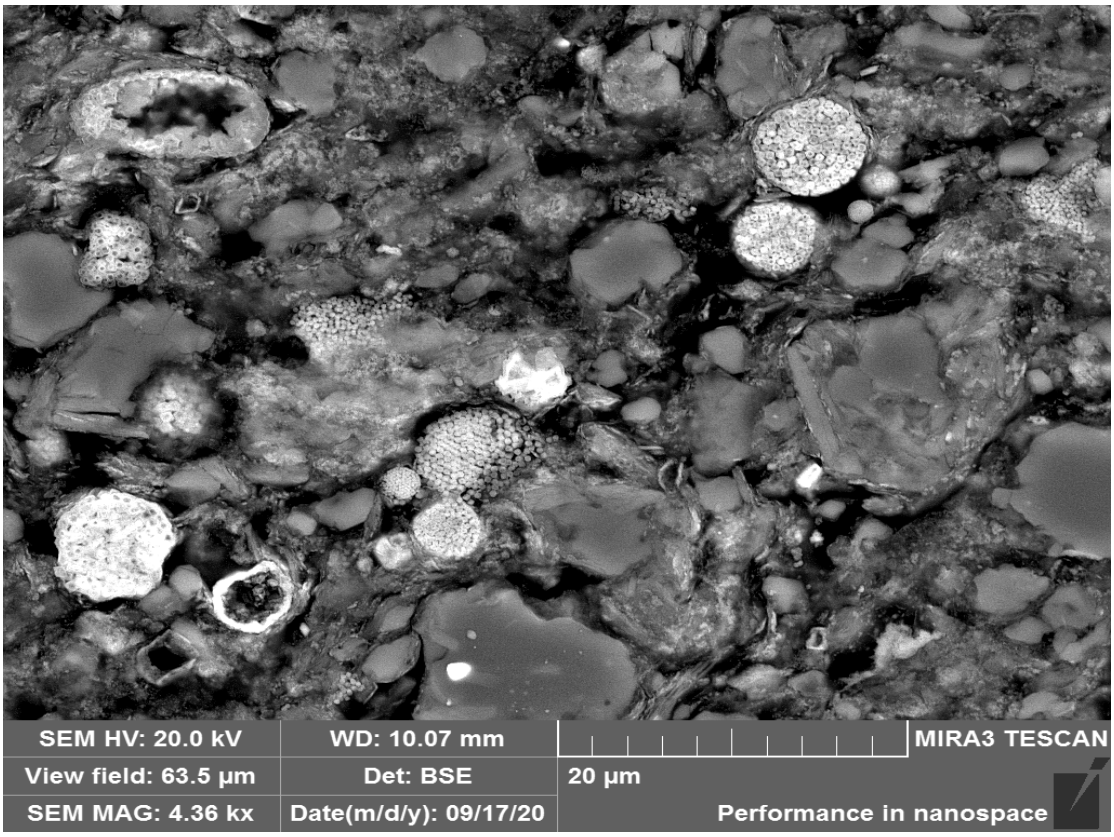
Client Sample No.: **AECOM-CONTROL -+2 – 073020**
Backscatter image of dolomite with bright Mn rich rinds – 1,200X



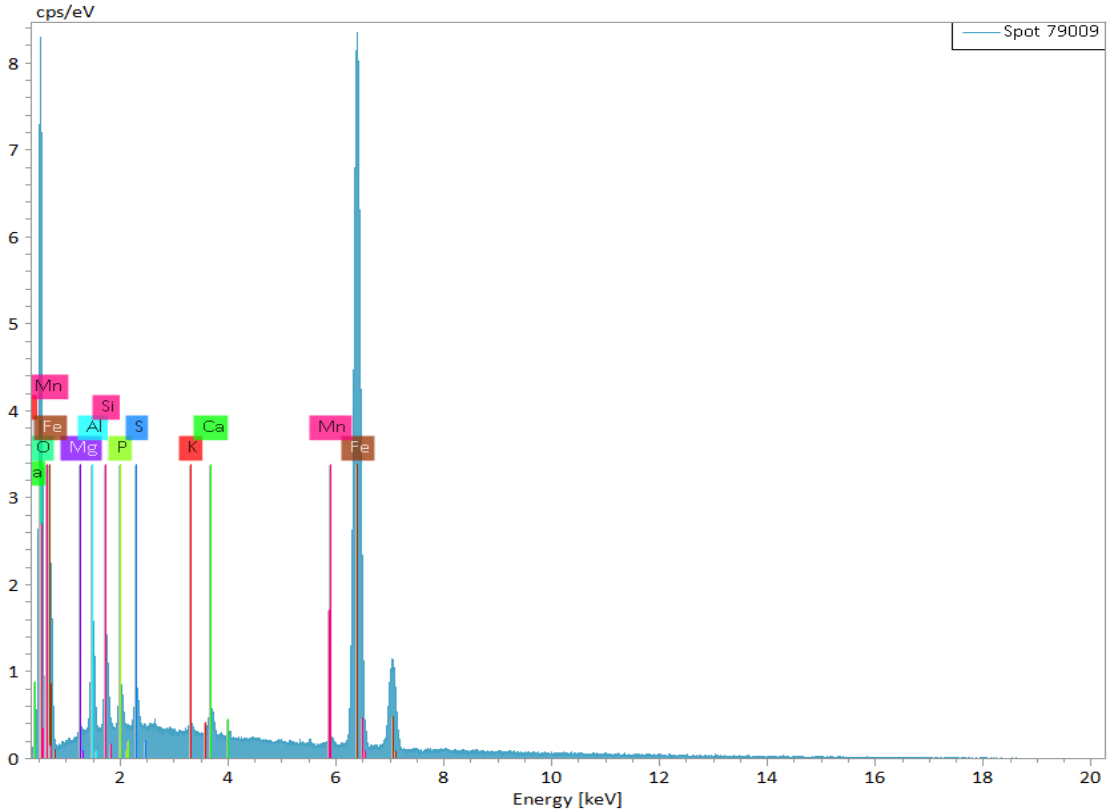


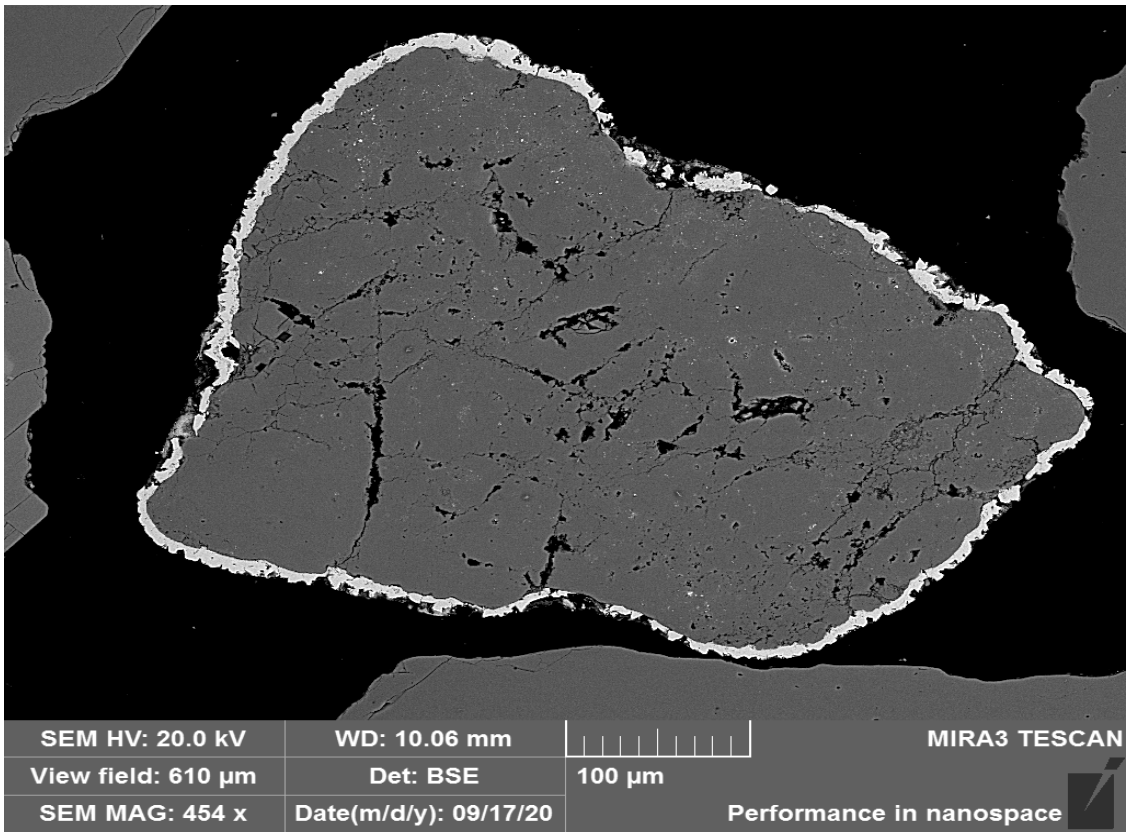
Client Sample No.: **AECOM-CONTROL -+2 – 073020**
Backscatter image of bright iron oxide attached to quartz – 629X





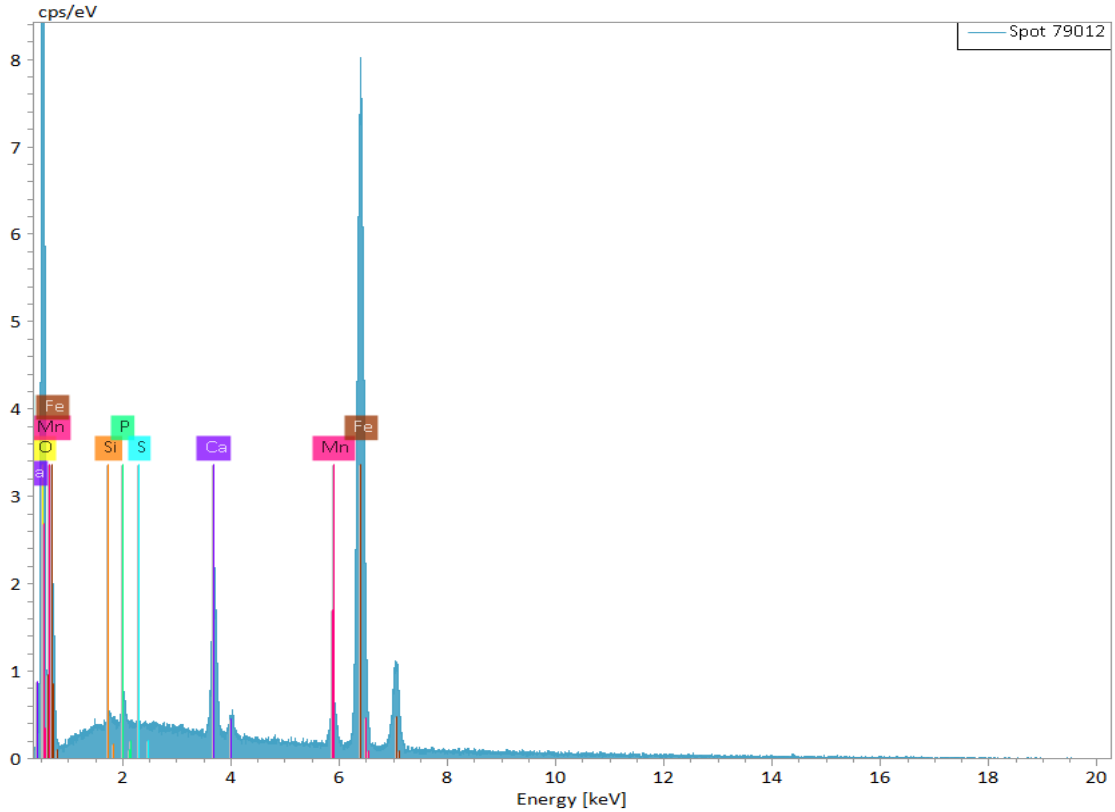
Client Sample No.: **AECOM-CONTROL -+2 – 073020**
Backscatter image of goethite replaced pyrite framboids – 4,360X

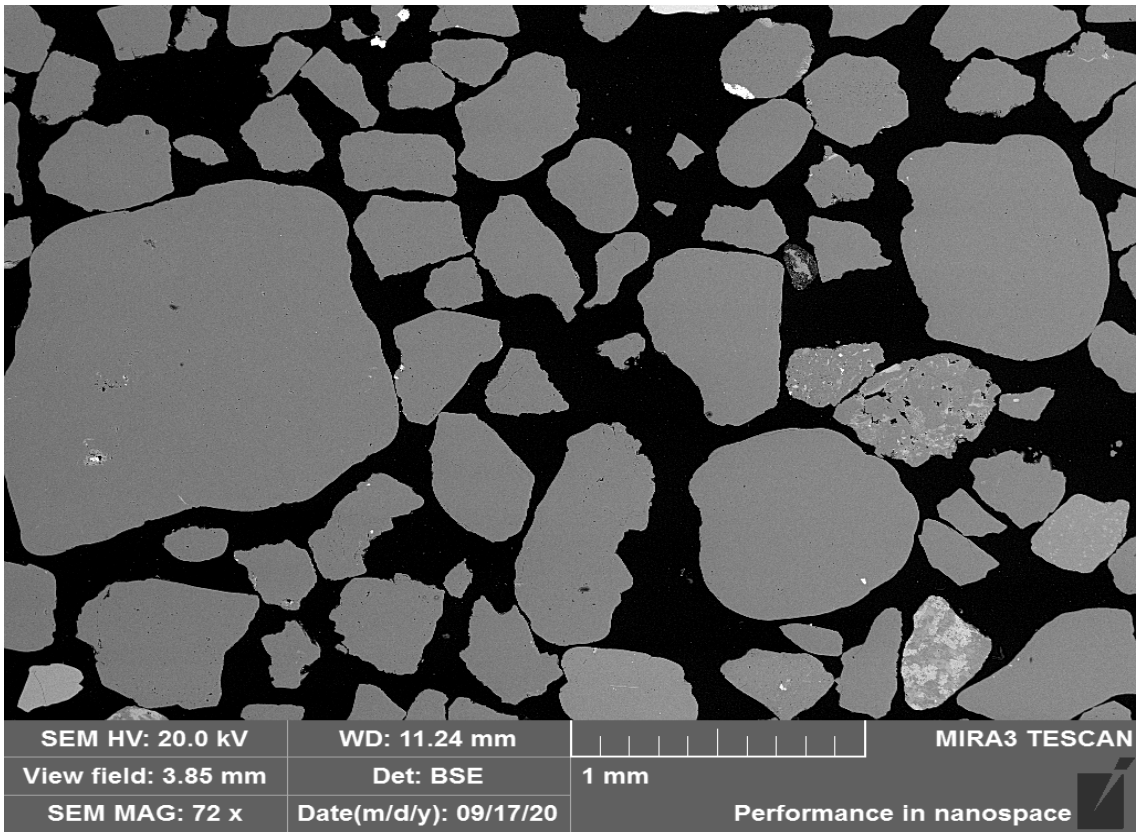




Client Sample No.: **AECOM-CONTROL -+2 – 073020**

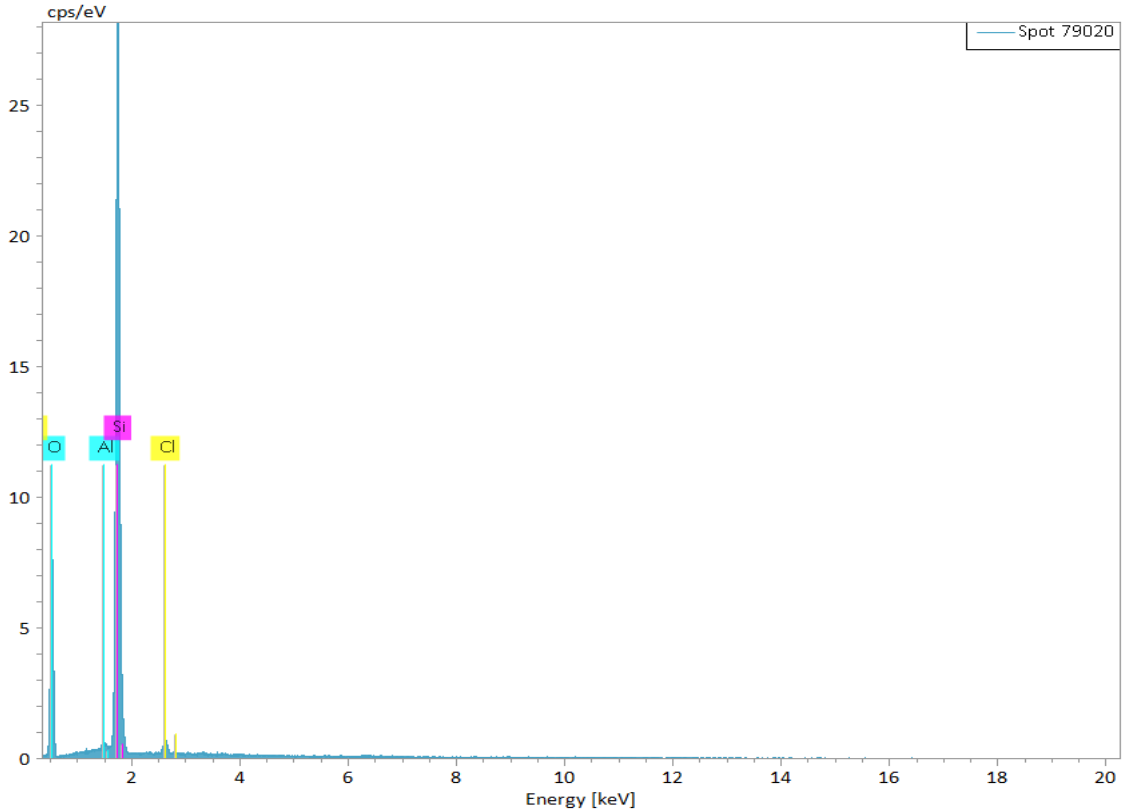
Backscatter image of a quartz grain with continuous rind of iron oxide – 454X





Client Sample No.: **AECOM-CONTROL -+2 – 073020**

Low magnification backscatter image showing grain morphology and size variation – 72X



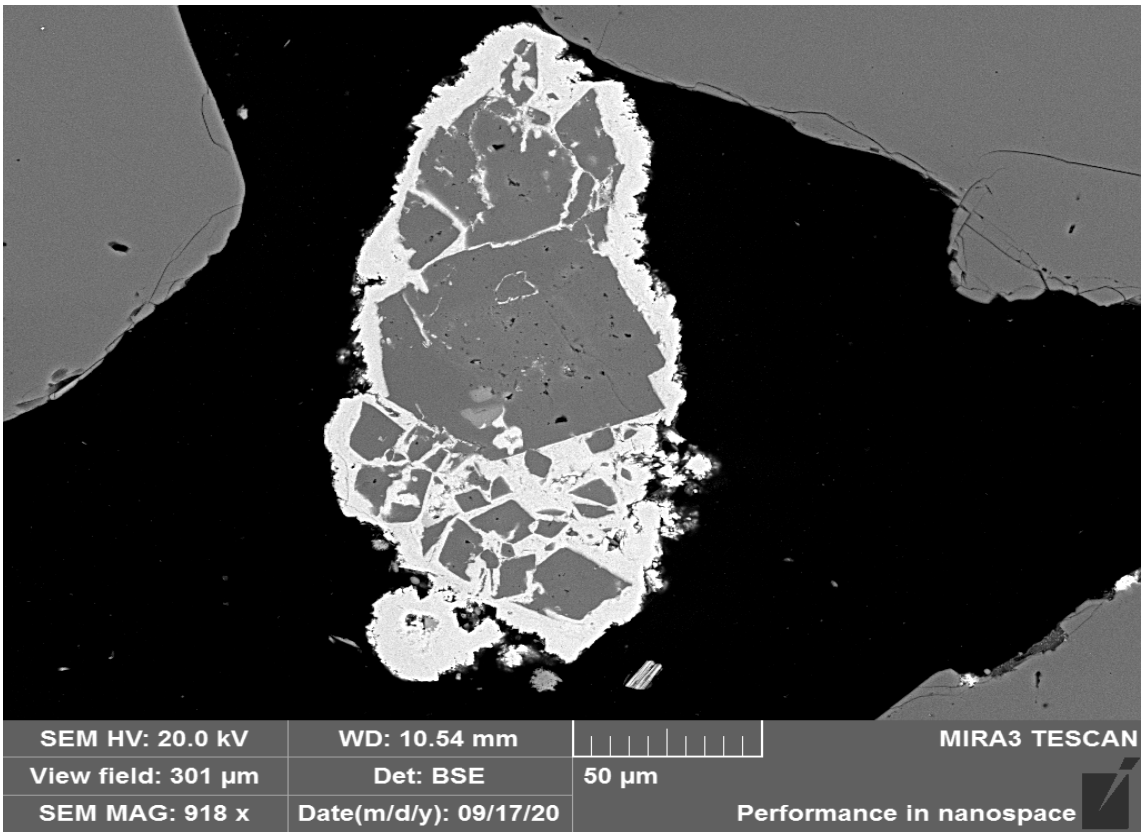
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**

Major Mineralogy by XRD: Quartz 61%, Plagioclase 14% K-spar 13% Mica 4% Chlorite 3% Amphibole 3%

Trace Mineralogy by FE-SEM: Goethite/Hematite, Zircon, Rare Earth Phosphates, Apatite, Calcite/Dolomite, Apatite, Zircon, Clay (undifferentiated) Rutile, Ilmenite, Magnetite, Gypsum

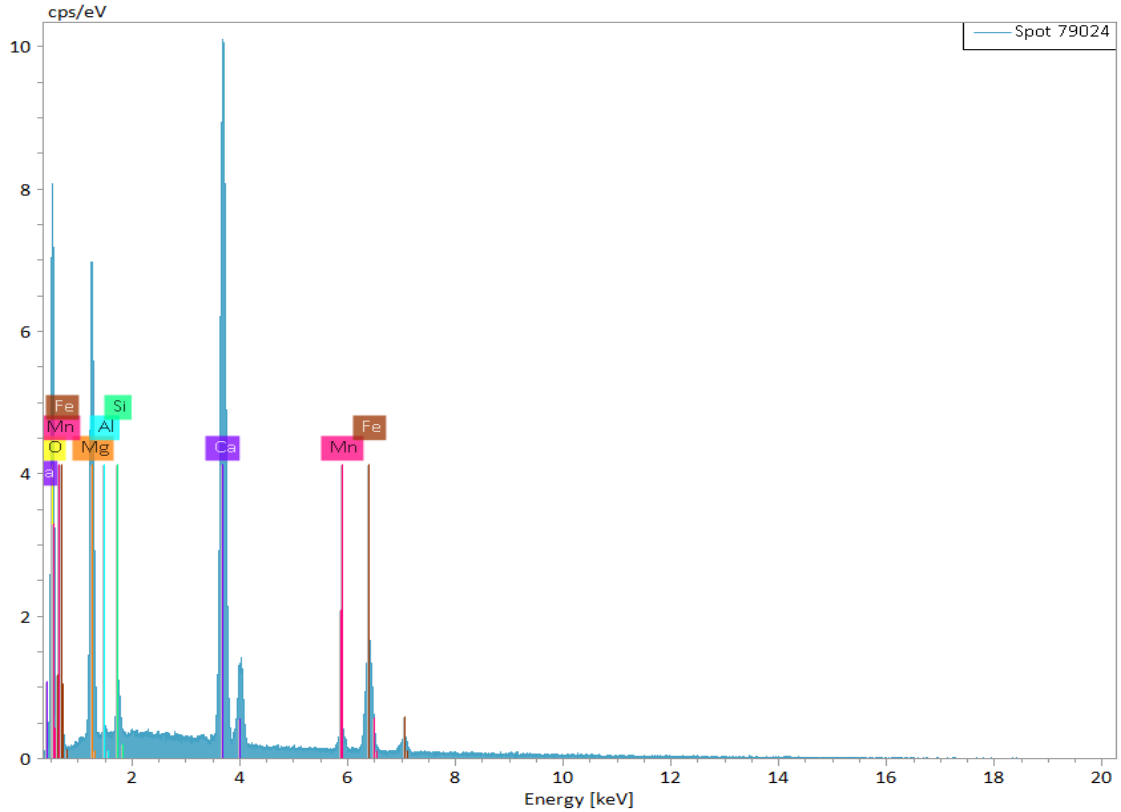
Microscopic Description by FE-SEM

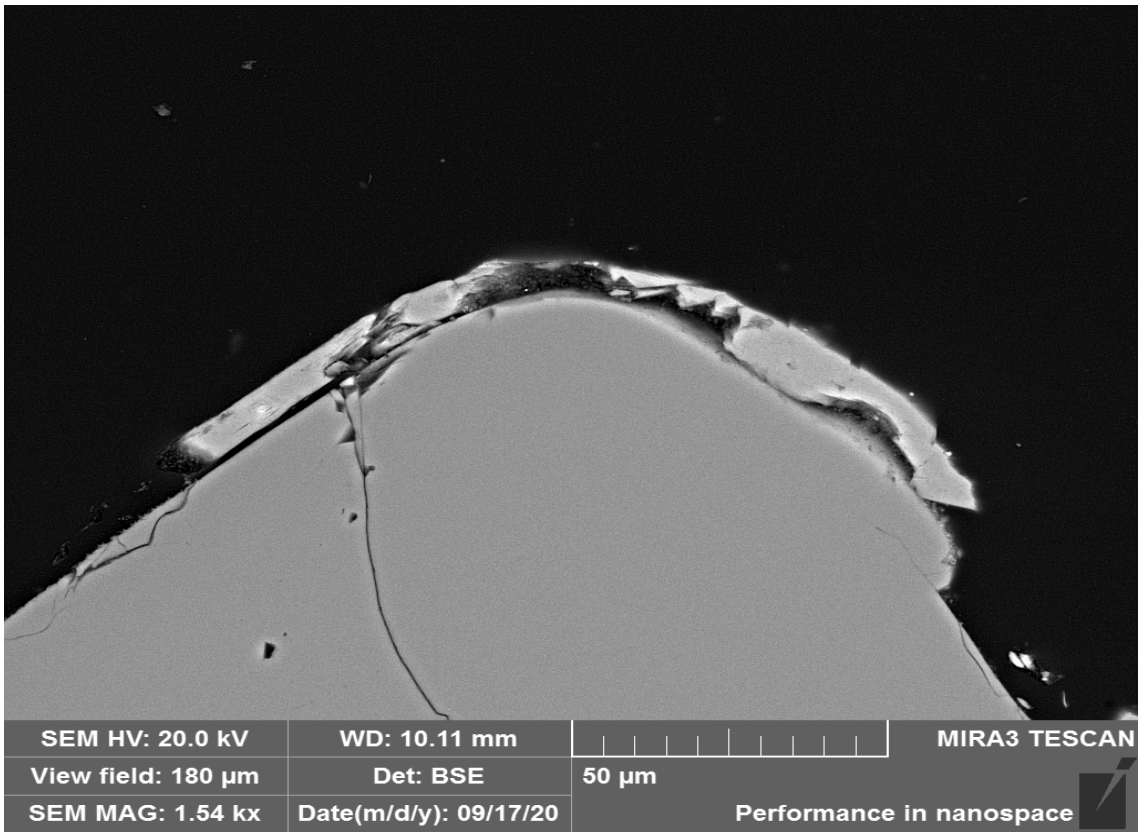
This sample a fine to coarse grained, brown colored unconsolidated sand and is essentially the same as the previous samples. XRD and FE-SEM identify the main phases as subrounded to rounded quartz/feldspar with lesser amounts of mica and amphibole. In thin section a minor population of the clasts shows coatings of secondary phases. Most common is calcite/dolomite with fairly thick coats of iron oxide. Iron oxide also occurs as thin coats on silicates and as liberated masses. In rock fragments with significant clay content, goethite pseudomorphs after pyrite cubes and pyrite framboids are common. A few rare quartz grains show discontinuous rinds of secondary gypsum.



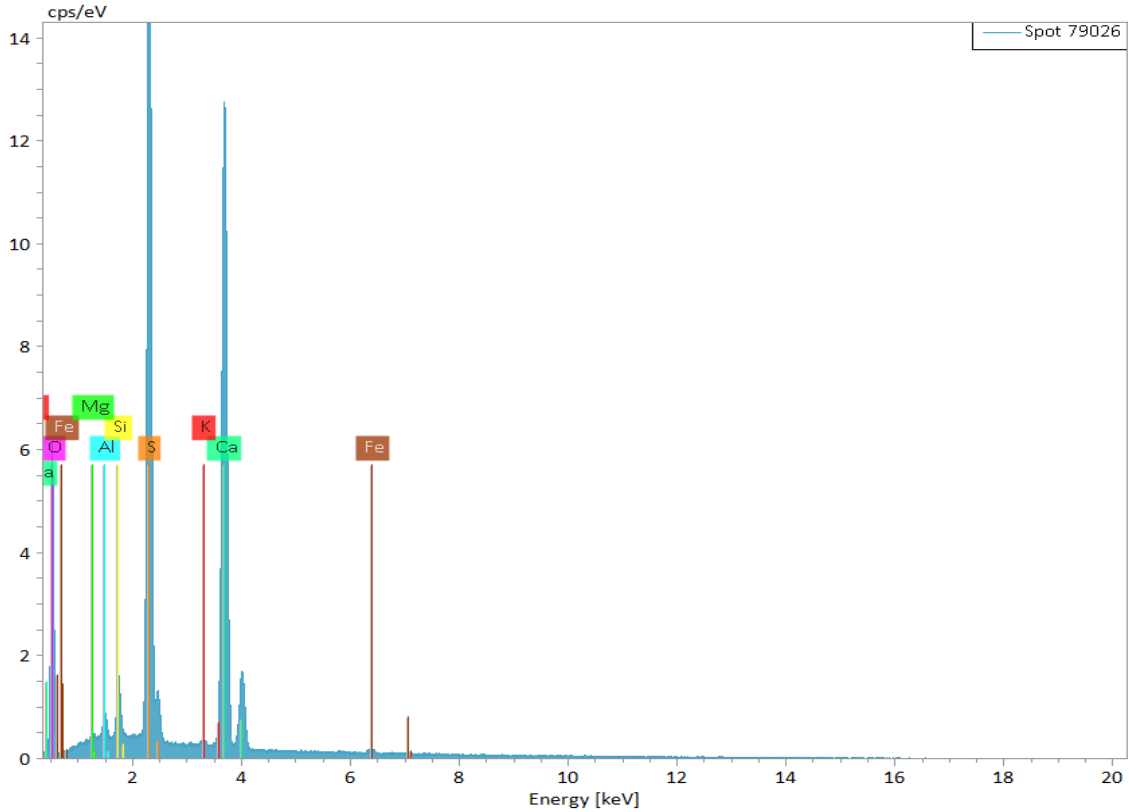
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**

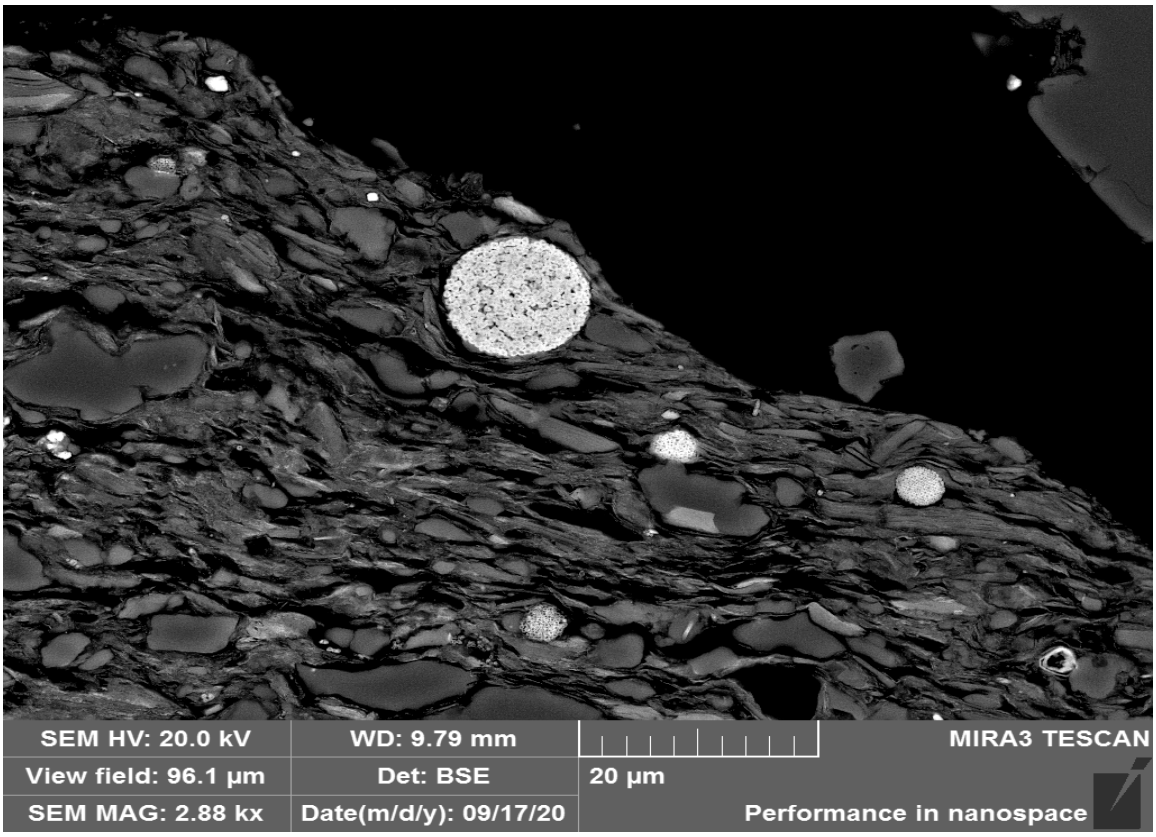
Backscatter image of dolomite cemented by secondary iron oxide – 918X



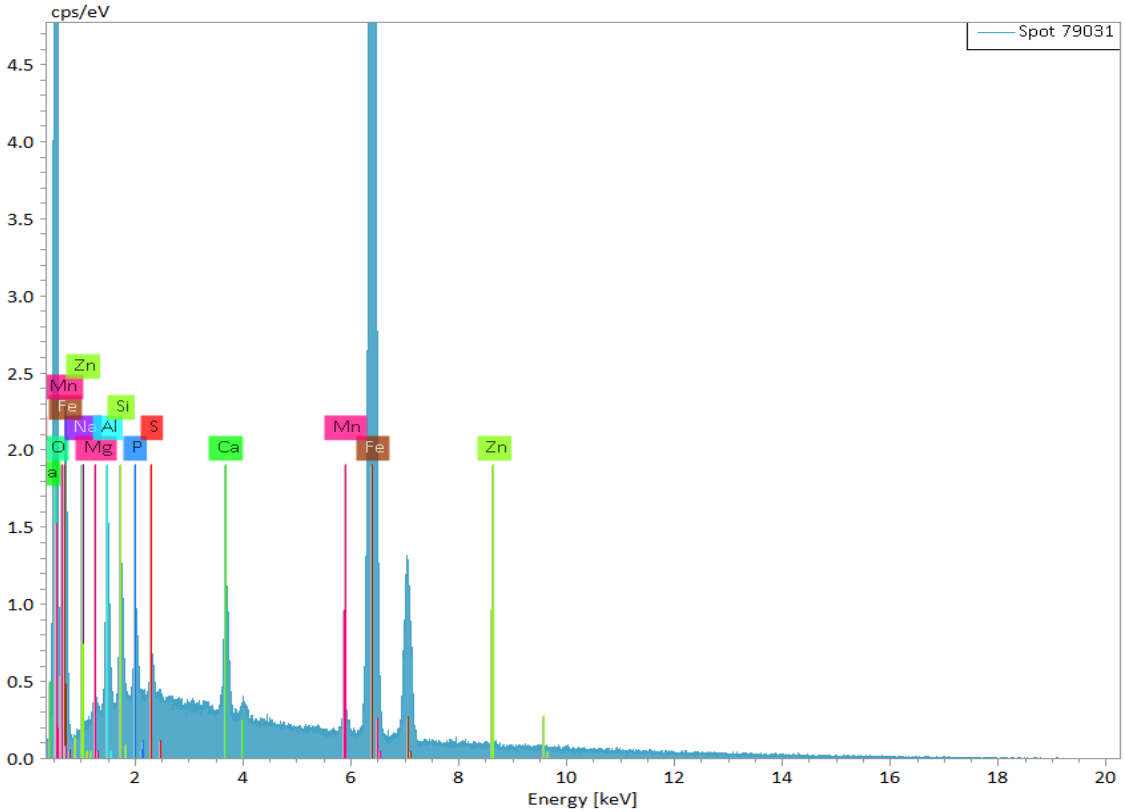


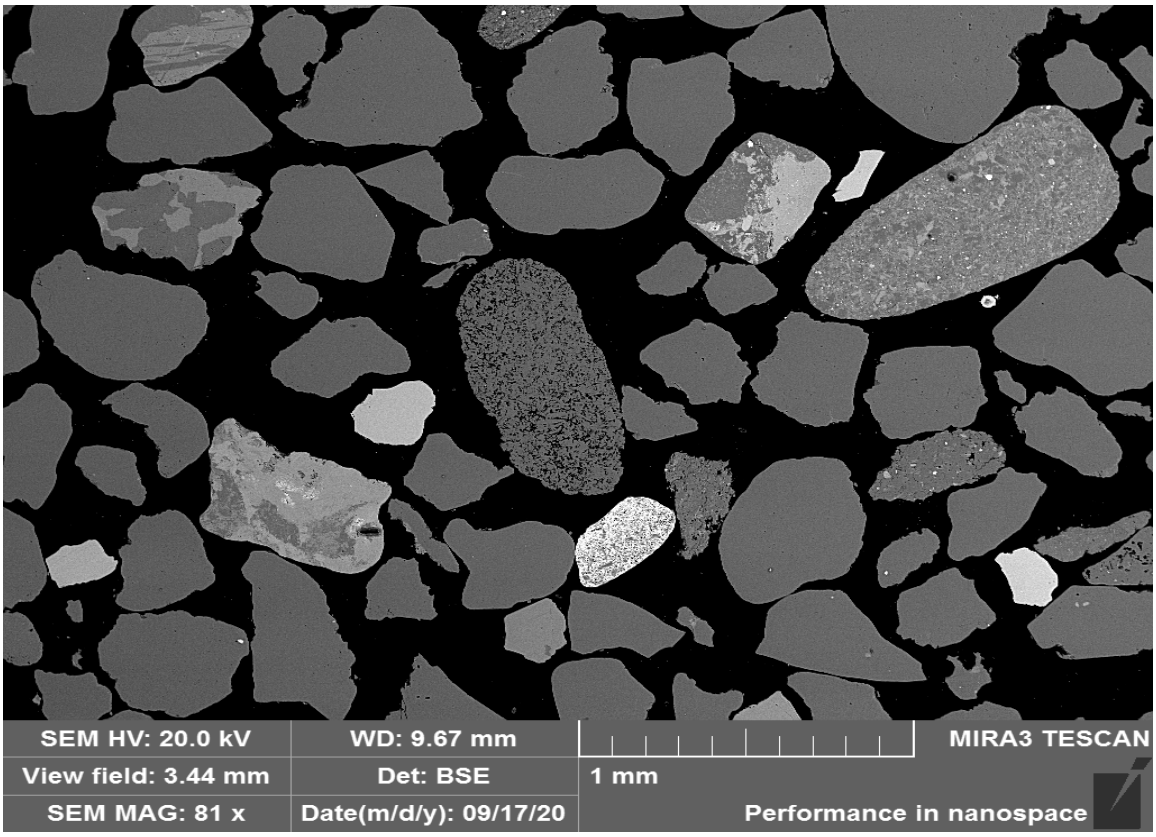
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**
Backscatter image of quartz with a rind of secondary gypsum – 1,540X





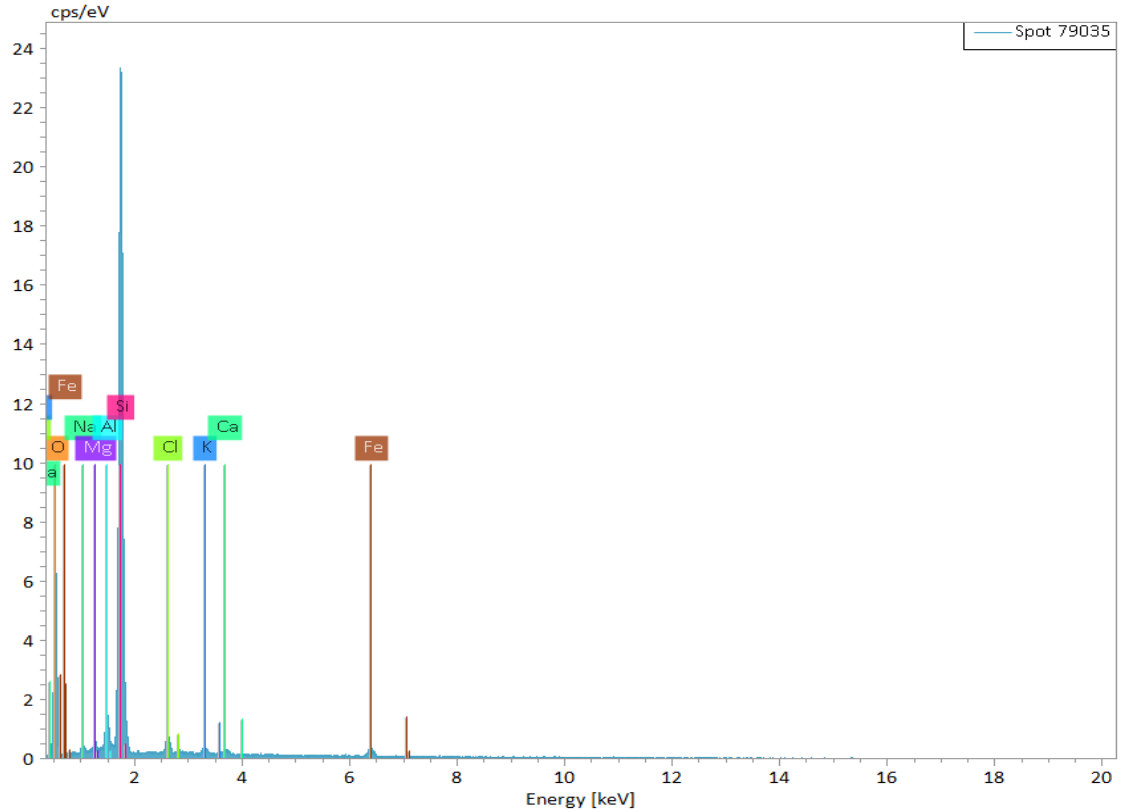
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**
Backscatter image of goethite replaced pyrite framboids – 2,880X

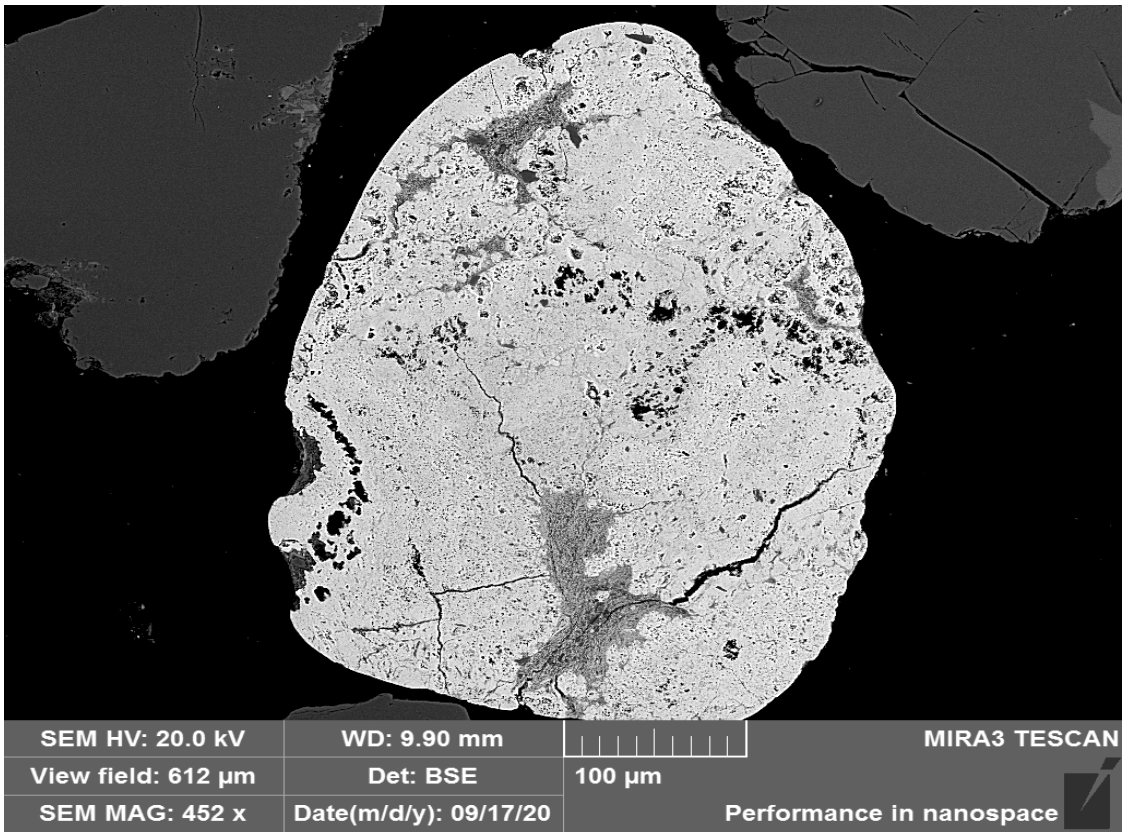




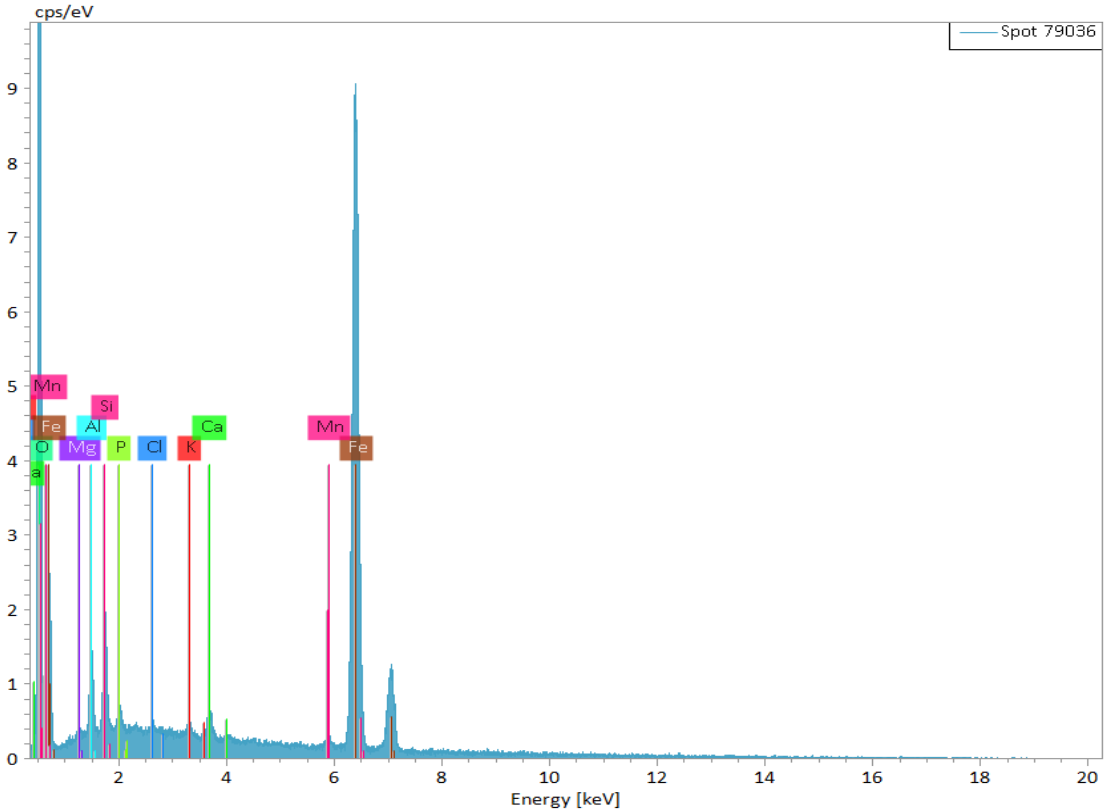
Client Sample No.: **AECOM-Hi CAL -+2 – 073020**

Low magnification backscatter image showing grain morphology and size variation – 81X





Client Sample No.: **AECOM-Hi CAL -+2 – 073020**
Backscatter image of a large iron oxide mass – 452X



12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033 (303) 463-8270

Semi-Quantitative X-Ray Diffraction Analysis

Client:
AECOM
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560

Analysis Date:	3-20-20
Reporting Date:	4-10-20
Receipt Date:	3-17-20
Client Job No.:	60621225
Project Title:	NRS Treatability Study
DCMSL Project:	AECOM5

Client Sample No.:	**GAF-SB-NRS069-40-50-03092020**	**GAF-SB-NRS070-50-60-03102020**	**GAF-SB-NRS068-40-58-03122020**
Bulk Sample			
Quartz	48	43	26
Goethite	<2*	<2*	<2*
K-Feldspar	-	-	<2*
Total Clay	52	57	74
Illite	33	37	53
Kaolinite	19	20	21
Chlorite	<2*	<2*	<2*

*May be present

The bulk sample(s) was/were spiked with corundum, prepared for x-ray diffraction analysis and scanned over a range of 3º to 40º 2θ Cu Kα radiation, 40kV, 25mA. Mineral phases were identified with the aid of computer-assisted programs accessing a powder diffraction database. Estimates of mineral concentrations are based on relative peak heights and reference intensity ratios (RIR) measured in-house.

12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033 (303) 463-8270

Semi-Quantitative X-Ray Diffraction Analysis

Client:
AECOM
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560

Analysis Date:	3-20-20
Reporting Date:	4-10-20
Receipt Date:	3-17-20
Client Job No.:	60621225
Project Title:	NRS Treatability Study
DCMSL Project:	AECOM5

Client Sample No.:	**GAF-SB-NRS069-40-50-03092020**	**GAF-SB-NRS070-50-60-03102020**	**GAF-SB-NRS068-40-58-03122020**
Clay Fraction <2µm			
Illite	63	65	71
Kaolinite	37	35	29
Chlorite	<2*	<2*	<2*

*May be present

An oriented clay mount (<2µm) was prepared for x-ray diffraction analysis and scanned over a range of 3° to 40° 2θ Cu Ka radiation, 40kV, 25mA. The mount was analyzed air-dried (RH ~25%) and glycolated. Clay concentrations are based on peak areas and intensity factors measured in-house on known standards or computer calculated.

Jason Barnes, Analyst

DCM SCIENCE LABORATORY, INC.
12421 W. 49th Avenue, Unit #6
Wheat Ridge, CO 80033

(303) 463-8270/(800) 852-7340
(303) 463-8267 – fax

Petr
inclu

Date/Time Received _____ DCMSL Group No. 0817 DCMSL Log No. AECOM5

Field Data Sheet/Chain of Custody

Samples Submitted By:
Company: AECOM
Address: 1600 PERIMETER PARK DRIVE
SUITE 400
MORRISVILLE, NC 27560
Contact: MARY STAUFFER/MICHELLE FRIEDMAN
Phone: ~~GAF-SB-NRS~~ MARY - 303-941-3756
Cell: MICHELLE - 919-461-1422
Email: ~~GAF-SB-NRS~~ MARY.[redacted]STAUFFER@AECOM.COM

Job/P.O. # 60621225

Project Title NRS TREATABILITY STUDY

Archive: Asbestos samples are archived for 6 months unless other arrangements are made. All other samples are archived for 3 months.

Turnaround Time Requested: ~~GAF-SB-NRS~~ MICHELLE.FRIEDMAN@AECOM.COM
(X) Standard (3 to 5 Business Days)
[ ] 24 Hour Rush
[ ] 2 Hour Rush (Asbestos Only)
[ ] Other _____

Procedure Requested:

ASBESTOS			DUST & SILICA		OTHER SERVICES	
Bulk	[ ]	Standard EPA	[ ]	Silica – Air NIOSH 7500	[ ]	Optical Microscopy
	[ ]	Progressive	[ ]	Silica – Bulk	[X]	X-ray Diffraction – Scan/Search
	[ ]	Point Count	[ ]	Silica – Bulk Respirable	[X]	X-ray Diffraction – Clay/Bulk
	[ ]	Other	[ ]	Dust – NIOSH 0500/0600	[ ]	SEM
Air	[ ]	NIOSH 7400	**Other Analysis:**			
	[ ]	OSHA ID-160				
	[ ]	Other				

Client Sample No.:	Sample Date	Air Volume	Other Information
1 GAF-SB-NRS069-40-50-03092020	3/9/20		
2 GAF-SB-NRS070-50-60-03102020	3/10/20		
3 GAF-SB-NRS068-40-58-03122020	3/12/20		
4			
5			
6			
7			
8			
9			
10			

Relinquished By:	Date/Time	Received By:	Date/Time
	3/13/20 1000		3/17/20 11:30

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-110724-1
Laboratory Sample Delivery Group: GAF-NRS-Treatability
Client Project/Site: TVA Gallatin EIP

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
9/18/2020 10:07:04 AM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Case Narrative

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

Job ID: 180-110724-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-110724-1

Receipt
The sample was received on 9/10/2020 9:30 AM; the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.5º C.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-110724-1	GAF-GW-COL1-GW-BL	Water	09/09/20 14:00	09/10/20 09:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-COL1-GW-BL

Date Collected: 09/09/20 14:00
Date Received: 09/10/20 09:30

Lab Sample ID: 180-110724-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	329718	09/15/20 09:28	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			330131	09/17/20 02:09	DSH	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KHM = Kyle Mucroski

Batch Type: Analysis

DSH = David Heakin

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-110724-1
SDG: GAF-NRS-Treatability

Client Sample ID: GAF-GW-COL1-GW-BL

Date Collected: 09/09/20 14:00
Date Received: 09/10/20 09:30

Lab Sample ID: 180-110724-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00419		0.00100	0.000217	mg/L		09/15/20 09:28	09/17/20 02:09	1
Beryllium	0.0125		0.00100	0.000182	mg/L		09/15/20 09:28	09/17/20 02:09	1
Nickel	0.148		0.00100	0.000336	mg/L		09/15/20 09:28	09/17/20 02:09	1
Lithium	0.131		0.00500	0.00339	mg/L		09/15/20 09:28	09/17/20 02:09	1

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

Lab Sample ID: MB 180-329718/1-A
Matrix: Water
Analysis Batch: 330131

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 329718

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		09/15/20 09:28	09/17/20 02:02	1
Beryllium	ND		0.00100	0.000182	mg/L		09/15/20 09:28	09/17/20 02:02	1
Nickel	ND		0.00100	0.000336	mg/L		09/15/20 09:28	09/17/20 02:02	1
Lithium	ND		0.00500	0.00339	mg/L		09/15/20 09:28	09/17/20 02:02	1

Lab Sample ID: LCS 180-329718/2-A
Matrix: Water
Analysis Batch: 330131

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 329718

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.5035		mg/L		101	80 - 120
Beryllium	0.500	0.5243		mg/L		105	80 - 120
Nickel	0.500	0.5072		mg/L		101	80 - 120
Lithium	0.500	0.5017		mg/L		100	80 - 120

Lab Sample ID: 180-110724-1 MS
Matrix: Water
Analysis Batch: 330131

Client Sample ID: GAF-GW-COL1-GW-BL
Prep Type: Total Recoverable
Prep Batch: 329718

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.00419		0.500	0.5292		mg/L		105	75 - 125
Beryllium	0.0125		0.500	0.5488		mg/L		107	75 - 125
Nickel	0.148		0.500	0.6723		mg/L		105	75 - 125
Lithium	0.131		0.500	0.6479		mg/L		103	75 - 125

Lab Sample ID: 180-110724-1 MSD
Matrix: Water
Analysis Batch: 330131

Client Sample ID: GAF-GW-COL1-GW-BL
Prep Type: Total Recoverable
Prep Batch: 329718

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.00419		0.500	0.5202		mg/L		103	75 - 125	2	20
Beryllium	0.0125		0.500	0.5381		mg/L		105	75 - 125	2	20
Nickel	0.148		0.500	0.6578		mg/L		102	75 - 125	2	20
Lithium	0.131		0.500	0.6406		mg/L		102	75 - 125	1	20

Metals

Prep Batch: 329718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-110724-1	GAF-GW-COL1-GW-BL	Total Recoverable	Water	3005A	
MB 180-329718/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-329718/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-110724-1 MS	GAF-GW-COL1-GW-BL	Total Recoverable	Water	3005A	
180-110724-1 MSD	GAF-GW-COL1-GW-BL	Total Recoverable	Water	3005A	

Analysis Batch: 330131

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-110724-1	GAF-GW-COL1-GW-BL	Total Recoverable	Water	EPA 6020A	329718
MB 180-329718/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	329718
LCS 180-329718/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	329718
180-110724-1 MS	GAF-GW-COL1-GW-BL	Total Recoverable	Water	EPA 6020A	329718
180-110724-1 MSD	GAF-GW-COL1-GW-BL	Total Recoverable	Water	EPA 6020A	329718

Chain of Custody Record

420681 eurofins | Environment Testing TestAmerica

Address: 301 Alpha Dr. Pittsburgh, PA 15238

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig MacPhee	Site Contact: Francisco Barajas	Date: 9/9/20	COC No:
Company Name: Environmental Standards	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☑ WORKING DAYS			For Lab Use Only:
Phone: 610. 935. 5577 x 414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☑ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
P O #	☐ 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)	6020 totals - Be, Cd, Li, N	Sample Specific Notes:
GAF-GW-Col 1 - GW - BL	9/9/20	1400	G	GW	1	N	N	✓	Be, Cd, Li, N only



Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ | 4

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:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	9/9/20 1600			9/10/20 930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:


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Environment Testing
TestAmerica
ORIGIN ID:PHDA (512
FRANCISCO BARAJAS
AECOM
9400 AMBERGLE
BUILDING D
AUSTUN, TX 787
UNITED STATES
E: 28FEB20
10.00 LB MAN
071/CAFE3311
1570
09.10
TO
EUROFINS
PITTSBURGH
301 ALPHA
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58963
RMA:
FedEx
Expres
E
FedEx
TRK# 0221 1680 3500 1570
THU - 10 SEP 10:30
PRIORITY OVERNIGHT
XH AGCA
15238
PA-US
PIT
PT-WI-SR-001 effective 7/26/13
Uncorrected temp 4.5 °C
Thermometer ID 14
CF 0 Initials B
FID: 1711129 09Sep2020 MMRA 56DG6/1545/05A2
180-110724 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-110724-1
SDG Number: GAF-NRS-Treatability

Login Number: 110724
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-112598-1
Laboratory Sample Delivery Group: GAF NRS Treatability
Client Project/Site: TVA GAF EIP

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
10/29/2020 11:19:32 AM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Job ID: 180-112598-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-112598-1

Receipt
The sample was received on 10/21/2020 9:00 AM; the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.6º C.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-112598-1	GAF-GW-HICAL-STAGE 1-PV4-68-70HRS	Water	09/12/20 14:00	10/21/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-HICAL-STAGE 1-PV4-68-70HRS

Lab Sample ID: 180-112598-1

Date Collected: 09/12/20 14:00

Matrix: Water

Date Received: 10/21/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	334405	10/22/20 15:33	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			335021	10/27/20 11:12	RSK	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	334405	10/22/20 15:33	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			334776	10/26/20 13:46	RJR	TAL PIT
	Instrument ID: NEMO									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

TJO = Tyler Oliver

Batch Type: Analysis

RJR = Ron Rosenbaum

RSK = Robert Kurtz

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-HICAL-STAGE 1-PV4-68-70HRS

Lab Sample ID: 180-112598-1

Date Collected: 09/12/20 14:00
Matrix: Water
Date Received: 10/21/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000362	J	0.00100	0.000217	mg/L		10/22/20 15:33	10/26/20 13:46	1
Beryllium	0.000280	J	0.00100	0.000182	mg/L		10/22/20 15:33	10/26/20 13:46	1
Nickel	0.00589		0.00100	0.000336	mg/L		10/22/20 15:33	10/26/20 13:46	1
Lithium	0.0151		0.00500	0.00339	mg/L		10/22/20 15:33	10/27/20 11:12	1

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

Lab Sample ID: MB 180-334405/1-A
Matrix: Water
Analysis Batch: 334776

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 334405

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		10/22/20 15:33	10/26/20 13:39	1
Beryllium	ND		0.00100	0.000182	mg/L		10/22/20 15:33	10/26/20 13:39	1
Nickel	ND		0.00100	0.000336	mg/L		10/22/20 15:33	10/26/20 13:39	1

Lab Sample ID: MB 180-334405/1-A
Matrix: Water
Analysis Batch: 335021

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 334405

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		0.00500	0.00339	mg/L		10/22/20 15:33	10/27/20 11:02	1

Lab Sample ID: LCS 180-334405/2-A
Matrix: Water
Analysis Batch: 334776

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 334405

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.5108		mg/L		102	80 - 120
Beryllium	0.500	0.4728		mg/L		95	80 - 120
Nickel	0.500	0.4723		mg/L		94	80 - 120

Lab Sample ID: LCS 180-334405/2-A
Matrix: Water
Analysis Batch: 335021

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 334405

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.500	0.4958		mg/L		99	80 - 120

Lab Sample ID: LCSD 180-334405/3-A
Matrix: Water
Analysis Batch: 334776

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 334405

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.500	0.5197		mg/L		104	80 - 120	2	20
Beryllium	0.500	0.4921		mg/L		98	80 - 120	4	20
Nickel	0.500	0.4821		mg/L		96	80 - 120	2	20

Lab Sample ID: LCSD 180-334405/3-A
Matrix: Water
Analysis Batch: 335021

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 334405

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	0.500	0.4984		mg/L		100	80 - 120	1	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF EIP

Job ID: 180-112598-1
SDG: GAF NRS Treatability

Metals

Prep Batch: 334405

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-112598-1	GAF-GW-HICAL-STAGE 1-PV4-68-70HRS	Total Recoverable	Water	3005A	
MB 180-334405/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-334405/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 180-334405/3-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	

Analysis Batch: 334776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-112598-1	GAF-GW-HICAL-STAGE 1-PV4-68-70HRS	Total Recoverable	Water	EPA 6020A	334405
MB 180-334405/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	334405
LCS 180-334405/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	334405
LCSD 180-334405/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	334405

Analysis Batch: 335021

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-112598-1	GAF-GW-HICAL-STAGE 1-PV4-68-70HRS	Total Recoverable	Water	EPA 6020A	334405
MB 180-334405/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	334405
LCS 180-334405/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	334405
LCSD 180-334405/3-A	Lab Control Sample Dup	Total Recoverable	Water	EPA 6020A	334405

Page 1 of 1

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

☑ Almgren Drive
Agawam, MA 01001
(413) 789-9018

☐ 646 Camp Avenue
N. Kingstown, RI 02852
(401) 732-3400

Special Handling:

☑ TAT - Date Needed: 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

List Preservative Code below: 4

QA/QC Reporting Notes:

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2=

G= Grab C=Compsite

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic		6020 Totals -Be, Cd, Li, Ni								
	GAF-GW-HiCal-Stage 1-PV4-68-70hrs	9/12/2020	2:00 PM	G	GW				1		x								

180-112598 Chain of Custody

Relinquished by:	Received by:	Date:	Time:	Temp °C
Rachel Watkins /AECOM		10/20/2020	1530	Observed
	Rachel Watkins	10-21-20	9:00	Correction Factor
	ETAPIH			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

www.EurofinsUS.com/Spectrum

Rev. Nov 2016

REF: 60621225
FedEx
180-112598 Waybill
TRK# 4842 0860 0669
WED – 21 OCT 10:30A
PRIORITY OVERNIGHT
XH AGCA
15238
PA – US
PIT
Uncorrected temp 26 °C
Thermometer ID 14
CF 0 Initials TB
PT-WI-SR-001 effective 7/26/13

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-112598-1
SDG Number: GAF NRS Treatability

Login Number: 112598
List Number: 1
Creator: Watson, Debbie

List Source: Eurofins 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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-113231-1
Client Project/Site: GAF-NRS-Treatability
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
11/24/2020 12:26:05 PM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

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Job ID: 180-113231-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-113231-1

This report was revised to update a sample ID.

Receipt
The samples were received on 11/5/2020 8:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 7.3º C.

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

Definitions/Glossary

Client: Environmental Standards Inc. Job ID: 180-113231-1
Project/Site: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc. Job ID: 180-113231-1
Project/Site: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-113231-1	GAF-GW-COL2-4.6PV	Water	10/30/20 12:40	11/05/20 08:30	
180-113231-2	GAF-GW-COL2-5.6PV	Water	10/31/20 07:20	11/05/20 08:30	
180-113231-3	GAF-GW-COL2-6.6PV	Water	11/01/20 01:00	11/05/20 08:30	
180-113231-4	GAF-GW-COL2-8PV	Water	11/01/20 18:20	11/05/20 08:30	
180-113231-5	GAF-GW-COL2-8.7PV	Water	11/02/20 14:30	11/05/20 08:30	
180-113231-6	GAF-GW-COL2-9.8PV	Water	11/03/20 06:00	11/05/20 08:30	
180-113231-7	GAF-GW-COL2-PV10	Water	11/02/20 21:10	11/05/20 08:30	
180-113231-8	GAF-GW-COL2-10.3PV	Water	11/03/20 16:30	11/05/20 08:30	
180-113231-9	GAF-GW-COL2-11PV	Water	11/03/20 23:40	11/05/20 08:30	
180-113231-10	GAF-GW-COL2-11.9PV	Water	11/04/20 10:40	11/05/20 08:30	
180-113231-11	GAF-GW-COL1-PV10	Water	11/02/20 21:10	11/05/20 08:30	
180-113231-12	GAF-GW-COL1-10.3PV	Water	11/03/20 06:00	11/05/20 08:30	
180-113231-13	GAF-GW-COL1-10.8PV	Water	11/03/20 16:30	11/05/20 08:30	
180-113231-14	GAF-GW-COL1-11.4PV	Water	11/03/20 23:40	11/05/20 08:30	
180-113231-15	GAF-GW-COL1-11.9PV	Water	11/04/20 10:40	11/05/20 08:30	
180-113231-16	GAF-GW-COL2-BL	Water	10/27/20 14:00	11/05/20 08:30	
180-113231-17	GAF-GW-COL2-PV0	Water	10/27/20 16:00	11/05/20 08:30	
180-113231-18	GAF-GW-COL2-PV1	Water	10/28/20 09:03	11/05/20 08:30	
180-113231-19	GAF-GW-COL2-PV2	Water	10/28/20 23:05	11/05/20 08:30	
180-113231-20	GAF-GW-COL2-PV3	Water	10/29/20 17:00	11/05/20 08:30	
180-113231-21	GAF-GW-COL1-BL	Water	10/27/20 14:00	11/05/20 08:30	
180-113231-22	GAF-GW-COL1-PV0	Water	10/27/20 16:00	11/05/20 08:30	
180-113231-23	GAF-GW-COL1-PV1	Water	10/28/20 09:03	11/05/20 08:30	
180-113231-24	GAF-GW-COL1-PV2	Water	10/28/20 23:05	11/05/20 08:30	
180-113231-25	GAF-GW-COL1-PV3.2	Water	10/29/20 17:00	11/05/20 08:30	
180-113231-26	GAF-GW-COL1-4.6PV	Water	10/30/20 12:40	11/05/20 08:30	
180-113231-27	GAF-GW-COL1-5.8PV	Water	10/31/20 07:20	11/05/20 08:30	
180-113231-28	GAF-GW-COL1-6.9PV	Water	11/01/20 01:00	11/05/20 08:30	
180-113231-29	GAF-GW-COL1-PV8.0	Water	11/01/20 18:40	11/05/20 08:30	
180-113231-30	GAF-GW-COL1-9.2PV	Water	11/02/20 13:56	11/05/20 08:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-4.6PV
Lab Sample ID: 180-113231-1
Date Collected: 10/30/20 12:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:23	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-5.6PV
Lab Sample ID: 180-113231-2
Date Collected: 10/31/20 07:20
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:26	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-6.6PV
Lab Sample ID: 180-113231-3
Date Collected: 11/01/20 01:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:28	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-8PV
Lab Sample ID: 180-113231-4
Date Collected: 11/01/20 18:20
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:31	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-8.7PV
Lab Sample ID: 180-113231-5
Date Collected: 11/02/20 14:30
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:34	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-9.8PV

Lab Sample ID: 180-113231-6
Date Collected: 11/03/20 06:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:36	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-PV10

Lab Sample ID: 180-113231-7
Date Collected: 11/02/20 21:10
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:39	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-10.3PV

Lab Sample ID: 180-113231-8
Date Collected: 11/03/20 16:30
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:41	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-11PV

Lab Sample ID: 180-113231-9
Date Collected: 11/03/20 23:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:49	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-11.9PV

Lab Sample ID: 180-113231-10
Date Collected: 11/04/20 10:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:51	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV10

Lab Sample ID: 180-113231-11
Date Collected: 11/02/20 21:10
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:54	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-10.3PV

Lab Sample ID: 180-113231-12
Date Collected: 11/03/20 06:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:57	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-10.8PV

Lab Sample ID: 180-113231-13
Date Collected: 11/03/20 16:30
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 13:59	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-11.4PV

Lab Sample ID: 180-113231-14
Date Collected: 11/03/20 23:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:02	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-11.9PV

Lab Sample ID: 180-113231-15
Date Collected: 11/04/20 10:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:04	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-BL
Lab Sample ID: 180-113231-16
Date Collected: 10/27/20 14:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:07	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-PV0
Lab Sample ID: 180-113231-17
Date Collected: 10/27/20 16:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:09	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-PV1
Lab Sample ID: 180-113231-18
Date Collected: 10/28/20 09:03
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:12	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-PV2
Lab Sample ID: 180-113231-19
Date Collected: 10/28/20 23:05
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:30	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL2-PV3
Lab Sample ID: 180-113231-20
Date Collected: 10/29/20 17:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336146	11/06/20 07:56	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:32	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-BL
Lab Sample ID: 180-113231-21
Date Collected: 10/27/20 14:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:40	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-PV0
Lab Sample ID: 180-113231-22
Date Collected: 10/27/20 16:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 14:58	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-PV1
Lab Sample ID: 180-113231-23
Date Collected: 10/28/20 09:03
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:00	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-PV2
Lab Sample ID: 180-113231-24
Date Collected: 10/28/20 23:05
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:03	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-PV3.2
Lab Sample ID: 180-113231-25
Date Collected: 10/29/20 17:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:06	RJR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-4.6PV

Lab Sample ID: 180-113231-26
Date Collected: 10/30/20 12:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:08	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-5.8PV

Lab Sample ID: 180-113231-27
Date Collected: 10/31/20 07:20
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:11	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-6.9PV

Lab Sample ID: 180-113231-28
Date Collected: 11/01/20 01:00
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:16	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-PV8.0

Lab Sample ID: 180-113231-29
Date Collected: 11/01/20 18:40
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:24	RJR	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-COL1-9.2PV

Lab Sample ID: 180-113231-30
Date Collected: 11/02/20 13:56
Matrix: Water
Date Received: 11/05/20 08:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	336147	11/06/20 07:59	KHM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			336494	11/09/20 15:26	RJR	TAL PIT
	Instrument ID: NEMO									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KHM = Kyle Mucroski

Batch Type: Analysis

RJR = Ron Rosenbaum

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-4.6PV
Date Collected: 10/30/20 12:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000296	J	0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:23	1
Beryllium	0.000492	J	0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:23	1
Nickel	0.00231		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:23	1
Lithium	0.0542		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:23	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-5.6PV
Date Collected: 10/31/20 07:20
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000248	J	0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:26	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:26	1
Nickel	0.0375		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:26	1
Lithium	0.104		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:26	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-6.6PV
Date Collected: 11/01/20 01:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00189		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:28	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:28	1
Nickel	0.184		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:28	1
Lithium	0.123		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:28	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-8PV
Date Collected: 11/01/20 18:20
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00321		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:31	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:31	1
Nickel	0.283		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:31	1
Lithium	0.128		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:31	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-8.7PV

Lab Sample ID: 180-113231-5

Date Collected: 11/02/20 14:30
Matrix: Water
Date Received: 11/05/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**0.00368**		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:34	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:34	1
Nickel	**0.339**		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:34	1
Lithium	**0.116**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:34	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-9.8PV
Date Collected: 11/03/20 06:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00340		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:36	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:36	1
Nickel	0.349		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:36	1
Lithium	0.110		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:36	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-PV10

Lab Sample ID: 180-113231-7

Date Collected: 11/02/20 21:10
Matrix: Water
Date Received: 11/05/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	**0.00360**		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:39	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:39	1
Nickel	**0.349**		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:39	1
Lithium	**0.111**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:39	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-10.3PV
Date Collected: 11/03/20 16:30
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00363		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:41	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:41	1
Nickel	0.376		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:41	1
Lithium	0.109		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:41	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-11PV
Date Collected: 11/03/20 23:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00306		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:49	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:49	1
Nickel	0.373		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:49	1
Lithium	0.108		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:49	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-11.9PV
Date Collected: 11/04/20 10:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00304		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:51	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:51	1
Nickel	0.395		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:51	1
Lithium	0.107		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:51	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV10
Date Collected: 11/02/20 21:10
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:54	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:54	1
Nickel	**0.000985**	**J**	0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:54	1
Lithium	**0.0951**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:54	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-10.3PV
Date Collected: 11/03/20 06:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-12
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:57	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:57	1
Nickel	**0.000931**	**J**	0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:57	1
Lithium	**0.108**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:57	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-10.8PV
Date Collected: 11/03/20 16:30
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:59	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:59	1
Nickel	**0.000727**	**J**	0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:59	1
Lithium	**0.125**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:59	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-11.4PV
Date Collected: 11/03/20 23:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:02	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:02	1
Nickel	**0.000676**	**J**	0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:02	1
Lithium	**0.127**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:02	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-11.9PV
Date Collected: 11/04/20 10:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:04	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:04	1
Nickel	**0.000477**	**J**	0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:04	1
Lithium	**0.132**		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:04	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-BL
Date Collected: 10/27/20 14:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-16
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00377		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:07	1
Beryllium	0.0109		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:07	1
Nickel	0.121		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:07	1
Lithium	0.123		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:07	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-PV0

Date Collected: 10/27/20 16:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-17

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:09	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:09	1
Nickel	**0.00992**		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:09	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:09	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-PV1

Date Collected: 10/28/20 09:03
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-18

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:12	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:12	1
Nickel	**0.0257**		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:12	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:12	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-PV2
Date Collected: 10/28/20 23:05
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-19
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000314	J	0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:30	1
Beryllium	0.000563	J	0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:30	1
Nickel	0.00936		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:30	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:30	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL2-PV3

Lab Sample ID: 180-113231-20

Date Collected: 10/29/20 17:00
Matrix: Water
Date Received: 11/05/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 14:32	1
Beryllium	**0.000214**	**J**	0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 14:32	1
Nickel	**0.00326**		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 14:32	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 14:32	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-BL
Date Collected: 10/27/20 14:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-21
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00434		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 14:40	1
Beryllium	0.0118		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 14:40	1
Nickel	0.137		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 14:40	1
Lithium	0.119		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 14:40	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV0
Date Collected: 10/27/20 16:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-22
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000289	J	0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 14:58	1
Beryllium	0.000659	J	0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 14:58	1
Nickel	0.00679		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 14:58	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 14:58	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV1
Date Collected: 10/28/20 09:03
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-23
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000219	J	0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:00	1
Beryllium	0.000362	J	0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:00	1
Nickel	0.0130		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:00	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:00	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV2

Lab Sample ID: 180-113231-24

Date Collected: 10/28/20 23:05
Matrix: Water
Date Received: 11/05/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:03	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:03	1
Nickel	**0.00707**		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:03	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:03	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV3.2
Date Collected: 10/29/20 17:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-25
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:06	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:06	1
Nickel	**0.00440**		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:06	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:06	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-4.6PV
Date Collected: 10/30/20 12:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-26
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:08	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:08	1
Nickel	**0.00263**		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:08	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:08	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-5.8PV

Lab Sample ID: 180-113231-27

Date Collected: 10/31/20 07:20
Matrix: Water
Date Received: 11/05/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:11	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:11	1
Nickel	**0.00174**		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:11	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:11	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-6.9PV
Date Collected: 11/01/20 01:00
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-28
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:16	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:16	1
Nickel	**0.00128**		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:16	1
Lithium	**0.0115**		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:16	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-PV8.0
Date Collected: 11/01/20 18:40
Date Received: 11/05/20 08:30

Lab Sample ID: 180-113231-29
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:24	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:24	1
Nickel	**0.00138**		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:24	1
Lithium	**0.0434**		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:24	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-113231-1

Client Sample ID: GAF-GW-COL1-9.2PV

Lab Sample ID: 180-113231-30

Date Collected: 11/02/20 13:56
Matrix: Water
Date Received: 11/05/20 08:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 15:26	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 15:26	1
Nickel	**0.000877**	**J**	0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 15:26	1
Lithium	**0.0795**		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 15:26	1

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

Lab Sample ID: MB 180-336146/1-A
Matrix: Water
Analysis Batch: 336494

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 336146

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:56	11/09/20 13:18	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:56	11/09/20 13:18	1
Nickel	ND		0.00100	0.000336	mg/L		11/06/20 07:56	11/09/20 13:18	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:56	11/09/20 13:18	1

Lab Sample ID: LCS 180-336146/2-A
Matrix: Water
Analysis Batch: 336494

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 336146

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.5117		mg/L		102	80 - 120
Beryllium	0.500	0.4759		mg/L		95	80 - 120
Nickel	0.500	0.4751		mg/L		95	80 - 120
Lithium	0.500	0.5042		mg/L		101	80 - 120

Lab Sample ID: 180-113231-18 MS
Matrix: Water
Analysis Batch: 336494

Client Sample ID: GAF-GW-COL2-PV1
Prep Type: Total Recoverable
Prep Batch: 336146

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		0.500	0.4928		mg/L		99	75 - 125
Beryllium	ND		0.500	0.4681		mg/L		94	75 - 125
Nickel	0.0257		0.500	0.4667		mg/L		88	75 - 125
Lithium	ND		0.500	0.4895		mg/L		98	75 - 125

Lab Sample ID: 180-113231-18 MSD
Matrix: Water
Analysis Batch: 336494

Client Sample ID: GAF-GW-COL2-PV1
Prep Type: Total Recoverable
Prep Batch: 336146

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		0.500	0.4863		mg/L		97	75 - 125	1	20
Beryllium	ND		0.500	0.4693		mg/L		94	75 - 125	0	20
Nickel	0.0257		0.500	0.4691		mg/L		89	75 - 125	1	20
Lithium	ND		0.500	0.4955		mg/L		99	75 - 125	1	20

Lab Sample ID: MB 180-336147/1-A
Matrix: Water
Analysis Batch: 336494

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 336147

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/06/20 07:59	11/09/20 14:35	1
Beryllium	ND		0.00100	0.000182	mg/L		11/06/20 07:59	11/09/20 14:35	1
Nickel	ND		0.00100	0.000336	mg/L		11/06/20 07:59	11/09/20 14:35	1
Lithium	ND		0.00500	0.00339	mg/L		11/06/20 07:59	11/09/20 14:35	1

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

Lab Sample ID: LCS 180-336147/2-A
Matrix: Water
Analysis Batch: 336494

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 336147

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cadmium			0.500	0.5134		mg/L		103	80 - 120		
Beryllium			0.500	0.5085		mg/L		102	80 - 120		
Nickel			0.500	0.4603		mg/L		92	80 - 120		
Lithium			0.500	0.5088		mg/L		102	80 - 120		

Lab Sample ID: 180-113231-21 MS
Matrix: Water
Analysis Batch: 336494

Client Sample ID: GAF-GW-COL1-BL
Prep Type: Total Recoverable
Prep Batch: 336147

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cadmium	0.00434		0.500	0.5146		mg/L		102	75 - 125		
Beryllium	0.0118		0.500	0.4832		mg/L		94	75 - 125		
Nickel	0.137		0.500	0.5694		mg/L		86	75 - 125		
Lithium	0.119		0.500	0.6037		mg/L		97	75 - 125		

Lab Sample ID: 180-113231-21 MSD
Matrix: Water
Analysis Batch: 336494

Client Sample ID: GAF-GW-COL1-BL
Prep Type: Total Recoverable
Prep Batch: 336147

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.00434		0.500	0.5204		mg/L		103	75 - 125	1	20
Beryllium	0.0118		0.500	0.4760		mg/L		93	75 - 125	1	20
Nickel	0.137		0.500	0.5711		mg/L		87	75 - 125	0	20
Lithium	0.119		0.500	0.6145		mg/L		99	75 - 125	2	20

Metals

Prep Batch: 336146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-113231-1	GAF-GW-COL2-4.6PV	Total Recoverable	Water	3005A	
180-113231-2	GAF-GW-COL2-5.6PV	Total Recoverable	Water	3005A	
180-113231-3	GAF-GW-COL2-6.6PV	Total Recoverable	Water	3005A	
180-113231-4	GAF-GW-COL2-8PV	Total Recoverable	Water	3005A	
180-113231-5	GAF-GW-COL2-8.7PV	Total Recoverable	Water	3005A	
180-113231-6	GAF-GW-COL2-9.8PV	Total Recoverable	Water	3005A	
180-113231-7	GAF-GW-COL2-PV10	Total Recoverable	Water	3005A	
180-113231-8	GAF-GW-COL2-10.3PV	Total Recoverable	Water	3005A	
180-113231-9	GAF-GW-COL2-11PV	Total Recoverable	Water	3005A	
180-113231-10	GAF-GW-COL2-11.9PV	Total Recoverable	Water	3005A	
180-113231-11	GAF-GW-COL1-PV10	Total Recoverable	Water	3005A	
180-113231-12	GAF-GW-COL1-10.3PV	Total Recoverable	Water	3005A	
180-113231-13	GAF-GW-COL1-10.8PV	Total Recoverable	Water	3005A	
180-113231-14	GAF-GW-COL1-11.4PV	Total Recoverable	Water	3005A	
180-113231-15	GAF-GW-COL1-11.9PV	Total Recoverable	Water	3005A	
180-113231-16	GAF-GW-COL2-BL	Total Recoverable	Water	3005A	
180-113231-17	GAF-GW-COL2-PV0	Total Recoverable	Water	3005A	
180-113231-18	GAF-GW-COL2-PV1	Total Recoverable	Water	3005A	
180-113231-19	GAF-GW-COL2-PV2	Total Recoverable	Water	3005A	
180-113231-20	GAF-GW-COL2-PV3	Total Recoverable	Water	3005A	
MB 180-336146/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-336146/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-113231-18 MS	GAF-GW-COL2-PV1	Total Recoverable	Water	3005A	
180-113231-18 MSD	GAF-GW-COL2-PV1	Total Recoverable	Water	3005A	

Prep Batch: 336147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-113231-21	GAF-GW-COL1-BL	Total Recoverable	Water	3005A	
180-113231-22	GAF-GW-COL1-PV0	Total Recoverable	Water	3005A	
180-113231-23	GAF-GW-COL1-PV1	Total Recoverable	Water	3005A	
180-113231-24	GAF-GW-COL1-PV2	Total Recoverable	Water	3005A	
180-113231-25	GAF-GW-COL1-PV3.2	Total Recoverable	Water	3005A	
180-113231-26	GAF-GW-COL1-4.6PV	Total Recoverable	Water	3005A	
180-113231-27	GAF-GW-COL1-5.8PV	Total Recoverable	Water	3005A	
180-113231-28	GAF-GW-COL1-6.9PV	Total Recoverable	Water	3005A	
180-113231-29	GAF-GW-COL1-PV8.0	Total Recoverable	Water	3005A	
180-113231-30	GAF-GW-COL1-9.2PV	Total Recoverable	Water	3005A	
MB 180-336147/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-336147/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-113231-21 MS	GAF-GW-COL1-BL	Total Recoverable	Water	3005A	
180-113231-21 MSD	GAF-GW-COL1-BL	Total Recoverable	Water	3005A	

Analysis Batch: 336494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-113231-1	GAF-GW-COL2-4.6PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-2	GAF-GW-COL2-5.6PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-3	GAF-GW-COL2-6.6PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-4	GAF-GW-COL2-8PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-5	GAF-GW-COL2-8.7PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-6	GAF-GW-COL2-9.8PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-7	GAF-GW-COL2-PV10	Total Recoverable	Water	EPA 6020A	336146

Metals (Continued)

Analysis Batch: 336494 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-113231-8	GAF-GW-COL2-10.3PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-9	GAF-GW-COL2-11PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-10	GAF-GW-COL2-11.9PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-11	GAF-GW-COL1-PV10	Total Recoverable	Water	EPA 6020A	336146
180-113231-12	GAF-GW-COL1-10.3PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-13	GAF-GW-COL1-10.8PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-14	GAF-GW-COL1-11.4PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-15	GAF-GW-COL1-11.9PV	Total Recoverable	Water	EPA 6020A	336146
180-113231-16	GAF-GW-COL2-BL	Total Recoverable	Water	EPA 6020A	336146
180-113231-17	GAF-GW-COL2-PV0	Total Recoverable	Water	EPA 6020A	336146
180-113231-18	GAF-GW-COL2-PV1	Total Recoverable	Water	EPA 6020A	336146
180-113231-19	GAF-GW-COL2-PV2	Total Recoverable	Water	EPA 6020A	336146
180-113231-20	GAF-GW-COL2-PV3	Total Recoverable	Water	EPA 6020A	336146
180-113231-21	GAF-GW-COL1-BL	Total Recoverable	Water	EPA 6020A	336147
180-113231-22	GAF-GW-COL1-PV0	Total Recoverable	Water	EPA 6020A	336147
180-113231-23	GAF-GW-COL1-PV1	Total Recoverable	Water	EPA 6020A	336147
180-113231-24	GAF-GW-COL1-PV2	Total Recoverable	Water	EPA 6020A	336147
180-113231-25	GAF-GW-COL1-PV3.2	Total Recoverable	Water	EPA 6020A	336147
180-113231-26	GAF-GW-COL1-4.6PV	Total Recoverable	Water	EPA 6020A	336147
180-113231-27	GAF-GW-COL1-5.8PV	Total Recoverable	Water	EPA 6020A	336147
180-113231-28	GAF-GW-COL1-6.9PV	Total Recoverable	Water	EPA 6020A	336147
180-113231-29	GAF-GW-COL1-PV8.0	Total Recoverable	Water	EPA 6020A	336147
180-113231-30	GAF-GW-COL1-9.2PV	Total Recoverable	Water	EPA 6020A	336147
MB 180-336146/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	336146
MB 180-336147/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	336147
LCS 180-336146/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	336146
LCS 180-336147/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	336147
180-113231-18 MS	GAF-GW-COL2-PV1	Total Recoverable	Water	EPA 6020A	336146
180-113231-18 MSD	GAF-GW-COL2-PV1	Total Recoverable	Water	EPA 6020A	336146
180-113231-21 MS	GAF-GW-COL1-BL	Total Recoverable	Water	EPA 6020A	336147
180-113231-21 MSD	GAF-GW-COL1-BL	Total Recoverable	Water	EPA 6020A	336147

Page 1 of 3

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CHAIN OF CUSTODY RECORD

☐ Almgren Drive
Agawam, MA 01001
(413) 789-9018

☐ 646 Camp Avenue
N. Kingstown, RI 02852
(401) 732-3400

Special Handling:

☑ TAT - Date Needed: 3-day ~~5-day~~ TAT

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Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
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Craig Katkic

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	GAF-GW-Col2-5.6PV	10/31/2020	7:20 AM	G	GW				1	x
	GAF-GW-Col2-6.6PV	11/1/2020	1:00 AM	G	GW				1	x
	GAF-GW-Col2-8PV	11/1/2020	6:20 PM	G	GW				1	x
	GAF-GW-Col2-8.7PV	11/2/2020	2:30 PM	G	GW				1	x
	GAF-GW-Col2-9.8PV	11/3/2020	6:00 AM	G	GW				1	x
	GAF-GW-Col2-PV10	11/2/2020	9:10 PM	G	GW				1	x
	GAF-GW-Col2-10.3PV	11/3/2020	4:30 PM	G	GW				1	x
	GAF-GW-Col2-11PV	11/3/2020	11:40 PM	G	GW				1	x
	GAF-GW-Col2-11.9PV	11/4/2020	10:40 AM	G	GW				1	x

180-113231 Chain of Custody

Relinquished by:	Received by:	Date:	Time:	Temp °C
Rachel Watkins		11/4/20	1600	Observed
	Dennie Watson	11-5-20	8:30	Correction Factor
	ETAPIA			Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

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☐ 646 Camp Avenue
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	GAF-GW-Col2-BL	10/27/2020	2:00 PM	G	GW				1	x	
	GAF-GW-Col2-PV0	10/27/2020	4:00 PM	G	GW				1	x	
	GAF-GW-Col2-PV1	10/28/2020	9:03 AM	G	GW				1	x	
	GAF-GW-Col2-PV2	10/28/2020	11:05 PM	G	GW				1	x	
	GAF-GW-Col2-PV3	10/29/2020	5:00 PM	G	GW				1	x	

QA/QC Reporting Notes:

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		11/4/20	1600
	Debbie Waton FIAPH	11-5-20	8:30

Temp °C: Observed; Correction Factor; Corrected; IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
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	GAF-GW-Col1-PV8.0	11/1/2020	6:40 PM	G	GW				1	x	
	GAF-GW-Col1-9.2PV	11/2/2020	1:56 PM	G	GW				1	x	

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☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		11/4/20	1600
	Nellie Watson ETA PM	11-5-20	8:30

Temp °C: Observed / Correction Factor / Corrected / IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Special Handling: Rev 1 Pe 11-11-2020

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CHAIN OF CUSTODY RECORD

☐ Almgren Drive, Agawam, MA 01001, (413) 789-9018
☐ 646 Camp Avenue, N. Kingstown, RI 02852, (401) 732-3400

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	GAF-GW-Col2-8PV	11/1/2020	6:20 PM	G	GW				1	x
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	GAF-GW-Col2-9.8PV	11/3/2020	6:00 AM	G	GW				1	x
	GAF-GW-Col2-PV10	11/2/2020	9:10 PM	G	GW				1	x
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	GAF-GW-Col2-11PV	11/3/2020	11:40 PM	G	GW				1	x
	GAF-GW-Col2-11.9PV	11/4/2020	10:40 AM	G	GW				1	x

QA/QC Reporting Level
☐ Level I ☐ Level II ☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

180-113231 Chain of Custody

Relinquished by:	Received by:	Date:	Time:	Temp °C
Rachel Watkins		11/4/20	1600	Observed
	Denise Patton FEDEX	11-5-20	8:30	Correction Factor
				Corrected
				IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Special Handling: REV 1 11-11-2020

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	GAF-GW-Col2-PV3	10/29/2020	5:00 PM	G	GW				1	x	

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Special Handling: Rev'd 11-11-2020

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Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-113231-1

Login Number: 113231 **List Source: Eurofins 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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-114024-1
Client Project/Site: GAF-NRS-Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
11/30/2020 11:58:49 AM

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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

Table of Contents

Cover Page 1
Table of Contents 2
Case Narrative 3
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Sample Summary 6
Method Summary 7
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Chain of Custody 21
Receipt Checklists 23

Job ID: 180-114024-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-114024-1

Receipt
The samples were received on 11/24/2020 9:30 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.2º C.

Metals
Method 6020A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-COL 3-BL (180-114024-1), (180-114024-A-1-B MS ^5), (180-114024-A-1-C MSD ^5), (180-114024-A-1-A PDS ^5) and (180-114024-A-1-A SD ^25). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc. Job ID: 180-114024-1
Project/Site: GAF-NRS-Treatability

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Job ID: 180-114024-1
Project/Site: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-21
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20 *
Florida	NELAP	E871008	06-30-21
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-21
Kansas	NELAP	E-10350	01-31-21
Kentucky (UST)	State	162013	04-30-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-21
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-21
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-21
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	12-31-21
North Dakota	State	R-227	04-30-21
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-21
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-21
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-21
Virginia	NELAP	10043	09-14-21
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-114024-1	GAF-GW-COL 3-BL	Water	11/09/20 00:00	11/24/20 09:30	
180-114024-2	GAF-GW-COL 3-PV0	Water	11/09/20 16:00	11/24/20 09:30	
180-114024-3	GAF-GW-COL 3-PV2	Water	11/10/20 20:30	11/24/20 09:30	
180-114024-4	GAF-GW-COL 3-PV3	Water	11/12/20 01:15	11/24/20 09:30	
180-114024-5	GAF-GW-COL 3-PV4	Water	11/13/20 06:00	11/24/20 09:30	
180-114024-6	GAF-GW-COL 3-PV5	Water	11/14/20 10:30	11/24/20 09:30	
180-114024-7	GAF-GW-COL 3-PV6	Water	11/15/20 15:20	11/24/20 09:30	
180-114024-8	GAF-GW-COL 3-PV7	Water	11/16/20 20:00	11/24/20 09:30	
180-114024-9	GAF-GW-COL 3-PV8	Water	11/17/20 10:25	11/24/20 09:30	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-BL
Lab Sample ID: 180-114024-1
Date Collected: 11/09/20 00:00
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		5			338736	11/27/20 19:19	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV0
Lab Sample ID: 180-114024-2
Date Collected: 11/09/20 16:00
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 19:36	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV2
Lab Sample ID: 180-114024-3
Date Collected: 11/10/20 20:30
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 19:40	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV3
Lab Sample ID: 180-114024-4
Date Collected: 11/12/20 01:15
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 19:43	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV4
Lab Sample ID: 180-114024-5
Date Collected: 11/13/20 06:00
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 19:47	RSK	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV5

Lab Sample ID: 180-114024-6
Date Collected: 11/14/20 10:30
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 19:57	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV6

Lab Sample ID: 180-114024-7
Date Collected: 11/15/20 15:20
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 20:01	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV7

Lab Sample ID: 180-114024-8
Date Collected: 11/16/20 20:00
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 20:04	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-COL 3-PV8

Lab Sample ID: 180-114024-9
Date Collected: 11/17/20 10:25
Matrix: Water
Date Received: 11/24/20 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	338568	11/25/20 14:41	TJO	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			338736	11/27/20 20:08	RSK	TAL PIT
	Instrument ID: A									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

TJO = Tyler Oliver

Batch Type: Analysis

RSK = Robert Kurtz

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-BL

Date Collected: 11/09/20 00:00
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00399	J	0.00500	0.00109	mg/L		11/25/20 14:41	11/27/20 19:19	5
Beryllium	0.0128		0.00500	0.000910	mg/L		11/25/20 14:41	11/27/20 19:19	5
Nickel	0.131		0.00500	0.00168	mg/L		11/25/20 14:41	11/27/20 19:19	5
Lithium	0.122		0.0250	0.0170	mg/L		11/25/20 14:41	11/27/20 19:19	5

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV0

Date Collected: 11/09/20 16:00
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 19:36	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 19:36	1
Nickel	**0.0676**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 19:36	1
Lithium	ND		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 19:36	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV2
Date Collected: 11/10/20 20:30
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 19:40	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 19:40	1
Nickel	**0.102**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 19:40	1
Lithium	ND		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 19:40	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV3

Date Collected: 11/12/20 01:15
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 19:43	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 19:43	1
Nickel	**0.0311**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 19:43	1
Lithium	ND		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 19:43	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV4

Date Collected: 11/13/20 06:00
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 19:47	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 19:47	1
Nickel	**0.00880**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 19:47	1
Lithium	**0.00888**		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 19:47	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV5

Date Collected: 11/14/20 10:30
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 19:57	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 19:57	1
Nickel	**0.00862**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 19:57	1
Lithium	**0.0174**		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 19:57	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV6

Lab Sample ID: 180-114024-7

Date Collected: 11/15/20 15:20
Matrix: Water
Date Received: 11/24/20 09:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 20:01	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 20:01	1
Nickel	**0.00586**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 20:01	1
Lithium	**0.0432**		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 20:01	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV7
Date Collected: 11/16/20 20:00
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 20:04	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 20:04	1
Nickel	**0.00461**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 20:04	1
Lithium	**0.0717**		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 20:04	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-114024-1

Client Sample ID: GAF-GW-COL 3-PV8

Date Collected: 11/17/20 10:25
Date Received: 11/24/20 09:30

Lab Sample ID: 180-114024-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 20:08	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 20:08	1
Nickel	**0.00543**		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 20:08	1
Lithium	**0.0933**		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 20:08	1

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

Lab Sample ID: MB 180-338568/1-A
Matrix: Water
Analysis Batch: 338736

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 338568

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		11/25/20 14:41	11/27/20 19:02	1
Beryllium	ND		0.00100	0.000182	mg/L		11/25/20 14:41	11/27/20 19:02	1
Nickel	ND		0.00100	0.000336	mg/L		11/25/20 14:41	11/27/20 19:02	1
Lithium	ND		0.00500	0.00339	mg/L		11/25/20 14:41	11/27/20 19:02	1

Lab Sample ID: LCS 180-338568/2-A
Matrix: Water
Analysis Batch: 338736

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 338568

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.4697		mg/L		94	80 - 120
Beryllium	0.500	0.4811		mg/L		96	80 - 120
Nickel	0.500	0.4631		mg/L		93	80 - 120
Lithium	0.500	0.4717		mg/L		94	80 - 120

Lab Sample ID: 180-114024-1 MS
Matrix: Water
Analysis Batch: 338736

Client Sample ID: GAF-GW-COL 3-BL
Prep Type: Total Recoverable
Prep Batch: 338568

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.00399	J	0.500	0.4747		mg/L		94	75 - 125
Beryllium	0.0128		0.500	0.5305		mg/L		104	75 - 125
Nickel	0.131		0.500	0.6074		mg/L		95	75 - 125
Lithium	0.122		0.500	0.6330		mg/L		102	75 - 125

Lab Sample ID: 180-114024-1 MSD
Matrix: Water
Analysis Batch: 338736

Client Sample ID: GAF-GW-COL 3-BL
Prep Type: Total Recoverable
Prep Batch: 338568

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	0.00399	J	0.500	0.4711		mg/L		93	75 - 125	1	20
Beryllium	0.0128		0.500	0.5323		mg/L		104	75 - 125	0	20
Nickel	0.131		0.500	0.5999		mg/L		94	75 - 125	1	20
Lithium	0.122		0.500	0.6335		mg/L		102	75 - 125	0	20

Client: Environmental Standards Inc.
Job ID: 180-114024-1
Project/Site: GAF-NRS-Treatability

Metals

Prep Batch: 338568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114024-1	GAF-GW-COL 3-BL	Total Recoverable	Water	3005A	
180-114024-2	GAF-GW-COL 3-PV0	Total Recoverable	Water	3005A	
180-114024-3	GAF-GW-COL 3-PV2	Total Recoverable	Water	3005A	
180-114024-4	GAF-GW-COL 3-PV3	Total Recoverable	Water	3005A	
180-114024-5	GAF-GW-COL 3-PV4	Total Recoverable	Water	3005A	
180-114024-6	GAF-GW-COL 3-PV5	Total Recoverable	Water	3005A	
180-114024-7	GAF-GW-COL 3-PV6	Total Recoverable	Water	3005A	
180-114024-8	GAF-GW-COL 3-PV7	Total Recoverable	Water	3005A	
180-114024-9	GAF-GW-COL 3-PV8	Total Recoverable	Water	3005A	
MB 180-338568/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-338568/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-114024-1 MS	GAF-GW-COL 3-BL	Total Recoverable	Water	3005A	
180-114024-1 MSD	GAF-GW-COL 3-BL	Total Recoverable	Water	3005A	

Analysis Batch: 338736

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-114024-1	GAF-GW-COL 3-BL	Total Recoverable	Water	EPA 6020A	338568
180-114024-2	GAF-GW-COL 3-PV0	Total Recoverable	Water	EPA 6020A	338568
180-114024-3	GAF-GW-COL 3-PV2	Total Recoverable	Water	EPA 6020A	338568
180-114024-4	GAF-GW-COL 3-PV3	Total Recoverable	Water	EPA 6020A	338568
180-114024-5	GAF-GW-COL 3-PV4	Total Recoverable	Water	EPA 6020A	338568
180-114024-6	GAF-GW-COL 3-PV5	Total Recoverable	Water	EPA 6020A	338568
180-114024-7	GAF-GW-COL 3-PV6	Total Recoverable	Water	EPA 6020A	338568
180-114024-8	GAF-GW-COL 3-PV7	Total Recoverable	Water	EPA 6020A	338568
180-114024-9	GAF-GW-COL 3-PV8	Total Recoverable	Water	EPA 6020A	338568
MB 180-338568/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	338568
LCS 180-338568/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	338568
180-114024-1 MS	GAF-GW-COL 3-BL	Total Recoverable	Water	EPA 6020A	338568
180-114024-1 MSD	GAF-GW-COL 3-BL	Total Recoverable	Water	EPA 6020A	338568

eurofins | Spectrum Analytical

CHAIN OF CUSTODY RECORD

301 Alpha Drive
Pittsburgh, PA 15238
(413) 789-9018

RUSH

Special Handling:

☑ TAT - Date Needed: 3-day TAT

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed

Report To:	Franciscos Barajas
	AECOM
	9400 Amberglen Blvd
	Austin, TX 78729
Telephone #:	978-905-2299
Project Mgr:	Craig MacPhee

Invoice To:	Craig MacPhee
	AECOM
	250 Apollo Dr.
	Chelmsford, MA 01824
P.O No.:	
Quote #:	

Project No:	TVA Gallatin EIP
Site Name:	GAF-NRS-Treatability
Location:	State:
Sampler(s):	Sangho Bang
	Craig Katkic

F=Field Filtered **1**=Na_2S2O_3 **2**=HCl **3**=H_2SO_4 **4**=HNO_3 **5**=NaOH **6**=Ascorbic Acid
7=CH3OH **8**=$NaHSO_4$ **9**=Deionized Water **10**=H_3PO_4 **11**= **12**=

List Preservative Code below: 4

QA/QC Reporting Notes:

DW=Drinking Water **GW**=Groundwater **SW**=Surface Water **WW**=Waste Water
O=Oil **SO**=Soil **SL**=Sludge **A**=Indoor/Ambient Air **SG**=Soil Gas
X1= X2=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: 6020 Totals -Be, Cd, Li, Ni
	GAF-GW-Col 3-BL	11/9/2020		G	GW				1	x
	GAF-GW-Col 3-PV0	11/9/2020	4:00 PM	G	GW				1	x
	GAF-GW-Col 3-PV2	11/10/2020	8:30 PM	G	GW				1	x
	GAF-GW-Col 3-PV3	11/12/2020	1:15 AM	G	GW				1	x
	GAF-GW-Col 3-PV4	11/13/2020	6:00 AM	G	S				1	x
	GAF-GW-Col 3-PV5	11/14/2020	10:30 AM	G	S				1	x
	GAF-GW-Col 3-PV6	11/15/2020	3:20 PM	G	S				1	x
	GAF-GW-Col 3-PV7	11/16/2020	8:00 PM	G	S				1	x
	GAF-GW-Col 3-PV8	11/17/2020	10:25 AM	G	S				1	x

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

180-114024 Chain of Custody

Relinquished by:	Received by:	Date:	Time:
		11/23/20	3:30pm
		11/24/20	930

Temp °C: Observed; Correction Factor; Corrected; IR ID #

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

(413) 789-9018

Samples disposed after 30 days unless otherwise instructed.

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr
Chelmsford, MA 01824

P O No: _____ Quote # _____

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: _____ State: _____
Sampler(s): Sangho Bang
Craig Katkic

=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
=H_3PO_4 1= _____ 12= _____

SW=Surface Water WW=Waste Water
/Ambient Air SG=Soil Gas

C=Composite

	Date:	Time:	Type	Matrix	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	List Preservative Code below: 4 — Analysis: 6020 Totals -Be, Cd, Li, Ni	QA/QC Reporting Notes:
	11/9/2020	n/a (rdw)	G	GW				1	x	no sample time recorded (rdw)
	11/9/2020	4:00 PM	G	GW				1	x	
	11/10/2020	8:30 PM	G	GW				1	x	
	11/12/2020	1:15 AM	G	GW				1	x	
	11/13/2020	6:00 AM	G	GW/S	(rdw)			1	x	
	11/14/2020	10:30 AM	G	GW/S	(rdw)			1	x	
	11/15/2020	3:20 PM	G	GW/S	(rdw)			1	x	
	11/16/2020	8:00 PM	G	GW/S	(rdw)			1	x	
	11/17/2020	10:25 AM	G	GW/S	(rdw)			1	x	

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other _____
State-specific reporting standards.

180-114024 Chain of Custody

Received by:	Date:	Time:	Temp °C
	11/23/20	3:30pm	Observed
[signature] Eurofins	11/24/20	930	Correction Factor
Rachel Watkins			Corrected
			IR ID #

☐ EDD format: _____
☐ E-mail to: _____

Condition upon receipt: Custody Seals: ☐ Present ☐ Intact ☐ Broken
☐ Ambient ☐ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-114024-1

Login Number: 114024 **List Source: Eurofins TestAmerica, Pittsburgh**
List Number: 1
Creator: Say, Thomas C

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-19962-1
Client Project/Site: GAF-NRSTreatability
Revision: 1

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
9/22/2020 10:41:20 AM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

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The test results in this report meet all 2003 NELAC, 2009 TNI, and 2016 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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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Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Qualifiers

Metals

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
B	Compound was found in the blank and sample.
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Job ID: 140-19962-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-19962-1

Revised Report
This report was revised to update the sample IDs to match the chain of custody. This replaces the previous final report.

Receipt
The samples were received on 8/7/2020 10:00 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.4º C.

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins 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 (MgSO4), 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-HNO3-H2O, 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, HNO3, HCl and H3BO3. 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, HNO3, HCl and H3BO3. 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:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/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

Job ID: 140-19962-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

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 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. The reporting limits were adjusted accordingly.

Methods 6010B, 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-42166 and 140-42471 and analytical batch 140-42568 was outside control limits. Sample non-homogeneity is suspected.

Method 6010B: The serial dilution performed for the following sample associated with batch 140-42568 was outside control limits: (140-19962-A-4-A SD ^5)

Methods 6010B, 6010B SEP: The following samples were diluted due to the presence of silicon which interferes with Nickel: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (140-19962-1), GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 (140-19962-2), GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 (140-19962-3), GAF-GW-PHIII-BKT-SAND-T3 (140-19962-4) and (140-19962-A-4-Z DU). Elevated reporting limits (RLs) are provided.

Methods 6010B, 6010B SEP: The following samples were diluted due to the nature of the sample matrix: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 (140-19962-1), GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 (140-19962-2), GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 (140-19962-3), GAF-GW-PHIII-BKT-SAND-T3 (140-19962-4), (140-19962-A-4-B DU ^10) and (140-19962-A-4-Z DU ^10). Elevated reporting limits (RLs) are provided. The diluted analysis result was greater than the undiluted result for Aluminum and Iron.

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

General Chemistry
% Moisture: The samples were analyzed for percent moisture using SOP number KNOX-WC-0012 (based on Modified MCAWW 160.3 and SM2540B and on the percent moisture determinations described in methods 3540C and 3550B).

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

Detection Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 140-19962-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nickel	0.351	J	9.50	0.323	mg/Kg	4	☼	6010B SEP	Step 1
Iron	25.8	B * *1	17.8	10.3	mg/Kg	3	☼	6010B SEP	Step 2
Nickel	0.191	J	7.12	0.178	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	14.1	J * *1	35.6	5.70	mg/Kg	3	☼	6010B SEP	Step 2
Beryllium	0.0374	J	0.297	0.0178	mg/Kg	1	☼	6010B SEP	Step 3
Cadmium	0.0795	J B *	0.297	0.0131	mg/Kg	1	☼	6010B SEP	Step 3
Iron	675		5.94	3.44	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	0.807	J	2.37	0.0997	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	86.2		11.9	2.49	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.0801	J	0.297	0.0190	mg/Kg	1	☼	6010B SEP	Step 4
Cadmium	0.0594	J	0.297	0.0131	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2820		5.94	3.44	mg/Kg	1	☼	6010B SEP	Step 4
Lithium	1.02	J	2.97	0.178	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	5.77		2.37	0.0463	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	521		11.9	1.90	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	1.13	J	35.6	1.07	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	101	J B * *1	178	27.9	mg/Kg	5	☼	6010B SEP	Step 5
Beryllium	0.0404	J	0.297	0.0142	mg/Kg	1	☼	6010B SEP	Step 6
Iron	2780		5.94	3.44	mg/Kg	1	☼	6010B SEP	Step 6
Lithium	1.06	J	2.97	0.178	mg/Kg	1	☼	6010B SEP	Step 6
Nickel	2.19	J	2.37	0.0629	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	627		11.9	1.90	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.346		0.297	0.00890	mg/Kg	1	☼	6010B SEP	Step 7
Cadmium	0.0315	J	0.297	0.0131	mg/Kg	1	☼	6010B SEP	Step 7
Iron	2180		59.4	48.7	mg/Kg	10	☼	6010B SEP	Step 7
Lithium	3.68		2.97	0.178	mg/Kg	1	☼	6010B SEP	Step 7
Nickel	0.966	J	4.75	0.135	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	18500		119	19.0	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.504		0.250	0.00750	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cadmium	0.170	J	0.250	0.0110	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	8480		5.00	4.10	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lithium	5.77		2.50	0.150	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Nickel	11.4		2.00	0.0280	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	19900		10.0	1.60	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.610		0.297	0.00890	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.0344	J	0.297	0.0131	mg/Kg	1	☼	6010B	Total/NA
Iron	18400		59.4	48.7	mg/Kg	10	☼	6010B	Total/NA
Lithium	8.60		2.97	0.178	mg/Kg	1	☼	6010B	Total/NA
Nickel	18.2		2.37	0.0677	mg/Kg	1	☼	6010B	Total/NA
Aluminum	18700		119	19.0	mg/Kg	10	☼	6010B	Total/NA

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 140-19962-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.0584	J	0.885	0.0390	mg/Kg	3	☼	6010B SEP	Step 2
Iron	138	B * *1	17.7	10.3	mg/Kg	3	☼	6010B SEP	Step 2

This Detection Summary does not include radiochemical test results.

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 (Continued)

Lab Sample ID: 140-19962-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nickel	0.666	J	7.08	0.177	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	49.6	* *1	35.4	5.67	mg/Kg	3	☼	6010B SEP	Step 2
Beryllium	0.0484	J	0.295	0.0177	mg/Kg	1	☼	6010B SEP	Step 3
Cadmium	0.0744	J B *	0.295	0.0130	mg/Kg	1	☼	6010B SEP	Step 3
Iron	736		5.90	3.42	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	1.58	J	2.36	0.0992	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	101		11.8	2.48	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.0803	J	0.295	0.0189	mg/Kg	1	☼	6010B SEP	Step 4
Cadmium	0.0744	J	0.295	0.0130	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2740		5.90	3.42	mg/Kg	1	☼	6010B SEP	Step 4
Lithium	0.920	J	2.95	0.177	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	5.40		2.36	0.0460	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	450		11.8	1.89	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	1.33	J	35.4	1.06	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	106	J B * *1	177	27.7	mg/Kg	5	☼	6010B SEP	Step 5
Beryllium	0.0531	J	0.295	0.0142	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3090		5.90	3.42	mg/Kg	1	☼	6010B SEP	Step 6
Lithium	1.05	J	2.95	0.177	mg/Kg	1	☼	6010B SEP	Step 6
Nickel	2.43		2.36	0.0626	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	631		11.8	1.89	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.324		0.295	0.00885	mg/Kg	1	☼	6010B SEP	Step 7
Cadmium	0.0248	J	0.295	0.0130	mg/Kg	1	☼	6010B SEP	Step 7
Iron	1880		59.0	48.4	mg/Kg	10	☼	6010B SEP	Step 7
Lithium	3.46		2.95	0.177	mg/Kg	1	☼	6010B SEP	Step 7
Nickel	0.821	J	4.72	0.135	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	18600		118	18.9	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.506		0.250	0.00750	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cadmium	0.232	J	0.250	0.0110	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	8590		5.00	4.10	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lithium	5.43		2.50	0.150	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Nickel	12.2		2.00	0.0280	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	20000		10.0	1.60	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.545		0.295	0.00885	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.0832	J	0.295	0.0130	mg/Kg	1	☼	6010B	Total/NA
Iron	10500		59.0	48.4	mg/Kg	10	☼	6010B	Total/NA
Lithium	6.69		2.95	0.177	mg/Kg	1	☼	6010B	Total/NA
Nickel	12.6		4.72	0.135	mg/Kg	2	☼	6010B	Total/NA
Aluminum	21300		118	18.9	mg/Kg	10	☼	6010B	Total/NA

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 140-19962-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.0442	J	0.884	0.0389	mg/Kg	3	☼	6010B SEP	Step 2
Iron	69.7	B * *1	17.7	10.3	mg/Kg	3	☼	6010B SEP	Step 2
Nickel	0.624	J	7.07	0.177	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	30.7	J * *1	35.4	5.66	mg/Kg	3	☼	6010B SEP	Step 2

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 (Continued)

Lab Sample ID: 140-19962-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Beryllium	0.0519	J	0.295	0.0177	mg/Kg	1	☼	6010B SEP	Step 3
Cadmium	0.0778	J B *	0.295	0.0130	mg/Kg	1	☼	6010B SEP	Step 3
Iron	733		5.89	3.42	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	1.85	J	2.36	0.0990	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	102		11.8	2.48	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.0872	J	0.295	0.0189	mg/Kg	1	☼	6010B SEP	Step 4
Cadmium	0.0796	J	0.295	0.0130	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2950		5.89	3.42	mg/Kg	1	☼	6010B SEP	Step 4
Lithium	1.09	J	2.95	0.177	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	6.79		2.36	0.0460	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	515		11.8	1.89	mg/Kg	1	☼	6010B SEP	Step 4
Iron	104	B * *1	88.4	51.9	mg/Kg	5	☼	6010B SEP	Step 5
Nickel	1.42	J	35.4	1.06	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	101	J B * *1	177	27.7	mg/Kg	5	☼	6010B SEP	Step 5
Beryllium	0.0495	J	0.295	0.0141	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3570		5.89	3.42	mg/Kg	1	☼	6010B SEP	Step 6
Lithium	1.51	J	2.95	0.177	mg/Kg	1	☼	6010B SEP	Step 6
Nickel	2.94		2.36	0.0625	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	832		11.8	1.89	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.329		0.295	0.00884	mg/Kg	1	☼	6010B SEP	Step 7
Cadmium	0.0383	J	0.295	0.0130	mg/Kg	1	☼	6010B SEP	Step 7
Iron	3300		58.9	48.3	mg/Kg	10	☼	6010B SEP	Step 7
Lithium	4.38		2.95	0.177	mg/Kg	1	☼	6010B SEP	Step 7
Nickel	1.63	J	4.72	0.134	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	18600		118	18.9	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.518		0.250	0.00750	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cadmium	0.240	J	0.250	0.0110	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	10700		5.00	4.10	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lithium	6.98		2.50	0.150	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Nickel	15.3		2.00	0.0280	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	20200		10.0	1.60	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.569		0.295	0.00884	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.0696	J	0.295	0.0130	mg/Kg	1	☼	6010B	Total/NA
Iron	10800		58.9	48.3	mg/Kg	10	☼	6010B	Total/NA
Lithium	6.01		2.95	0.177	mg/Kg	1	☼	6010B	Total/NA
Nickel	12.8		2.36	0.0672	mg/Kg	1	☼	6010B	Total/NA
Aluminum	22600		118	18.9	mg/Kg	10	☼	6010B	Total/NA

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Lab Sample ID: 140-19962-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.0431	J	0.770	0.0339	mg/Kg	3	☼	6010B SEP	Step 2
Iron	18.7	B * *1	15.4	8.93	mg/Kg	3	☼	6010B SEP	Step 2
Nickel	0.337	J	6.16	0.154	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	6.45	J * *1	30.8	4.93	mg/Kg	3	☼	6010B SEP	Step 2
Beryllium	0.0416	J	0.257	0.0154	mg/Kg	1	☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3 (Continued)

Lab Sample ID: 140-19962-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cadmium	0.0549	J B *	0.257	0.0113	mg/Kg	1	☼	6010B SEP	Step 3
Iron	405		5.13	2.98	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	1.66	J	2.05	0.0863	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	57.2		10.3	2.16	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.0765	J	0.257	0.0164	mg/Kg	1	☼	6010B SEP	Step 4
Cadmium	0.0719	J	0.257	0.0113	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2520		5.13	2.98	mg/Kg	1	☼	6010B SEP	Step 4
Lithium	0.949	J	2.57	0.154	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	5.43		2.05	0.0401	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	435		10.3	1.64	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	1.36	J	30.8	0.924	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	102	J B * *1	154	24.1	mg/Kg	5	☼	6010B SEP	Step 5
Beryllium	0.0426	J	0.257	0.0123	mg/Kg	1	☼	6010B SEP	Step 6
Iron	2990		5.13	2.98	mg/Kg	1	☼	6010B SEP	Step 6
Lithium	1.02	J	2.57	0.154	mg/Kg	1	☼	6010B SEP	Step 6
Nickel	2.34		2.05	0.0544	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	591		10.3	1.64	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.305		0.257	0.00770	mg/Kg	1	☼	6010B SEP	Step 7
Cadmium	0.0524	J	0.257	0.0113	mg/Kg	1	☼	6010B SEP	Step 7
Iron	2220		51.3	42.1	mg/Kg	10	☼	6010B SEP	Step 7
Lithium	3.34		2.57	0.154	mg/Kg	1	☼	6010B SEP	Step 7
Nickel	0.912	J	4.11	0.117	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	15100		103	16.4	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.466		0.250	0.00750	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cadmium	0.222	J	0.250	0.0110	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	8150		5.00	4.10	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lithium	5.31		2.50	0.150	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Nickel	12.0		2.00	0.0280	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	16300		10.0	1.60	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.463		0.257	0.00770	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.0539	J	0.257	0.0113	mg/Kg	1	☼	6010B	Total/NA
Iron	8570		51.3	42.1	mg/Kg	10	☼	6010B	Total/NA
Lithium	5.42		2.57	0.154	mg/Kg	1	☼	6010B	Total/NA
Nickel	10.0		2.05	0.0585	mg/Kg	1	☼	6010B	Total/NA
Aluminum	20200		103	16.4	mg/Kg	10	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3
Lab Sample ID: 140-19962-1
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00
Matrix: Solid
Percent Solids: 84.2

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47.5	7.60	mg/Kg	☼	08/28/20 08:00	09/03/20 11:04	4
Beryllium	ND		1.19	0.366	mg/Kg	☼	08/28/20 08:00	09/03/20 11:04	4
Cadmium	ND		1.19	0.0760	mg/Kg	☼	08/28/20 08:00	09/03/20 11:04	4
Iron	ND		23.7	13.8	mg/Kg	☼	08/28/20 08:00	09/03/20 11:04	4
Lithium	ND		11.9	0.712	mg/Kg	☼	08/28/20 08:00	09/03/20 11:04	4
Nickel	**0.351**	**J**	9.50	0.323	mg/Kg	☼	08/28/20 08:00	09/03/20 11:04	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.890	0.0570	mg/Kg	☼	08/31/20 08:00	09/03/20 11:56	3
Cadmium	ND		0.890	0.0392	mg/Kg	☼	08/31/20 08:00	09/03/20 11:56	3
Iron	**25.8**	**B * *1**	17.8	10.3	mg/Kg	☼	08/31/20 08:00	09/03/20 11:56	3
Lithium	ND		8.90	0.534	mg/Kg	☼	08/31/20 08:00	09/03/20 11:56	3
Nickel	**0.191**	**J**	7.12	0.178	mg/Kg	☼	08/31/20 08:00	09/03/20 11:56	3
Aluminum	**14.1**	**J * *1**	35.6	5.70	mg/Kg	☼	08/31/20 08:00	09/03/20 11:56	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0374**	**J**	0.297	0.0178	mg/Kg	☼	09/01/20 08:00	09/03/20 12:49	1
Cadmium	**0.0795**	**J B ***	0.297	0.0131	mg/Kg	☼	09/01/20 08:00	09/03/20 12:49	1
Iron	**675**		5.94	3.44	mg/Kg	☼	09/01/20 08:00	09/03/20 12:49	1
Lithium	ND		2.97	0.178	mg/Kg	☼	09/01/20 08:00	09/03/20 12:49	1
Nickel	**0.807**	**J**	2.37	0.0997	mg/Kg	☼	09/01/20 08:00	09/03/20 12:49	1
Aluminum	**86.2**		11.9	2.49	mg/Kg	☼	09/01/20 08:00	09/03/20 12:49	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0801**	**J**	0.297	0.0190	mg/Kg	☼	09/02/20 08:00	09/03/20 13:42	1
Cadmium	**0.0594**	**J**	0.297	0.0131	mg/Kg	☼	09/02/20 08:00	09/03/20 13:42	1
Iron	**2820**		5.94	3.44	mg/Kg	☼	09/02/20 08:00	09/08/20 10:53	1
Lithium	**1.02**	**J**	2.97	0.178	mg/Kg	☼	09/02/20 08:00	09/03/20 13:42	1
Nickel	**5.77**		2.37	0.0463	mg/Kg	☼	09/02/20 08:00	09/03/20 13:42	1
Aluminum	**521**		11.9	1.90	mg/Kg	☼	09/02/20 08:00	09/03/20 13:42	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	4.45	0.374	mg/Kg	☼	09/04/20 08:00	09/08/20 11:46	5
Cadmium	ND		4.45	0.190	mg/Kg	☼	09/04/20 08:00	09/08/20 11:46	5
Iron	ND	* *1	89.0	52.2	mg/Kg	☼	09/04/20 08:00	09/08/20 11:46	5
Lithium	ND		44.5	2.61	mg/Kg	☼	09/04/20 08:00	09/08/20 11:46	5
Nickel	**1.13**	**J**	35.6	1.07	mg/Kg	☼	09/04/20 08:00	09/08/20 11:46	5
Aluminum	**101**	**J B * *1**	178	27.9	mg/Kg	☼	09/04/20 08:00	09/08/20 11:46	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0404**	**J**	0.297	0.0142	mg/Kg	☼	09/03/20 11:45	09/08/20 12:39	1
Cadmium	ND		0.297	0.0131	mg/Kg	☼	09/03/20 11:45	09/08/20 12:39	1
Iron	**2780**		5.94	3.44	mg/Kg	☼	09/03/20 11:45	09/08/20 12:39	1
Lithium	**1.06**	**J**	2.97	0.178	mg/Kg	☼	09/03/20 11:45	09/08/20 12:39	1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 140-19962-1

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Matrix: Solid
Percent Solids: 84.2

Method: 6010B SEP - SEP Metals (ICP) - Step 6 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	2.19	J	2.37	0.0629	mg/Kg	☼	09/03/20 11:45	09/08/20 12:39	1
Aluminum	627		11.9	1.90	mg/Kg	☼	09/03/20 11:45	09/08/20 12:39	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.346		0.297	0.00890	mg/Kg	☼	09/04/20 08:00	09/09/20 12:40	1
Cadmium	0.0315	J	0.297	0.0131	mg/Kg	☼	09/04/20 08:00	09/09/20 12:40	1
Iron	2180		59.4	48.7	mg/Kg	☼	09/04/20 08:00	09/09/20 11:25	10
Lithium	3.68		2.97	0.178	mg/Kg	☼	09/04/20 08:00	09/09/20 12:40	1
Nickel	0.966	J	4.75	0.135	mg/Kg	☼	09/04/20 08:00	09/09/20 13:58	2
Aluminum	18500		119	19.0	mg/Kg	☼	09/04/20 08:00	09/09/20 11:25	10

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.504		0.250	0.00750	mg/Kg			09/11/20 13:59	1
Cadmium	0.170	J	0.250	0.0110	mg/Kg			09/11/20 13:59	1
Iron	8480		5.00	4.10	mg/Kg			09/11/20 13:59	1
Lithium	5.77		2.50	0.150	mg/Kg			09/11/20 13:59	1
Nickel	11.4		2.00	0.0280	mg/Kg			09/11/20 13:59	1
Aluminum	19900		10.0	1.60	mg/Kg			09/11/20 13:59	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.610		0.297	0.00890	mg/Kg	☼	08/27/20 08:00	09/09/20 13:08	1
Cadmium	0.0344	J	0.297	0.0131	mg/Kg	☼	08/27/20 08:00	09/09/20 13:08	1
Iron	18400		59.4	48.7	mg/Kg	☼	08/27/20 08:00	09/09/20 12:02	10
Lithium	8.60		2.97	0.178	mg/Kg	☼	08/27/20 08:00	09/09/20 13:08	1
Nickel	18.2		2.37	0.0677	mg/Kg	☼	08/27/20 08:00	09/09/20 13:08	1
Aluminum	18700		119	19.0	mg/Kg	☼	08/27/20 08:00	09/09/20 12:02	10

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 140-19962-2

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Matrix: Solid
Percent Solids: 84.7

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47.2	7.56	mg/Kg	☼	08/28/20 08:00	09/03/20 11:08	4
Beryllium	ND		1.18	0.364	mg/Kg	☼	08/28/20 08:00	09/03/20 11:08	4
Cadmium	ND		1.18	0.0756	mg/Kg	☼	08/28/20 08:00	09/03/20 11:08	4
Iron	ND		23.6	13.7	mg/Kg	☼	08/28/20 08:00	09/03/20 11:08	4
Lithium	ND		11.8	0.708	mg/Kg	☼	08/28/20 08:00	09/03/20 11:08	4
Nickel	ND		9.44	0.321	mg/Kg	☼	08/28/20 08:00	09/03/20 11:08	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.885	0.0567	mg/Kg	☼	08/31/20 08:00	09/03/20 12:01	3
Cadmium	0.0584	J	0.885	0.0390	mg/Kg	☼	08/31/20 08:00	09/03/20 12:01	3
Iron	138	B * *1	17.7	10.3	mg/Kg	☼	08/31/20 08:00	09/03/20 12:01	3
Lithium	ND		8.85	0.531	mg/Kg	☼	08/31/20 08:00	09/03/20 12:01	3
Nickel	0.666	J	7.08	0.177	mg/Kg	☼	08/31/20 08:00	09/03/20 12:01	3

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3
Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Lab Sample ID: 140-19962-2
Matrix: Solid
Percent Solids: 84.7

Method: 6010B SEP - SEP Metals (ICP) - Step 2 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	49.6	* *1	35.4	5.67	mg/Kg	☼	08/31/20 08:00	09/03/20 12:01	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0484	J	0.295	0.0177	mg/Kg	☼	09/01/20 08:00	09/03/20 12:54	1
Cadmium	0.0744	J B *	0.295	0.0130	mg/Kg	☼	09/01/20 08:00	09/03/20 12:54	1
Iron	736		5.90	3.42	mg/Kg	☼	09/01/20 08:00	09/03/20 12:54	1
Lithium	ND		2.95	0.177	mg/Kg	☼	09/01/20 08:00	09/03/20 12:54	1
Nickel	1.58	J	2.36	0.0992	mg/Kg	☼	09/01/20 08:00	09/03/20 12:54	1
Aluminum	101		11.8	2.48	mg/Kg	☼	09/01/20 08:00	09/03/20 12:54	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0803	J	0.295	0.0189	mg/Kg	☼	09/02/20 08:00	09/03/20 13:46	1
Cadmium	0.0744	J	0.295	0.0130	mg/Kg	☼	09/02/20 08:00	09/03/20 13:46	1
Iron	2740		5.90	3.42	mg/Kg	☼	09/02/20 08:00	09/08/20 10:58	1
Lithium	0.920	J	2.95	0.177	mg/Kg	☼	09/02/20 08:00	09/03/20 13:46	1
Nickel	5.40		2.36	0.0460	mg/Kg	☼	09/02/20 08:00	09/03/20 13:46	1
Aluminum	450		11.8	1.89	mg/Kg	☼	09/02/20 08:00	09/03/20 13:46	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	4.43	0.372	mg/Kg	☼	09/04/20 08:00	09/08/20 11:51	5
Cadmium	ND		4.43	0.189	mg/Kg	☼	09/04/20 08:00	09/08/20 11:51	5
Iron	ND	* *1	88.5	51.9	mg/Kg	☼	09/04/20 08:00	09/08/20 11:51	5
Lithium	ND		44.3	2.60	mg/Kg	☼	09/04/20 08:00	09/08/20 11:51	5
Nickel	1.33	J	35.4	1.06	mg/Kg	☼	09/04/20 08:00	09/08/20 11:51	5
Aluminum	106	J B * *1	177	27.7	mg/Kg	☼	09/04/20 08:00	09/08/20 11:51	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0531	J	0.295	0.0142	mg/Kg	☼	09/03/20 11:45	09/08/20 12:44	1
Cadmium	ND		0.295	0.0130	mg/Kg	☼	09/03/20 11:45	09/08/20 12:44	1
Iron	3090		5.90	3.42	mg/Kg	☼	09/03/20 11:45	09/08/20 12:44	1
Lithium	1.05	J	2.95	0.177	mg/Kg	☼	09/03/20 11:45	09/08/20 12:44	1
Nickel	2.43		2.36	0.0626	mg/Kg	☼	09/03/20 11:45	09/08/20 12:44	1
Aluminum	631		11.8	1.89	mg/Kg	☼	09/03/20 11:45	09/08/20 12:44	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.324		0.295	0.00885	mg/Kg	☼	09/04/20 08:00	09/09/20 12:45	1
Cadmium	0.0248	J	0.295	0.0130	mg/Kg	☼	09/04/20 08:00	09/09/20 12:45	1
Iron	1880		59.0	48.4	mg/Kg	☼	09/04/20 08:00	09/09/20 11:29	10
Lithium	3.46		2.95	0.177	mg/Kg	☼	09/04/20 08:00	09/09/20 12:45	1
Nickel	0.821	J	4.72	0.135	mg/Kg	☼	09/04/20 08:00	09/09/20 14:02	2
Aluminum	18600		118	18.9	mg/Kg	☼	09/04/20 08:00	09/09/20 11:29	10

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.506		0.250	0.00750	mg/Kg			09/11/20 13:59	1
Cadmium	0.232	J	0.250	0.0110	mg/Kg			09/11/20 13:59	1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3 Lab Sample ID: 140-19962-2

Date Collected: 08/06/20 11:00 **Matrix: Solid**
Date Received: 08/07/20 10:00 **Percent Solids: 84.7**

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	8590		5.00	4.10	mg/Kg			09/11/20 13:59	1
Lithium	5.43		2.50	0.150	mg/Kg			09/11/20 13:59	1
Nickel	12.2		2.00	0.0280	mg/Kg			09/11/20 13:59	1
Aluminum	20000		10.0	1.60	mg/Kg			09/11/20 13:59	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.545		0.295	0.00885	mg/Kg	☼	08/27/20 08:00	09/09/20 13:13	1
Cadmium	0.0832	J	0.295	0.0130	mg/Kg	☼	08/27/20 08:00	09/09/20 13:13	1
Iron	10500		59.0	48.4	mg/Kg	☼	08/27/20 08:00	09/09/20 12:07	10
Lithium	6.69		2.95	0.177	mg/Kg	☼	08/27/20 08:00	09/09/20 13:13	1
Nickel	12.6		4.72	0.135	mg/Kg	☼	08/27/20 08:00	09/09/20 14:26	2
Aluminum	21300		118	18.9	mg/Kg	☼	08/27/20 08:00	09/09/20 12:07	10

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3 Lab Sample ID: 140-19962-3

Date Collected: 08/06/20 11:00 **Matrix: Solid**
Date Received: 08/07/20 10:00 **Percent Solids: 84.8**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47.2	7.55	mg/Kg	☼	08/28/20 08:00	09/03/20 11:13	4
Beryllium	ND		1.18	0.363	mg/Kg	☼	08/28/20 08:00	09/03/20 11:13	4
Cadmium	ND		1.18	0.0755	mg/Kg	☼	08/28/20 08:00	09/03/20 11:13	4
Iron	ND		23.6	13.7	mg/Kg	☼	08/28/20 08:00	09/03/20 11:13	4
Lithium	ND		11.8	0.707	mg/Kg	☼	08/28/20 08:00	09/03/20 11:13	4
Nickel	ND		9.43	0.321	mg/Kg	☼	08/28/20 08:00	09/03/20 11:13	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.884	0.0566	mg/Kg	☼	08/31/20 08:00	09/03/20 12:06	3
Cadmium	0.0442	J	0.884	0.0389	mg/Kg	☼	08/31/20 08:00	09/03/20 12:06	3
Iron	69.7	B * *1	17.7	10.3	mg/Kg	☼	08/31/20 08:00	09/03/20 12:06	3
Lithium	ND		8.84	0.531	mg/Kg	☼	08/31/20 08:00	09/03/20 12:06	3
Nickel	0.624	J	7.07	0.177	mg/Kg	☼	08/31/20 08:00	09/03/20 12:06	3
Aluminum	30.7	J * *1	35.4	5.66	mg/Kg	☼	08/31/20 08:00	09/03/20 12:06	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0519	J	0.295	0.0177	mg/Kg	☼	09/01/20 08:00	09/03/20 12:59	1
Cadmium	0.0778	J B *	0.295	0.0130	mg/Kg	☼	09/01/20 08:00	09/03/20 12:59	1
Iron	733		5.89	3.42	mg/Kg	☼	09/01/20 08:00	09/03/20 12:59	1
Lithium	ND		2.95	0.177	mg/Kg	☼	09/01/20 08:00	09/03/20 12:59	1
Nickel	1.85	J	2.36	0.0990	mg/Kg	☼	09/01/20 08:00	09/03/20 12:59	1
Aluminum	102		11.8	2.48	mg/Kg	☼	09/01/20 08:00	09/03/20 12:59	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0872	J	0.295	0.0189	mg/Kg	☼	09/02/20 08:00	09/03/20 13:51	1
Cadmium	0.0796	J	0.295	0.0130	mg/Kg	☼	09/02/20 08:00	09/03/20 13:51	1
Iron	2950		5.89	3.42	mg/Kg	☼	09/02/20 08:00	09/08/20 11:03	1
Lithium	1.09	J	2.95	0.177	mg/Kg	☼	09/02/20 08:00	09/03/20 13:51	1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 140-19962-3

Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00
Percent Solids: 84.8

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	6.79		2.36	0.0460	mg/Kg	☼	09/02/20 08:00	09/03/20 13:51	1
Aluminum	515		11.8	1.89	mg/Kg	☼	09/02/20 08:00	09/03/20 13:51	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	4.42	0.371	mg/Kg	☼	09/04/20 08:00	09/08/20 11:56	5
Cadmium	ND		4.42	0.189	mg/Kg	☼	09/04/20 08:00	09/08/20 11:56	5
Iron	104	B * *1	88.4	51.9	mg/Kg	☼	09/04/20 08:00	09/08/20 11:56	5
Lithium	ND		44.2	2.59	mg/Kg	☼	09/04/20 08:00	09/08/20 11:56	5
Nickel	1.42	J	35.4	1.06	mg/Kg	☼	09/04/20 08:00	09/08/20 11:56	5
Aluminum	101	J B * *1	177	27.7	mg/Kg	☼	09/04/20 08:00	09/08/20 11:56	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.0495	J	0.295	0.0141	mg/Kg	☼	09/03/20 11:45	09/08/20 12:49	1
Cadmium	ND		0.295	0.0130	mg/Kg	☼	09/03/20 11:45	09/08/20 12:49	1
Iron	3570		5.89	3.42	mg/Kg	☼	09/03/20 11:45	09/08/20 12:49	1
Lithium	1.51	J	2.95	0.177	mg/Kg	☼	09/03/20 11:45	09/08/20 12:49	1
Nickel	2.94		2.36	0.0625	mg/Kg	☼	09/03/20 11:45	09/08/20 12:49	1
Aluminum	832		11.8	1.89	mg/Kg	☼	09/03/20 11:45	09/08/20 12:49	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.329		0.295	0.00884	mg/Kg	☼	09/04/20 08:00	09/09/20 12:49	1
Cadmium	0.0383	J	0.295	0.0130	mg/Kg	☼	09/04/20 08:00	09/09/20 12:49	1
Iron	3300		58.9	48.3	mg/Kg	☼	09/04/20 08:00	09/09/20 11:43	10
Lithium	4.38		2.95	0.177	mg/Kg	☼	09/04/20 08:00	09/09/20 12:49	1
Nickel	1.63	J	4.72	0.134	mg/Kg	☼	09/04/20 08:00	09/09/20 14:07	2
Aluminum	18600		118	18.9	mg/Kg	☼	09/04/20 08:00	09/09/20 11:43	10

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.518		0.250	0.00750	mg/Kg			09/11/20 13:59	1
Cadmium	0.240	J	0.250	0.0110	mg/Kg			09/11/20 13:59	1
Iron	10700		5.00	4.10	mg/Kg			09/11/20 13:59	1
Lithium	6.98		2.50	0.150	mg/Kg			09/11/20 13:59	1
Nickel	15.3		2.00	0.0280	mg/Kg			09/11/20 13:59	1
Aluminum	20200		10.0	1.60	mg/Kg			09/11/20 13:59	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.569		0.295	0.00884	mg/Kg	☼	08/27/20 08:00	09/09/20 13:18	1
Cadmium	0.0696	J	0.295	0.0130	mg/Kg	☼	08/27/20 08:00	09/09/20 13:18	1
Iron	10800		58.9	48.3	mg/Kg	☼	08/27/20 08:00	09/09/20 12:12	10
Lithium	6.01		2.95	0.177	mg/Kg	☼	08/27/20 08:00	09/09/20 13:18	1
Nickel	12.8		2.36	0.0672	mg/Kg	☼	08/27/20 08:00	09/09/20 13:18	1
Aluminum	22600		118	18.9	mg/Kg	☼	08/27/20 08:00	09/09/20 12:12	10

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Lab Sample ID: 140-19962-4

Matrix: Solid
Percent Solids: 97.4

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		41.1	6.57	mg/Kg	☼	08/28/20 08:00	09/03/20 11:18	4
Beryllium	ND		1.03	0.316	mg/Kg	☼	08/28/20 08:00	09/03/20 11:18	4
Cadmium	ND		1.03	0.0657	mg/Kg	☼	08/28/20 08:00	09/03/20 11:18	4
Iron	ND		20.5	11.9	mg/Kg	☼	08/28/20 08:00	09/03/20 11:18	4
Lithium	ND		10.3	0.616	mg/Kg	☼	08/28/20 08:00	09/03/20 11:18	4
Nickel	ND		8.22	0.279	mg/Kg	☼	08/28/20 08:00	09/03/20 11:18	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.770	0.0493	mg/Kg	☼	08/31/20 08:00	09/03/20 12:11	3
Cadmium	**0.0431**	**J**	0.770	0.0339	mg/Kg	☼	08/31/20 08:00	09/03/20 12:11	3
Iron	**18.7**	**B * *1**	15.4	8.93	mg/Kg	☼	08/31/20 08:00	09/03/20 12:11	3
Lithium	ND		7.70	0.462	mg/Kg	☼	08/31/20 08:00	09/03/20 12:11	3
Nickel	**0.337**	**J**	6.16	0.154	mg/Kg	☼	08/31/20 08:00	09/03/20 12:11	3
Aluminum	**6.45**	**J * *1**	30.8	4.93	mg/Kg	☼	08/31/20 08:00	09/03/20 12:11	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0416**	**J**	0.257	0.0154	mg/Kg	☼	09/01/20 08:00	09/03/20 13:04	1
Cadmium	**0.0549**	**J B ***	0.257	0.0113	mg/Kg	☼	09/01/20 08:00	09/03/20 13:04	1
Iron	**405**		5.13	2.98	mg/Kg	☼	09/01/20 08:00	09/03/20 13:04	1
Lithium	ND		2.57	0.154	mg/Kg	☼	09/01/20 08:00	09/03/20 13:04	1
Nickel	**1.66**	**J**	2.05	0.0863	mg/Kg	☼	09/01/20 08:00	09/03/20 13:04	1
Aluminum	**57.2**		10.3	2.16	mg/Kg	☼	09/01/20 08:00	09/03/20 13:04	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0765**	**J**	0.257	0.0164	mg/Kg	☼	09/02/20 08:00	09/03/20 13:56	1
Cadmium	**0.0719**	**J**	0.257	0.0113	mg/Kg	☼	09/02/20 08:00	09/03/20 13:56	1
Iron	**2520**		5.13	2.98	mg/Kg	☼	09/02/20 08:00	09/08/20 11:08	1
Lithium	**0.949**	**J**	2.57	0.154	mg/Kg	☼	09/02/20 08:00	09/03/20 13:56	1
Nickel	**5.43**		2.05	0.0401	mg/Kg	☼	09/02/20 08:00	09/03/20 13:56	1
Aluminum	**435**		10.3	1.64	mg/Kg	☼	09/02/20 08:00	09/03/20 13:56	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	3.85	0.323	mg/Kg	☼	09/04/20 08:00	09/08/20 12:01	5
Cadmium	ND		3.85	0.164	mg/Kg	☼	09/04/20 08:00	09/08/20 12:01	5
Iron	ND	* *1	77.0	45.2	mg/Kg	☼	09/04/20 08:00	09/08/20 12:01	5
Lithium	ND		38.5	2.26	mg/Kg	☼	09/04/20 08:00	09/08/20 12:01	5
Nickel	**1.36**	**J**	30.8	0.924	mg/Kg	☼	09/04/20 08:00	09/08/20 12:01	5
Aluminum	**102**	**J B * *1**	154	24.1	mg/Kg	☼	09/04/20 08:00	09/08/20 12:01	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0426**	**J**	0.257	0.0123	mg/Kg	☼	09/03/20 11:45	09/08/20 12:54	1
Cadmium	ND		0.257	0.0113	mg/Kg	☼	09/03/20 11:45	09/08/20 12:54	1
Iron	**2990**		5.13	2.98	mg/Kg	☼	09/03/20 11:45	09/08/20 12:54	1
Lithium	**1.02**	**J**	2.57	0.154	mg/Kg	☼	09/03/20 11:45	09/08/20 12:54	1
Nickel	**2.34**		2.05	0.0544	mg/Kg	☼	09/03/20 11:45	09/08/20 12:54	1
Aluminum	**591**		10.3	1.64	mg/Kg	☼	09/03/20 11:45	09/08/20 12:54	1

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Lab Sample ID: 140-19962-4

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Matrix: Solid
Percent Solids: 97.4

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.305		0.257	0.00770	mg/Kg	☼	09/04/20 08:00	09/09/20 12:54	1
Cadmium	0.0524	J	0.257	0.0113	mg/Kg	☼	09/04/20 08:00	09/09/20 12:54	1
Iron	2220		51.3	42.1	mg/Kg	☼	09/04/20 08:00	09/09/20 11:48	10
Lithium	3.34		2.57	0.154	mg/Kg	☼	09/04/20 08:00	09/09/20 12:54	1
Nickel	0.912	J	4.11	0.117	mg/Kg	☼	09/04/20 08:00	09/09/20 14:12	2
Aluminum	15100		103	16.4	mg/Kg	☼	09/04/20 08:00	09/09/20 11:48	10

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.466		0.250	0.00750	mg/Kg			09/11/20 13:59	1
Cadmium	0.222	J	0.250	0.0110	mg/Kg			09/11/20 13:59	1
Iron	8150		5.00	4.10	mg/Kg			09/11/20 13:59	1
Lithium	5.31		2.50	0.150	mg/Kg			09/11/20 13:59	1
Nickel	12.0		2.00	0.0280	mg/Kg			09/11/20 13:59	1
Aluminum	16300		10.0	1.60	mg/Kg			09/11/20 13:59	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.463		0.257	0.00770	mg/Kg	☼	08/27/20 08:00	09/09/20 13:23	1
Cadmium	0.0539	J	0.257	0.0113	mg/Kg	☼	08/27/20 08:00	09/09/20 13:23	1
Iron	8570		51.3	42.1	mg/Kg	☼	08/27/20 08:00	09/09/20 12:16	10
Lithium	5.42		2.57	0.154	mg/Kg	☼	08/27/20 08:00	09/09/20 13:23	1
Nickel	10.0		2.05	0.0585	mg/Kg	☼	08/27/20 08:00	09/09/20 13:23	1
Aluminum	20200		103	16.4	mg/Kg	☼	08/27/20 08:00	09/09/20 12:16	10

Default Detection Limits

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Method: 6010B SEP - SEP Metals (ICP) - Step 1
Prep: 3010A
SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.0770	mg/Kg
Cadmium	0.250	0.0160	mg/Kg
Iron	5.00	2.90	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0680	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2
Prep: 3010A
SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.0160	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	2.90	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0500	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 3
Prep: 3010A
SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10.0	2.10	mg/Kg
Beryllium	0.250	0.0150	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	2.90	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0840	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4
Prep: 3010A
SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.0160	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	2.90	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0390	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 5
Prep: 3010A
SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30.0	4.70	mg/Kg
Beryllium	0.750	0.0630	mg/Kg
Cadmium	0.750	0.0320	mg/Kg
Iron	15.0	8.80	mg/Kg
Lithium	7.50	0.440	mg/Kg
Nickel	6.00	0.180	mg/Kg

Default Detection Limits

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.0120	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	2.90	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0530	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.00750	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	4.10	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0570	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.00750	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	4.10	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0280	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units
Aluminum	10.0	1.60	mg/Kg
Beryllium	0.250	0.00750	mg/Kg
Cadmium	0.250	0.0110	mg/Kg
Iron	5.00	4.10	mg/Kg
Lithium	2.50	0.150	mg/Kg
Nickel	2.00	0.0570	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-42166/8-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 42166

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.00750	mg/Kg		08/27/20 08:00	09/09/20 11:01	1
Cadmium	ND		0.250	0.0110	mg/Kg		08/27/20 08:00	09/09/20 11:01	1
Iron	ND		5.00	4.10	mg/Kg		08/27/20 08:00	09/09/20 11:01	1
Lithium	ND		2.50	0.150	mg/Kg		08/27/20 08:00	09/09/20 11:01	1
Nickel	ND		2.00	0.0570	mg/Kg		08/27/20 08:00	09/09/20 11:01	1
Aluminum	ND		10.0	1.60	mg/Kg		08/27/20 08:00	09/09/20 11:01	1

Lab Sample ID: LCS 140-42166/9-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 42166

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.572		mg/Kg		103	75 - 125
Cadmium	2.50	2.617		mg/Kg		105	75 - 125
Iron	50.0	52.73		mg/Kg		105	75 - 125
Lithium	5.00	5.103		mg/Kg		102	75 - 125
Nickel	25.0	26.07		mg/Kg		104	75 - 125
Aluminum	100	99.23		mg/Kg		99	75 - 125

Lab Sample ID: LCSD 140-42166/10-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 42166

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.539		mg/Kg		102	75 - 125	1	30
Cadmium	2.50	2.596		mg/Kg		104	75 - 125	1	30
Iron	50.0	52.54		mg/Kg		105	75 - 125	0	30
Lithium	5.00	5.112		mg/Kg		102	75 - 125	0	30
Nickel	25.0	25.93		mg/Kg		104	75 - 125	1	30
Aluminum	100	98.63		mg/Kg		99	75 - 125	1	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Total/NA
Prep Batch: 42166

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	8570		11970	F3	mg/Kg	☼	33	30
Aluminum	20200		22440		mg/Kg	☼	11	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Total/NA
Prep Batch: 42166

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	0.463		0.5905		mg/Kg	☼	24	30
Cadmium	0.0539	J	0.07959	J F5	mg/Kg	☼	38	30
Lithium	5.42		6.411		mg/Kg	☼	17	30
Nickel	10.0		12.99		mg/Kg	☼	26	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-42168/8-B ^4
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 42218

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.308	mg/Kg		08/28/20 08:00	09/03/20 10:50	4
Cadmium	ND		1.00	0.0640	mg/Kg		08/28/20 08:00	09/03/20 10:50	4
Iron	ND		20.0	11.6	mg/Kg		08/28/20 08:00	09/03/20 10:50	4
Lithium	ND		10.0	0.600	mg/Kg		08/28/20 08:00	09/03/20 10:50	4
Nickel	ND		8.00	0.272	mg/Kg		08/28/20 08:00	09/03/20 10:50	4
Aluminum	ND		40.0	6.40	mg/Kg		08/28/20 08:00	09/03/20 10:50	4

Lab Sample ID: LCS 140-42168/9-B ^5
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 42218

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.470		mg/Kg		99	75 - 125
Cadmium	2.50	2.405		mg/Kg		96	75 - 125
Iron	50.0	47.18		mg/Kg		94	75 - 125
Lithium	5.00	5.390	J	mg/Kg		108	75 - 125
Nickel	25.0	23.30		mg/Kg		93	75 - 125
Aluminum	100	90.97		mg/Kg		91	75 - 125

Lab Sample ID: LCSD 140-42168/10-B ^5
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 42218

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.528		mg/Kg		101	75 - 125	2	30
Cadmium	2.50	2.445		mg/Kg		98	75 - 125	2	30
Iron	50.0	49.52		mg/Kg		99	75 - 125	5	30
Lithium	5.00	5.095	J	mg/Kg		102	75 - 125	6	30
Nickel	25.0	23.70		mg/Kg		95	75 - 125	2	30
Aluminum	100	91.03		mg/Kg		91	75 - 125	0	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 1
Prep Batch: 42218

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	ND		ND		mg/Kg	☼	NC	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Iron	ND		ND		mg/Kg	☼	NC	30
Lithium	ND		ND		mg/Kg	☼	NC	30
Nickel	ND		ND		mg/Kg	☼	NC	30
Aluminum	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-42219/8-B ^3
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 42267

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.750	0.0480	mg/Kg		08/31/20 08:00	09/03/20 11:42	3

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-42219/8-B ^3
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 42267

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.750	0.0330	mg/Kg		08/31/20 08:00	09/03/20 11:42	3
Iron	10.20	J	15.0	8.70	mg/Kg		08/31/20 08:00	09/03/20 11:42	3
Lithium	ND		7.50	0.450	mg/Kg		08/31/20 08:00	09/03/20 11:42	3
Nickel	ND		6.00	0.150	mg/Kg		08/31/20 08:00	09/03/20 11:42	3
Aluminum	ND		30.0	4.80	mg/Kg		08/31/20 08:00	09/03/20 11:42	3

Lab Sample ID: LCS 140-42219/9-B ^5
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 42267

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	1.355	*	mg/Kg		54	75 - 125
Cadmium	2.50	2.493		mg/Kg		100	75 - 125
Iron	50.0	ND	*	mg/Kg		6	75 - 125
Lithium	5.00	5.140	J	mg/Kg		103	75 - 125
Nickel	25.0	23.67		mg/Kg		95	75 - 125
Aluminum	100	ND	*	mg/Kg		-4	75 - 125

Lab Sample ID: LCSD 140-42219/10-B ^5
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 42267

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	1.310	*	mg/Kg		52	75 - 125	3	30
Cadmium	2.50	2.423		mg/Kg		97	75 - 125	3	30
Iron	50.0	ND	* *1	mg/Kg		4	75 - 125	40	30
Lithium	5.00	5.078	J	mg/Kg		102	75 - 125	1	30
Nickel	25.0	23.03		mg/Kg		92	75 - 125	3	30
Aluminum	100	ND	* *1	mg/Kg		-0.4	75 - 125	165	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 2
Prep Batch: 42267

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	ND	*	ND	*	mg/Kg	☼	NC	30
Cadmium	0.0431	J	0.04005	J	mg/Kg	☼	7	30
Iron	18.7	B * *1	19.84	* *1	mg/Kg	☼	6	30
Lithium	ND		ND		mg/Kg	☼	NC	30
Nickel	0.337	J	0.2973	J	mg/Kg	☼	13	30
Aluminum	6.45	J * *1	5.208	J * *1	mg/Kg	☼	21	30

Lab Sample ID: MB 140-42268/6-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 42349

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0150	mg/Kg		09/01/20 08:00	09/03/20 12:35	1
Cadmium	0.07300	J	0.250	0.0110	mg/Kg		09/01/20 08:00	09/03/20 12:35	1
Iron	ND		5.00	2.90	mg/Kg		09/01/20 08:00	09/03/20 12:35	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-42268/6-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 42349

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		2.50	0.150	mg/Kg		09/01/20 08:00	09/03/20 12:35	1
Nickel	ND		2.00	0.0840	mg/Kg		09/01/20 08:00	09/03/20 12:35	1
Aluminum	ND		10.0	2.10	mg/Kg		09/01/20 08:00	09/03/20 12:35	1

Lab Sample ID: LCS 140-42268/7-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 42349

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.515		mg/Kg		101	75 - 125
Cadmium	2.50	0.8610	*	mg/Kg		34	75 - 125
Iron	50.0	45.23		mg/Kg		90	75 - 125
Lithium	5.00	5.258		mg/Kg		105	75 - 125
Nickel	25.0	23.69		mg/Kg		95	75 - 125
Aluminum	100	91.17		mg/Kg		91	75 - 125

Lab Sample ID: LCSD 140-42268/8-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 42349

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.553		mg/Kg		102	75 - 125	2	30
Cadmium	2.50	0.9660	*	mg/Kg		39	75 - 125	11	30
Iron	50.0	46.10		mg/Kg		92	75 - 125	2	30
Lithium	5.00	5.355		mg/Kg		107	75 - 125	2	30
Nickel	25.0	24.16		mg/Kg		97	75 - 125	2	30
Aluminum	100	91.81		mg/Kg		92	75 - 125	1	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 3
Prep Batch: 42349

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	0.0416	J	0.03954	J	mg/Kg	☼	5	30
Cadmium	0.0549	J B *	0.05340	J *	mg/Kg	☼	3	30
Iron	405		446.1		mg/Kg	☼	10	30
Lithium	ND		ND		mg/Kg	☼	NC	30
Nickel	1.66	J	1.595	J	mg/Kg	☼	4	30
Aluminum	57.2		58.10		mg/Kg	☼	2	30

Lab Sample ID: MB 140-42350/6-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 42391

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0160	mg/Kg		09/02/20 08:00	09/03/20 13:28	1
Cadmium	ND		0.250	0.0110	mg/Kg		09/02/20 08:00	09/03/20 13:28	1
Lithium	ND		2.50	0.150	mg/Kg		09/02/20 08:00	09/03/20 13:28	1
Nickel	ND		2.00	0.0390	mg/Kg		09/02/20 08:00	09/03/20 13:28	1
Aluminum	ND		10.0	1.60	mg/Kg		09/02/20 08:00	09/03/20 13:28	1

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-42350/6-B
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 42391

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0160	mg/Kg		09/02/20 08:00	09/08/20 10:39	1
Cadmium	ND		0.250	0.0110	mg/Kg		09/02/20 08:00	09/08/20 10:39	1
Iron	ND		5.00	2.90	mg/Kg		09/02/20 08:00	09/08/20 10:39	1
Lithium	ND		2.50	0.150	mg/Kg		09/02/20 08:00	09/08/20 10:39	1
Nickel	ND		2.00	0.0390	mg/Kg		09/02/20 08:00	09/08/20 10:39	1
Aluminum	ND		10.0	1.60	mg/Kg		09/02/20 08:00	09/08/20 10:39	1

Lab Sample ID: LCS 140-42350/7-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 42391

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.589		mg/Kg		104	75 - 125
Cadmium	2.50	2.525		mg/Kg		101	75 - 125
Lithium	5.00	5.451		mg/Kg		109	75 - 125
Nickel	25.0	24.17		mg/Kg		97	75 - 125
Aluminum	100	90.59		mg/Kg		91	75 - 125

Lab Sample ID: LCS 140-42350/7-B
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 42391

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.631		mg/Kg		105	75 - 125
Cadmium	2.50	2.546		mg/Kg		102	75 - 125
Iron	50.0	49.83		mg/Kg		100	75 - 125
Lithium	5.00	5.092		mg/Kg		102	75 - 125
Nickel	25.0	24.45		mg/Kg		98	75 - 125
Aluminum	100	96.88		mg/Kg		97	75 - 125

Lab Sample ID: LCSD 140-42350/8-B
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 42391

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.589		mg/Kg		104	75 - 125	0	30
Cadmium	2.50	2.534		mg/Kg		101	75 - 125	0	30
Lithium	5.00	5.486		mg/Kg		110	75 - 125	1	30
Nickel	25.0	24.22		mg/Kg		97	75 - 125	0	30
Aluminum	100	90.30		mg/Kg		90	75 - 125	0	30

Lab Sample ID: LCSD 140-42350/8-B
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 42391

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.668		mg/Kg		107	75 - 125	1	30
Cadmium	2.50	2.577		mg/Kg		103	75 - 125	1	30
Iron	50.0	51.35		mg/Kg		103	75 - 125	3	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-42350/8-B
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 42391

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium	5.00	5.159		mg/Kg		103	75 - 125	1	30
Nickel	25.0	24.73		mg/Kg		99	75 - 125	1	30
Aluminum	100	100.1		mg/Kg		100	75 - 125	3	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42475

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 4
Prep Batch: 42391

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	0.0765	J	0.08729	J	mg/Kg	☼	13	30
Cadmium	0.0719	J	0.08729	J	mg/Kg	☼	19	30
Lithium	0.949	J	1.124	J	mg/Kg	☼	17	30
Nickel	5.43		6.239		mg/Kg	☼	14	30
Aluminum	435		517.6		mg/Kg	☼	17	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 4
Prep Batch: 42391

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	2520		3013		mg/Kg	☼	18	30

Lab Sample ID: MB 140-42393/6-B ^5
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 42458

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		3.75	0.315	mg/Kg		09/04/20 08:00	09/08/20 11:32	5
Cadmium	ND		3.75	0.160	mg/Kg		09/04/20 08:00	09/08/20 11:32	5
Iron	48.24	J	75.0	44.0	mg/Kg		09/04/20 08:00	09/08/20 11:32	5
Lithium	ND		37.5	2.20	mg/Kg		09/04/20 08:00	09/08/20 11:32	5
Nickel	ND		30.0	0.900	mg/Kg		09/04/20 08:00	09/08/20 11:32	5
Aluminum	28.00	J	150	23.5	mg/Kg		09/04/20 08:00	09/08/20 11:32	5

Lab Sample ID: LCS 140-42393/7-B ^5
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 42458

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	7.50	3.998	*	mg/Kg		53	75 - 125
Cadmium	7.50	7.718		mg/Kg		103	75 - 125
Iron	150	ND	*	mg/Kg		2	75 - 125
Lithium	15.0	17.87	J	mg/Kg		119	75 - 125
Nickel	75.0	56.90		mg/Kg		76	75 - 125
Aluminum	300	ND	*	mg/Kg		2	75 - 125

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-42393/8-B ^5
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 42458

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			7.50	4.163	*	mg/Kg		56	75 - 125	4	30
Cadmium			7.50	8.018		mg/Kg		107	75 - 125	4	30
Iron			150	ND	* *1	mg/Kg		3	75 - 125	54	30
Lithium			15.0	17.80	J	mg/Kg		119	75 - 125	0	30
Nickel			75.0	60.80		mg/Kg		81	75 - 125	7	30
Aluminum			300	ND	* *1	mg/Kg		4	75 - 125	44	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 5
Prep Batch: 42458

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Beryllium	ND	*		ND	*	mg/Kg	☼			NC	30
Cadmium	ND			ND		mg/Kg	☼			NC	30
Iron	ND	* *1		ND	* *1	mg/Kg	☼			NC	30
Lithium	ND			ND		mg/Kg	☼			NC	30
Nickel	1.36	J		1.617	J	mg/Kg	☼			17	30
Aluminum	102	J B * *1		128.3	J * *1	mg/Kg	☼			23	30

Lab Sample ID: MB 140-42459/6-A
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 42459

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0120	mg/Kg		09/03/20 11:45	09/08/20 12:25	1
Cadmium	ND		0.250	0.0110	mg/Kg		09/03/20 11:45	09/08/20 12:25	1
Iron	ND		5.00	2.90	mg/Kg		09/03/20 11:45	09/08/20 12:25	1
Lithium	ND		2.50	0.150	mg/Kg		09/03/20 11:45	09/08/20 12:25	1
Nickel	ND		2.00	0.0530	mg/Kg		09/03/20 11:45	09/08/20 12:25	1
Aluminum	ND		10.0	1.60	mg/Kg		09/03/20 11:45	09/08/20 12:25	1

Lab Sample ID: LCS 140-42459/7-A
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 42459

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium			2.50	2.499		mg/Kg		100	75 - 125
Cadmium			2.50	2.453		mg/Kg		98	75 - 125
Iron			50.0	44.76		mg/Kg		90	75 - 125
Lithium			5.00	5.007		mg/Kg		100	75 - 125
Nickel			25.0	23.26		mg/Kg		93	75 - 125
Aluminum			100	91.09		mg/Kg		91	75 - 125

Lab Sample ID: LCSD 140-42459/8-A
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 42459

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			2.50	2.558		mg/Kg		102	75 - 125	2	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-42459/8-A
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 42459

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium			2.50	2.504		mg/Kg		100	75 - 125	2	30
Iron			50.0	45.44		mg/Kg		91	75 - 125	2	30
Lithium			5.00	5.064		mg/Kg		101	75 - 125	1	30
Nickel			25.0	23.72		mg/Kg		95	75 - 125	2	30
Aluminum			100	92.41		mg/Kg		92	75 - 125	1	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42539

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 6
Prep Batch: 42459

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Beryllium	0.0426	J		0.04981	J	mg/Kg	☼			16	30
Cadmium	ND			ND		mg/Kg	☼			NC	30
Iron	2990			3364		mg/Kg	☼			12	30
Lithium	1.02	J		1.071	J	mg/Kg	☼			5	30
Nickel	2.34			2.684		mg/Kg	☼			14	30
Aluminum	591			647.3		mg/Kg	☼			9	30

Lab Sample ID: MB 140-42471/6-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 42471

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.00750	mg/Kg		09/04/20 08:00	09/09/20 10:46	1
Cadmium	ND		0.250	0.0110	mg/Kg		09/04/20 08:00	09/09/20 10:46	1
Iron	ND		5.00	4.10	mg/Kg		09/04/20 08:00	09/09/20 10:46	1
Lithium	ND		2.50	0.150	mg/Kg		09/04/20 08:00	09/09/20 10:46	1
Nickel	ND		2.00	0.0570	mg/Kg		09/04/20 08:00	09/09/20 10:46	1
Aluminum	ND		10.0	1.60	mg/Kg		09/04/20 08:00	09/09/20 10:46	1

Lab Sample ID: LCS 140-42471/7-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 42471

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Beryllium			2.50	2.576		mg/Kg		103	75 - 125		
Cadmium			2.50	2.621		mg/Kg		105	75 - 125		
Iron			50.0	52.54		mg/Kg		105	75 - 125		
Lithium			5.00	5.119		mg/Kg		102	75 - 125		
Nickel			25.0	25.74		mg/Kg		103	75 - 125		
Aluminum			100	99.37		mg/Kg		99	75 - 125		

Lab Sample ID: LCSD 140-42471/8-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 42471

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			2.50	2.566		mg/Kg		103	75 - 125	0	30
Cadmium			2.50	2.619		mg/Kg		105	75 - 125	0	30
Iron			50.0	52.02		mg/Kg		104	75 - 125	1	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-42471/8-A
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 42471

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lithium			5.00	5.173		mg/Kg		103	75 - 125	1	30
Nickel			25.0	25.79		mg/Kg		103	75 - 125	0	30
Aluminum			100	98.88		mg/Kg		99	75 - 125	0	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 7
Prep Batch: 42471

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Iron	2220			2698		mg/Kg	☼			19	30
Aluminum	15100			17780		mg/Kg	☼			16	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 7
Prep Batch: 42471

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Beryllium	0.305			0.3014		mg/Kg	☼			1	30
Cadmium	0.0524	J		0.03800	J F5	mg/Kg	☼			32	30
Lithium	3.34			3.115		mg/Kg	☼			7	30

Lab Sample ID: 140-19962-4 DU
Matrix: Solid
Analysis Batch: 42568

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3
Prep Type: Step 7
Prep Batch: 42471

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Nickel	0.912	J		2.100	J F5	mg/Kg	☼			79	30

Metals

Prep Batch: 42166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	Total	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	Total	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	Total	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	Total	
MB 140-42166/8-A	Method Blank	Total/NA	Solid	Total	
LCS 140-42166/9-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-42166/10-A	Lab Control Sample Dup	Total/NA	Solid	Total	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	Total	

SEP Batch: 42168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 1	Solid	Exchangeable	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 1	Solid	Exchangeable	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 1	Solid	Exchangeable	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 1	Solid	Exchangeable	
MB 140-42168/8-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-42168/9-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-42168/10-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 1	Solid	Exchangeable	

Prep Batch: 42218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 1	Solid	3010A	42168
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 1	Solid	3010A	42168
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 1	Solid	3010A	42168
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 1	Solid	3010A	42168
MB 140-42168/8-B ^4	Method Blank	Step 1	Solid	3010A	42168
LCS 140-42168/9-B ^5	Lab Control Sample	Step 1	Solid	3010A	42168
LCSD 140-42168/10-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	42168
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 1	Solid	3010A	42168

SEP Batch: 42219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 2	Solid	Carbonate	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 2	Solid	Carbonate	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 2	Solid	Carbonate	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 2	Solid	Carbonate	
MB 140-42219/8-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-42219/9-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-42219/10-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 2	Solid	Carbonate	

Prep Batch: 42267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 2	Solid	3010A	42219
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 2	Solid	3010A	42219
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 2	Solid	3010A	42219
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 2	Solid	3010A	42219
MB 140-42219/8-B ^3	Method Blank	Step 2	Solid	3010A	42219
LCS 140-42219/9-B ^5	Lab Control Sample	Step 2	Solid	3010A	42219
LCSD 140-42219/10-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	42219

Metals (Continued)

Prep Batch: 42267 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 2	Solid	3010A	42219

SEP Batch: 42268

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 3	Solid	Non-Crystalline	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 3	Solid	Non-Crystalline	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 3	Solid	Non-Crystalline	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 3	Solid	Non-Crystalline	
MB 140-42268/6-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-42268/7-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-42268/8-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 3	Solid	Non-Crystalline	

Prep Batch: 42349

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 3	Solid	3010A	42268
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 3	Solid	3010A	42268
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 3	Solid	3010A	42268
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 3	Solid	3010A	42268
MB 140-42268/6-B	Method Blank	Step 3	Solid	3010A	42268
LCS 140-42268/7-B	Lab Control Sample	Step 3	Solid	3010A	42268
LCSD 140-42268/8-B	Lab Control Sample Dup	Step 3	Solid	3010A	42268
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 3	Solid	3010A	42268

SEP Batch: 42350

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 4	Solid	Metal Hydroxide	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 4	Solid	Metal Hydroxide	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 4	Solid	Metal Hydroxide	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	Metal Hydroxide	
MB 140-42350/6-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-42350/7-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-42350/8-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	Metal Hydroxide	

Prep Batch: 42391

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 4	Solid	3010A	42350
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 4	Solid	3010A	42350
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 4	Solid	3010A	42350
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	3010A	42350
MB 140-42350/6-B	Method Blank	Step 4	Solid	3010A	42350
LCS 140-42350/7-B	Lab Control Sample	Step 4	Solid	3010A	42350
LCSD 140-42350/8-B	Lab Control Sample Dup	Step 4	Solid	3010A	42350
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	3010A	42350

SEP Batch: 42393

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 5	Solid	Organic-Bound	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 5	Solid	Organic-Bound	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 5	Solid	Organic-Bound	

Metals (Continued)

SEP Batch: 42393 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 5	Solid	Organic-Bound	
MB 140-42393/6-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-42393/7-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-42393/8-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 5	Solid	Organic-Bound	

Prep Batch: 42458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 5	Solid	3010A	42393
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 5	Solid	3010A	42393
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 5	Solid	3010A	42393
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 5	Solid	3010A	42393
MB 140-42393/6-B ^5	Method Blank	Step 5	Solid	3010A	42393
LCS 140-42393/7-B ^5	Lab Control Sample	Step 5	Solid	3010A	42393
LCSD 140-42393/8-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	42393
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 5	Solid	3010A	42393

SEP Batch: 42459

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 6	Solid	Acid/Sulfide	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 6	Solid	Acid/Sulfide	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 6	Solid	Acid/Sulfide	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 6	Solid	Acid/Sulfide	
MB 140-42459/6-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-42459/7-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-42459/8-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 6	Solid	Acid/Sulfide	

Prep Batch: 42471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 7	Solid	Residual	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 7	Solid	Residual	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 7	Solid	Residual	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	Residual	
MB 140-42471/6-A	Method Blank	Step 7	Solid	Residual	
LCS 140-42471/7-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-42471/8-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	Residual	

Analysis Batch: 42475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 1	Solid	6010B SEP	42218
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 2	Solid	6010B SEP	42267
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 3	Solid	6010B SEP	42349
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 4	Solid	6010B SEP	42391
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 1	Solid	6010B SEP	42218
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 2	Solid	6010B SEP	42267
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 3	Solid	6010B SEP	42349
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 4	Solid	6010B SEP	42391
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 1	Solid	6010B SEP	42218
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 2	Solid	6010B SEP	42267

Metals (Continued)

Analysis Batch: 42475 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 3	Solid	6010B SEP	42349
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 4	Solid	6010B SEP	42391
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 1	Solid	6010B SEP	42218
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 2	Solid	6010B SEP	42267
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 3	Solid	6010B SEP	42349
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	6010B SEP	42391
MB 140-42168/8-B ^4	Method Blank	Step 1	Solid	6010B SEP	42218
MB 140-42219/8-B ^3	Method Blank	Step 2	Solid	6010B SEP	42267
MB 140-42268/6-B	Method Blank	Step 3	Solid	6010B SEP	42349
MB 140-42350/6-B	Method Blank	Step 4	Solid	6010B SEP	42391
LCS 140-42168/9-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	42218
LCS 140-42219/9-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	42267
LCS 140-42268/7-B	Lab Control Sample	Step 3	Solid	6010B SEP	42349
LCS 140-42350/7-B	Lab Control Sample	Step 4	Solid	6010B SEP	42391
LCSD 140-42168/10-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	42218
LCSD 140-42219/10-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	42267
LCSD 140-42268/8-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	42349
LCSD 140-42350/8-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	42391
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 1	Solid	6010B SEP	42218
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 2	Solid	6010B SEP	42267
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 3	Solid	6010B SEP	42349
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	6010B SEP	42391

Analysis Batch: 42539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 4	Solid	6010B SEP	42391
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 5	Solid	6010B SEP	42458
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 6	Solid	6010B SEP	42459
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 4	Solid	6010B SEP	42391
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 5	Solid	6010B SEP	42458
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 6	Solid	6010B SEP	42459
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 4	Solid	6010B SEP	42391
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 5	Solid	6010B SEP	42458
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 6	Solid	6010B SEP	42459
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	6010B SEP	42391
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 5	Solid	6010B SEP	42458
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 6	Solid	6010B SEP	42459
MB 140-42350/6-B	Method Blank	Step 4	Solid	6010B SEP	42391
MB 140-42393/6-B ^5	Method Blank	Step 5	Solid	6010B SEP	42458
MB 140-42459/6-A	Method Blank	Step 6	Solid	6010B SEP	42459
LCS 140-42350/7-B	Lab Control Sample	Step 4	Solid	6010B SEP	42391
LCS 140-42393/7-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	42458
LCS 140-42459/7-A	Lab Control Sample	Step 6	Solid	6010B SEP	42459
LCSD 140-42350/8-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	42391
LCSD 140-42393/8-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	42458
LCSD 140-42459/8-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	42459
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 4	Solid	6010B SEP	42391
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 5	Solid	6010B SEP	42458
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 6	Solid	6010B SEP	42459

Metals

Analysis Batch: 42568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Step 7	Solid	6010B SEP	42471
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	6010B	42166
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	6010B SEP	42471
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	6010B SEP	42471
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	6010B SEP	42471
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	6010B	42166
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	6010B	42166
MB 140-42166/8-A	Method Blank	Total/NA	Solid	6010B	42166
MB 140-42471/6-A	Method Blank	Step 7	Solid	6010B SEP	42471
LCS 140-42166/9-A	Lab Control Sample	Total/NA	Solid	6010B	42166
LCS 140-42471/7-A	Lab Control Sample	Step 7	Solid	6010B SEP	42471
LCSD 140-42166/10-A	Lab Control Sample Dup	Total/NA	Solid	6010B	42166
LCSD 140-42471/8-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	42471
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	6010B SEP	42471
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	6010B SEP	42471
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Step 7	Solid	6010B SEP	42471
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	6010B	42166
140-19962-4 DU	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	6010B	42166

Analysis Batch: 42657

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Sum of Steps 1-7	Solid	6010B SEP	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Sum of Steps 1-7	Solid	6010B SEP	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Sum of Steps 1-7	Solid	6010B SEP	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 41773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	Moisture	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Total/NA	Solid	Moisture	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Total/NA	Solid	Moisture	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Total/NA	Solid	Moisture	
140-19962-1 DU	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 140-19962-1

Date Collected: 08/06/20 11:00

Matrix: Solid

Date Received: 08/07/20 10:00

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			42657	09/11/20 13:59	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			41773	08/12/20 14:49	KW1	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 140-19962-1

Date Collected: 08/06/20 11:00

Matrix: Solid

Date Received: 08/07/20 10:00

Percent Solids: 84.2

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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			42568	09/09/20 12:02	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 13:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			42475	09/03/20 11:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			42475	09/03/20 11:56	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 12:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:42	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 10:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 11:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:39	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3

Lab Sample ID: 140-19962-1

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Matrix: Solid
Percent Solids: 84.2

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	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			42568	09/09/20 11:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 12:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			42568	09/09/20 13:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 140-19962-2

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Matrix: Solid

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			42657	09/11/20 13:59	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			41773	08/12/20 14:49	KW1	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 140-19962-2

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Matrix: Solid
Percent Solids: 84.7

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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			42568	09/09/20 12:07	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 13:13	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			42568	09/09/20 14:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			42475	09/03/20 11:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			42475	09/03/20 12:01	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3

Lab Sample ID: 140-19962-2
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00
Percent Solids: 84.7

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	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 12:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 10:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 11:51	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:44	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			42568	09/09/20 11:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 12:45	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			42568	09/09/20 14:02	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 140-19962-3
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00

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			42657	09/11/20 13:59	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			41773	08/12/20 14:49	KW1	TAL KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3

Lab Sample ID: 140-19962-3
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00
Percent Solids: 84.8

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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			42568	09/09/20 12:12	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 13:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			42475	09/03/20 11:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			42475	09/03/20 12:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 12:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:51	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 11:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 11:56	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			42568	09/09/20 11:43	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 12:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			42568	09/09/20 14:07	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Lab Sample ID: 140-19962-4
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00

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			42657	09/11/20 13:59	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			41773	08/12/20 14:49	KW1	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Lab Sample ID: 140-19962-4
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00
Percent Solids: 97.4

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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			42568	09/09/20 12:16	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 13:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			42475	09/03/20 11:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			42475	09/03/20 12:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 13:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:56	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 11:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 12:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			42568	09/09/20 11:48	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Lab Sample ID: 140-19962-4
Date Collected: 08/06/20 11:00
Matrix: Solid
Date Received: 08/07/20 10:00
Percent Solids: 97.4

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	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 12:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			42568	09/09/20 14:12	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-42166/8-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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 11:01	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-42168/8-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	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			42475	09/03/20 10:50	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-42219/8-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 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			42475	09/03/20 11:42	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-42268/6-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	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 12:35	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-42350/6-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	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:28	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 10:39	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-42393/6-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	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 11:32	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-42459/6-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	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:25	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-42471/6-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	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 10:46	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-42166/9-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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 11:06	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc. Job ID: 140-19962-1
Project/Site: GAF-NRSTreatability

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-42168/9-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	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			42475	09/03/20 10:54	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-42219/9-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 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			42475	09/03/20 11:47	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-42268/7-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	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 12:40	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-42350/7-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	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 10:44	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-42393/7-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	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 11:36	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-42459/7-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	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:30	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-42471/7-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	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 10:51	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-42166/10-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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 11:10	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-42168/10-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	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			42475	09/03/20 10:59	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — **Lab Sample ID: LCSD 140-42219/10-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 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			42475	09/03/20 11:52	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — **Lab Sample ID: LCSD 140-42268/8-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	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 12:45	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — **Lab Sample ID: LCSD 140-42350/8-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	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 13:37	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 10:49	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — **Lab Sample ID: LCSD 140-42393/8-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	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 11:41	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — **Lab Sample ID: LCSD 140-42459/8-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	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:35	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc. Job ID: 140-19962-1
Project/Site: GAF-NRSTreatability

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-42471/8-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	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 10:56	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3 — Lab Sample ID: 140-19962-1 DU

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 10:00

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			41773	08/12/20 14:49	KW1	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3 — Lab Sample ID: 140-19962-4 DU

Date Collected: 08/06/20 11:00 — **Matrix: Solid**
Date Received: 08/07/20 10:00 — **Percent Solids: 97.4**

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 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			42568	09/09/20 12:21	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	42166	08/27/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			42568	09/09/20 13:37	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	42168	08/27/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	42218	08/28/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			42475	09/03/20 11:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	42219	08/28/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	42267	08/31/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			42475	09/03/20 12:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	42268	08/31/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	42349	09/01/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			42475	09/03/20 13:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42475	09/03/20 14:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	42350	09/01/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	42391	09/02/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			42539	09/08/20 11:12	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Client Sample ID: GAF-GW-PHIII-BKT-SAND-T3

Date Collected: 08/06/20 11:00
Date Received: 08/07/20 10:00

Lab Sample ID: 140-19962-4 DU

Matrix: Solid
Percent Solids: 97.4

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	42393	09/02/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	42458	09/04/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			42539	09/08/20 12:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	42459	09/03/20 11:45	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			42539	09/08/20 12:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			42568	09/09/20 11:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			42568	09/09/20 12:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	42471	09/04/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			42568	09/09/20 14:17	KNC	TAL KNX
	Instrument ID: DUO									

Laboratory References:
TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Job ID: 140-19962-1
Project/Site: GAF-NRSTreatability

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
ANAB	ISO/IEC 17025	L2311	02-14-22
Arkansas DEQ	State	88-0688	06-17-21
California	State	2423	06-30-21
Colorado	State	TN00009	02-28-21
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	07-01-21
Georgia (DW)	State	906	12-11-22
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	11-01-20
Kentucky (DW)	State	90101	01-01-21
Louisiana	NELAP	LA110001	12-31-12 *
Louisiana	NELAP	83979	06-30-21
Louisiana (DW)	State	LA019	12-31-20
Maryland	State	277	03-31-21
Michigan	State	9933	12-11-22
Nevada	State	TN00009	07-31-21
New Hampshire	NELAP	299919	01-17-21
New Jersey	NELAP	TN001	07-01-21
New York	NELAP	10781	03-31-21
North Carolina (DW)	State	21705	07-31-21
North Carolina (WW/SW)	State	64	12-31-20
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	08-31-21
Oregon	NELAP	TNI0189	01-02-21
Pennsylvania	NELAP	68-00576	12-31-20
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-21
Virginia	NELAP	460176	09-14-20
Washington	State	C593	01-19-21
West Virginia (DW)	State	9955C	01-01-21
West Virginia DEP	State	345	05-01-21
Wisconsin	State	998044300	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	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 = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRSTreatability

Job ID: 140-19962-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-19962-1	GAF-GW-PHIII-BKT-CONTROL-SAND-19R-T3	Solid	08/06/20 11:00	08/07/20 10:00	
140-19962-2	GAF-GW-PHIII-BKT-DOLO-SAND-19R-T3	Solid	08/06/20 11:00	08/07/20 10:00	
140-19962-3	GAF-GW-PHIII-BKT-HI CAL-SAND-19R-T3	Solid	08/06/20 11:00	08/07/20 10:00	
140-19962-4	GAF-GW-PHIII-BKT-SAND-T3	Solid	08/06/20 11:00	08/07/20 10:00	

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CHAIN OF CUSTODY RECORD

☐ Almgren Drive, Agawam, MA 01001, (413) 789-9018
☐ 646 Camp Avenue, N. Kingstown, RI 02852, (401) 732-3400

Special Handling:

☑ TAT - Date Needed: 5-day TAT, except SEP

All TATs subject to laboratory approval
Min. 24-hr notification needed for rushes
Samples disposed after 30 days unless otherwise instructed.

Report To: Franciscos Barajas
AECOM
9400 Amberglen Blvd
Austin, TX 78729
Telephone #: 978-905-2299
Project Mgr: Craig MacPhee

Invoice To: Craig MacPhee
AECOM
250 Apollo Dr.
Chelmsford, MA 01824
P.O No.: Quote #:

Project No: TVA Gallatin EIP
Site Name: GAF-NRS-Treatability
Location: State:
Sampler(s): Rachel Watkins
Craig Katkic

F=Field Filtered 1=Na_2S2O_3 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH3OH 8=$NaHSO_4$ 9=Deionized Water 10=H_3PO_4 1= 12=

DW=Drinking Water GW=Groundwater SW=Surface Water WW=Waste Water
O=Oil SO=Soil SL=Sludge A=Indoor/Ambient Air SG=Soil Gas
X1= X2=

G= Grab C=Compsite

Lab ID:	Sample ID:	Date:	Time:	Type	Matrix	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis: SW-846 3010D/6010D sequential extraction & analysis	List Preservative Code below:	QA/QC Reporting Notes:
	GAF-GW-PHIII-Bkt-Control-sand-19R-t3	8/6/2020	11:00 AM	G	S			2		x		Analysis of Be, Cd, Li, Ni, Al, Fe
	GAF-GW-PHIII-Bkt-Dolo-sand-19R-t3	8/6/2020	11:00 AM	G	S			2		x		Analysis of Be, Cd, Li, Ni, Al, Fe
	GAF-GW-PHIII-Bkt-Hi Cal-sand-19R-t3	8/6/2020	11:00 AM	G	S			2		x		Analysis of Be, Cd, Li, Ni, Al, Fe
	GAF-GW-PHIII-Bkt-sand-t3	8/6/2020	11:00 AM	G	S			2		x		Analysis of Be, Cd, Li, Ni, Al, Fe

RT: 1.4°C CT: 1.4°C, Cooler
FedEx Po, Custody seal intact
Trk# 4842 0859 7496
KLJ 8/7/20

140-19962 Chain of Custody

QA/QC Reporting Level
☐ Level I ☐ Level II
☐ Level III ☐ Level IV
☐ Other:
State-specific reporting standards:

Relinquished by:	Received by:	Date:	Time:
Rachel Watkins		8/6/20	1500
	Ken Zak	8/7/20	1000

Temp °C
Observed: 1.4°C
Correction Factor: 1.4°C
Corrected: 0.0
IR ID#:

☐ EDD format:
☐ E-mail to:

Condition upon receipt: Custody Seals: ☐ Present ☑ Intact ☐ Broken
☐ Ambient ☑ Iced ☐ Refrigerated ☐ DI VOA Frozen ☐ Soil Jar Frozen

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:** Loc: 140 19962

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	/			☐ **Containers, Broken**
2. Were ambient air containers received intact?			/	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	/			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : SC68 Correction factor: 0.0	/			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	/			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	/			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	/			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	/			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	/			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?	/			☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	/			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	/			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	/			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	/			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	/			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			/	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			/	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			/	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			/	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			/	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 18022206 PM Instructions:

Sample Receiving Associate: Ken Wilson Date: 8/17/20

QA026R32.doc, 062719

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-103583-2
Laboratory Sample Delivery Group: SEP Metals
Client Project/Site: GAF-2020-03092259

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
4/22/2020 9:04:41 PM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: 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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Job ID: 180-103583-2

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-103583-2

Receipt
The samples were received on 3/14/2020 10:15 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.5º C.

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins 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 (MgSO4), 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-HNO3-H2O, 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, HNO3, HCl and H3BO3. 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, HNO3, HCl and H3BO3. 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:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/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

Job ID: 180-103583-2 (Continued)

Laboratory: Eurofins TestAmerica, Pittsburgh (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. The reporting limits were adjusted accordingly.

Method 6010B: The following samples were diluted due to the presence of silicon which interferes with Nickel:
GAF-SB-NRS070-50-60-03102020 ~ NRS070 (180-103583-4) and GAF-SB-NRS068-40-58-03122020 ~ NRS068 (180-103583-5).
Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Qualifiers

Metals

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*1	LCS/LCSD RPD exceeds control limits.
B	Compound was found in the blank and sample.
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: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
ANAB	ISO/IEC 17025	L2311	02-14-22
Arkansas DEQ	State	88-0688	06-16-20
California	State	2423	06-30-20
Colorado	State	TN00009	02-28-21
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	06-30-20
Georgia (DW)	State	906	04-13-20 *
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	11-01-20
Kentucky (DW)	State	90101	01-01-21
Louisiana	NELAP	83979	06-30-20
Louisiana (DW)	State	LA019	12-31-20
Maryland	State	277	03-31-21
Michigan	State	9933	12-11-22
Nevada	State	TN00009	07-31-20
New Hampshire	NELAP	299919	01-17-21
New Jersey	NELAP	TN001	06-30-20
New York	NELAP	10781	03-31-21
North Carolina (DW)	State	21705	07-31-20
North Carolina (WW/SW)	State	64	12-31-20
Ohio VAP	State	CL0059	08-28-20
Oklahoma	State	9415	09-01-20
Oregon	NELAP	TNI0189	01-02-21
Pennsylvania	NELAP	68-00576	12-31-20
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-20
Virginia	NELAP	460176	09-15-20
Washington	State	C593	01-19-21
West Virginia (DW)	State	9955C	01-01-21
West Virginia DEP	State	345	04-30-20
Wisconsin	State	998044300	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Solid	03/09/20 14:20	03/14/20 10:15	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Solid	03/10/20 17:40	03/14/20 10:15	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Solid	03/12/20 09:50	03/14/20 10:15	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
3010A	Preparation, Total Metals	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:

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 = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069

Lab Sample ID: 180-103583-1
Date Collected: 03/09/20 14:20
Matrix: Solid
Date Received: 03/14/20 10:15

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	38881	04/06/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			39150	04/17/20 12:41	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	38882	04/06/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	38913	04/07/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			39000	04/09/20 12:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	38914	04/07/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	38928	04/08/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			39023	04/10/20 11:47	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	38930	04/08/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	38965	04/09/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			39065	04/14/20 11:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	38966	04/09/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	39002	04/10/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			39065	04/14/20 12:43	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	39003	04/10/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	39041	04/14/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			39087	04/15/20 11:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	39042	04/14/20 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			39087	04/15/20 12:42	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	39055	04/15/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			39126	04/16/20 12:56	KNC	TAL KNX
	Instrument ID: DUO									
Sum of Steps 1-7	Analysis	6010B SEP		1			39247	04/22/20 14:10	DKW	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-SB-NRS070-50-60-03102020 ~ NRS070

Lab Sample ID: 180-103583-4
Date Collected: 03/10/20 17:40
Matrix: Solid
Date Received: 03/14/20 10:15

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	38881	04/06/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		5			39150	04/17/20 11:30	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	38881	04/06/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			39150	04/17/20 12:52	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Client Sample ID: GAF-SB-NRS070-50-60-03102020 ~ NRS070

Lab Sample ID: 180-103583-4
Date Collected: 03/10/20 17:40
Matrix: Solid
Date Received: 03/14/20 10:15

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	38882	04/06/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	38913	04/07/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			39000	04/09/20 12:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	38914	04/07/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	38928	04/08/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			39023	04/10/20 11:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	38930	04/08/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	38965	04/09/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			39065	04/14/20 11:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	38966	04/09/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	39002	04/10/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			39065	04/14/20 13:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	39003	04/10/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	39041	04/14/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			39087	04/15/20 11:24	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	39042	04/14/20 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			39087	04/15/20 13:07	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	39055	04/15/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			39126	04/16/20 13:06	KNC	TAL KNX
	Instrument ID: DUO									
Sum of Steps 1-7	Analysis	6010B SEP		1			39247	04/22/20 14:10	DKW	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-SB-NRS068-40-58-03122020 ~ NRS068

Lab Sample ID: 180-103583-5
Date Collected: 03/12/20 09:50
Matrix: Solid
Date Received: 03/14/20 10:15

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	38881	04/06/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		5			39150	04/17/20 11:35	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	38881	04/06/20 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			39150	04/17/20 12:57	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	38882	04/06/20 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	38913	04/07/20 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			39000	04/09/20 13:04	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Client Sample ID: GAF-SB-NRS068-40-58-03122020 ~ NRS068

Lab Sample ID: 180-103583-5

Date Collected: 03/12/20 09:50
Matrix: Solid
Date Received: 03/14/20 10:15

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	38914	04/07/20 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	38928	04/08/20 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			39023	04/10/20 12:03	KNC	TAL KNX
	Instrument ID:	DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	38930	04/08/20 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	38965	04/09/20 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			39065	04/14/20 11:31	KNC	TAL KNX
	Instrument ID:	DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	38966	04/09/20 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	39002	04/10/20 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			39065	04/14/20 13:13	KNC	TAL KNX
	Instrument ID:	DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	39003	04/10/20 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	39041	04/14/20 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			39087	04/15/20 11:29	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	39042	04/14/20 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			39087	04/15/20 13:13	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	39055	04/15/20 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			39126	04/16/20 13:26	KNC	TAL KNX
	Instrument ID:	DUO								
Sum of Steps 1-7	Analysis	6010B SEP		1			39247	04/22/20 14:10	DKW	TAL KNX
	Instrument ID:	NOEQUIP								

Laboratory References:
TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Analyst References:
Lab: TAL KNX
Batch Type: SEP
KNC = Kerry Collins
Batch Type: Prep
KNC = Kerry Collins
Batch Type: Analysis
DKW = Donna Wilburn
KNC = Kerry Collins

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069

Lab Sample ID: 180-103583-1

Date Collected: 03/09/20 14:20
Matrix: Solid
Date Received: 03/14/20 10:15

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.23	0.378	mg/Kg	☼	04/07/20 08:00	04/09/20 12:49	4
Cadmium	ND		1.23	0.0785	mg/Kg	☼	04/07/20 08:00	04/09/20 12:49	4
Iron	**999**		24.5	14.2	mg/Kg	☼	04/07/20 08:00	04/09/20 12:49	4
Lithium	ND		12.3	0.736	mg/Kg	☼	04/07/20 08:00	04/09/20 12:49	4
Nickel	**0.365**	**J**	9.81	0.334	mg/Kg	☼	04/07/20 08:00	04/09/20 12:49	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.920	0.0589	mg/Kg	☼	04/08/20 08:00	04/10/20 11:47	3
Cadmium	ND		0.920	0.0405	mg/Kg	☼	04/08/20 08:00	04/10/20 11:47	3
Iron	**91.6**	*****	18.4	10.7	mg/Kg	☼	04/08/20 08:00	04/10/20 11:47	3
Lithium	ND		9.20	0.552	mg/Kg	☼	04/08/20 08:00	04/10/20 11:47	3
Nickel	ND		7.36	0.184	mg/Kg	☼	04/08/20 08:00	04/10/20 11:47	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0533**	**J**	0.307	0.0184	mg/Kg	☼	04/09/20 08:00	04/14/20 11:15	1
Cadmium	**0.0454**	**J B ***	0.307	0.0135	mg/Kg	☼	04/09/20 08:00	04/14/20 11:15	1
Iron	**993**		6.13	3.56	mg/Kg	☼	04/09/20 08:00	04/14/20 11:15	1
Lithium	ND		3.07	0.184	mg/Kg	☼	04/09/20 08:00	04/14/20 11:15	1
Nickel	ND		2.45	0.103	mg/Kg	☼	04/09/20 08:00	04/14/20 11:15	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.278**	**J**	0.307	0.0196	mg/Kg	☼	04/10/20 08:00	04/14/20 12:43	1
Cadmium	**0.0208**	**J**	0.307	0.0135	mg/Kg	☼	04/10/20 08:00	04/14/20 12:43	1
Iron	**12900**		6.13	3.56	mg/Kg	☼	04/10/20 08:00	04/14/20 12:43	1
Lithium	**0.917**	**J**	3.07	0.184	mg/Kg	☼	04/10/20 08:00	04/14/20 12:43	1
Nickel	**4.50**		2.45	0.0478	mg/Kg	☼	04/10/20 08:00	04/14/20 12:43	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	4.60	0.386	mg/Kg	☼	04/14/20 08:00	04/15/20 11:13	5
Cadmium	ND		4.60	0.196	mg/Kg	☼	04/14/20 08:00	04/15/20 11:13	5
Iron	ND	* *1	92.0	54.0	mg/Kg	☼	04/14/20 08:00	04/15/20 11:13	5
Lithium	ND		46.0	2.70	mg/Kg	☼	04/14/20 08:00	04/15/20 11:13	5
Nickel	ND		36.8	1.10	mg/Kg	☼	04/14/20 08:00	04/15/20 11:13	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.128**	**J**	0.307	0.0147	mg/Kg	☼	04/14/20 08:00	04/15/20 12:42	1
Cadmium	ND		0.307	0.0135	mg/Kg	☼	04/14/20 08:00	04/15/20 12:42	1
Iron	**5130**		6.13	3.56	mg/Kg	☼	04/14/20 08:00	04/15/20 12:42	1
Lithium	**2.91**	**J**	3.07	0.184	mg/Kg	☼	04/14/20 08:00	04/15/20 12:42	1
Nickel	**3.30**		2.45	0.0650	mg/Kg	☼	04/14/20 08:00	04/15/20 12:42	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.586**		0.307	0.00920	mg/Kg	☼	04/15/20 08:00	04/16/20 12:56	1
Cadmium	ND		0.307	0.0135	mg/Kg	☼	04/15/20 08:00	04/16/20 12:56	1
Iron	**3700**		6.13	5.03	mg/Kg	☼	04/15/20 08:00	04/16/20 12:56	1

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Lab Sample ID: 180-103583-1
Date Collected: 03/09/20 14:20
Matrix: Solid
Date Received: 03/14/20 10:15

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	13.7		3.07	0.184	mg/Kg	☼	04/15/20 08:00	04/16/20 12:56	1
Nickel	7.02		2.45	0.0343	mg/Kg	☼	04/15/20 08:00	04/16/20 12:56	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.04		0.250	0.00750	mg/Kg			04/22/20 14:10	1
Cadmium	0.0662	J	0.250	0.0110	mg/Kg			04/22/20 14:10	1
Iron	23800		5.00	4.10	mg/Kg			04/22/20 14:10	1
Lithium	17.5		2.50	0.150	mg/Kg			04/22/20 14:10	1
Nickel	15.2		2.00	0.0280	mg/Kg			04/22/20 14:10	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.04		0.307	0.00920	mg/Kg	☼	04/06/20 08:00	04/17/20 12:41	1
Cadmium	0.441		0.307	0.0135	mg/Kg	☼	04/06/20 08:00	04/17/20 12:41	1
Iron	23200		6.13	5.03	mg/Kg	☼	04/06/20 08:00	04/17/20 12:41	1
Lithium	18.3		3.07	0.184	mg/Kg	☼	04/06/20 08:00	04/17/20 12:41	1
Nickel	15.1		2.45	0.0343	mg/Kg	☼	04/06/20 08:00	04/17/20 12:41	1

Client Sample ID: GAF-SB-NRS070-50-60-03102020 ~ NRS070

Lab Sample ID: 180-103583-4

Date Collected: 03/10/20 17:40
Matrix: Solid
Date Received: 03/14/20 10:15

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.23	0.379	mg/Kg	☼	04/07/20 08:00	04/09/20 12:59	4
Cadmium	ND		1.23	0.0789	mg/Kg	☼	04/07/20 08:00	04/09/20 12:59	4
Iron	ND		24.6	14.3	mg/Kg	☼	04/07/20 08:00	04/09/20 12:59	4
Lithium	ND		12.3	0.739	mg/Kg	☼	04/07/20 08:00	04/09/20 12:59	4
Nickel	ND		9.86	0.335	mg/Kg	☼	04/07/20 08:00	04/09/20 12:59	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.924	0.0591	mg/Kg	☼	04/08/20 08:00	04/10/20 11:58	3
Cadmium	ND		0.924	0.0407	mg/Kg	☼	04/08/20 08:00	04/10/20 11:58	3
Iron	ND	*	18.5	10.7	mg/Kg	☼	04/08/20 08:00	04/10/20 11:58	3
Lithium	ND		9.24	0.554	mg/Kg	☼	04/08/20 08:00	04/10/20 11:58	3
Nickel	ND		7.39	0.185	mg/Kg	☼	04/08/20 08:00	04/10/20 11:58	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0727**	**J**	0.308	0.0185	mg/Kg	☼	04/09/20 08:00	04/14/20 11:25	1
Cadmium	**0.0875**	**J B ***	0.308	0.0136	mg/Kg	☼	04/09/20 08:00	04/14/20 11:25	1
Iron	**509**		6.16	3.57	mg/Kg	☼	04/09/20 08:00	04/14/20 11:25	1
Lithium	ND		3.08	0.185	mg/Kg	☼	04/09/20 08:00	04/14/20 11:25	1
Nickel	**0.271**	**J**	2.46	0.103	mg/Kg	☼	04/09/20 08:00	04/14/20 11:25	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.278**	**J**	0.308	0.0197	mg/Kg	☼	04/10/20 08:00	04/14/20 13:08	1
Cadmium	**0.0271**	**J**	0.308	0.0136	mg/Kg	☼	04/10/20 08:00	04/14/20 13:08	1
Iron	**7700**		6.16	3.57	mg/Kg	☼	04/10/20 08:00	04/14/20 13:08	1
Lithium	**1.22**	**J**	3.08	0.185	mg/Kg	☼	04/10/20 08:00	04/14/20 13:08	1
Nickel	**4.79**		2.46	0.0481	mg/Kg	☼	04/10/20 08:00	04/14/20 13:08	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	4.62	0.388	mg/Kg	☼	04/14/20 08:00	04/15/20 11:24	5
Cadmium	ND		4.62	0.197	mg/Kg	☼	04/14/20 08:00	04/15/20 11:24	5
Iron	ND	* *1	92.4	54.2	mg/Kg	☼	04/14/20 08:00	04/15/20 11:24	5
Lithium	ND		46.2	2.71	mg/Kg	☼	04/14/20 08:00	04/15/20 11:24	5
Nickel	ND		37.0	1.11	mg/Kg	☼	04/14/20 08:00	04/15/20 11:24	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.109**	**J**	0.308	0.0148	mg/Kg	☼	04/14/20 08:00	04/15/20 13:07	1
Cadmium	ND		0.308	0.0136	mg/Kg	☼	04/14/20 08:00	04/15/20 13:07	1
Iron	**2680**		6.16	3.57	mg/Kg	☼	04/14/20 08:00	04/15/20 13:07	1
Lithium	**1.98**	**J**	3.08	0.185	mg/Kg	☼	04/14/20 08:00	04/15/20 13:07	1
Nickel	**2.63**		2.46	0.0653	mg/Kg	☼	04/14/20 08:00	04/15/20 13:07	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.615**		0.308	0.00924	mg/Kg	☼	04/15/20 08:00	04/16/20 13:06	1
Cadmium	ND		0.308	0.0136	mg/Kg	☼	04/15/20 08:00	04/16/20 13:06	1
Iron	**3340**		6.16	5.05	mg/Kg	☼	04/15/20 08:00	04/16/20 13:06	1

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Client Sample ID: GAF-SB-NRS070-50-60-03102020 ~ NRS070
Lab Sample ID: 180-103583-4
Date Collected: 03/10/20 17:40
Matrix: Solid
Date Received: 03/14/20 10:15

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	19.6		3.08	0.185	mg/Kg	☼	04/15/20 08:00	04/16/20 13:06	1
Nickel	10.0		2.46	0.0345	mg/Kg	☼	04/15/20 08:00	04/16/20 13:06	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.08		0.250	0.00750	mg/Kg			04/22/20 14:10	1
Cadmium	0.115	J	0.250	0.0110	mg/Kg			04/22/20 14:10	1
Iron	14200		5.00	4.10	mg/Kg			04/22/20 14:10	1
Lithium	22.8		2.50	0.150	mg/Kg			04/22/20 14:10	1
Nickel	17.7		2.00	0.0280	mg/Kg			04/22/20 14:10	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.21		0.308	0.00924	mg/Kg	☼	04/06/20 08:00	04/17/20 12:52	1
Cadmium	0.506		0.308	0.0136	mg/Kg	☼	04/06/20 08:00	04/17/20 12:52	1
Iron	19400		6.16	5.05	mg/Kg	☼	04/06/20 08:00	04/17/20 12:52	1
Lithium	18.9		3.08	0.185	mg/Kg	☼	04/06/20 08:00	04/17/20 12:52	1
Nickel	20.3		12.3	0.172	mg/Kg	☼	04/06/20 08:00	04/17/20 11:30	5

Client Sample ID: GAF-SB-NRS068-40-58-03122020 ~ NRS068

Date Collected: 03/12/20 09:50
Date Received: 03/14/20 10:15

Lab Sample ID: 180-103583-5

Matrix: Solid

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.20	0.368	mg/Kg	☼	04/07/20 08:00	04/09/20 13:04	4
Cadmium	ND		1.20	0.0765	mg/Kg	☼	04/07/20 08:00	04/09/20 13:04	4
Iron	**265**		23.9	13.9	mg/Kg	☼	04/07/20 08:00	04/09/20 13:04	4
Lithium	ND		12.0	0.717	mg/Kg	☼	04/07/20 08:00	04/09/20 13:04	4
Nickel	ND		9.56	0.325	mg/Kg	☼	04/07/20 08:00	04/09/20 13:04	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	0.897	0.0574	mg/Kg	☼	04/08/20 08:00	04/10/20 12:03	3
Cadmium	ND		0.897	0.0395	mg/Kg	☼	04/08/20 08:00	04/10/20 12:03	3
Iron	**28.9**	*	17.9	10.4	mg/Kg	☼	04/08/20 08:00	04/10/20 12:03	3
Lithium	ND		8.97	0.538	mg/Kg	☼	04/08/20 08:00	04/10/20 12:03	3
Nickel	ND		7.17	0.179	mg/Kg	☼	04/08/20 08:00	04/10/20 12:03	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0640**	J	0.299	0.0179	mg/Kg	☼	04/09/20 08:00	04/14/20 11:31	1
Cadmium	**0.0442**	J B *	0.299	0.0132	mg/Kg	☼	04/09/20 08:00	04/14/20 11:31	1
Iron	**1940**		5.98	3.47	mg/Kg	☼	04/09/20 08:00	04/14/20 11:31	1
Lithium	ND		2.99	0.179	mg/Kg	☼	04/09/20 08:00	04/14/20 11:31	1
Nickel	ND		2.39	0.100	mg/Kg	☼	04/09/20 08:00	04/14/20 11:31	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.299**		0.299	0.0191	mg/Kg	☼	04/10/20 08:00	04/14/20 13:13	1
Cadmium	**0.0197**	J	0.299	0.0132	mg/Kg	☼	04/10/20 08:00	04/14/20 13:13	1
Iron	**15100**		5.98	3.47	mg/Kg	☼	04/10/20 08:00	04/14/20 13:13	1
Lithium	**1.57**	J	2.99	0.179	mg/Kg	☼	04/10/20 08:00	04/14/20 13:13	1
Nickel	**6.26**		2.39	0.0466	mg/Kg	☼	04/10/20 08:00	04/14/20 13:13	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND	*	4.48	0.377	mg/Kg	☼	04/14/20 08:00	04/15/20 11:29	5
Cadmium	ND		4.48	0.191	mg/Kg	☼	04/14/20 08:00	04/15/20 11:29	5
Iron	ND	* *1	89.7	52.6	mg/Kg	☼	04/14/20 08:00	04/15/20 11:29	5
Lithium	**2.81**	J	44.8	2.63	mg/Kg	☼	04/14/20 08:00	04/15/20 11:29	5
Nickel	ND		35.9	1.08	mg/Kg	☼	04/14/20 08:00	04/15/20 11:29	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.105**	J	0.299	0.0143	mg/Kg	☼	04/14/20 08:00	04/15/20 13:13	1
Cadmium	ND		0.299	0.0132	mg/Kg	☼	04/14/20 08:00	04/15/20 13:13	1
Iron	**4240**		5.98	3.47	mg/Kg	☼	04/14/20 08:00	04/15/20 13:13	1
Lithium	**2.43**	J	2.99	0.179	mg/Kg	☼	04/14/20 08:00	04/15/20 13:13	1
Nickel	**4.00**		2.39	0.0634	mg/Kg	☼	04/14/20 08:00	04/15/20 13:13	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.566**		0.299	0.00897	mg/Kg	☼	04/15/20 08:00	04/16/20 13:26	1
Cadmium	ND		0.299	0.0132	mg/Kg	☼	04/15/20 08:00	04/16/20 13:26	1
Iron	**3470**		5.98	4.90	mg/Kg	☼	04/15/20 08:00	04/16/20 13:26	1

Client: Environmental Standards Inc.
Project/Site: GAF-2020-03092259

Job ID: 180-103583-2
SDG: SEP Metals

Client Sample ID: GAF-SB-NRS068-40-58-03122020 ~ NRS068
Lab Sample ID: 180-103583-5
Date Collected: 03/12/20 09:50
Matrix: Solid
Date Received: 03/14/20 10:15

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	14.3		2.99	0.179	mg/Kg	☼	04/15/20 08:00	04/16/20 13:26	1
Nickel	10.7		2.39	0.0335	mg/Kg	☼	04/15/20 08:00	04/16/20 13:26	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.03		0.250	0.00750	mg/Kg			04/22/20 14:10	1
Cadmium	0.0640	J	0.250	0.0110	mg/Kg			04/22/20 14:10	1
Iron	25000		5.00	4.10	mg/Kg			04/22/20 14:10	1
Lithium	21.1		2.50	0.150	mg/Kg			04/22/20 14:10	1
Nickel	21.0		2.00	0.0280	mg/Kg			04/22/20 14:10	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.01		0.299	0.00897	mg/Kg	☼	04/06/20 08:00	04/17/20 12:57	1
Cadmium	0.444		0.299	0.0132	mg/Kg	☼	04/06/20 08:00	04/17/20 12:57	1
Iron	21400		5.98	4.90	mg/Kg	☼	04/06/20 08:00	04/17/20 12:57	1
Lithium	22.3		2.99	0.179	mg/Kg	☼	04/06/20 08:00	04/17/20 12:57	1
Nickel	21.9		12.0	0.167	mg/Kg	☼	04/06/20 08:00	04/17/20 11:35	5

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-38881/12-A
Matrix: Solid
Analysis Batch: 39150

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 38881

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.00750	mg/Kg		04/06/20 08:00	04/17/20 10:54	1
Cadmium	ND		0.250	0.0110	mg/Kg		04/06/20 08:00	04/17/20 10:54	1
Iron	ND		5.00	4.10	mg/Kg		04/06/20 08:00	04/17/20 10:54	1
Lithium	ND		2.50	0.150	mg/Kg		04/06/20 08:00	04/17/20 10:54	1
Nickel	ND		2.00	0.0280	mg/Kg		04/06/20 08:00	04/17/20 10:54	1

Lab Sample ID: LCS 140-38881/13-A
Matrix: Solid
Analysis Batch: 39150

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 38881

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.517		mg/Kg		101	75 - 125
Cadmium	2.50	2.574		mg/Kg		103	75 - 125
Iron	50.0	51.57		mg/Kg		103	75 - 125
Lithium	5.00	4.929		mg/Kg		99	75 - 125
Nickel	25.0	26.28		mg/Kg		105	75 - 125

Lab Sample ID: LCSD 140-38881/14-A
Matrix: Solid
Analysis Batch: 39150

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 38881

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.535		mg/Kg		101	75 - 125	1	30
Cadmium	2.50	2.582		mg/Kg		103	75 - 125	0	30
Iron	50.0	51.70		mg/Kg		103	75 - 125	0	30
Lithium	5.00	4.947		mg/Kg		99	75 - 125	0	30
Nickel	25.0	26.24		mg/Kg		105	75 - 125	0	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39150

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Total/NA
Prep Batch: 38881

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	1.04		1.050		mg/Kg	☼	0.6	30
Cadmium	0.441		0.4604		mg/Kg	☼	4	30
Iron	23200		22890		mg/Kg	☼	1	30
Lithium	18.3		18.31		mg/Kg	☼	0	30
Nickel	15.1		15.02		mg/Kg	☼	0.2	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-38882/12-B ^4
Matrix: Solid
Analysis Batch: 39000

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 38913

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.308	mg/Kg		04/07/20 08:00	04/09/20 12:33	4
Cadmium	ND		1.00	0.0640	mg/Kg		04/07/20 08:00	04/09/20 12:33	4
Iron	ND		20.0	11.6	mg/Kg		04/07/20 08:00	04/09/20 12:33	4
Lithium	ND		10.0	0.600	mg/Kg		04/07/20 08:00	04/09/20 12:33	4

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-38882/12-B ^4
Matrix: Solid
Analysis Batch: 39000

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 38913

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nickel	ND		8.00	0.272	mg/Kg		04/07/20 08:00	04/09/20 12:33	4

Lab Sample ID: LCS 140-38882/13-B ^5
Matrix: Solid
Analysis Batch: 39000

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 38913

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.563		mg/Kg		103	75 - 125
Cadmium	2.50	2.388		mg/Kg		96	75 - 125
Iron	50.0	50.40		mg/Kg		101	75 - 125
Lithium	5.00	5.245	J	mg/Kg		105	75 - 125
Nickel	25.0	24.65		mg/Kg		99	75 - 125

Lab Sample ID: LCSD 140-38882/14-B ^5
Matrix: Solid
Analysis Batch: 39000

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 38913

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.648		mg/Kg		106	75 - 125	3	30
Cadmium	2.50	2.495		mg/Kg		100	75 - 125	4	30
Iron	50.0	50.07		mg/Kg		100	75 - 125	1	30
Lithium	5.00	5.268	J	mg/Kg		105	75 - 125	0	30
Nickel	25.0	25.83		mg/Kg		103	75 - 125	5	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39000

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 1
Prep Batch: 38913

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	ND		ND		mg/Kg	☼	NC	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Iron	999		995.3		mg/Kg	☼	0.4	30
Lithium	ND		ND		mg/Kg	☼	NC	30
Nickel	0.365	J	0.3899	J	mg/Kg	☼	6	30

Lab Sample ID: MB 140-38914/12-B ^3
Matrix: Solid
Analysis Batch: 39023

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 38928

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.750	0.0480	mg/Kg		04/08/20 08:00	04/10/20 11:32	3
Cadmium	ND		0.750	0.0330	mg/Kg		04/08/20 08:00	04/10/20 11:32	3
Iron	ND		15.0	8.70	mg/Kg		04/08/20 08:00	04/10/20 11:32	3
Lithium	ND		7.50	0.450	mg/Kg		04/08/20 08:00	04/10/20 11:32	3
Nickel	ND		6.00	0.150	mg/Kg		04/08/20 08:00	04/10/20 11:32	3

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-38914/13-B ^5
Matrix: Solid
Analysis Batch: 39023

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 38928

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Beryllium			2.50	1.325	*	mg/Kg		53	75 - 125		
Cadmium			2.50	2.413		mg/Kg		97	75 - 125		
Iron			50.0	ND	*	mg/Kg		4	75 - 125		
Lithium			5.00	4.988	J	mg/Kg		100	75 - 125		
Nickel			25.0	24.80		mg/Kg		99	75 - 125		

Lab Sample ID: LCSD 140-38914/14-B ^5
Matrix: Solid
Analysis Batch: 39023

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 38928

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			2.50	1.343	*	mg/Kg		54	75 - 125	1	30
Cadmium			2.50	2.435		mg/Kg		97	75 - 125	1	30
Iron			50.0	ND	*	mg/Kg		4	75 - 125	4	30
Lithium			5.00	4.863	J	mg/Kg		97	75 - 125	3	30
Nickel			25.0	25.21		mg/Kg		101	75 - 125	2	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39023

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 2
Prep Batch: 38928

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Beryllium	ND	*		ND	*	mg/Kg	☼			NC	30
Cadmium	ND			ND		mg/Kg	☼			NC	30
Iron	91.6	*		79.54	*	mg/Kg	☼			14	30
Lithium	ND			ND		mg/Kg	☼			NC	30
Nickel	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-38930/12-B
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 38965

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0150	mg/Kg		04/09/20 08:00	04/14/20 11:00	1
Cadmium	0.08300	J	0.250	0.0110	mg/Kg		04/09/20 08:00	04/14/20 11:00	1
Iron	ND		5.00	2.90	mg/Kg		04/09/20 08:00	04/14/20 11:00	1
Lithium	ND		2.50	0.150	mg/Kg		04/09/20 08:00	04/14/20 11:00	1
Nickel	ND		2.00	0.0840	mg/Kg		04/09/20 08:00	04/14/20 11:00	1

Lab Sample ID: LCS 140-38930/13-B
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 38965

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Beryllium			2.50	2.514		mg/Kg		101	75 - 125		
Cadmium			2.50	0.6875	*	mg/Kg		28	75 - 125		
Iron			50.0	48.86		mg/Kg		98	75 - 125		
Lithium			5.00	4.761		mg/Kg		95	75 - 125		
Nickel			25.0	25.07		mg/Kg		100	75 - 125		

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-38930/14-B
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 38965

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			2.50	2.689		mg/Kg		108	75 - 125	7	30
Cadmium			2.50	0.7735	*	mg/Kg		31	75 - 125	12	30
Iron			50.0	51.87		mg/Kg		104	75 - 125	6	30
Lithium			5.00	4.985		mg/Kg		100	75 - 125	5	30
Nickel			25.0	26.89		mg/Kg		108	75 - 125	7	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 3
Prep Batch: 38965

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Beryllium	0.0533	J		0.05947	J	mg/Kg	☼			11	30
Cadmium	0.0454	J B *		0.04659	J *	mg/Kg	☼			3	30
Iron	993			936.5		mg/Kg	☼			6	30
Lithium	ND			ND		mg/Kg	☼			NC	30
Nickel	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-38966/12-B
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 39002

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0160	mg/Kg		04/10/20 08:00	04/14/20 12:28	1
Cadmium	ND		0.250	0.0110	mg/Kg		04/10/20 08:00	04/14/20 12:28	1
Iron	ND		5.00	2.90	mg/Kg		04/10/20 08:00	04/14/20 12:28	1
Lithium	ND		2.50	0.150	mg/Kg		04/10/20 08:00	04/14/20 12:28	1
Nickel	ND		2.00	0.0390	mg/Kg		04/10/20 08:00	04/14/20 12:28	1

Lab Sample ID: LCS 140-38966/13-B
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 39002

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium			2.50	2.600		mg/Kg		104	75 - 125
Cadmium			2.50	2.688		mg/Kg		108	75 - 125
Iron			50.0	50.59		mg/Kg		101	75 - 125
Lithium			5.00	5.061		mg/Kg		101	75 - 125
Nickel			25.0	27.05		mg/Kg		108	75 - 125

Lab Sample ID: LCSD 140-38966/14-B
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 39002

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			2.50	2.600		mg/Kg		104	75 - 125	0	30
Cadmium			2.50	2.723		mg/Kg		109	75 - 125	1	30
Iron			50.0	50.08		mg/Kg		100	75 - 125	1	30
Lithium			5.00	5.108		mg/Kg		102	75 - 125	1	30
Nickel			25.0	27.36		mg/Kg		109	75 - 125	1	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39065

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 4
Prep Batch: 39002

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	0.278	J	0.3010	J	mg/Kg	☼	8	30
Cadmium	0.0208	J	0.01717	J	mg/Kg	☼	19	30
Iron	12900		13430		mg/Kg	☼	4	30
Lithium	0.917	J	0.8945	J	mg/Kg	☼	2	30
Nickel	4.50		4.672		mg/Kg	☼	4	30

Lab Sample ID: MB 140-39003/12-B ^5
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 39041

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		3.75	0.315	mg/Kg		04/14/20 08:00	04/15/20 10:57	5
Cadmium	ND		3.75	0.160	mg/Kg		04/14/20 08:00	04/15/20 10:57	5
Iron	ND		75.0	44.0	mg/Kg		04/14/20 08:00	04/15/20 10:57	5
Lithium	ND		37.5	2.20	mg/Kg		04/14/20 08:00	04/15/20 10:57	5
Nickel	ND		30.0	0.900	mg/Kg		04/14/20 08:00	04/15/20 10:57	5

Lab Sample ID: LCS 140-39003/13-B ^5
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 39041

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	7.50	4.238	*	mg/Kg		57	75 - 125
Cadmium	7.50	7.710		mg/Kg		103	75 - 125
Iron	150	ND	*	mg/Kg		1	75 - 125
Lithium	15.0	16.87	J	mg/Kg		112	75 - 125
Nickel	75.0	59.14		mg/Kg		79	75 - 125

Lab Sample ID: LCSD 140-39003/14-B ^5
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 39041

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	7.50	4.275	*	mg/Kg		57	75 - 125	1	30
Cadmium	7.50	7.958		mg/Kg		106	75 - 125	3	30
Iron	150	ND	* *1	mg/Kg		3	75 - 125	111	30
Lithium	15.0	18.25	J	mg/Kg		122	75 - 125	8	30
Nickel	75.0	63.92		mg/Kg		85	75 - 125	8	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 5
Prep Batch: 39041

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	ND	*	ND	*	mg/Kg	☼	NC	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Iron	ND	* *1	ND	* *1	mg/Kg	☼	NC	30
Lithium	ND		ND		mg/Kg	☼	NC	30
Nickel	ND		ND		mg/Kg	☼	NC	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-39042/12-A
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 39042

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.0120	mg/Kg		04/14/20 08:00	04/15/20 12:27	1
Cadmium	ND		0.250	0.0110	mg/Kg		04/14/20 08:00	04/15/20 12:27	1
Iron	ND		5.00	2.90	mg/Kg		04/14/20 08:00	04/15/20 12:27	1
Lithium	ND		2.50	0.150	mg/Kg		04/14/20 08:00	04/15/20 12:27	1
Nickel	ND		2.00	0.0530	mg/Kg		04/14/20 08:00	04/15/20 12:27	1

Lab Sample ID: LCS 140-39042/13-A
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 39042

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.641		mg/Kg		106	75 - 125
Cadmium	2.50	2.535		mg/Kg		101	75 - 125
Iron	50.0	49.39		mg/Kg		99	75 - 125
Lithium	5.00	4.811		mg/Kg		96	75 - 125
Nickel	25.0	25.80		mg/Kg		103	75 - 125

Lab Sample ID: LCSD 140-39042/14-A
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 39042

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	2.50	2.604		mg/Kg		104	75 - 125	1	30
Cadmium	2.50	2.525		mg/Kg		101	75 - 125	0	30
Iron	50.0	49.26		mg/Kg		99	75 - 125	0	30
Lithium	5.00	4.810		mg/Kg		96	75 - 125	0	30
Nickel	25.0	25.62		mg/Kg		102	75 - 125	1	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39087

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 6
Prep Batch: 39042

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Beryllium	0.128	J	0.1122	J	mg/Kg	☼	13	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Iron	5130		4589		mg/Kg	☼	11	30
Lithium	2.91	J	2.503	J	mg/Kg	☼	15	30
Nickel	3.30		2.992		mg/Kg	☼	10	30

Lab Sample ID: MB 140-39055/12-A
Matrix: Solid
Analysis Batch: 39126

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 39055

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.250	0.00750	mg/Kg		04/15/20 08:00	04/16/20 12:35	1
Cadmium	ND		0.250	0.0110	mg/Kg		04/15/20 08:00	04/16/20 12:35	1
Iron	ND		5.00	4.10	mg/Kg		04/15/20 08:00	04/16/20 12:35	1
Lithium	ND		2.50	0.150	mg/Kg		04/15/20 08:00	04/16/20 12:35	1
Nickel	ND		2.00	0.0280	mg/Kg		04/15/20 08:00	04/16/20 12:35	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-39055/13-A
Matrix: Solid
Analysis Batch: 39126

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 39055

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Beryllium			2.50	2.577		mg/Kg		103	75 - 125		
Cadmium			2.50	2.647		mg/Kg		106	75 - 125		
Iron			50.0	51.91		mg/Kg		104	75 - 125		
Lithium			5.00	4.986		mg/Kg		100	75 - 125		
Nickel			25.0	26.68		mg/Kg		107	75 - 125		

Lab Sample ID: LCSD 140-39055/14-A
Matrix: Solid
Analysis Batch: 39126

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 39055

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium			2.50	2.610		mg/Kg		104	75 - 125	1	30
Cadmium			2.50	2.677		mg/Kg		107	75 - 125	1	30
Iron			50.0	55.53		mg/Kg		111	75 - 125	7	30
Lithium			5.00	5.083		mg/Kg		102	75 - 125	2	30
Nickel			25.0	26.92		mg/Kg		108	75 - 125	1	30

Lab Sample ID: 180-103583-1 DU
Matrix: Solid
Analysis Batch: 39126

Client Sample ID: GAF-SB-NRS069-40-50-03092020 ~ NRS069
Prep Type: Step 7
Prep Batch: 39055

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Beryllium	0.586			0.5763		mg/Kg	☼			2	30
Cadmium	ND			ND		mg/Kg	☼			NC	30
Iron	3700			3568		mg/Kg	☼			4	30
Lithium	13.7			14.30		mg/Kg	☼			5	30
Nickel	7.02			6.890		mg/Kg	☼			2	30

Metals

Prep Batch: 38881

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Total/NA	Solid	Total	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Total/NA	Solid	Total	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Total/NA	Solid	Total	
MB 140-38881/12-A	Method Blank	Total/NA	Solid	Total	
LCS 140-38881/13-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-38881/14-A	Lab Control Sample Dup	Total/NA	Solid	Total	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Total/NA	Solid	Total	

SEP Batch: 38882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 1	Solid	Exchangeable	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 1	Solid	Exchangeable	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 1	Solid	Exchangeable	
MB 140-38882/12-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-38882/13-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-38882/14-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 1	Solid	Exchangeable	

Prep Batch: 38913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 1	Solid	3010A	38882
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 1	Solid	3010A	38882
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 1	Solid	3010A	38882
MB 140-38882/12-B ^4	Method Blank	Step 1	Solid	3010A	38882
LCS 140-38882/13-B ^5	Lab Control Sample	Step 1	Solid	3010A	38882
LCSD 140-38882/14-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	38882
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 1	Solid	3010A	38882

SEP Batch: 38914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 2	Solid	Carbonate	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 2	Solid	Carbonate	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 2	Solid	Carbonate	
MB 140-38914/12-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-38914/13-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-38914/14-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 2	Solid	Carbonate	

Prep Batch: 38928

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 2	Solid	3010A	38914
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 2	Solid	3010A	38914
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 2	Solid	3010A	38914
MB 140-38914/12-B ^3	Method Blank	Step 2	Solid	3010A	38914
LCS 140-38914/13-B ^5	Lab Control Sample	Step 2	Solid	3010A	38914
LCSD 140-38914/14-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	38914
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 2	Solid	3010A	38914

SEP Batch: 38930

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 3	Solid	Non-Crystalline	

Metals (Continued)

SEP Batch: 38930 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 3	Solid	Non-Crystalline	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 3	Solid	Non-Crystalline	
MB 140-38930/12-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-38930/13-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-38930/14-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 3	Solid	Non-Crystalline	

Prep Batch: 38965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 3	Solid	3010A	38930
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 3	Solid	3010A	38930
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 3	Solid	3010A	38930
MB 140-38930/12-B	Method Blank	Step 3	Solid	3010A	38930
LCS 140-38930/13-B	Lab Control Sample	Step 3	Solid	3010A	38930
LCSD 140-38930/14-B	Lab Control Sample Dup	Step 3	Solid	3010A	38930
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 3	Solid	3010A	38930

SEP Batch: 38966

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 4	Solid	Metal Hydroxide	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 4	Solid	Metal Hydroxide	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 4	Solid	Metal Hydroxide	
MB 140-38966/12-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-38966/13-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-38966/14-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 4	Solid	Metal Hydroxide	

Analysis Batch: 39000

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 1	Solid	6010B SEP	38913
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 1	Solid	6010B SEP	38913
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 1	Solid	6010B SEP	38913
MB 140-38882/12-B ^4	Method Blank	Step 1	Solid	6010B SEP	38913
LCS 140-38882/13-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	38913
LCSD 140-38882/14-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	38913
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 1	Solid	6010B SEP	38913

Prep Batch: 39002

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 4	Solid	3010A	38966
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 4	Solid	3010A	38966
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 4	Solid	3010A	38966
MB 140-38966/12-B	Method Blank	Step 4	Solid	3010A	38966
LCS 140-38966/13-B	Lab Control Sample	Step 4	Solid	3010A	38966
LCSD 140-38966/14-B	Lab Control Sample Dup	Step 4	Solid	3010A	38966
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 4	Solid	3010A	38966

SEP Batch: 39003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 5	Solid	Organic-Bound	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 5	Solid	Organic-Bound	

Metals (Continued)

SEP Batch: 39003 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 5	Solid	Organic-Bound	
MB 140-39003/12-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-39003/13-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-39003/14-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 5	Solid	Organic-Bound	

Analysis Batch: 39023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 2	Solid	6010B SEP	38928
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 2	Solid	6010B SEP	38928
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 2	Solid	6010B SEP	38928
MB 140-38914/12-B ^3	Method Blank	Step 2	Solid	6010B SEP	38928
LCS 140-38914/13-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	38928
LCSD 140-38914/14-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	38928
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 2	Solid	6010B SEP	38928

Prep Batch: 39041

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 5	Solid	3010A	39003
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 5	Solid	3010A	39003
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 5	Solid	3010A	39003
MB 140-39003/12-B ^5	Method Blank	Step 5	Solid	3010A	39003
LCS 140-39003/13-B ^5	Lab Control Sample	Step 5	Solid	3010A	39003
LCSD 140-39003/14-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	39003
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 5	Solid	3010A	39003

SEP Batch: 39042

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 6	Solid	Acid/Sulfide	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 6	Solid	Acid/Sulfide	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 6	Solid	Acid/Sulfide	
MB 140-39042/12-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-39042/13-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-39042/14-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 6	Solid	Acid/Sulfide	

Prep Batch: 39055

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 7	Solid	Residual	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 7	Solid	Residual	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 7	Solid	Residual	
MB 140-39055/12-A	Method Blank	Step 7	Solid	Residual	
LCS 140-39055/13-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-39055/14-A	Lab Control Sample Dup	Step 7	Solid	Residual	
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 7	Solid	Residual	

Analysis Batch: 39065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 3	Solid	6010B SEP	38965
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 4	Solid	6010B SEP	39002
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 3	Solid	6010B SEP	38965

Metals (Continued)

Analysis Batch: 39065 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 4	Solid	6010B SEP	39002
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 3	Solid	6010B SEP	38965
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 4	Solid	6010B SEP	39002
MB 140-38930/12-B	Method Blank	Step 3	Solid	6010B SEP	38965
MB 140-38966/12-B	Method Blank	Step 4	Solid	6010B SEP	39002
LCS 140-38930/13-B	Lab Control Sample	Step 3	Solid	6010B SEP	38965
LCS 140-38966/13-B	Lab Control Sample	Step 4	Solid	6010B SEP	39002
LCSD 140-38930/14-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	38965
LCSD 140-38966/14-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	39002
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 3	Solid	6010B SEP	38965
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 4	Solid	6010B SEP	39002

Analysis Batch: 39087

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 5	Solid	6010B SEP	39041
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 6	Solid	6010B SEP	39042
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 5	Solid	6010B SEP	39041
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 6	Solid	6010B SEP	39042
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 5	Solid	6010B SEP	39041
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 6	Solid	6010B SEP	39042
MB 140-39003/12-B ^5	Method Blank	Step 5	Solid	6010B SEP	39041
MB 140-39042/12-A	Method Blank	Step 6	Solid	6010B SEP	39042
LCS 140-39003/13-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	39041
LCS 140-39042/13-A	Lab Control Sample	Step 6	Solid	6010B SEP	39042
LCSD 140-39003/14-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	39041
LCSD 140-39042/14-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	39042
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 5	Solid	6010B SEP	39041
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 6	Solid	6010B SEP	39042

Analysis Batch: 39126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 7	Solid	6010B SEP	39055
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Step 7	Solid	6010B SEP	39055
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Step 7	Solid	6010B SEP	39055
MB 140-39055/12-A	Method Blank	Step 7	Solid	6010B SEP	39055
LCS 140-39055/13-A	Lab Control Sample	Step 7	Solid	6010B SEP	39055
LCSD 140-39055/14-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	39055
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Step 7	Solid	6010B SEP	39055

Analysis Batch: 39150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Total/NA	Solid	6010B	38881
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Total/NA	Solid	6010B	38881
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Total/NA	Solid	6010B	38881
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Total/NA	Solid	6010B	38881
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Total/NA	Solid	6010B	38881
MB 140-38881/12-A	Method Blank	Total/NA	Solid	6010B	38881
LCS 140-38881/13-A	Lab Control Sample	Total/NA	Solid	6010B	38881
LCSD 140-38881/14-A	Lab Control Sample Dup	Total/NA	Solid	6010B	38881
180-103583-1 DU	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Total/NA	Solid	6010B	38881

Metals

Analysis Batch: 39247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103583-1	GAF-SB-NRS069-40-50-03092020 ~ NRS069	Sum of Steps 1-7	Solid	6010B SEP	
180-103583-4	GAF-SB-NRS070-50-60-03102020 ~ NRS070	Sum of Steps 1-7	Solid	6010B SEP	
180-103583-5	GAF-SB-NRS068-40-58-03122020 ~ NRS068	Sum of Steps 1-7	Solid	6010B SEP	

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate.

Page: 1 of 2 coolers
Cooler #

COC # GAF-2020-03092259

Task Desc: NRS Field Investigation

Required Ship to Lab:

Lab Name:	TestAmerica Pittsburgh
Address:	301 Alpha Drive Pittsburgh, PA 15238
Lab PM:	Gail Lage
Phone/Fax:	(615)301-5741
Lab PM email	Gail.Lage@testamericainc.com
Applicable Lab Quote #:	

Required Project Information:

Site ID #:	Gallatin Fossil Plant
Project #	NRS Field Investigation
Site Address	1499 Steam Plant Rd
City	Gallatin
State, Zip	TN, 37066
Site PM Name	Mary Stauffer
Phone/Fax:	1-919-461-1468
Site PM Email:	mary.stauffer@aecom.com

Required Sampler Information:

Sampler	Ethan House
Sampling Company	AECOM
Address:	1600 Perimeter Park Drive, Suite 400
City/State	Morrisville, NC 27560
Phone #:	1-919-461-1100
Reimbursement project?	
Non-reimbursement project?	
Mark one	
Send EDD to	TVA_DELIVERABLES@envstd.com
CC Hardcopy report to	
CC Hardcopy report to	

TAT: Standard | Rush | Mark One

ITEM #	SAMPLE ID (Samples IDs MUST BE UNIQUE)	SAMPLE LOCATION	Sample Depth Start Depth	Sample Depth End Depth	MATRIX CODE	G=GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	Comments/Lab Sample I.D.	Filtered	Preserve	Analysis: Lloyd_Kahn - TIC / TOC	Analysis: 6020A - (MOD) Custom Metals	Analysis: Mercury	Analysis: Sequential Extraction	Analysis: 6020A; 7470A
1	GAF-SB-NRS069-40-50-03092020	NRS069			S	G	N	3/9/20	1420	1		N	None	X	X	X	X	
2	GAF-SB-NRS069-40-50-03092020	NRS069			S	G	N	3/9/20	1430	2		N	None	X	X	X		
3	GAF-AQ-903-03092020	DUP			S	G	N	3/9/20	—	2		N	None	X	X	X		
4	GAF-SB-NRS069-40-50-03092020-MS	NRS069-MS			S	G	N	3/9/20	1420	2		N	None	X	X	X		
5	GAF-SB-NRS069-40-50-03092020-MSD	NRS069-MSD			S	G	N	3/9/20	1420	2		N	None	X	X	X		
6	GAF-AQ-902-03092020	EB			W	G	N	3/9/20	1430	5		N	HNO3					X
7	GAF-SB-NRS070-50-60-03102020	NRS070			S	G	N	3/10/20	1740	1		N	None	X	X	X	X	
8	GAF-SB-NRS070-50-60-03102020	NRS070			S	G	N	3/10/20	1740	2		N	None	X	X	X		
9	GAF-SB-NRS068-40-58-03122020	NRS068			S	G	N	3/12/20	0950	1		N	None	X	X	X	X	
10	GAF-SB-NRS068-40-58-03122020	NRS068			S	G	N	3/12/20	0950	2		N	None	X	X	X		
11																		
12																		

SEE NOTES

Additional Comments/Special Instructions:

NRS Soil_Blanks:
Metals preserved w/ HNO3 to pH<2; TOC preserved w/ H2SO4 to pH <2

SEQUENTIAL - RUN METALS Be, Cd, Li, Ni, Fe ONLY

Add PHOSPHOROUS TESTING TO SOIL SAMPLES, CALL MARY IF NEEDED.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Ethan House / AECOM	3/13/20	1000		3/14/20	0915

Sample Receipt Conditions

	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

SHIPPING METHOD: (mark as appropriate)	SAMPLER NAME AND SIGNATURE
Fedex	Ethan House

Temp in OC | Samples on Ice? | Sample Intact? | Trip Blank?

180-103583 Chain of Custody

Environmental Standards, Inc-LastUpdated-031609

4/22/2020

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed and accurate.

Task Desc NRS

Required Ship to Lab:

Lab Name:	TestAmerica Pittsburgh
Address:	301 Alpha Drive Pittsburgh, PA 15238
Lab PM:	Gail Lage
Phone/Fax:	(615)301-5741
Lab PM email	Gail Lage@testamericainc.com
Applicable Lab Quote #:	

Required Project Information:

Site ID #:	Gallatin Fossil Plant
Project #	NRS Field Investigation
Site Address	1499 Steam Plant Rd
City	Gallatin
State, Zip	TN, 37066
Site PM Name	Mary Stauffer
Phone/Fax:	1-919-461-1468
Site PM Email:	mary.stauffer@aecom.com

Required Sampler Information:

Sampler	Ethan House
Sampling Company	AECOM
Address:	1600 Perimeter Park Drive, Suite 400
City/State	Morrisville, NC 27560
Phone #:	1-919-461-1100
Reimbursement project?	
Non-reimbursement project?	Mark one
Send EDD to	TVA_DELIVERABLES@envstd.com
CC Hardcopy report to	
CC Hardcopy report to	

TAT: Stan

ITEM #	SAMPLE ID Samples IDs MUST BE UNIQUE	SAMPLE LOCATION	Sample Depth Depth Unit: Start Depth	End Depth	MATRIX CODE	G=GRAB C=COMP	SAMPLE TYPE	SAMPLE DATE	SAMPLE TIME	#OF CONTAINERS	Comments/Lab Sample I.D.	Filtered	Preserve	Analysis Lloyd_Kahn - TIC / TOC EPA/NA - (MOD) Custom Metals
1	GAF-SB-NRS069-40-50-03092020	NRS069			S	G	N	3/9/20	1420	13		N	None	X X
2	~~GAF-SB-NRS069-40-50-03092020~~	NRS069			S	G	N	3/9/20	1430	2				X X
3	GAF-~~AB~~-903-03092020	DUP			S	G	~~N~~ FD	3/9/20	—	2				X X
4	GAF-SB-NRS069-40-50-03092020-MS	NRS069-MS			S	G	N	3/9/20	1420	2				X X
5	GAF-SB-NRS069-40-50-03092020-MSD	NRS069-MSD			S	G	N	3/9/20	1420	2				X X
6	GAF-AQ-902-03092020	EB			AQ	G	EB	3/9/20	1430	5				
7	GAF-SB-NRS070-50-60-03102020	NRS070			S	G	N	3/10/20	1740	13				X X
8	~~GAF-SB-NRS070-50-60-03102020~~	NRS070			S	G	N	3/10/20	1740	2				X X
9	GAF-SB-NRS068-40-58-03122020	NRS068			S	G	N	3/12/20	0950	13				X X
10	~~GAF-SB-NRS068-40-58-03122020~~	NRS068			S	G	N	3/12/20	0950	2				X X
11														
12														

Additional Comments/Special Instructions:

NRS Soil_Blanks:

Metals preserved w/ HNO3 to pH<2; TOC preserved w/ H2SO4 to pH <2

SEQUENTIAL - RUN METALS Be, Cd, Li Ni, Fe ONLY

Add PHOSPHORO TESTING TO SOIL SAMPLES, CALL MARY IF NEEDED

Revised by: Mary Stauffer 3/19/20

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION
Ethan House / AECOM	3/13/20	1000	

SHIPPING METHOD (mark as appropriate): Fedex

SAMPLER NAME AND SIGNATURE: Ethan House



eurofins | Environment Testi
TestAmerica

ORIGIN ID:MIFA (919) 461-1429
URS SHIPPING AND RECEIVING/ JOEY KI
TVA GALLATIN FOSSIL PLANT
1499 STEAM PLANT ROAD

GALLATIN, TN 37066
UNITED STATES US

SHIP DATE: 05MAR
ACTWGT: 10.00 LB
CAD: 592545/CAFE

TO

EUROFINS TESTAMERICA PITTSBURG
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907

(412) 963-7068
DEPT: BOTTLES

REF: 8180-59137

RMA:

FedEx Express

FedEx
TRK# 0221 1685 4439 2891

SATURDAY 12:0
PRIORITY OVERNIGH

XO AGCA

15238
PA-US PIT

Uncorrected temp
Thermometer ID 17

CF 0 Initials JJ

PT-WI-SR-001 effective 11/8/18

Custody Seal

3/13/20

1251912

Page 33 of 36

4/22/2020

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

180-103583 Chain of Custody

ofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L		180-587806.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jennifer.rumble@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-103583-2
Address: 5815 Middlebrook Pike, ,	Due Date Requested: 4/20/2020			
City: Knoxville	TAT Requested (days):			
State, Zip: TN, 37921				
Phone: 865-291-3000(Tel) 865-584-4315(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF-2020-03092259	Project #: 18016336			
Site: TVA GW Sampling	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP/SEP1_MgSO4 (MOD) Step 1	6010B_SEP/SEP2_NaOAc (MOD) Step 2	6010B_SEP/SEP3_Oxalate (MOD) Step 3	6010B_SEP/SEP4_Hydroxyl (MOD) Step 4	6010B_SEP/SEP5_NaClO (MOD) Step 5	6010B_SEP/SEP6_Acid (MOD) Step 6	6010B_SEP/SEP7_LM_Prep (MOD) Step 7	6010B_SEP_Calc/ (MOD) SEP Totals	6010B/SEP_Tot_Prep (MOD) Total	Total Number of containers	Special Instructions/Note:
			Preservation Code:														
GAF-SB-NRS069-40-50-03092020 ~ NRS069 (180-103583-1)	3/9/20	14:20 Central		Solid			X	X	X	X	X	X	X	X	X	1	
GAF-SB-NRS070-50-60-03102020 ~ NRS070 (180-103583-4)	3/10/20	17:40 Central		Solid			X	X	X	X	X	X	X	X	X	1	
GAF-SB-NRS068-40-58-03122020 ~ NRS068 (180-103583-5)	3/12/20	09:50 Central		Solid			X	X	X	X	X	X	X	X	X	1	

RT: 1.0°C CT: 1.0°C, 1 cooler
Fedex Po, Custody seal intact
Fr K# 1689 5099 8138
KW 3/18/20

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification *Unconfirmed*			***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*		
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable Rank: 2		Special Instructions/QC Requirements:		
Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 3/17/20 1700	Company: ETA PH	Received by: [signature]	Date/Time: 3/18/20 1430	Company: ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

Ver: 01/16/2019

4/22/2020

Loc: 180

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:** **103583**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓			☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	✓			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : CC68 Correction factor: 0.0	✓			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?			✓	☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: _____ PM Instructions: _____

Sample Receiving Associate: KL Date: 7/18/20

QA026R32.doc, 062719

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-103583-2
SDG Number: SEP Metals

Login Number: 103583
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-103681-1
Client Project/Site: GAF NRS Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
4/1/2020 11:34:51 AM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: 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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Job ID: 180-103681-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-103681-1

Receipt
The samples were received on 3/18/2020 10:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.8º C.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

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

General Chemistry
Method 365.4: The method blank for preparation batch 400-483212 and analytical batch 400-483998 contained Phosphorus, Total above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
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: Environmental Standards Inc. Job ID: 180-103681-1
Project/Site: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Accreditation/Certification Summary

Client: Environmental Standards Inc. Job ID: 180-103681-1
Project/Site: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-21
Connecticut	State	PH-0590	12-31-21
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20 *
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-21
Kansas	NELAP	E-10336	04-30-20
Kentucky (WW)	State	KY98016	12-31-20
Minnesota	NELAP	OH00048	12-31-20
Minnesota (Petrofund)	State	3506	08-01-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-24-21
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19 *
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-21
West Virginia DEP	State	210	12-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Job ID: 180-103681-1
Project/Site: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	07-01-20
ANAB	ISO/IEC 17025	L2471	02-23-23
Arizona	State	AZ0710	01-13-21
Arkansas DEQ	State	88-0689	09-01-20
California	State	2510	07-01-20
Florida	NELAP	E81010	06-30-20
Georgia	State	E81010(FL)	06-30-20
Illinois	NELAP	004586	10-09-20
Iowa	State	367	08-01-20
Kansas	NELAP	E-10253	08-16-20
Kentucky (UST)	State	53	06-30-20
Kentucky (WW)	State	KY98030	12-31-20
Louisiana	NELAP	30976	06-30-20
Louisiana (DW)	State	LA017	12-31-20
Maryland	State	233	09-30-20
Massachusetts	State	M-FL094	06-30-20
Michigan	State	9912	05-06-20
Minnesota	NELAP	012-999-481	12-31-20
New Jersey	NELAP	FL006	06-30-20
New York	NELAP	12115	03-31-20
New York	NELAP Secondary AB	12115	04-01-20
North Carolina (WW/SW)	State	314	12-31-20
Oklahoma	State	9810-186	08-31-20
Pennsylvania	NELAP	68-00467	01-31-21
Rhode Island	State	LAO00307	12-30-20
South Carolina	State	96026002	06-30-20
Tennessee	State	TN02907	06-30-20
Texas	NELAP	T104704286	09-30-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00148	05-17-21
Virginia	NELAP	460166	06-14-20
Washington	State	C915	05-15-20
West Virginia DEP	State	136	06-30-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-103681-5	GAF-GW-FERROBLACK	Water	03/17/20 13:00	03/18/20 10:00	
180-103681-6	GAF-GW-DOLO FINES-444U	Water	03/17/20 13:00	03/18/20 10:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL PEN
365.4	Phosphorus, Total	EPA	TAL PEN
EPA 353.2	Nitrogen, Nitrate-Nitrite	EPA	TAL PIT
SM 2310B	Acidity	SM	TAL PIT
SM 5310C	Total Organic Carbon	SM	TAL PIT
SM2320 B	Alkalinity, Total	SM18	TAL PIT
SM4500 P E-2011	Phosphorus	SM	TAL CAN
SM4500-S-2 F.	Sulfide	SM21	TAL PIT
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL PEN
365.2/365.3/365	Phosphorus, Total	MCAWW	TAL PEN

Protocol References:

EPA = US Environmental Protection Agency
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater"
SM18 = "Standard Methods For The Examination Of Water And Wastewater", 18th Edition, 1992.
SM21 = Standard Methods For The Examination Of Water And Wastewater, 21st Edition
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396
TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001
TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Client Sample ID: GAF-GW-FERROBLACK

Lab Sample ID: 180-103681-5

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		10			311491	03/30/20 20:27	SAC	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		100			311491	03/30/20 20:43	SAC	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Prep	351.2			25 mL	25 mL	483211	03/23/20 13:54	HES	TAL PEN
Total/NA	Analysis	351.2		1			484005	03/27/20 17:47	RRC	TAL PEN
	Instrument ID: Lachat 3									
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	483212	03/23/20 13:57	HES	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	483998	03/27/20 15:46	RRC	TAL PEN
	Instrument ID: Lachat 2									
Total/NA	Analysis	EPA 353.2		1	8 mL	8 mL	310580	03/20/20 09:33	CAK	TAL PIT
	Instrument ID: ASTORIA2									
Total/NA	Analysis	SM 2310B		1	50 mL	50 mL	311136	03/25/20 17:48	ELS	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 5310C		1			310863	03/23/20 10:28	TAM	TAL PIT
	Instrument ID: TOC1030									
Total/NA	Analysis	SM2320 B		1			310659	03/20/20 20:16	AVS	TAL PIT
	Instrument ID: PCTITRATOR									
Total/NA	Analysis	SM4500 P E-2011		1	5 mL	5 mL	428529	03/27/20 05:32	TPH	TAL CAN
	Instrument ID: ERNIE									
Total/NA	Analysis	SM4500-S-2 F.		1	50 mL	50 mL	310684	03/21/20 10:25	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Client Sample ID: GAF-GW-DOLO FINES-444U

Lab Sample ID: 180-103681-6

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9056A		2.5			311491	03/30/20 22:33	SAC	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Analysis	EPA 9056A		25			311491	03/30/20 22:49	SAC	TAL PIT
	Instrument ID: CHICS2100B									
Total/NA	Prep	351.2			25 mL	25 mL	483211	03/23/20 13:54	HES	TAL PEN
Total/NA	Analysis	351.2		1			484005	03/27/20 17:48	RRC	TAL PEN
	Instrument ID: Lachat 3									
Total/NA	Prep	365.2/365.3/365			25 mL	25 mL	483212	03/23/20 13:57	HES	TAL PEN
Total/NA	Analysis	365.4		1	10 mL	10 mL	483998	03/27/20 15:47	RRC	TAL PEN
	Instrument ID: Lachat 2									
Total/NA	Analysis	EPA 353.2		1	8 mL	8 mL	310580	03/20/20 09:39	CAK	TAL PIT
	Instrument ID: ASTORIA2									
Total/NA	Analysis	SM 2310B		1	50 mL	50 mL	311136	03/25/20 17:48	ELS	TAL PIT
	Instrument ID: NOEQUIP									
Total/NA	Analysis	SM 5310C		1			310863	03/23/20 10:43	TAM	TAL PIT
	Instrument ID: TOC1030									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Client Sample ID: GAF-GW-DOLO FINES-444U

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Lab Sample ID: 180-103681-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM2320 B		1			310659	03/20/20 16:20	AVS	TAL PIT
Total/NA	Analysis	SM4500 P E-2011		1	5 mL	5 mL	428529	03/27/20 05:36	TPH	TAL CAN
	Instrument ID: ERNIE									
Total/NA	Analysis	SM4500-S-2 F.		1	50 mL	50 mL	310684	03/21/20 10:28	CMR	TAL PIT
	Instrument ID: NOEQUIP									

Laboratory References:

TAL CAN = Eurofins TestAmerica, Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396
TAL PEN = Eurofins TestAmerica, Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001
TAL PIT = Eurofins TestAmerica, Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Analyst References:

Lab: TAL CAN
  Batch Type: Analysis
    TPH = Tom Harshman
Lab: TAL PEN
  Batch Type: Prep
    HES = Hans Schroeder
  Batch Type: Analysis
    RRC = Rebecca Chandler
Lab: TAL PIT
  Batch Type: Analysis
    AVS = Abbey Smith
    CAK = Chuck Kieda
    CMR = Carl Reagle
    ELS = Edwin Shireman
    SAC = Shawn Clemente
    TAM = Tessa Mastalski

Client: Environmental Standards Inc.
Job ID: 180-103681-1
Project/Site: GAF NRS Treatability

Client Sample ID: GAF-GW-FERROBLACK
Lab Sample ID: 180-103681-5
Date Collected: 03/17/20 13:00
Matrix: Water
Date Received: 03/18/20 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**3560**		100	32.0	mg/L			03/30/20 20:43	100
Fluoride	ND		1.00	0.263	mg/L			03/30/20 20:27	10
Sulfate	**2130**		100	38.0	mg/L			03/30/20 20:43	100

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	**5.48**		0.500	0.260	mg/L		03/23/20 13:54	03/27/20 17:47	1
Phosphorus, Total	**0.0937**	**J B**	0.100	0.0320	mg/L		03/23/20 13:57	03/27/20 15:46	1
Nitrate Nitrite Nitrogen	**0.157**		0.100	0.0650	mg/L			03/20/20 09:33	1
Acidity as CaCO3 to pH 8.3	**682**		5.00	5.00	mg/L			03/25/20 17:48	1
Total Organic Carbon - Duplicates	**37.0**		1.00	0.508	mg/L			03/23/20 10:28	1
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			03/20/20 20:16	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			03/20/20 20:16	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			03/20/20 20:16	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			03/20/20 20:16	1
Phosphate as PO4	**0.175**	**J**	0.307	0.114	mg/L			03/27/20 05:32	1
Sulfide	ND		3.00	1.34	mg/L			03/21/20 10:25	1

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Client Sample ID: GAF-GW-DOLO FINES-444U

Lab Sample ID: 180-103681-6

Date Collected: 03/17/20 13:00

Matrix: Water

Date Received: 03/18/20 10:00

Method: EPA 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	71.9		2.50	0.800	mg/L			03/30/20 22:33	2.5
Fluoride	0.612		0.250	0.0658	mg/L			03/30/20 22:33	2.5
Sulfate	2050		25.0	9.51	mg/L			03/30/20 22:49	25

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	1.06		0.500	0.260	mg/L		03/23/20 13:54	03/27/20 17:48	1
Phosphorus, Total	0.131	B	0.100	0.0320	mg/L		03/23/20 13:57	03/27/20 15:47	1
Nitrate Nitrite Nitrogen	0.0680	J	0.100	0.0650	mg/L			03/20/20 09:39	1
Acidity as CaCO3 to pH 8.3	- 36.1		5.00	5.00	mg/L			03/25/20 17:48	1
Total Organic Carbon - Duplicates	34.1		1.00	0.508	mg/L			03/23/20 10:43	1
Total Alkalinity as CaCO3 to pH 4.5	35.8		5.00	5.00	mg/L			03/20/20 16:20	1
Bicarbonate Alkalinity as CaCO3	15.5		5.00	5.00	mg/L			03/20/20 16:20	1
Carbonate Alkalinity as CaCO3	20.4		5.00	5.00	mg/L			03/20/20 16:20	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			03/20/20 16:20	1
Phosphate as PO4	ND		0.307	0.114	mg/L			03/27/20 05:36	1
Sulfide	ND		3.00	1.34	mg/L			03/21/20 10:28	1

Method: EPA 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 180-311491/37
Matrix: Water
Analysis Batch: 311491

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.00	0.320	mg/L			03/30/20 14:40	1
Fluoride	ND		0.100	0.0263	mg/L			03/30/20 14:40	1
Sulfate	ND		1.00	0.380	mg/L			03/30/20 14:40	1

Lab Sample ID: LCS 180-311491/36
Matrix: Water
Analysis Batch: 311491

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	48.12		mg/L		96	80 - 120
Fluoride	2.50	2.329		mg/L		93	80 - 120
Sulfate	50.0	47.60		mg/L		95	80 - 120

Lab Sample ID: 180-103680-D-1 MS
Matrix: Water
Analysis Batch: 311491

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	23.6		25.0	48.04		mg/L		98	80 - 120
Fluoride	0.0316	J	1.25	1.230		mg/L		96	80 - 120
Sulfate	7.06		25.0	30.57		mg/L		94	80 - 120

Lab Sample ID: 180-103680-D-1 MSD
Matrix: Water
Analysis Batch: 311491

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	23.6		25.0	48.24		mg/L		99	80 - 120	0	15
Fluoride	0.0316	J	1.25	1.213		mg/L		95	80 - 120	1	15
Sulfate	7.06		25.0	29.45		mg/L		90	80 - 120	4	15

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 400-483211/1-A
Matrix: Water
Analysis Batch: 484005

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 483211

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Kjeldahl	ND		0.500	0.260	mg/L		03/23/20 13:54	03/27/20 17:18	1

Lab Sample ID: LCS 400-483211/2-A
Matrix: Water
Analysis Batch: 484005

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 483211

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrogen, Kjeldahl	10.0	10.98		mg/L		110	90 - 110

Method: 351.2 - Nitrogen, Total Kjeldahl (Continued)

Lab Sample ID: 180-103763-A-1-B MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 484005 — **Prep Batch: 483211**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Kjeldahl	ND		4.00	4.005		mg/L		100	90 - 110		

Lab Sample ID: 180-103763-A-1-C MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 484005 — **Prep Batch: 483211**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrogen, Kjeldahl	ND		4.00	4.103		mg/L		103	90 - 110	2	22

Lab Sample ID: MRL 400-484005/2 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 484005

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrogen, Kjeldahl			0.500	0.6350		mg/L		127	50 - 150		

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 400-483212/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 483998 — **Prep Batch: 483212**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	0.09320	J	0.100	0.0320	mg/L		03/23/20 13:57	03/27/20 15:15	1

Lab Sample ID: LCS 400-483212/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 483998 — **Prep Batch: 483212**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphorus, Total			2.00	2.031		mg/L		102	75 - 113		

Lab Sample ID: 180-103763-A-1-E MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 483998 — **Prep Batch: 483212**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Phosphorus, Total	0.154	B	0.400	0.5497		mg/L		99	72 - 120		

Lab Sample ID: 180-103763-A-1-F MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 483998 — **Prep Batch: 483212**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphorus, Total	0.154	B	0.400	0.5878		mg/L		108	72 - 120	7	27

Method: 365.4 - Phosphorus, Total (Continued)

Lab Sample ID: MRL 400-483998/11
Matrix: Water
Analysis Batch: 483998

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphorus, Total	0.100	0.1433		mg/L		143	50 - 150

Method: EPA 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 180-310580/56
Matrix: Water
Analysis Batch: 310580

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite Nitrogen	ND		0.100	0.0650	mg/L			03/20/20 09:22	1

Lab Sample ID: LCS 180-310580/52
Matrix: Water
Analysis Batch: 310580

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite Nitrogen	2.00	1.817		mg/L		91	90 - 110

Lab Sample ID: 180-102906-D-1 MS
Matrix: Water
Analysis Batch: 310580

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite Nitrogen	ND	F1	2.00	2.364	F1	mg/L		118	90 - 110

Lab Sample ID: 180-102906-D-1 MSD
Matrix: Water
Analysis Batch: 310580

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate Nitrite Nitrogen	ND	F1	2.00	2.330	F1	mg/L		117	90 - 110	1	20

Method: SM 2310B - Acidity

Lab Sample ID: MB 180-311136/2
Matrix: Water
Analysis Batch: 311136

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acidity as CaCO3 to pH 8.3	ND		5.00	5.00	mg/L			03/25/20 17:42	1

Lab Sample ID: LCS 180-311136/1
Matrix: Water
Analysis Batch: 311136

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acidity as CaCO3 to pH 8.3	250	253.4		mg/L		101	90 - 110

Method: SM 2310B - Acidity (Continued)

Lab Sample ID: 180-103680-D-1 DU
Matrix: Water
Analysis Batch: 311136

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Acidity as CaCO3 to pH 8.3	- 226		- 228		mg/L		NC	20

Method: SM 5310C - Total Organic Carbon

Lab Sample ID: MB 180-310863/33
Matrix: Water
Analysis Batch: 310863

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	ND		1.00	0.508	mg/L			03/23/20 04:05	1

Lab Sample ID: LCS 180-310863/31
Matrix: Water
Analysis Batch: 310863

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	20.0	20.12		mg/L		101	85 - 115

Lab Sample ID: LCSD 180-310863/32
Matrix: Water
Analysis Batch: 310863

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Duplicates	20.0	20.10		mg/L		101	85 - 115	0	20

Lab Sample ID: 180-103581-F-1 MSD
Matrix: Water
Analysis Batch: 310863

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Duplicates	0.708	J	10.0	10.43		mg/L		97	75 - 125	5	20

Lab Sample ID: 180-103581-I-1 MS
Matrix: Water
Analysis Batch: 310863

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Duplicates	0.708	J	10.0	10.97		mg/L		103	75 - 125

Method: SM2320 B - Alkalinity, Total

Lab Sample ID: MB 180-310659/63
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			03/20/20 14:36	1

Method: SM2320 B - Alkalinity, Total (Continued)

Lab Sample ID: MB 180-310659/63
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			03/20/20 14:36	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			03/20/20 14:36	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			03/20/20 14:36	1

Lab Sample ID: MB 180-310659/87
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3 to pH 4.5	ND		5.00	5.00	mg/L			03/20/20 17:38	1
Bicarbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			03/20/20 17:38	1
Carbonate Alkalinity as CaCO3	ND		5.00	5.00	mg/L			03/20/20 17:38	1
Hydroxide Alkalinity	ND		5.00	5.00	mg/L			03/20/20 17:38	1

Lab Sample ID: LCS 180-310659/62
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Alkalinity as CaCO3 to pH 4.5			250	232.3		mg/L		93	90 - 110		

Lab Sample ID: LCS 180-310659/86
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Alkalinity as CaCO3 to pH 4.5			250	224.6		mg/L		90	90 - 110		

Lab Sample ID: 180-103658-C-3 DU
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	28.7			28.45		mg/L				0.9	20
Bicarbonate Alkalinity as CaCO3	28.7			28.45		mg/L				0.9	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Lab Sample ID: 180-103680-D-1 DU
Matrix: Water
Analysis Batch: 310659

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Alkalinity as CaCO3 to pH 4.5	266			262.6		mg/L				1	20
Bicarbonate Alkalinity as CaCO3	266			262.6		mg/L				1	20
Carbonate Alkalinity as CaCO3	ND			ND		mg/L				NC	20
Hydroxide Alkalinity	ND			ND		mg/L				NC	20

Method: SM4500 P E-2011 - Phosphorus

Lab Sample ID: MB 240-428529/3
Matrix: Water
Analysis Batch: 428529

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphate as PO4	ND		0.307	0.114	mg/L			03/27/20 05:13	1

Lab Sample ID: LCS 240-428529/4
Matrix: Water
Analysis Batch: 428529

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphate as PO4	0.416	0.4884		mg/L		117	77 - 120

Lab Sample ID: 240-127784-B-1 MS
Matrix: Water
Analysis Batch: 428529

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Phosphate as PO4	1.18		1.54	2.729		mg/L		101	38 - 156

Lab Sample ID: 240-127784-B-1 MSD
Matrix: Water
Analysis Batch: 428529

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Phosphate as PO4	1.18		1.54	2.677		mg/L		97	38 - 156	2	29

Method: SM4500-S-2 F. - Sulfide

Lab Sample ID: MB 180-310684/3
Matrix: Water
Analysis Batch: 310684

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3.00	1.34	mg/L			03/21/20 10:20	1

Lab Sample ID: LCS 180-310684/4
Matrix: Water
Analysis Batch: 310684

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	12.8	12.96		mg/L		101	90 - 110

Lab Sample ID: 180-103763-J-11 MS
Matrix: Water
Analysis Batch: 310684

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		12.8	13.12		mg/L		102	75 - 125

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-1

Method: SM4500-S-2 F. - Sulfide (Continued)

Lab Sample ID: 180-103763-J-11 MSD
Matrix: Water
Analysis Batch: 310684

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		12.8	12.34		mg/L		96	75 - 125	6	20

HPLC/IC

Analysis Batch: 311491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	EPA 9056A	
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	EPA 9056A	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	EPA 9056A	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	EPA 9056A	
MB 180-311491/37	Method Blank	Total/NA	Water	EPA 9056A	
LCS 180-311491/36	Lab Control Sample	Total/NA	Water	EPA 9056A	
180-103680-D-1 MS	Matrix Spike	Total/NA	Water	EPA 9056A	
180-103680-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 9056A	

General Chemistry

Analysis Batch: 310580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	EPA 353.2	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	EPA 353.2	
MB 180-310580/56	Method Blank	Total/NA	Water	EPA 353.2	
LCS 180-310580/52	Lab Control Sample	Total/NA	Water	EPA 353.2	
180-102906-D-1 MS	Matrix Spike	Total/NA	Water	EPA 353.2	
180-102906-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 353.2	

Analysis Batch: 310659

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	SM2320 B	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	SM2320 B	
MB 180-310659/63	Method Blank	Total/NA	Water	SM2320 B	
MB 180-310659/87	Method Blank	Total/NA	Water	SM2320 B	
LCS 180-310659/62	Lab Control Sample	Total/NA	Water	SM2320 B	
LCS 180-310659/86	Lab Control Sample	Total/NA	Water	SM2320 B	
180-103658-C-3 DU	Duplicate	Total/NA	Water	SM2320 B	
180-103680-D-1 DU	Duplicate	Total/NA	Water	SM2320 B	

Analysis Batch: 310684

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	SM4500-S-2 F.	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	SM4500-S-2 F.	
MB 180-310684/3	Method Blank	Total/NA	Water	SM4500-S-2 F.	
LCS 180-310684/4	Lab Control Sample	Total/NA	Water	SM4500-S-2 F.	
180-103763-J-11 MS	Matrix Spike	Total/NA	Water	SM4500-S-2 F.	
180-103763-J-11 MSD	Matrix Spike Duplicate	Total/NA	Water	SM4500-S-2 F.	

Analysis Batch: 310863

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	SM 5310C	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	SM 5310C	
MB 180-310863/33	Method Blank	Total/NA	Water	SM 5310C	
LCS 180-310863/31	Lab Control Sample	Total/NA	Water	SM 5310C	
LCSD 180-310863/32	Lab Control Sample Dup	Total/NA	Water	SM 5310C	
180-103581-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5310C	
180-103581-I-1 MS	Matrix Spike	Total/NA	Water	SM 5310C	

General Chemistry

Analysis Batch: 311136

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	SM 2310B	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	SM 2310B	
MB 180-311136/2	Method Blank	Total/NA	Water	SM 2310B	
LCS 180-311136/1	Lab Control Sample	Total/NA	Water	SM 2310B	
180-103680-D-1 DU	Duplicate	Total/NA	Water	SM 2310B	

Analysis Batch: 428529

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	SM4500 P E-2011	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	SM4500 P E-2011	
MB 240-428529/3	Method Blank	Total/NA	Water	SM4500 P E-2011	
LCS 240-428529/4	Lab Control Sample	Total/NA	Water	SM4500 P E-2011	
240-127784-B-1 MS	Matrix Spike	Total/NA	Water	SM4500 P E-2011	
240-127784-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM4500 P E-2011	

Prep Batch: 483211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	351.2	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	351.2	
MB 400-483211/1-A	Method Blank	Total/NA	Water	351.2	
LCS 400-483211/2-A	Lab Control Sample	Total/NA	Water	351.2	
180-103763-A-1-B MS	Matrix Spike	Total/NA	Water	351.2	
180-103763-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	

Prep Batch: 483212

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	365.2/365.3/365	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	365.2/365.3/365	
MB 400-483212/1-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 400-483212/2-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
180-103763-A-1-E MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
180-103763-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 483998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	365.4	483212
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	365.4	483212
MB 400-483212/1-A	Method Blank	Total/NA	Water	365.4	483212
LCS 400-483212/2-A	Lab Control Sample	Total/NA	Water	365.4	483212
MRL 400-483998/11	Lab Control Sample	Total/NA	Water	365.4	
180-103763-A-1-E MS	Matrix Spike	Total/NA	Water	365.4	483212
180-103763-A-1-F MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	483212

Analysis Batch: 484005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	351.2	483211
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	351.2	483211

General Chemistry (Continued)

Analysis Batch: 484005 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 400-483211/1-A	Method Blank	Total/NA	Water	351.2	483211
LCS 400-483211/2-A	Lab Control Sample	Total/NA	Water	351.2	483211
MRL 400-484005/2	Lab Control Sample	Total/NA	Water	351.2	
180-103763-A-1-B MS	Matrix Spike	Total/NA	Water	351.2	483211
180-103763-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	351.2	483211

Chain of Custody Record 420760

eurofins | Environment Testing TestAmerica

Address: Pittsburgh, PA

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date: 3/17/2020	COC No:
Company Name: Jennifer Gables	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: Environmental Standards, Inc.	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks	see sample notes		Lab Sampling:
Project Name: TVA Gallatin EIP	☐ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020A - total - Be, Li, Cd, Ni	6020A - dis - Be, Li, Cd, Ni	6020A - total - full suite	SM4500 - sulfide	4500 - Phosphate	353.2 NO2/NO3	5310C TOC	351.2 TKN	365.4 Total P	9056A ORG FM_28D CLF SO4	2320B - Alk	SM2310B - acidity	Sample Specific Notes:
GAF - GW - Hi Cal - CaCl2	3/17/20	1300	G	GW	2	N		✓	✓											One day TAT
GAF - GW - Dolo Fines - CaCl2	↓	↓	↓	↓	2	N		✓	✓											One day TAT
GAF - GW - Zeolite - CaCl2	↓	↓	↓	↓	2	N		✓	✓											One day TAT
GAF - GW - NaOH	↓	↓	↓	↓	1	N		✓												One day TAT
GAF - GW - Ferroblack	↓	↓	↓	↓	9	N			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	One day on metals, std TAT on all else
GAF - GW - Dolo Fines - 444u	↓	↓	↓	↓	7	N				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	One day on metals, std TAT on all else
								4	4	4	6	3	3	3	3	3	-	-	-	

180-103681 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Zinc acetate / NaOH

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 s... retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	3/17/2020 1600	[signature]	ETAPitt	3-18-20
					10:00
			Received in Laboratory by:		



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ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTUN, TX 78729
UNITED STATES US

SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311

TO

EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58963

RMA:

FedEx Express

FedEx
TRK# 0221 1680 3500 1526

WED - 18 MAR 10:30A
PRIORITY OVERNIGHT

15238
PA-US
PIT

XH AGCA

Uncorrected temp 1.8 °C
Thermometer ID 17
CF 0 Initials JB

PT-WI-SR-001 effective 11/8/18

FID 3830365 17MAR20 MMRA 56BC2/54E0/05A2

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

2.7/3.4

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-388821.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jennifer.rumble@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-103681-1
Address: 4101 Shuffel Street NW, ,	Due Date Requested: 3/31/2020			
City: North Canton	TAT Requested (days):			
State, Zip: OH, 44720				
Phone: 330-497-9396(Tel) 330-497-0772(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF NRS Treatability	Project #: 18016336			
Site: TVA GW Sampling	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	4500_P_E/ Phosphate as PO4	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
GAF-GW-FERROBLACK (180-103681-5)	3/17/20	13:00 Central		Water			X	1	Analysis Must follow TVA Protocol
GAF-GW-DOLO FINES-444U (180-103681-6)	3/17/20	13:00 Central		Water			X	1	Analysis Must follow TVA Protocol

118

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 3/25/20 1200	Company: Pitt	Received by: [signature]	Date/Time: 3-26-20 920	Company: ETAC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Eurofins TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : _____

Client ETA Pittsburgh Site Name _____

Cooler Received on 3-26-20 Opened on 3-26-20

FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other _____

Cooler unpacked by: [signature]

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # TH Foam Box Client Cooler Box Other _____

Packing material used: ~~Bubble Wrap~~ Foam ~~Plastic Bag~~ None Other _____

COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form

IR GUN# IR-10 (CF **+0.7** °C) Observed Cooler Temp. 2.7 °C Corrected Cooler Temp. 3.4 °C

IR GUN #IR-11 (CF **+0.9**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C

2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity _____	Yes	~~No~~
-Were the seals on the outside of the cooler(s) signed & dated?	Yes	No NA
-Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)?	Yes	~~No~~
-Were tamper/custody seals intact and uncompromised?	Yes	No NA
3. Shippers' packing slip attached to the cooler(s)?	~~Yes~~	No
4. Did custody papers accompany the sample(s)?	Yes	No
5. Were the custody papers relinquished & signed in the appropriate place?	Yes	No
6. Was/were the person(s) who collected the samples clearly identified on the COC?	Yes	No
7. Did all bottles arrive in good condition (Unbroken)?	Yes	No
8. Could all bottle labels be reconciled with the COC?	Yes	No
9. Were correct bottle(s) used for the test(s) indicated?	Yes	No
10. Sufficient quantity received to perform indicated analyses?	Yes	No
11. Are these work share samples?	Yes	No
If yes, Questions 12-16 have been checked at the originating laboratory.		
12. Were all preserved sample(s) at the correct pH upon receipt?	Yes	No NA pH Strip Lot# **HC902937**
13. Were VOAs on the COC?	Yes	No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this.	Yes	No NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____	Yes	No
16. Was a LL Hg or Me Hg trip blank present? _____	Yes	No

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.

Time preserved: _____ Preservative(s) added/Lot number(s): _____

VOA Sample Preservation - Date/Time VOAs Frozen: _____

WI-NC-099

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive RIDC Park
Pittsburgh, PA 15238
Phone: 412-963-7058 Fax: 412-963-2468

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Rumble, Jennifer L	Carrier Tracking No(s):	COC No: 180-388081.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: jennifer.rumble@testamericainc.com	State of Origin: Tennessee	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):		Job #: 180-103681-1
Address: 3355 McLemore Drive, ,	Due Date Requested: 3/30/2020			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: GAF NRS Treatability	Project #: 18016336			
Site: TVA GW Sampling	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, 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=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	365.4/365_Prep	351.2/351.2_Prep	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
GAF-GW-FERROBLACK (180-103681-5)	3/17/20	13:00 Central		Water			X	X	1	
GAF-GW-DOLO FINES-444U (180-103681-6)	3/17/20	13:00 Central		Water			X	X	1	

Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica places the ownership of method, analyte & accreditation compliance upon out 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/tests/matrix being analyzed, the samples must be shipped back to the Eurofins TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins TestAmerica.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

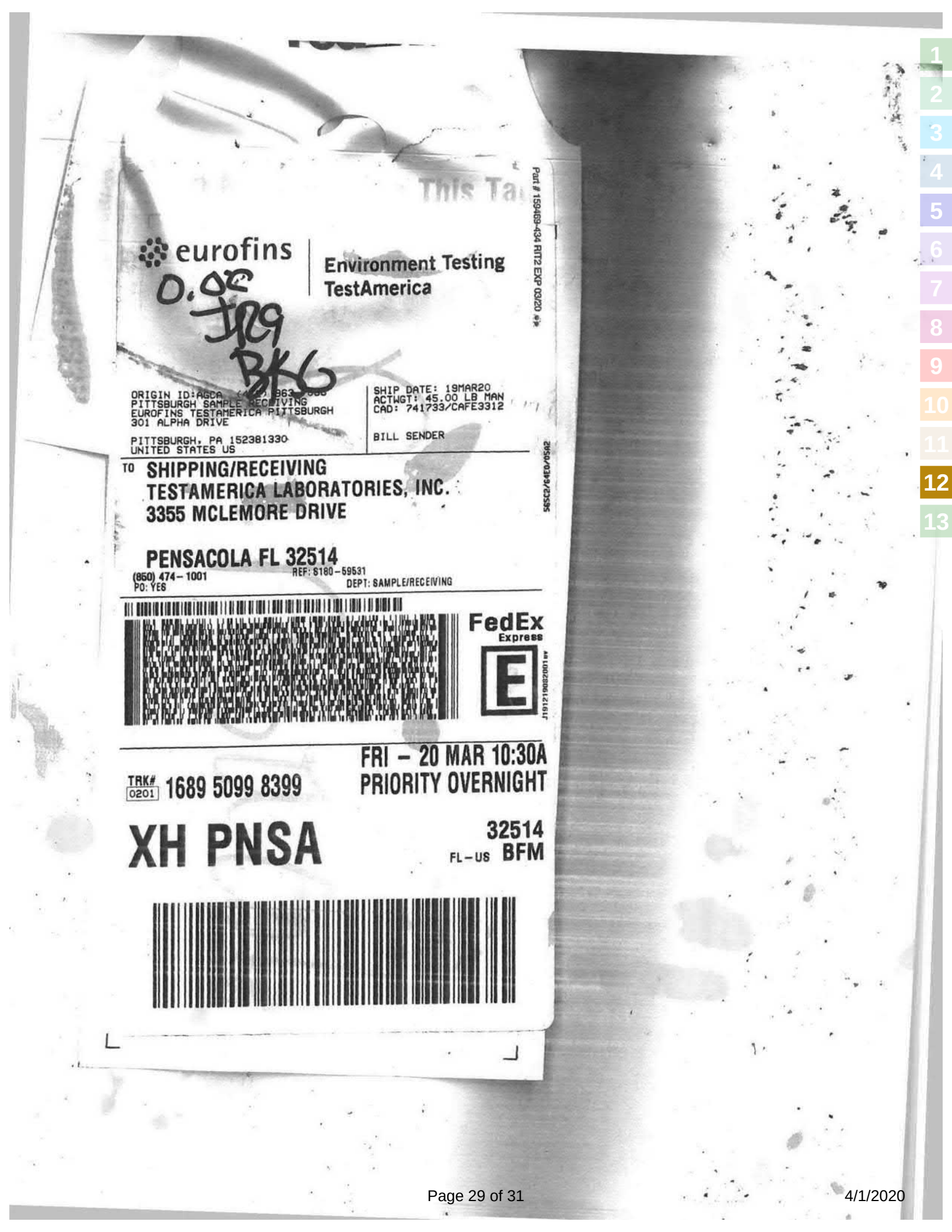
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
		3/19/20 1200	PAT			
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-20-20 8:54	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.0° IR9

Ver: 01/16/2019

This Ta

Part # 159469-434 RIT2 EXP 03/20



eurofins | Environment Testing TestAmerica

0.02
JR9
BK6

ORIGIN ID:AGCA (4[illegible]) 863-[illegible]
PITTSBURGH SAMPLE RECEIVING
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE

PITTSBURGH, PA 152381330
UNITED STATES US

SHIP DATE: 19MAR20
ACTWGT: 45.00 LB MAN
CAD: 741733/CAFE3312

BILL SENDER

TO SHIPPING/RECEIVING
TESTAMERICA LABORATORIES, INC.
3355 MCLEMORE DRIVE

PENSACOLA FL 32514
(850) 474-1001
PO: YES
REF: S180-59531
DEPT: SAMPLE/RECEIVING

565C2/64E0/05A2

FedEx Express

E

J191219082001ev

FRI - 20 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 1689 5099 8399

XH PNSA

32514
FL-US BFM

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-103681-1

Login Number: 103681 **List Source: Eurofins 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?	False	
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: Environmental Standards Inc.

Job Number: 180-103681-1

Login Number: 103681
List Number: 2
Creator: Conrady, Hank W

List Source: Eurofins TestAmerica, Pensacola
List Creation: 03/20/20 06:37 PM

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.	N/A	
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	0.0°C IR-9
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-101827-1
Client Project/Site: GAF - NRS - Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
2/18/2020 2:27:43 PM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: 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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Receipt Checklists 15

Job ID: 180-101827-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-101827-1

Receipt
The samples were received on 2/4/2020 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.9º C.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

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: Environmental Standards Inc.
Job ID: 180-101827-1
Project/Site: GAF - NRS - Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20 *
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-101827-1	GAF-ENVIROBLEND	Water	01/31/20 15:00	02/04/20 09:00	
180-101827-2	GAF-KHCO3	Water	01/31/20 13:30	02/04/20 09:00	
180-101827-3	GAF-MAGOX 1%	Water	01/31/20 15:00	02/04/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Client Sample ID: GAF-ENVIROBLEND

Lab Sample ID: 180-101827-1
Matrix: Water
Date Collected: 01/31/20 15:00
Date Received: 02/04/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306264	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	307003	02/13/20 01:05	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: GAF-KHCO3

Lab Sample ID: 180-101827-2
Matrix: Water
Date Collected: 01/31/20 13:30
Date Received: 02/04/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306264	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	307003	02/13/20 01:10	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: GAF-MAGOX 1%

Lab Sample ID: 180-101827-3
Matrix: Water
Date Collected: 01/31/20 15:00
Date Received: 02/04/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306264	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	307003	02/13/20 01:15	WTR	TAL PIT
	Instrument ID: M									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

RJR = Ron Rosenbaum

Batch Type: Analysis

WTR = Bill Reinheimer

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Client Sample ID: GAF-ENVIROBLEND
Date Collected: 01/31/20 15:00
Date Received: 02/04/20 09:00

Lab Sample ID: 180-101827-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	2.14		1.00	0.182	ug/L		02/06/20 11:30	02/13/20 01:05	1
Cadmium	1.67		1.00	0.217	ug/L		02/06/20 11:30	02/13/20 01:05	1
Lithium	150		5.00	3.39	ug/L		02/06/20 11:30	02/13/20 01:05	1
Nickel	83.7		1.00	0.336	ug/L		02/06/20 11:30	02/13/20 01:05	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Client Sample ID: GAF-KHCO3

Date Collected: 01/31/20 13:30
Date Received: 02/04/20 09:00

Lab Sample ID: 180-101827-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	1.28		1.00	0.182	ug/L		02/06/20 11:30	02/13/20 01:10	1
Cadmium	0.979	J	1.00	0.217	ug/L		02/06/20 11:30	02/13/20 01:10	1
Lithium	122		5.00	3.39	ug/L		02/06/20 11:30	02/13/20 01:10	1
Nickel	90.8		1.00	0.336	ug/L		02/06/20 11:30	02/13/20 01:10	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Client Sample ID: GAF-MAGOX 1%
Date Collected: 01/31/20 15:00
Date Received: 02/04/20 09:00

Lab Sample ID: 180-101827-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	2.58		1.00	0.182	ug/L		02/06/20 11:30	02/13/20 01:15	1
Cadmium	2.51		1.00	0.217	ug/L		02/06/20 11:30	02/13/20 01:15	1
Lithium	138		5.00	3.39	ug/L		02/06/20 11:30	02/13/20 01:15	1
Nickel	110		1.00	0.336	ug/L		02/06/20 11:30	02/13/20 01:15	1

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

Lab Sample ID: MB 180-306264/1-A
Matrix: Water
Analysis Batch: 307003

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 306264

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		02/06/20 11:30	02/12/20 23:11	1
Cadmium	ND		1.00	0.217	ug/L		02/06/20 11:30	02/12/20 23:11	1
Lithium	ND		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 23:11	1
Nickel	ND		1.00	0.336	ug/L		02/06/20 11:30	02/12/20 23:11	1

Lab Sample ID: LCS 180-306264/2-A
Matrix: Water
Analysis Batch: 307003

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 306264

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	500	524.9		ug/L		105	80 - 120
Cadmium	500	513.7		ug/L		103	80 - 120
Lithium	500	556.2		ug/L		111	80 - 120
Nickel	500	470.0		ug/L		94	80 - 120

Lab Sample ID: 180-101790-B-5-A MS
Matrix: Water
Analysis Batch: 307003

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 306264

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		500	530.7		ug/L		106	75 - 125
Cadmium	ND		500	504.2		ug/L		101	75 - 125
Lithium	ND		500	551.0		ug/L		110	75 - 125
Nickel	0.372	J	500	451.1		ug/L		90	75 - 125

Lab Sample ID: 180-101790-B-5-B MSD
Matrix: Water
Analysis Batch: 307003

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 306264

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		500	520.8		ug/L		104	75 - 125	2	20
Cadmium	ND		500	516.8		ug/L		103	75 - 125	2	20
Lithium	ND		500	549.8		ug/L		110	75 - 125	0	20
Nickel	0.372	J	500	448.7		ug/L		90	75 - 125	1	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: GAF - NRS - Treatability

Job ID: 180-101827-1

Metals

Prep Batch: 306264

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101827-1	GAF-ENVIROBLEND	Total Recoverable	Water	3005A	
180-101827-2	GAF-KHCO3	Total Recoverable	Water	3005A	
180-101827-3	GAF-MAGOX 1%	Total Recoverable	Water	3005A	
MB 180-306264/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-306264/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-101790-B-5-A MS	Matrix Spike	Total Recoverable	Water	3005A	
180-101790-B-5-B MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 307003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101827-1	GAF-ENVIROBLEND	Total Recoverable	Water	EPA 6020A	306264
180-101827-2	GAF-KHCO3	Total Recoverable	Water	EPA 6020A	306264
180-101827-3	GAF-MAGOX 1%	Total Recoverable	Water	EPA 6020A	306264
MB 180-306264/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	306264
LCS 180-306264/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	306264
180-101790-B-5-A MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	306264
180-101790-B-5-B MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	306264

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238-2907
phone 412.963.7058 fax 412.963.2468

Chain of Custody Record

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Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	**Project Manager: Craig Macphee**		COC No:
Jennifer Gables	Email: craig.macphee@aecom.com	**Site Contact: Francisco Barajas** Date:2/3/2020	___1___ of __1___ COCs
Environmental Standards Inc	**Tel/Fax: 512-419-5447**	**Lab Contact: Rachel Watkins** Carrier:	TALS Project #: 18016336
	Analysis Turnaround Time		Sampler:
	☐ CALENDAR DAYS ☐ WORKING DAYS		**For Lab Use Only:**
610.935.5577 x414	TAT if different from Below _____		Walk-in Client:
(xxx) xxx-xxxx FAX	☐ 2 weeks		Lab Sampling:
Project Name: TVA Gallatin EIP	☐ 1 week		
Site: GAF-NRS-Treatability	☐ 2 days		Job / SDG No.:
P O #	☐ 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)	6020A (Mod) GAF, Groundwater, T	Sample Specific Notes:
GAF-Enviroblend	1/31/2020	1500	G	GW	1	N	N	x	Only Cd, Be, Ni, Li
GAF-KHCO3	1/31/2020	1330	G	GW	1	N	N	x	
GAF-MagOx 1%	1/31/2020	1500	G	GW	1	N	N	x	
								4	

180-101827 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:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____		Therm ID No.:_____
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 2/03/20 16:00	Received by:	Company: Fedex	Date/Time: 2/4/20 900
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

2/18/2020

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-101827-1

Login Number: 101827 **List Source: Eurofins TestAmerica, Pittsburgh**
List Number: 1
Creator: Say, Thomas C

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	
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	

eurofins | Environment Testing TestAmerica



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-103681-2
Client Project/Site: GAF NRS Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
3/25/2020 1:20:02 PM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: 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

Table of Contents

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Job ID: 180-103681-2

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-103681-2

Receipt
The samples were received on 3/18/2020 10:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.8º C.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

Metals
Methods 6020A: The continuing calibration verification (CCV) associated with batch 180-310945 recovered above the upper control limit for selenium. The samples associated with this CCV were non-detects or less than the RL for the affected analytes; therefore, the data have been reported.

Method 6020A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-HI CAL-CACL2 (180-103681-1), GAF-GW-DOLO FINES-CACL2 (180-103681-2), GAF-GW-ZEOLITE-CACL2 (180-103681-3) and GAF-GW-FERROBLACK (180-103681-5). Elevated reporting limits (RLs) are provided.

Method 6020A: The following samples were diluted due to the high concentration of calcium in the sample matrix: GAF-GW-HI CAL-CACL2 (180-103681-1), GAF-GW-DOLO FINES-CACL2 (180-103681-2) and GAF-GW-ZEOLITE-CACL2 (180-103681-3). Elevated reporting limits (RLs) are provided.

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

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Qualifiers

Metals

Qualifier	Qualifier Description
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.
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
F7	MS/MSD RPD exceeds control limits. Sample size differs by <10%
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: Environmental Standards Inc. Job ID: 180-103681-2
Project/Site: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-103681-1	GAF-GW-HI CAL-CACL2	Water	03/17/20 13:00	03/18/20 10:00	
180-103681-2	GAF-GW-DOLO FINES-CACL2	Water	03/17/20 13:00	03/18/20 10:00	
180-103681-3	GAF-GW-ZEOLITE-CACL2	Water	03/17/20 13:00	03/18/20 10:00	
180-103681-4	GAF-GW-NAOH	Water	03/17/20 13:00	03/18/20 10:00	
180-103681-5	GAF-GW-FERROBLACK	Water	03/17/20 13:00	03/18/20 10:00	
180-103681-6	GAF-GW-DOLO FINES-444U	Water	03/17/20 13:00	03/18/20 10:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 7470A	Mercury (CVAA)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-HI CAL-CACL2

Lab Sample ID: 180-103681-1
Date Collected: 03/17/20 13:00
Matrix: Water
Date Received: 03/18/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Dissolved	Analysis	EPA 6020A		10			311056	03/24/20 16:59	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			311056	03/24/20 16:33	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-DOLO FINES-CACL2

Lab Sample ID: 180-103681-2
Date Collected: 03/17/20 13:00
Matrix: Water
Date Received: 03/18/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Dissolved	Analysis	EPA 6020A		10			311056	03/24/20 17:01	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			311056	03/24/20 16:36	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-ZEOLITE-CACL2

Lab Sample ID: 180-103681-3
Date Collected: 03/17/20 13:00
Matrix: Water
Date Received: 03/18/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Dissolved	Analysis	EPA 6020A		10			311056	03/24/20 17:04	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			311056	03/24/20 16:38	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GW-NAOH

Lab Sample ID: 180-103681-4
Date Collected: 03/17/20 13:00
Matrix: Water
Date Received: 03/18/20 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			310945	03/23/20 20:50	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			311056	03/24/20 16:41	RSK	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-FERROBLACK

Lab Sample ID: 180-103681-5

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Dissolved	Analysis	EPA 6020A		5			311056	03/24/20 17:06	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			311056	03/24/20 16:43	RSK	TAL PIT
	Instrument ID: NEMO									
Total/NA	Prep	7470A			50 mL	50 mL	310482	03/19/20 14:38	NAM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			310647	03/20/20 18:48	NAM	TAL PIT
	Instrument ID: HGZ									

Client Sample ID: GAF-GW-DOLO FINES-444U

Lab Sample ID: 180-103681-6

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			310945	03/23/20 20:55	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	310836	03/23/20 09:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			311056	03/24/20 16:46	RSK	TAL PIT
	Instrument ID: NEMO									
Total/NA	Prep	7470A			50 mL	50 mL	310482	03/19/20 14:38	NAM	TAL PIT
Total/NA	Analysis	EPA 7470A		1			310647	03/20/20 18:49	NAM	TAL PIT
	Instrument ID: HGZ									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

NAM = Nicole Marfisi
RJR = Ron Rosenbaum

Batch Type: Analysis

NAM = Nicole Marfisi
RSK = Robert Kurtz

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-HI CAL-CACL2

Lab Sample ID: 180-103681-1

Date Collected: 03/17/20 13:00

Matrix: Water

Date Received: 03/18/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0100	0.00182	mg/L		03/23/20 09:30	03/24/20 16:33	10
Cadmium	ND		0.0100	0.00217	mg/L		03/23/20 09:30	03/24/20 16:33	10
Lithium	ND		0.0500	0.0339	mg/L		03/23/20 09:30	03/24/20 16:33	10
Nickel	ND		0.0100	0.00336	mg/L		03/23/20 09:30	03/24/20 16:33	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0100	0.00182	mg/L		03/23/20 09:30	03/24/20 16:59	10
Cadmium	ND		0.0100	0.00217	mg/L		03/23/20 09:30	03/24/20 16:59	10
Lithium	**0.141**		0.0500	0.0339	mg/L		03/23/20 09:30	03/24/20 16:59	10
Nickel	**0.00378**	**J**	0.0100	0.00336	mg/L		03/23/20 09:30	03/24/20 16:59	10

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-DOLO FINES-CACL2

Lab Sample ID: 180-103681-2

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0100	0.00182	mg/L		03/23/20 09:30	03/24/20 16:36	10
Cadmium	ND		0.0100	0.00217	mg/L		03/23/20 09:30	03/24/20 16:36	10
Lithium	**0.143**		0.0500	0.0339	mg/L		03/23/20 09:30	03/24/20 16:36	10
Nickel	**0.00407**	**J**	0.0100	0.00336	mg/L		03/23/20 09:30	03/24/20 16:36	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.00291**	**J B**	0.0100	0.00182	mg/L		03/23/20 09:30	03/24/20 17:01	10
Cadmium	**0.00741**	**J**	0.0100	0.00217	mg/L		03/23/20 09:30	03/24/20 17:01	10
Lithium	**0.198**		0.0500	0.0339	mg/L		03/23/20 09:30	03/24/20 17:01	10
Nickel	**0.0109**		0.0100	0.00336	mg/L		03/23/20 09:30	03/24/20 17:01	10

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-ZEOLITE-CACL2

Lab Sample ID: 180-103681-3

Date Collected: 03/17/20 13:00
Date Received: 03/18/20 10:00

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0100	0.00182	mg/L		03/23/20 09:30	03/24/20 16:38	10
Cadmium	ND		0.0100	0.00217	mg/L		03/23/20 09:30	03/24/20 16:38	10
Lithium	**0.184**		0.0500	0.0339	mg/L		03/23/20 09:30	03/24/20 16:38	10
Nickel	ND		0.0100	0.00336	mg/L		03/23/20 09:30	03/24/20 16:38	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0100	0.00182	mg/L		03/23/20 09:30	03/24/20 17:04	10
Cadmium	**0.00266**	**J**	0.0100	0.00217	mg/L		03/23/20 09:30	03/24/20 17:04	10
Lithium	**0.238**		0.0500	0.0339	mg/L		03/23/20 09:30	03/24/20 17:04	10
Nickel	**0.0883**		0.0100	0.00336	mg/L		03/23/20 09:30	03/24/20 17:04	10

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-NAOH

Lab Sample ID: 180-103681-4

Date Collected: 03/17/20 13:00

Matrix: Water

Date Received: 03/18/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00432	B	0.00100	0.000182	mg/L		03/23/20 09:30	03/24/20 16:41	1
Cadmium	0.00656		0.00100	0.000217	mg/L		03/23/20 09:30	03/23/20 20:50	1
Lithium	0.0330		0.00500	0.00339	mg/L		03/23/20 09:30	03/24/20 16:41	1
Nickel	0.590		0.00100	0.000336	mg/L		03/23/20 09:30	03/23/20 20:50	1

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-FERROBLACK

Lab Sample ID: 180-103681-5

Date Collected: 03/17/20 13:00

Matrix: Water

Date Received: 03/18/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.320**		0.0300	0.0125	mg/L		03/23/20 09:30	03/24/20 16:43	1
Antimony	ND		0.00200	0.000378	mg/L		03/23/20 09:30	03/24/20 16:43	1
Arsenic	ND		0.00100	0.000313	mg/L		03/23/20 09:30	03/24/20 16:43	1
Barium	**0.00340**	**J**	0.0100	0.00160	mg/L		03/23/20 09:30	03/24/20 16:43	1
Beryllium	ND		0.00100	0.000182	mg/L		03/23/20 09:30	03/24/20 16:43	1
Boron	**0.682**		0.0800	0.0386	mg/L		03/23/20 09:30	03/24/20 16:43	1
Cadmium	ND		0.00100	0.000217	mg/L		03/23/20 09:30	03/24/20 16:43	1
Calcium	**107**		0.500	0.127	mg/L		03/23/20 09:30	03/24/20 16:43	1
Chromium	ND		0.00200	0.00153	mg/L		03/23/20 09:30	03/24/20 16:43	1
Cobalt	**0.0131**		0.000500	0.000134	mg/L		03/23/20 09:30	03/24/20 16:43	1
Copper	ND		0.00200	0.000627	mg/L		03/23/20 09:30	03/24/20 16:43	1
Iron	**75.8**	**B**	0.0500	0.0195	mg/L		03/23/20 09:30	03/24/20 16:43	1
Lead	ND		0.00100	0.000128	mg/L		03/23/20 09:30	03/24/20 16:43	1
Lithium	**0.00732**		0.00500	0.00339	mg/L		03/23/20 09:30	03/24/20 16:43	1
Magnesium	**4.70**		0.500	0.0827	mg/L		03/23/20 09:30	03/24/20 16:43	1
Manganese	**2.88**	**B**	0.00500	0.000866	mg/L		03/23/20 09:30	03/24/20 16:43	1
Molybdenum	ND		0.00500	0.000610	mg/L		03/23/20 09:30	03/24/20 16:43	1
Nickel	**0.00359**		0.00100	0.000336	mg/L		03/23/20 09:30	03/24/20 16:43	1
Potassium	**20.3**		0.500	0.156	mg/L		03/23/20 09:30	03/24/20 16:43	1
Selenium	ND		0.00500	0.00151	mg/L		03/23/20 09:30	03/24/20 16:43	1
Silver	ND		0.00100	0.000177	mg/L		03/23/20 09:30	03/24/20 16:43	1
Sodium	**442**		0.500	0.348	mg/L		03/23/20 09:30	03/24/20 16:43	1
Thallium	ND		0.00100	0.000148	mg/L		03/23/20 09:30	03/24/20 16:43	1
Vanadium	ND		0.00100	0.000991	mg/L		03/23/20 09:30	03/24/20 16:43	1
Zinc	**0.0143**		0.00500	0.00322	mg/L		03/23/20 09:30	03/24/20 16:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00500	0.000910	mg/L		03/23/20 09:30	03/24/20 17:06	5
Cadmium	ND		0.00500	0.00109	mg/L		03/23/20 09:30	03/24/20 17:06	5
Lithium	**0.0369**		0.0250	0.0170	mg/L		03/23/20 09:30	03/24/20 17:06	5
Nickel	**0.0166**		0.00500	0.00168	mg/L		03/23/20 09:30	03/24/20 17:06	5

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000101	mg/L		03/19/20 14:38	03/20/20 18:48	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Client Sample ID: GAF-GW-DOLO FINES-444U

Lab Sample ID: 180-103681-6

Date Collected: 03/17/20 13:00
Matrix: Water
Date Received: 03/18/20 10:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1.91**		0.0300	0.0125	mg/L		03/23/20 09:30	03/24/20 16:46	1
Antimony	ND		0.00200	0.000378	mg/L		03/23/20 09:30	03/23/20 20:55	1
Arsenic	**0.00112**		0.00100	0.000313	mg/L		03/23/20 09:30	03/23/20 20:55	1
Barium	**0.0144**		0.0100	0.00160	mg/L		03/23/20 09:30	03/23/20 20:55	1
Beryllium	**0.00176**	**B**	0.00100	0.000182	mg/L		03/23/20 09:30	03/24/20 16:46	1
Boron	**4.04**		0.0800	0.0386	mg/L		03/23/20 09:30	03/24/20 16:46	1
Cadmium	**0.00139**		0.00100	0.000217	mg/L		03/23/20 09:30	03/23/20 20:55	1
Calcium	**628**		0.500	0.127	mg/L		03/23/20 09:30	03/24/20 16:46	1
Chromium	ND		0.00200	0.00153	mg/L		03/23/20 09:30	03/23/20 20:55	1
Cobalt	**0.191**		0.000500	0.000134	mg/L		03/23/20 09:30	03/23/20 20:55	1
Copper	**0.00162**	**J**	0.00200	0.000627	mg/L		03/23/20 09:30	03/23/20 20:55	1
Iron	**10.3**		0.0500	0.0195	mg/L		03/23/20 09:30	03/23/20 20:55	1
Lead	**0.000602**	**J**	0.00100	0.000128	mg/L		03/23/20 09:30	03/23/20 20:55	1
Lithium	**0.0342**		0.00500	0.00339	mg/L		03/23/20 09:30	03/24/20 16:46	1
Magnesium	**97.4**		0.500	0.0827	mg/L		03/23/20 09:30	03/23/20 20:55	1
Manganese	**10.9**	**B**	0.00500	0.000866	mg/L		03/23/20 09:30	03/23/20 20:55	1
Molybdenum	ND		0.00500	0.000610	mg/L		03/23/20 09:30	03/23/20 20:55	1
Nickel	**0.0783**		0.00100	0.000336	mg/L		03/23/20 09:30	03/23/20 20:55	1
Potassium	**85.1**		0.500	0.156	mg/L		03/23/20 09:30	03/23/20 20:55	1
Selenium	ND		0.00500	0.00151	mg/L		03/23/20 09:30	03/23/20 20:55	1
Silver	**0.0102**		0.00100	0.000177	mg/L		03/23/20 09:30	03/23/20 20:55	1
Sodium	**57.4**		0.500	0.348	mg/L		03/23/20 09:30	03/23/20 20:55	1
Thallium	**0.000185**	**J**	0.00100	0.000148	mg/L		03/23/20 09:30	03/23/20 20:55	1
Vanadium	ND		0.00100	0.000991	mg/L		03/23/20 09:30	03/23/20 20:55	1
Zinc	**0.131**		0.00500	0.00322	mg/L		03/23/20 09:30	03/23/20 20:55	1

Method: EPA 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000101	mg/L		03/19/20 14:38	03/20/20 18:49	1

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

Lab Sample ID: MB 180-310836/1-A
Matrix: Water
Analysis Batch: 310945

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		0.0300	0.0125	mg/L		03/23/20 09:30	03/23/20 19:28	1
Antimony	ND		0.00200	0.000378	mg/L		03/23/20 09:30	03/23/20 19:28	1
Arsenic	ND		0.00100	0.000313	mg/L		03/23/20 09:30	03/23/20 19:28	1
Barium	ND		0.0100	0.00160	mg/L		03/23/20 09:30	03/23/20 19:28	1
Beryllium	0.0002460	J	0.00100	0.000182	mg/L		03/23/20 09:30	03/23/20 19:28	1
Cadmium	ND		0.00100	0.000217	mg/L		03/23/20 09:30	03/23/20 19:28	1
Calcium	ND		0.500	0.127	mg/L		03/23/20 09:30	03/23/20 19:28	1
Chromium	ND		0.00200	0.00153	mg/L		03/23/20 09:30	03/23/20 19:28	1
Cobalt	ND		0.000500	0.000134	mg/L		03/23/20 09:30	03/23/20 19:28	1
Copper	ND		0.00200	0.000627	mg/L		03/23/20 09:30	03/23/20 19:28	1
Lead	ND		0.00100	0.000128	mg/L		03/23/20 09:30	03/23/20 19:28	1
Lithium	ND		0.00500	0.00339	mg/L		03/23/20 09:30	03/23/20 19:28	1
Magnesium	ND		0.500	0.0827	mg/L		03/23/20 09:30	03/23/20 19:28	1
Manganese	0.001912	J	0.00500	0.000866	mg/L		03/23/20 09:30	03/23/20 19:28	1
Molybdenum	ND		0.00500	0.000610	mg/L		03/23/20 09:30	03/23/20 19:28	1
Nickel	ND		0.00100	0.000336	mg/L		03/23/20 09:30	03/23/20 19:28	1
Potassium	ND		0.500	0.156	mg/L		03/23/20 09:30	03/23/20 19:28	1
Silver	ND		0.00100	0.000177	mg/L		03/23/20 09:30	03/23/20 19:28	1
Sodium	ND		0.500	0.348	mg/L		03/23/20 09:30	03/23/20 19:28	1
Thallium	ND		0.00100	0.000148	mg/L		03/23/20 09:30	03/23/20 19:28	1
Vanadium	ND		0.00100	0.000991	mg/L		03/23/20 09:30	03/23/20 19:28	1
Zinc	ND		0.00500	0.00322	mg/L		03/23/20 09:30	03/23/20 19:28	1

Lab Sample ID: MB 180-310836/1-A
Matrix: Water
Analysis Batch: 311056

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.0800	0.0386	mg/L		03/23/20 09:30	03/24/20 18:23	1
Iron	0.04952	J	0.0500	0.0195	mg/L		03/23/20 09:30	03/24/20 18:23	1
Selenium	ND		0.00500	0.00151	mg/L		03/23/20 09:30	03/24/20 18:23	1

Lab Sample ID: LCS 180-310836/2-A
Matrix: Water
Analysis Batch: 310945

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5.00	4.328		mg/L		87	80 - 120
Antimony	0.250	0.2058		mg/L		82	80 - 120
Arsenic	1.00	0.8409		mg/L		84	80 - 120
Barium	1.00	0.8734		mg/L		87	80 - 120
Beryllium	0.500	0.4630		mg/L		93	80 - 120
Boron	1.25	1.004		mg/L		80	80 - 120
Cadmium	0.500	0.4349		mg/L		87	80 - 120
Calcium	25.0	22.56		mg/L		90	80 - 120
Chromium	0.500	0.4323		mg/L		86	80 - 120
Cobalt	0.500	0.4549		mg/L		91	80 - 120
Copper	0.500	0.4398		mg/L		88	80 - 120
Lead	0.500	0.4260		mg/L		85	80 - 120

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

Lab Sample ID: LCS 180-310836/2-A
Matrix: Water
Analysis Batch: 310945

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lithium	0.500	0.4649		mg/L		93	80 - 120
Magnesium	25.0	22.21		mg/L		89	80 - 120
Manganese	0.500	0.4211		mg/L		84	80 - 120
Molybdenum	0.500	0.4467		mg/L		89	80 - 120
Nickel	0.500	0.4193		mg/L		84	80 - 120
Potassium	25.0	20.91		mg/L		84	80 - 120
Selenium	1.00	0.9737		mg/L		97	80 - 120
Silver	0.250	0.2037		mg/L		81	80 - 120
Sodium	25.0	23.15		mg/L		93	80 - 120
Thallium	1.00	0.8794		mg/L		88	80 - 120
Vanadium	0.500	0.4396		mg/L		88	80 - 120
Zinc	0.250	0.2044		mg/L		82	80 - 120

Lab Sample ID: LCS 180-310836/2-A
Matrix: Water
Analysis Batch: 311056

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	5.00	5.181		mg/L		104	80 - 120

Lab Sample ID: 180-103475-B-9-C MS
Matrix: Water
Analysis Batch: 310945

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND		5.00	4.842		mg/L		97	75 - 125
Antimony	ND		0.250	0.2564		mg/L		103	75 - 125
Arsenic	0.000716	J	1.00	1.044		mg/L		104	75 - 125
Barium	0.0485		1.00	1.095		mg/L		105	75 - 125
Cadmium	ND		0.500	0.5283		mg/L		106	75 - 125
Chromium	ND		0.500	0.5128		mg/L		103	75 - 125
Cobalt	ND		0.500	0.5166		mg/L		103	75 - 125
Copper	ND		0.500	0.5028		mg/L		101	75 - 125
Iron	7.02		5.00	12.11		mg/L		102	75 - 125
Lead	ND		0.500	0.5061		mg/L		101	75 - 125
Magnesium	29.2		25.0	55.51		mg/L		105	75 - 125
Manganese	2.39	B	0.500	3.018	4	mg/L		125	75 - 125
Molybdenum	0.00113	J	0.500	0.5510		mg/L		110	75 - 125
Nickel	ND		0.500	0.4968		mg/L		99	75 - 125
Potassium	1.32		25.0	25.64		mg/L		97	75 - 125
Selenium	ND		1.00	1.080		mg/L		108	75 - 125
Silver	ND		0.250	0.2569		mg/L		103	75 - 125
Sodium	35.6		25.0	64.34		mg/L		115	75 - 125
Thallium	ND		1.00	1.055		mg/L		106	75 - 125
Vanadium	ND		0.500	0.5270		mg/L		105	75 - 125
Zinc	ND		0.250	0.2359		mg/L		94	75 - 125

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

Lab Sample ID: 180-103475-B-9-C MS
Matrix: Water
Analysis Batch: 311056

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND	F1 ^	0.500	0.5508		mg/L		110	75 - 125
Boron	0.324	^ F1	1.25	1.658		mg/L		107	75 - 125
Calcium	208	^	25.0	243.8	4	mg/L		142	75 - 125
Lithium	ND	F1 ^	0.500	0.5072		mg/L		101	75 - 125

Lab Sample ID: 180-103475-B-9-D MSD
Matrix: Water
Analysis Batch: 310945

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND		5.00	4.921		mg/L		98	75 - 125	2	20
Antimony	ND		0.250	0.2521		mg/L		101	75 - 125	2	20
Arsenic	0.000716	J	1.00	1.025		mg/L		102	75 - 125	2	20
Barium	0.0485		1.00	1.085		mg/L		104	75 - 125	1	20
Cadmium	ND		0.500	0.5223		mg/L		104	75 - 125	1	20
Chromium	ND		0.500	0.5131		mg/L		103	75 - 125	0	20
Cobalt	ND		0.500	0.5100		mg/L		102	75 - 125	1	20
Copper	ND		0.500	0.4904		mg/L		98	75 - 125	2	20
Iron	7.02		5.00	12.09		mg/L		101	75 - 125	0	20
Lead	ND		0.500	0.5072		mg/L		101	75 - 125	0	20
Magnesium	29.2		25.0	55.97		mg/L		107	75 - 125	1	20
Manganese	2.39	B	0.500	2.960	4	mg/L		113	75 - 125	2	20
Molybdenum	0.00113	J	0.500	0.5355		mg/L		107	75 - 125	3	20
Nickel	ND		0.500	0.4919		mg/L		98	75 - 125	1	20
Potassium	1.32		25.0	25.57		mg/L		97	75 - 125	0	20
Selenium	ND		1.00	1.022		mg/L		102	75 - 125	5	20
Silver	ND		0.250	0.2504		mg/L		100	75 - 125	3	20
Sodium	35.6		25.0	63.82		mg/L		113	75 - 125	1	20
Thallium	ND		1.00	1.040		mg/L		104	75 - 125	1	20
Vanadium	ND		0.500	0.5239		mg/L		105	75 - 125	1	20
Zinc	ND		0.250	0.2276		mg/L		91	75 - 125	4	20

Lab Sample ID: 180-103475-B-9-D MSD
Matrix: Water
Analysis Batch: 311056

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 310836

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND	F1 ^	0.500	0.5556	F7	mg/L		111	75 - 125	56	20
Boron	0.324	^ F1	1.25	1.713	F7	mg/L		111	75 - 125	60	20
Calcium	208	^	25.0	243.1	4	mg/L		139	75 - 125	1	20
Lithium	ND	F1 ^	0.500	0.5100	F7	mg/L		102	75 - 125	54	20

Client: Environmental Standards Inc.
Project/Site: GAF NRS Treatability

Job ID: 180-103681-2

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: MB 180-310482/1-A
Matrix: Water
Analysis Batch: 310647

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 310482

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.000200	0.000101	mg/L		03/19/20 14:38	03/20/20 18:46	1

Lab Sample ID: LCS 180-310482/2-A
Matrix: Water
Analysis Batch: 310647

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 310482

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00250	0.002419		mg/L		97	80 - 120		

Lab Sample ID: 180-103475-B-9-A MS
Matrix: Water
Analysis Batch: 310647

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 310482

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury	ND	F1	0.00100	0.0006730	F1	mg/L		67	75 - 125		

Lab Sample ID: 180-103475-B-9-B MSD
Matrix: Water
Analysis Batch: 310647

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 310482

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND	F1	0.00100	0.0006580	F1	mg/L		66	75 - 125	2	20

Metals

Prep Batch: 310482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	7470A	
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	7470A	
MB 180-310482/1-A	Method Blank	Total/NA	Water	7470A	
LCS 180-310482/2-A	Lab Control Sample	Total/NA	Water	7470A	
180-103475-B-9-A MS	Matrix Spike	Total/NA	Water	7470A	
180-103475-B-9-B MSD	Matrix Spike Duplicate	Total/NA	Water	7470A	

Analysis Batch: 310647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Total/NA	Water	EPA 7470A	310482
180-103681-6	GAF-GW-DOLO FINES-444U	Total/NA	Water	EPA 7470A	310482
MB 180-310482/1-A	Method Blank	Total/NA	Water	EPA 7470A	310482
LCS 180-310482/2-A	Lab Control Sample	Total/NA	Water	EPA 7470A	310482
180-103475-B-9-A MS	Matrix Spike	Total/NA	Water	EPA 7470A	310482
180-103475-B-9-B MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 7470A	310482

Prep Batch: 310836

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-1	GAF-GW-HI CAL-CACL2	Dissolved	Water	3005A	
180-103681-1	GAF-GW-HI CAL-CACL2	Total Recoverable	Water	3005A	
180-103681-2	GAF-GW-DOLO FINES-CACL2	Dissolved	Water	3005A	
180-103681-2	GAF-GW-DOLO FINES-CACL2	Total Recoverable	Water	3005A	
180-103681-3	GAF-GW-ZEOLITE-CACL2	Dissolved	Water	3005A	
180-103681-3	GAF-GW-ZEOLITE-CACL2	Total Recoverable	Water	3005A	
180-103681-4	GAF-GW-NAOH	Total Recoverable	Water	3005A	
180-103681-5	GAF-GW-FERROBLACK	Dissolved	Water	3005A	
180-103681-5	GAF-GW-FERROBLACK	Total Recoverable	Water	3005A	
180-103681-6	GAF-GW-DOLO FINES-444U	Total Recoverable	Water	3005A	
MB 180-310836/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-310836/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-103475-B-9-C MS	Matrix Spike	Total Recoverable	Water	3005A	
180-103475-B-9-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 310945

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-4	GAF-GW-NAOH	Total Recoverable	Water	EPA 6020A	310836
180-103681-6	GAF-GW-DOLO FINES-444U	Total Recoverable	Water	EPA 6020A	310836
MB 180-310836/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	310836
LCS 180-310836/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	310836
180-103475-B-9-C MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	310836
180-103475-B-9-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	310836

Analysis Batch: 311056

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-1	GAF-GW-HI CAL-CACL2	Dissolved	Water	EPA 6020A	310836
180-103681-1	GAF-GW-HI CAL-CACL2	Total Recoverable	Water	EPA 6020A	310836
180-103681-2	GAF-GW-DOLO FINES-CACL2	Dissolved	Water	EPA 6020A	310836
180-103681-2	GAF-GW-DOLO FINES-CACL2	Total Recoverable	Water	EPA 6020A	310836
180-103681-3	GAF-GW-ZEOLITE-CACL2	Dissolved	Water	EPA 6020A	310836
180-103681-3	GAF-GW-ZEOLITE-CACL2	Total Recoverable	Water	EPA 6020A	310836
180-103681-4	GAF-GW-NAOH	Total Recoverable	Water	EPA 6020A	310836

Metals (Continued)

Analysis Batch: 311056 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-103681-5	GAF-GW-FERROBLACK	Dissolved	Water	EPA 6020A	310836
180-103681-5	GAF-GW-FERROBLACK	Total Recoverable	Water	EPA 6020A	310836
180-103681-6	GAF-GW-DOLO FINES-444U	Total Recoverable	Water	EPA 6020A	310836
MB 180-310836/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	310836
LCS 180-310836/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	310836
180-103475-B-9-C MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	310836
180-103475-B-9-D MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	310836

Chain of Custody Record 420760

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Address: Pittsburgh, PA

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date: 3/17/2020	COC No:
Company Name: Jennifer Gables	Tel/Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: Environmental Standards, Inc.	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610.935.5577 x414	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks	see sample notes		Lab Sampling:
Project Name: TVA Gallatin EIP	☐ 1 week			
Site: GAF - NRS - Treatability	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020A - total - Be, Li, Cd, Ni	6020A - dis - Be, Li, Cd, Ni	6020A - total - full suite	SM4500 - sulfide	4500 - Phosphate	353.2 NO2/NO3	5310C TOC	351.2 TKN	365.4 Total P	9056A ORG FM_28D CLF SO4	2320B - Alk	SM2310B - acidity	Sample Specific Notes:
GAF - GW - Hi Cal - CaCl2	3/17/20	1300	G	GW	2	N		✓	✓											One day TAT
GAF - GW - Dolo Fines - CaCl2	↓	↓	↓	↓	2	N		✓	✓											One day TAT
GAF - GW - Zeolite - CaCl2	↓	↓	↓	↓	2	N		✓	✓											One day TAT
GAF - GW - NaOH	↓	↓	↓	↓	1	N		✓												One day TAT
GAF - GW - Ferroblack	↓	↓	↓	↓	9	N			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	One day on metals, std TAT on all else
GAF - GW - Dolo Fines - 444u	↓	↓	↓	↓	7	N				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	One day on metals, std TAT on all else
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other Zinc acetate / NaOH								4	4	4	6	3	3	3	3	3	-	-	-	

180-103681 Chain of Custody

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 s... retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Rachel Watkins	AECOM	3/17/2020 1600	[signature]	ETAPitt	3-18-20
					10:00
			Received in Laboratory by:		


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Environment Testing
TestAmerica
ORIGIN ID:PHDA (512) 454-4797
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTUN, TX 78729
UNITED STATES US
SHIP DATE: 28FEB20
ACTWGT: 10.00 LB MAN
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58963
RMA:
FedEx
Express
FedEx
TRK#
0221 1680 3500 1526
WED - 18 MAR 10:30A
PRIORITY OVERNIGHT
15238
PA-US
PIT
XH AGCA
Uncorrected temp 1.8 °C
Thermometer ID 17
CF 0 Initials JB
PT-WI-SR-001 effective 11/8/18
FID 3830365 17MAR20 MMRA 56BC2/54E0/05A2
180-103681 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-103681-2

Login Number: 103681 **List Source: Eurofins 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?	False	
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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-104513-1
Laboratory Sample Delivery Group: TVA NRS Treatability
Client Project/Site: TVA Gallatin EIP
Revision: 1

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable



Authorized for release by:
5/12/2020 5:08:06 PM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-104513-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-104513-1

This report was revised to include aditional information in the narrative.

Receipt
The samples were received on 4/10/2020 8:15 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.4° C.

Metals
Method 6020A: Sample 180-104513-1 (GAF-GW-FB-DO-Total) was diluted to the large amount of sodium in the sample. The sample could not be run at 1x.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

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: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-21
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-104513-1	GAF-GW-FB-DO-TOTAL	Water	04/09/20 13:30	04/10/20 08:15	
180-104513-2	GAF-GW-HICAL-CACL2-TOTAL	Water	04/09/20 13:30	04/10/20 08:15	
180-104513-3	GAF-GW-KOH-TOTAL	Water	04/09/20 13:30	04/10/20 08:15	
180-104513-4	GAF-GW-HICAL-CACL2-DISS	Water	04/09/20 13:30	04/10/20 08:15	
180-104513-5	GAF-GW-KOH-DISSOLVED	Water	04/09/20 13:30	04/10/20 08:15	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Client Sample ID: GAF-GW-FB-DO-TOTAL
Lab Sample ID: 180-104513-1
Date Collected: 04/09/20 13:30
Matrix: Water
Date Received: 04/10/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	312925	04/15/20 09:49	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			313332	04/18/20 19:02	WTR	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-HICAL-CACL2-TOTAL
Lab Sample ID: 180-104513-2
Date Collected: 04/09/20 13:30
Matrix: Water
Date Received: 04/10/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	312925	04/15/20 09:49	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			313608	04/22/20 13:28	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-KOH-TOTAL
Lab Sample ID: 180-104513-3
Date Collected: 04/09/20 13:30
Matrix: Water
Date Received: 04/10/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	312925	04/15/20 09:49	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			313608	04/22/20 13:31	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-HICAL-CACL2-DISS
Lab Sample ID: 180-104513-4
Date Collected: 04/09/20 13:30
Matrix: Water
Date Received: 04/10/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	312925	04/15/20 09:49	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			313608	04/22/20 13:35	RSK	TAL PIT
	Instrument ID: A									

Client Sample ID: GAF-GW-KOH-DISSOLVED
Lab Sample ID: 180-104513-5
Date Collected: 04/09/20 13:30
Matrix: Water
Date Received: 04/10/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	312925	04/15/20 09:49	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			313608	04/22/20 13:38	RSK	TAL PIT
	Instrument ID: A									

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney

Batch Type: Analysis

RSK = Robert Kurtz

WTR = Bill Reinheimer

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Client Sample ID: GAF-GW-FB-DO-TOTAL

Date Collected: 04/09/20 13:30
Date Received: 04/10/20 08:15

Lab Sample ID: 180-104513-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.0100	0.00182	mg/L		04/15/20 09:49	04/18/20 19:02	10
Cadmium	ND		0.0100	0.00217	mg/L		04/15/20 09:49	04/18/20 19:02	10
Lithium	ND		0.0500	0.0339	mg/L		04/15/20 09:49	04/18/20 19:02	10
Nickel	ND		0.0100	0.00336	mg/L		04/15/20 09:49	04/18/20 19:02	10

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Client Sample ID: GAF-GW-HICAL-CACL2-TOTAL
Date Collected: 04/09/20 13:30
Date Received: 04/10/20 08:15

Lab Sample ID: 180-104513-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		04/15/20 09:49	04/22/20 13:28	1
Cadmium	**0.000941**	**J**	0.00100	0.000217	mg/L		04/15/20 09:49	04/22/20 13:28	1
Lithium	**0.213**		0.00500	0.00339	mg/L		04/15/20 09:49	04/22/20 13:28	1
Nickel	**0.0349**		0.00100	0.000336	mg/L		04/15/20 09:49	04/22/20 13:28	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Client Sample ID: GAF-GW-KOH-TOTAL

Date Collected: 04/09/20 13:30
Date Received: 04/10/20 08:15

Lab Sample ID: 180-104513-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000252	J	0.00100	0.000182	mg/L		04/15/20 09:49	04/22/20 13:31	1
Cadmium	0.00343		0.00100	0.000217	mg/L		04/15/20 09:49	04/22/20 13:31	1
Lithium	0.0290		0.00500	0.00339	mg/L		04/15/20 09:49	04/22/20 13:31	1
Nickel	0.218		0.00100	0.000336	mg/L		04/15/20 09:49	04/22/20 13:31	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Client Sample ID: GAF-GW-HICAL-CACL2-DISS
Date Collected: 04/09/20 13:30
Date Received: 04/10/20 08:15

Lab Sample ID: 180-104513-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		04/15/20 09:49	04/22/20 13:35	1
Cadmium	**0.000969**	**J**	0.00100	0.000217	mg/L		04/15/20 09:49	04/22/20 13:35	1
Lithium	**0.212**		0.00500	0.00339	mg/L		04/15/20 09:49	04/22/20 13:35	1
Nickel	**0.0343**		0.00100	0.000336	mg/L		04/15/20 09:49	04/22/20 13:35	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Client Sample ID: GAF-GW-KOH-DISSOLVED

Lab Sample ID: 180-104513-5

Date Collected: 04/09/20 13:30
Matrix: Water
Date Received: 04/10/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		04/15/20 09:49	04/22/20 13:38	1
Cadmium	**0.00320**		0.00100	0.000217	mg/L		04/15/20 09:49	04/22/20 13:38	1
Lithium	**0.0300**		0.00500	0.00339	mg/L		04/15/20 09:49	04/22/20 13:38	1
Nickel	**0.219**		0.00100	0.000336	mg/L		04/15/20 09:49	04/22/20 13:38	1

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

Lab Sample ID: MB 180-312925/1-A
Matrix: Water
Analysis Batch: 313332

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 312925

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		04/15/20 09:49	04/18/20 18:55	1
Cadmium	ND		0.00100	0.000217	mg/L		04/15/20 09:49	04/18/20 18:55	1
Lithium	ND		0.00500	0.00339	mg/L		04/15/20 09:49	04/18/20 18:55	1
Nickel	ND		0.00100	0.000336	mg/L		04/15/20 09:49	04/18/20 18:55	1

Lab Sample ID: LCS 180-312925/2-A
Matrix: Water
Analysis Batch: 313332

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 312925

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.4948		mg/L		99	80 - 120
Cadmium	0.500	0.5120		mg/L		102	80 - 120
Lithium	0.500	0.4749		mg/L		95	80 - 120
Nickel	0.500	0.4881		mg/L		98	80 - 120

Lab Sample ID: 180-104549-B-1-A MS
Matrix: Water
Analysis Batch: 313332

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 312925

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.4817		mg/L		96	75 - 125
Cadmium	0.000508	J	0.500	0.5118		mg/L		102	75 - 125
Lithium	0.0725		0.500	0.5544		mg/L		96	75 - 125
Nickel	0.0388		0.500	0.5333		mg/L		99	75 - 125

Lab Sample ID: 180-104549-B-1-B MSD
Matrix: Water
Analysis Batch: 313332

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 312925

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.4960		mg/L		99	75 - 125	3	20
Cadmium	0.000508	J	0.500	0.5300		mg/L		106	75 - 125	3	20
Lithium	0.0725		0.500	0.5532		mg/L		96	75 - 125	0	20
Nickel	0.0388		0.500	0.5428		mg/L		101	75 - 125	2	20

Lab Sample ID: 180-104549-C-1-A MS
Matrix: Water
Analysis Batch: 313332

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 312925

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.5039		mg/L		101	75 - 125
Cadmium	0.000545	J	0.500	0.5266		mg/L		105	75 - 125
Lithium	0.0728		0.500	0.5493		mg/L		95	75 - 125
Nickel	0.0387		0.500	0.5311		mg/L		98	75 - 125

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

Lab Sample ID: 180-104549-C-1-B MSD
Matrix: Water
Analysis Batch: 313332

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 312925

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.5077		mg/L		102	75 - 125	1	20
Cadmium	0.000545	J	0.500	0.5334		mg/L		107	75 - 125	1	20
Lithium	0.0728		0.500	0.5532		mg/L		96	75 - 125	1	20
Nickel	0.0387		0.500	0.5424		mg/L		101	75 - 125	2	20

QC Association Summary

Client: Environmental Standards Inc.
Project/Site: TVA Gallatin EIP

Job ID: 180-104513-1
SDG: TVA NRS Treatability

Metals

Prep Batch: 312925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-104513-1	GAF-GW-FB-DO-TOTAL	Total Recoverable	Water	3005A	
180-104513-2	GAF-GW-HICAL-CACL2-TOTAL	Total Recoverable	Water	3005A	
180-104513-3	GAF-GW-KOH-TOTAL	Total Recoverable	Water	3005A	
180-104513-4	GAF-GW-HICAL-CACL2-DISS	Dissolved	Water	3005A	
180-104513-5	GAF-GW-KOH-DISSOLVED	Dissolved	Water	3005A	
MB 180-312925/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-312925/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-104549-B-1-A MS	Matrix Spike	Total Recoverable	Water	3005A	
180-104549-B-1-B MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
180-104549-C-1-A MS	Matrix Spike	Dissolved	Water	3005A	
180-104549-C-1-B MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	

Analysis Batch: 313332

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-104513-1	GAF-GW-FB-DO-TOTAL	Total Recoverable	Water	EPA 6020A	312925
MB 180-312925/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	312925
LCS 180-312925/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	312925
180-104549-B-1-A MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	312925
180-104549-B-1-B MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	312925
180-104549-C-1-A MS	Matrix Spike	Dissolved	Water	EPA 6020A	312925
180-104549-C-1-B MSD	Matrix Spike Duplicate	Dissolved	Water	EPA 6020A	312925

Analysis Batch: 313608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-104513-2	GAF-GW-HICAL-CACL2-TOTAL	Total Recoverable	Water	EPA 6020A	312925
180-104513-3	GAF-GW-KOH-TOTAL	Total Recoverable	Water	EPA 6020A	312925
180-104513-4	GAF-GW-HICAL-CACL2-DISS	Dissolved	Water	EPA 6020A	312925
180-104513-5	GAF-GW-KOH-DISSOLVED	Dissolved	Water	EPA 6020A	312925

Chain of Custody Record

420759 eurofins | Environment Testing TestAmerica

Address: Pittsburgh, PA

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TAL-8210

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date:	COC No:
Company Name: Jennifer Gables	Tel/Email: Craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: Environmental Standards Inc	Analysis Turnaround Time			Sampler:
City/State/Zip:	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 610-935-5577 ex 414	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: TVA Gallatin EIP	☒ 1 week			
Site: GAF - NRS - Treatibility	☐ 2 days			Job / SDG No.:
PO #	☐ 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)	6020A - Total - Be, Li, Ni	6020A - Dissolved - Be, Li, Ni	Sample Specific Notes:
GAF-GW - FB-DO - Total	4/9/20	1330	G	GW	1	N		✓		
GAF-GW - HiCal - CaCl2 - Total	↓	↓	↓	↓	1	N		✓		
GAF-GW - KOH - Total	↓	↓	↓	↓	1	N		✓		
GAF-GW - HiCal - CaCl2 - Diss	↓	↓	↓	↓	1	Y			✓	0.45µm filtered
GAF-GW - KOH - Dissolved	↓	↓	↓	↓	1	Y			✓	↓

180-104513 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:
5-day TAT

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____		
Relinquished by: Craig Kathric	Company: AECOM	Date/Time: 4/9/20 1400	Received by:	Company: EUROFINS	Date/Time: 4/10/20 815
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:


eurofins
Environment Testing
TestAmerica
RT 0
FZ 0
1548
04.10
ORIGIN ID:PHDA (512) 454-4
FRANCISCO BARAJAS
AECOM
9400 AMBERGLEN BOULEVARD
BUILDING D
AUSTIN, TX 78729
UNITED STATES US
CAD: 0562071/CAFE3311
TO
EUROFINS TESTAMERICA PITTSBURGH
301 ALPHA DRIVE
RIDC PARK
PITTSBURGH PA 152382907
(412) 963-7058
REF: S180-58963
RMA:
FedEx
Express
TRK# 0221 1680 3500 1548
RETURNS MON-SAT
PRIORITY OVERNIGHT
FRI - 10 APR 10:30A
PRIORITY OVERNIGHT
15238
PA-US
PIT
XH AGCA
Uncorrected temp
Thermometer ID
CF 0
Initials
1.4 °C
17
JB
PT-WI-SR-001 effective 7/26/13
180-104513 Waybill

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-104513-1
SDG Number: TVA NRS Treatability

Login Number: 104513
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins TestAmerica, Pittsburgh

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	
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	

eurofins | Environment Testing America



ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-105162-1
Laboratory Sample Delivery Group: GAF NRS Treatability
Client Project/Site: TVA GAF AECOM Lab
Revision: 2

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
8/28/2020 8:17:05 PM
Gail Lage, Senior Project Manager
(615)301-5741
Gail.Lage@Eurofinset.com

Designee for

Jennifer Rumble, Project Manager I
(412)963-7058
Jennifer.Rumble@Eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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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Job ID: 180-105162-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-105162-1

Revised Report
This report was revised to update the sample IDs to change the + to T. This replaces the previous final report.

Receipt
The samples were received on 4/30/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.2º C.

Metals
Method 3005A: The following samples were diluted due to the nature of the sample matrix: GAF-GW-BKT-PHI-FB22-T1 (180-105162-2), GAF-GW-BKT-PHI-SOILCONTROL-T1 (180-105162-8) and GAF-GW-BKT-PHI-FB22 SOIL-T1 (180-105162-9). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Accreditation/Certification Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-26-20
California	State	2891	04-30-21
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-21
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	01-31-21
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Maine	State	PA00164	03-06-22
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-05-21
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-21
North Carolina (WW/SW)	State	434	01-01-21
Oregon	NELAP	PA-2151	07-01-20
Pennsylvania	NELAP	02-00416	05-21-20
Rhode Island	State	LAO00362	12-31-20
Texas	NELAP	T104704528	03-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

Sample Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Water	04/27/20 14:00	04/30/20 08:15	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Water	04/29/20 12:00	04/30/20 08:15	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Water	04/29/20 12:00	04/30/20 08:15	

Method Summary

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-BKT-PHI-CONTROL-T1

Lab Sample ID: 180-105162-1
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:20	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:04	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:17	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 01:53	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-FB22-T1

Lab Sample ID: 180-105162-2
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:24	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:07	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-DOLO-T1

Lab Sample ID: 180-105162-3
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:27	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:10	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:31	WTR	TAL PIT
	Instrument ID: A									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:14	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:34	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:17	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-WC-PHI-NAOH-ZEOLITE-T1

Lab Sample ID: 180-105162-6
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:41	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:24	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:37	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:21	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 17:55	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:31	RSK	TAL PIT
	Instrument ID: DORY									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:51	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:28	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 18:02	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:45	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 17:58	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:35	RSK	TAL PIT
	Instrument ID: DORY									

Client Sample ID: GAF-GW-BKT-PHI-FB22 SOIL-T1

Lab Sample ID: 180-105162-9
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314621	05/02/20 18:09	WTR	TAL PIT
	Instrument ID: A									
Dissolved	Prep	3005A			50 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Dissolved	Analysis	EPA 6020A		1			314781	05/06/20 02:52	RSK	TAL PIT
	Instrument ID: DORY									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314621	05/02/20 18:05	WTR	TAL PIT
	Instrument ID: A									
Total Recoverable	Prep	3005A			10 mL	50 mL	314367	05/01/20 08:37	KEM	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			314781	05/06/20 02:49	RSK	TAL PIT
	Instrument ID: DORY									

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

Analyst References:

Lab: TAL PIT

Batch Type: Prep

KEM = Kimberly Mahoney

Batch Type: Analysis

RSK = Robert Kurtz

WTR = Bill Reinheimer

Client Sample ID: GAF-GW-BKT-PHI-CONTROL-T1

Lab Sample ID: 180-105162-1
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000597	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 01:53	1
Cadmium	0.00257		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:17	1
Lithium	0.0219	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 01:53	1
Nickel	0.0834		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:17	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:04	1
Cadmium	0.00216		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:20	1
Lithium	0.0184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:04	1
Nickel	0.0639		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:20	1

Client Sample ID: GAF-GW-BKT-PHI-FB22-T1

Lab Sample ID: 180-105162-2
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:07	1
Cadmium	0.00263	J	0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 17:24	1
Lithium	0.0475	B	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:07	1
Nickel	0.0544		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 17:24	1

Client Sample ID: GAF-GW-BKT-PHI-DOLO-T1

Lab Sample ID: 180-105162-3
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000991	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:10	1
Cadmium	0.000720	J	0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:27	1
Lithium	0.0112	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:10	1
Nickel	0.0569		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:27	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-T1

Lab Sample ID: 180-105162-4
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000265	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:14	1
Cadmium	0.000390	J	0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:31	1
Lithium	0.0106	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:14	1
Nickel	0.0200		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:31	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.000562	J	0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:17	1

Client Sample ID: GAF-GW-BKT-PHI-HICAL-CACL2-T1

Lab Sample ID: 180-105162-5
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00747		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:34	1
Lithium	0.0283	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:17	1
Nickel	0.0543		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:34	1

Client Sample ID: GAF-GW-WC-PHI-NAOH-ZEOLITE-T1

Lab Sample ID: 180-105162-6
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:21	1
Cadmium	0.00191		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:37	1
Lithium	0.286	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:21	1
Nickel	0.0674		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:37	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:24	1
Cadmium	0.00166		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:41	1
Lithium	0.300	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:24	1
Nickel	0.0697		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:41	1

Client Sample ID: GAF-GW-WC-PHI-444U-T1

Lab Sample ID: 180-105162-7
Date Collected: 04/27/20 14:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:28	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:51	1
Lithium	0.184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:28	1
Nickel	0.000603	J	0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:51	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:31	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 17:55	1
Lithium	0.184	B	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:31	1
Nickel	ND		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 17:55	1

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.00808		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:35	1
Cadmium	0.0128		0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 17:58	1
Lithium	0.0897	B	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:35	1
Nickel	0.323		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 17:58	1

Client Sample ID: GAF-GW-BKT-PHI-SOILCONTROL-T1

Lab Sample ID: 180-105162-8
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:45	1
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 18:02	1
Lithium	**0.0112**	**B**	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:45	1
Nickel	**0.000545**	**J**	0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 18:02	1

Client Sample ID: GAF-GW-BKT-PHI-FB22 SOIL-T1

Lab Sample ID: 180-105162-9
Date Collected: 04/29/20 12:00
Matrix: Water
Date Received: 04/30/20 08:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0105**		0.00500	0.000910	mg/L		05/01/20 08:37	05/06/20 02:49	1
Cadmium	**0.0314**		0.00500	0.00109	mg/L		05/01/20 08:37	05/02/20 18:05	1
Lithium	**0.127**	**B**	0.0250	0.0170	mg/L		05/01/20 08:37	05/06/20 02:49	1
Nickel	**1.02**		0.00500	0.00168	mg/L		05/01/20 08:37	05/02/20 18:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.0145**		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 02:52	1
Cadmium	**0.0785**		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 18:09	1
Lithium	**0.150**	**B**	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 02:52	1
Nickel	**1.93**		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 18:09	1

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

Lab Sample ID: MB 180-314367/1-A
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.00100	0.000217	mg/L		05/01/20 08:37	05/02/20 16:28	1
Nickel	ND		0.00100	0.000336	mg/L		05/01/20 08:37	05/02/20 16:28	1

Lab Sample ID: MB 180-314367/1-A
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		0.00100	0.000182	mg/L		05/01/20 08:37	05/06/20 01:04	1
Lithium	0.004190	J	0.00500	0.00339	mg/L		05/01/20 08:37	05/06/20 01:04	1

Lab Sample ID: LCS 180-314367/2-A
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.500	0.4964		mg/L		99	80 - 120
Nickel	0.500	0.4945		mg/L		99	80 - 120

Lab Sample ID: LCS 180-314367/2-A
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	0.500	0.4915		mg/L		98	80 - 120
Lithium	0.500	0.4770		mg/L		95	80 - 120

Lab Sample ID: 180-105129-C-3-B MS
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	ND		0.500	0.5064		mg/L		101	75 - 125
Nickel	0.00138		0.500	0.4950		mg/L		99	75 - 125

Lab Sample ID: 180-105129-C-3-B MS
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		0.500	0.4881		mg/L		98	75 - 125
Lithium	0.00497	J B	0.500	0.4746		mg/L		94	75 - 125

Lab Sample ID: 180-105129-C-3-C MSD
Matrix: Water
Analysis Batch: 314621

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		0.500	0.5022		mg/L		100	75 - 125	1	20
Nickel	0.00138		0.500	0.4921		mg/L		98	75 - 125	1	20

Client: Environmental Standards Inc.
Project/Site: TVA GAF AECOM Lab

Job ID: 180-105162-1
SDG: GAF NRS Treatability

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

Lab Sample ID: 180-105129-C-3-C MSD
Matrix: Water
Analysis Batch: 314781

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 314367

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		0.500	0.4837		mg/L		97	75 - 125	1	20
Lithium	0.00497	J B	0.500	0.4660		mg/L		92	75 - 125	2	20

Metals

Prep Batch: 314367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	3005A	
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	3005A	
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	3005A	
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	3005A	
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	3005A	
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	3005A	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	3005A	
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	3005A	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	3005A	
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	3005A	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	3005A	
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	3005A	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	3005A	
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	3005A	
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 314621

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	EPA 6020A	314367
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	314367
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	314367

Analysis Batch: 314781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-1	GAF-GW-BKT-PHI-CONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-2	GAF-GW-BKT-PHI-FB22-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-3	GAF-GW-BKT-PHI-DOLO-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-4	GAF-GW-BKT-PHI-HICAL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-5	GAF-GW-BKT-PHI-HICAL-CACL2-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Dissolved	Water	EPA 6020A	314367
180-105162-6	GAF-GW-WC-PHI-NAOH-ZEOLITE-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-7	GAF-GW-WC-PHI-444U-T1	Dissolved	Water	EPA 6020A	314367

Metals (Continued)

Analysis Batch: 314781 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-105162-7	GAF-GW-WC-PHI-444U-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-8	GAF-GW-BKT-PHI-SOILCONTROL-T1	Total Recoverable	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Dissolved	Water	EPA 6020A	314367
180-105162-9	GAF-GW-BKT-PHI-FB22 SOIL-T1	Total Recoverable	Water	EPA 6020A	314367
MB 180-314367/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	314367
LCS 180-314367/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	314367
180-105129-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	314367

Chain of Custody Record 420758

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Address: Pittsburgh, PA

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: TAL-8210

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date: 4/28/2020	COC No:
Company Name: Jennifer Gables	Tel/Email: Craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
Address: Environmental Standards, Inc.	Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS			Sampler:
City/State/Zip:	TAT if different from Below ____			For Lab Use Only:
Phone: 610.935.5577 x414	☐ 2 weeks			Walk-in Client:
Fax:	☒ 1 week			Lab Sampling:
Project Name: TVA Gallatin EIP	☐ 2 days			
Site: GAF-NRS-Treatability	☐ 1 day			Job / SDG No.:
PO#				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	6020A - total - Be, Li, Cd, Ni	6020A - dis - Be, Li, Cd, Ni	Sample Specific Notes:
GAF-GW-Bkt-PHI-Control-+1	4/27/20	1400	G	GW	2	Y/N		✓	✓	Dissolved has been filtered
GAF-GW-Bkt-PHI-FB22-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-Dolo-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-HiCal-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-Bkt-PHI-HiCal-CaCl2-+1	4/27/20	1400	G	|	1	N		✓		
GAF-GW-WC-PHI-NaOH-zeolite-+1	4/27/20	1400	G	|	2	Y/N		✓	✓	Dissolved has been filtered
GAF-GW-WC-PHI-444u-+1	4/27/20	1400	G	↓	2	Y/N		✓	✓	"
GAF-GW-Bkt-PHI-Soil control-+1	4/27/20	1200	G	|	2	Y/N		✓	✓	"
GAF-GW-Bkt-PHI-FB22 soil-+1	4/27/20	1200	G	↓	2	Y/N		✓	✓	"
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____								4	4	

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 sampl

☐ Return to Client ☑ Disposal by Lab

180-105162 Chain of Custody

Special Instructions/QC Requirements & Comments: total bottles were not filtered

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 4/29/20 1300 4/28/20 1600	Received by:	Company: EMPiv	Date/Time: 4/30/20 815
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: Environmental Standards Inc.

Job Number: 180-105162-1
SDG Number: GAF NRS Treatability

Login Number: 105162
List Number: 1
Creator: Say, Thomas C

List Source: Eurofins 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	

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ANALYTICAL REPORT

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238
Tel: (412)963-7058

Laboratory Job ID: 180-101736-1
Client Project/Site: GAF-NRS-Treatability

For:
Environmental Standards Inc.
1140 Valley Forge Road
PO BOX 810
Valley Forge, Pennsylvania 19482-0810

Attn: Jennifer N. Gable

Authorized for release by:
2/17/2020 3:16:10 PM

Jennifer Rumble, Project Manager I
(412)963-7058
jennifer.rumble@testamericainc.com

Links

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: 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

Table of Contents

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Case Narrative

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Job ID: 180-101736-1

Laboratory: Eurofins TestAmerica, Pittsburgh

Narrative

Job Narrative
180-101736-1

Receipt
The samples were received on 1/30/2020 9:00 AM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 1.4º C.

Metals
Method 3005A: The following sample was prepped at a 10X dilution due to the nature of the sample matrix: GAF-HYDROXYAPATITE (180-101736-11). Elevated reporting limits (RLs) are provided.

Method 6020A: The following sample was diluted due to the nature of the sample matrix: GAF-GEOFORM EXTENED (180-101736-9). Elevated reporting limits (RLs) are provided.

Methods 6020, 6020A: The continuing calibration verification (CCV) associated with batch 180-306922 recovered above the upper control limit for boron. The samples associated with this CCV were non-detects or less than the RL for the affected analytes; therefore, the data have been reported.

Methods 6020, 6020A: The continuing calibration verification (CCB) associated with batch 180-306922 recovered above the upper control limit for sodium. The samples associated with this CCB were non-detects or less than the RL for the affected analytes; therefore, the data have been reported.

Method 6020A: The following sample was diluted due to the nature of the sample matrix: GAF-GEOFORM EXTENED (180-101736-9). Elevated reporting limits (RLs) are provided.

Method 6020A: The low level continuing calibration verification (CCVL) associated with batch 180-306922 recovered above the upper control limit for nickel. The samples associated with this CCVL were 10 times the RL for the affected analytes; therefore, the data have been reported.

Method 6020A: The following samples were diluted due to the nature of the sample matrix: GAF-1% CARB/BICARB (180-101736-5) and GAF-FERRIC BLACK 100% (180-101736-6). Elevated reporting limits (RLs) are provided.

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

Definitions/Glossary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Qualifiers

Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
B	Compound was found in the blank and sample.
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: Environmental Standards Inc. Job ID: 180-101736-1
Project/Site: GAF-NRS-Treatability

Laboratory: Eurofins TestAmerica, Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-27-20
California	State	2891	04-30-20
Connecticut	State	PH-0688	09-30-20
Florida	NELAP	E871008	06-30-20
Georgia	State	PA 02-00416	04-30-20
Illinois	NELAP	004375	06-30-20
Kansas	NELAP	E-10350	03-31-20
Kentucky (UST)	State	162013	04-30-20
Kentucky (WW)	State	KY98043	12-31-20
Louisiana	NELAP	04041	06-30-20
Minnesota	NELAP	042-999-482	12-31-20
Nevada	State	PA00164	07-31-20
New Hampshire	NELAP	2030	04-04-20
New Jersey	NELAP	PA005	06-30-20
New York	NELAP	11182	04-01-20
North Carolina (WW/SW)	State	434	01-01-21
North Dakota	State	R-227	04-30-20
Oregon	NELAP	PA-2151	02-06-20 *
Pennsylvania	NELAP	02-00416	04-30-20
Rhode Island	State	LAO00362	12-31-20
South Carolina	State	89014	04-30-20
Texas	NELAP	T104704528	03-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P-Soil-01	06-26-22
USDA	US Federal Programs	P330-16-00211	06-26-22
Utah	NELAP	PA001462019-8	05-31-20
Virginia	NELAP	10043	09-15-20
West Virginia DEP	State	142	02-01-21
Wisconsin	State	998027800	08-31-20

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Sample Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
180-101736-1	GAF-HI CAL LONGVIEW 1%	Water	01/27/20 16:25	01/30/20 09:00	
180-101736-2	GAF-NAOH 1%	Water	01/27/20 16:30	01/30/20 09:00	
180-101736-3	GAF-1% K2CO3	Water	01/28/20 12:30	01/30/20 09:00	
180-101736-4	GAF-1% DOLO FINES	Water	01/28/20 12:35	01/30/20 09:00	
180-101736-5	GAF-1% CARB/BICARB	Water	01/28/20 14:15	01/30/20 09:00	
180-101736-6	GAF-FERRIC BLACK 100%	Water	01/28/20 16:50	01/30/20 09:00	
180-101736-7	GAF-3% KOH	Water	01/28/20 16:55	01/30/20 09:00	
180-101736-8	GAF-TN VALLEY LS	Water	01/29/20 11:20	01/30/20 09:00	
180-101736-9	GAF-GEOFORM EXTENED	Water	01/29/20 11:25	01/30/20 09:00	
180-101736-10	GAF-PROVECTUS IRMA SOLIDS	Water	01/29/20 15:30	01/30/20 09:00	
180-101736-11	GAF-HYDROXYAPATITE	Water	01/29/20 15:35	01/30/20 09:00	

Method Summary

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	TAL PIT

Protocol References:

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

Laboratory References:

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

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-HI CAL LONGVIEW 1%

Lab Sample ID: 180-101736-1
Matrix: Water
Date Collected: 01/27/20 16:25
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:11	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			307167	02/14/20 17:51	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-NAOH 1%

Lab Sample ID: 180-101736-2
Matrix: Water
Date Collected: 01/27/20 16:30
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:14	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			307167	02/14/20 17:54	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1% K2CO3

Lab Sample ID: 180-101736-3
Matrix: Water
Date Collected: 01/28/20 12:30
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:16	RSK	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			307167	02/14/20 17:56	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-1% DOLO FINES

Lab Sample ID: 180-101736-4
Matrix: Water
Date Collected: 01/28/20 12:35
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306497	02/08/20 19:14	WTR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:18	RSK	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-1% CARB/BICARB

Lab Sample ID: 180-101736-5
Matrix: Water
Date Collected: 01/28/20 14:15
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			307030	02/13/20 14:40	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-FERRIC BLACK 100%

Lab Sample ID: 180-101736-6
Matrix: Water
Date Collected: 01/28/20 16:50
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		10			307030	02/13/20 14:42	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-3% KOH

Lab Sample ID: 180-101736-7
Matrix: Water
Date Collected: 01/28/20 16:55
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306497	02/08/20 19:26	WTR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:31	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-TN VALLEY LS

Lab Sample ID: 180-101736-8
Matrix: Water
Date Collected: 01/29/20 11:20
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306497	02/08/20 19:29	WTR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:33	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-GEOFORM EXTENED

Lab Sample ID: 180-101736-9
Matrix: Water
Date Collected: 01/29/20 11:25
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		100			306497	02/08/20 19:31	WTR	TAL PIT
	Instrument ID: NEMO									

Lab Chronicle

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-GEOFORM EXTENED

Lab Sample ID: 180-101736-9
Matrix: Water
Date Collected: 01/29/20 11:25
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		100			306922	02/12/20 16:36	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-PROVECTUS IRMA SOLIDS

Lab Sample ID: 180-101736-10
Matrix: Water
Date Collected: 01/29/20 15:30
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			50 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:38	RSK	TAL PIT
	Instrument ID: NEMO									

Client Sample ID: GAF-HYDROXYAPATITE

Lab Sample ID: 180-101736-11
Matrix: Water
Date Collected: 01/29/20 15:35
Date Received: 01/30/20 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			5 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306497	02/08/20 19:36	WTR	TAL PIT
	Instrument ID: NEMO									
Total Recoverable	Prep	3005A			5 mL	50 mL	306245	02/06/20 11:30	RJR	TAL PIT
Total Recoverable	Analysis	EPA 6020A		1			306922	02/12/20 16:40	RSK	TAL PIT
	Instrument ID: NEMO									

Laboratory References:

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

Analyst References:

Lab: TAL PIT

Batch Type: Prep

RJR = Ron Rosenbaum

Batch Type: Analysis

RSK = Robert Kurtz

WTR = Bill Reinheimer

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-HI CAL LONGVIEW 1%

Lab Sample ID: 180-101736-1

Date Collected: 01/27/20 16:25
Matrix: Water
Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:11	1
Cadmium	**0.618**	**J**	1.00	0.217	ug/L		02/06/20 11:30	02/12/20 16:11	1
Lithium	**128**		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:11	1
Nickel	**4.35**	**B**	1.00	0.336	ug/L		02/06/20 11:30	02/14/20 17:51	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-NAOH 1%

Lab Sample ID: 180-101736-2

Date Collected: 01/27/20 16:30

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:14	1
Cadmium	**1.31**		1.00	0.217	ug/L		02/06/20 11:30	02/12/20 16:14	1
Lithium	**128**		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:14	1
Nickel	**18.0**	**B**	1.00	0.336	ug/L		02/06/20 11:30	02/14/20 17:54	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-1% K2CO3

Date Collected: 01/28/20 12:30
Date Received: 01/30/20 09:00

Lab Sample ID: 180-101736-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.236	J	1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:16	1
Cadmium	1.47		1.00	0.217	ug/L		02/06/20 11:30	02/12/20 16:16	1
Lithium	118		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:16	1
Nickel	74.8	B	1.00	0.336	ug/L		02/06/20 11:30	02/14/20 17:56	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-1% DOLO FINES

Lab Sample ID: 180-101736-4

Date Collected: 01/28/20 12:35
Matrix: Water
Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.187	J	1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:18	1
Cadmium	0.258	J	1.00	0.217	ug/L		02/06/20 11:30	02/08/20 19:14	1
Lithium	128		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:18	1
Nickel	2.91	B	1.00	0.336	ug/L		02/06/20 11:30	02/08/20 19:14	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-1% CARB/BICARB

Lab Sample ID: 180-101736-5

Date Collected: 01/28/20 14:15

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		10.0	1.82	ug/L		02/06/20 11:30	02/13/20 14:40	10
Cadmium	ND		10.0	2.17	ug/L		02/06/20 11:30	02/13/20 14:40	10
Lithium	**136**		50.0	33.9	ug/L		02/06/20 11:30	02/13/20 14:40	10
Nickel	**62.2**	**B**	10.0	3.36	ug/L		02/06/20 11:30	02/13/20 14:40	10

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-FERRIC BLACK 100%

Lab Sample ID: 180-101736-6

Date Collected: 01/28/20 16:50

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		10.0	1.82	ug/L		02/06/20 11:30	02/13/20 14:42	10
Cadmium	ND		10.0	2.17	ug/L		02/06/20 11:30	02/13/20 14:42	10
Lithium	ND		50.0	33.9	ug/L		02/06/20 11:30	02/13/20 14:42	10
Nickel	ND		10.0	3.36	ug/L		02/06/20 11:30	02/13/20 14:42	10

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-3% KOH

Date Collected: 01/28/20 16:55
Date Received: 01/30/20 09:00

Lab Sample ID: 180-101736-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:31	1
Cadmium	ND		1.00	0.217	ug/L		02/06/20 11:30	02/08/20 19:26	1
Lithium	**128**		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:31	1
Nickel	**17.7**	**B**	1.00	0.336	ug/L		02/06/20 11:30	02/08/20 19:26	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-TN VALLEY LS

Lab Sample ID: 180-101736-8

Date Collected: 01/29/20 11:20

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.964	J	1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:33	1
Cadmium	158		1.00	0.217	ug/L		02/06/20 11:30	02/08/20 19:29	1
Lithium	134		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:33	1
Nickel	169	B	1.00	0.336	ug/L		02/06/20 11:30	02/08/20 19:29	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-GEOFORM EXTENED

Lab Sample ID: 180-101736-9

Date Collected: 01/29/20 11:25

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		100	18.2	ug/L		02/06/20 11:30	02/12/20 16:36	100
Cadmium	ND		100	21.7	ug/L		02/06/20 11:30	02/08/20 19:31	100
Lithium	**367**	**J**	500	339	ug/L		02/06/20 11:30	02/12/20 16:36	100
Nickel	**1270**	**B**	100	33.6	ug/L		02/06/20 11:30	02/08/20 19:31	100

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-PROVECTUS IRMA SOLIDS

Lab Sample ID: 180-101736-10

Date Collected: 01/29/20 15:30

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.242	J	1.00	0.182	ug/L		02/06/20 11:30	02/12/20 16:38	1
Cadmium	0.476	J	1.00	0.217	ug/L		02/06/20 11:30	02/12/20 16:38	1
Lithium	110		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 16:38	1
Nickel	21.1	^	1.00	0.336	ug/L		02/06/20 11:30	02/12/20 16:38	1

Client Sample Results

Client: Environmental Standards Inc.
Project/Site: GAF-NRS-Treatability

Job ID: 180-101736-1

Client Sample ID: GAF-HYDROXYAPATITE

Lab Sample ID: 180-101736-11

Date Collected: 01/29/20 15:35

Matrix: Water

Date Received: 01/30/20 09:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	4.26	J	10.0	1.82	ug/L		02/06/20 11:30	02/12/20 16:40	1
Cadmium	15.4		10.0	2.17	ug/L		02/06/20 11:30	02/08/20 19:36	1
Lithium	167		50.0	33.9	ug/L		02/06/20 11:30	02/12/20 16:40	1
Nickel	129	B	10.0	3.36	ug/L		02/06/20 11:30	02/08/20 19:36	1

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

Lab Sample ID: MB 180-306245/1-A
Matrix: Water
Analysis Batch: 306497

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		1.00	0.217	ug/L		02/06/20 11:30	02/08/20 18:16	1
Nickel	0.4680	J	1.00	0.336	ug/L		02/06/20 11:30	02/08/20 18:16	1

Lab Sample ID: MB 180-306245/1-A
Matrix: Water
Analysis Batch: 306922

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	ND		1.00	0.182	ug/L		02/06/20 11:30	02/12/20 15:22	1
Lithium	ND		5.00	3.39	ug/L		02/06/20 11:30	02/12/20 15:22	1

Lab Sample ID: LCS 180-306245/2-A
Matrix: Water
Analysis Batch: 306497

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	500	537.3		ug/L		107	80 - 120
Nickel	500	458.6		ug/L		92	80 - 120

Lab Sample ID: LCS 180-306245/2-A
Matrix: Water
Analysis Batch: 306922

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	500	494.3		ug/L		99	80 - 120
Lithium	500	500.7		ug/L		100	80 - 120

Lab Sample ID: 180-101687-E-2-B MS
Matrix: Water
Analysis Batch: 306922

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	ND		500	527.2		ug/L		105	75 - 125
Lithium	6.11		500	505.6		ug/L		100	75 - 125

Lab Sample ID: 180-101687-E-2-C MSD
Matrix: Water
Analysis Batch: 306497

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cadmium	ND		500	533.5		ug/L		107	75 - 125	1	20
Nickel	1.18	B	500	454.8		ug/L		91	75 - 125	3	20

Lab Sample ID: 180-101687-E-2-C MSD
Matrix: Water
Analysis Batch: 306922

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 306245

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Beryllium	ND		500	534.8		ug/L		107	75 - 125	1	20
Lithium	6.11		500	528.6		ug/L		104	75 - 125	4	20

Metals

Prep Batch: 306245

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101736-1	GAF-HI CAL LONGVIEW 1%	Total Recoverable	Water	3005A	
180-101736-2	GAF-NAOH 1%	Total Recoverable	Water	3005A	
180-101736-3	GAF-1% K2CO3	Total Recoverable	Water	3005A	
180-101736-4	GAF-1% DOLO FINES	Total Recoverable	Water	3005A	
180-101736-5	GAF-1% CARB/BICARB	Total Recoverable	Water	3005A	
180-101736-6	GAF-FERRIC BLACK 100%	Total Recoverable	Water	3005A	
180-101736-7	GAF-3% KOH	Total Recoverable	Water	3005A	
180-101736-8	GAF-TN VALLEY LS	Total Recoverable	Water	3005A	
180-101736-9	GAF-GEOFORM EXTENED	Total Recoverable	Water	3005A	
180-101736-10	GAF-PROVECTUS IRMA SOLIDS	Total Recoverable	Water	3005A	
180-101736-11	GAF-HYDROXYAPATITE	Total Recoverable	Water	3005A	
MB 180-306245/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 180-306245/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
180-101687-E-2-B MS	Matrix Spike	Total Recoverable	Water	3005A	
180-101687-E-2-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 306497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101736-4	GAF-1% DOLO FINES	Total Recoverable	Water	EPA 6020A	306245
180-101736-7	GAF-3% KOH	Total Recoverable	Water	EPA 6020A	306245
180-101736-8	GAF-TN VALLEY LS	Total Recoverable	Water	EPA 6020A	306245
180-101736-9	GAF-GEOFORM EXTENED	Total Recoverable	Water	EPA 6020A	306245
180-101736-11	GAF-HYDROXYAPATITE	Total Recoverable	Water	EPA 6020A	306245
MB 180-306245/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	306245
LCS 180-306245/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	306245
180-101687-E-2-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	306245

Analysis Batch: 306922

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101736-1	GAF-HI CAL LONGVIEW 1%	Total Recoverable	Water	EPA 6020A	306245
180-101736-2	GAF-NAOH 1%	Total Recoverable	Water	EPA 6020A	306245
180-101736-3	GAF-1% K2CO3	Total Recoverable	Water	EPA 6020A	306245
180-101736-4	GAF-1% DOLO FINES	Total Recoverable	Water	EPA 6020A	306245
180-101736-7	GAF-3% KOH	Total Recoverable	Water	EPA 6020A	306245
180-101736-8	GAF-TN VALLEY LS	Total Recoverable	Water	EPA 6020A	306245
180-101736-9	GAF-GEOFORM EXTENED	Total Recoverable	Water	EPA 6020A	306245
180-101736-10	GAF-PROVECTUS IRMA SOLIDS	Total Recoverable	Water	EPA 6020A	306245
180-101736-11	GAF-HYDROXYAPATITE	Total Recoverable	Water	EPA 6020A	306245
MB 180-306245/1-A	Method Blank	Total Recoverable	Water	EPA 6020A	306245
LCS 180-306245/2-A	Lab Control Sample	Total Recoverable	Water	EPA 6020A	306245
180-101687-E-2-B MS	Matrix Spike	Total Recoverable	Water	EPA 6020A	306245
180-101687-E-2-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	EPA 6020A	306245

Analysis Batch: 307030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101736-5	GAF-1% CARB/BICARB	Total Recoverable	Water	EPA 6020A	306245
180-101736-6	GAF-FERRIC BLACK 100%	Total Recoverable	Water	EPA 6020A	306245

Analysis Batch: 307167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101736-1	GAF-HI CAL LONGVIEW 1%	Total Recoverable	Water	EPA 6020A	306245

Metals (Continued)

Analysis Batch: 307167 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-101736-2	GAF-NAOH 1%	Total Recoverable	Water	EPA 6020A	306245
180-101736-3	GAF-1% K2CO3	Total Recoverable	Water	EPA 6020A	306245

Eurofins TestAmerica, Pittsburgh
301 Alpha Drive
RIDC Park
Pittsburgh, PA 15238-2907
phone 412.963.7058 fax 412.963.2468

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact	Project Manager: Craig Macphee	Site Contact: Francisco Barajas	Date: 1/29/2020	COC No:
AECOM	Email: craig.macphee@aecom.com	Lab Contact: Rachel Watkins	Carrier:	1 of 1 COCs
9400 Amberglen Blvd	Tel/Fax: 512-419-5447			TALS Project #: 18016336
Austin, TX 78729	Analysis Turnaround Time			Sampler:
(512) 419-5447 Phone	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(xxx) xxx-xxxx FAX	TAT if different from Below _____			Walk-in Client:
Project Name: TVA Gallatin EIP	☐ 2 weeks			Lab Sampling:
Site: GAF-NRS-Treatability	☐ 1 week			Job / SDG No.:
P O #	☐ 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)	6020A (Mod) GAF, Groundwater, T	Sample Specific Notes:
GAF-Hi Cal Longview 1%	1/27/2020	16250	G	GW	1	N	N	x	
GAF-NaOH 1%	1/27/2020	1630	G	GW	1	N	N	x	
GAF-1% K2CO3	1/28/2020	1230	G	GW	1	N	N	x	
GAF-1% Dolo Fines	1/28/2020	1235	G	GW	1	N	N	x	
GAF-1% Carb/Bicarb	1/28/2020	1415	G	GW	1	N	N	x	
GAF-Ferric Black 100%	1/28/2020	1650	G	GW	1	N	N	x	
GAF-3% KOH	1/28/2020	1655	G	GW	1	N	N	x	Only Cd, Be, Ni, Li
GAF-TN Valley LS	1/29/2020	1120	G	GW	1	N	N	x	
GAF-GeoForm Extended	1/29/2020	1125	G	GW	1	N	N	x	
GAF-Provectus IRMa solids	1/29/2020	15:30	G	GW	1	N	N	x	
GAF- Hydroxyapatite	1/29/2020	15:35	G	GW	1	N	N	x	
Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____								4	

180-101736 Chain of Custody

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:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:_____ Corr'd:_____		Therm ID No.:_____
Relinquished by: Rachel Watkins	Company: AECOM	Date/Time: 1/29/20 16:00	Received by: [signature]	Company: FEDEX	Date/Time: 1-30-20 9:00
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.30, dated 1/1/2020

Login Sample Receipt Checklist

Client: Environmental Standards Inc. Job Number: 180-101736-1

Login Number: 101736 **List Source: Eurofins 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	