



**Shredder Emissions Test Report for
Total Hydrocarbons, Particulate, and Metals
General Iron Industries, Inc. – Chicago, Illinois
IEPA Bureau of Air Site ID No.: 031600BTB**

JUNE 25, 2018

**APPENDIX B –
Test Report Particulate Matter and Total Select Metals
Hammermill Shredder
General Iron Industries, Inc. – Chicago, Illinois
Prepared by Montrose Air Quality Services and
Dated June 21, 2018**

**TEST REPORT
PARTICULATE MATTER AND
TOTAL SELECT METALS
HAMMERMILL SHREDDER
GENERAL IRON INDUSTRIES, INC.
IEPA BUREAU OF AIR SITE ID NO.: 031600BTB
CHICAGO, ILLINOIS**

Prepared For:

Freeborn & Peters, LLP
311 South Wacker Drive
Chicago, Illinois 60606

Prepared By:

Montrose Air Quality Services, LLC
1371 Brummel Avenue
Elk Grove Village, Illinois

Document Number:	023AS-451738-RT-144
Test Dates:	June 13 and 14, 2018
Document Date	June 25, 2018



TABLE OF CONTENTS

SECTIONS	PAGE
1.0 PROJECT OVERVIEW	4
1.1 General	4
1.2 Methodology	4
1.3 Parameters	5
1.4 Results	5
2.0 SUMMARY OF RESULTS	6
3.0 TEST PROCEDURES	11
3.1 Method Listing	11
3.2 Method Descriptions	11
3.2.1 Method 1	11
3.2.2 Method 2	11
3.2.3 Method 3A	12
3.2.4 Method 4	12
3.2.5 Method 5/29	13
4.0 DESCRIPTION OF INSTALLATION	15

LIST OF TABLES

TABLE 1-1 EXECUTIVE SUMMARY	5
TABLE 2 – 1 SUMMARY OF PM RESULTS	6
TABLE 2 – 2 SUMMARY OF TSM RESULTS	7

APPENDICES

APPENDIX A FIGURES
APPENDIX B SAMPLE CALCULATIONS
APPENDIX C PARAMETERS
APPENDIX D FIELD DATA PRINTOUTS
APPENDIX E FIELD DATA
APPENDIX F LABORATORY DATA
APPENDIX G CALIBRATION DATA

REPORT CERTIFICATION

STATEMENT OF CONFORMANCE AND TEST REPORT CERTIFICATION

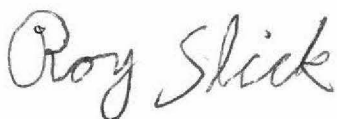
I certify, to the best of my knowledge, that this test program was conducted in a manner conforming to the criteria set forth in ASTM D7036-04: Standard Practice for Competence of Air Emission Testing Bodies, and that project management and supervision of all project related activities were performed by qualified individuals as defined by this practice.

I further certify that this test report and all attachments were prepared under my direction or supervision in accordance with the Montrose Air Quality Services, LLC quality management system designed to ensure that qualified personnel gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed the sampling and analysis relating to this performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate and complete.

Performance data is available upon request.



Cathy Busse
Technical Writer
Montrose Air Quality Services, LLC



Roy Slick, Technical Writer
Quality Assurance Manager
Montrose Air Quality Services, LLC

1.0 PROJECT OVERVIEW

1.1 GENERAL

Montrose Air Quality Services, LLC (Montrose) located at 1371 Brummel Avenue, Elk Grove Village, Illinois was contracted by Freeborn & Peters, LLP to conduct an air emissions test program at the General Iron Industries, Inc. (General Iron) facility located at 1909 N Clifton Ave, Chicago, Illinois. This test program was conducted in accordance with the United States Environmental Protection Agency (USEPA) Request to Provide Information Pursuant to the Clean Air Act (information request) dated November 16, 2017. The specific objectives of this test program were to determine the concentration of particulate matter (PM), and total selected metals (TSM¹) from the exhaust duct of the Hammermill Shredder.

Testing was performed at the direction of Freeborn & Peters, LLP.

Testing was performed on June 13 and June 14, 2018. Coordinating the field portion of the test program were:

John Pinion – RK & Associates, Inc. (630) 393-9000
Jim Kallas – General Iron Industries, Inc. (847) 508-9710
Michael Hess – Montrose Air Quality Services, LLC (630) 670-4740

Testing was witnessed on site by the following regulatory officials:

Kevin Mattison – Illinois Environmental Protection Agency (IEPA)
Scott Connolly – United States Environmental Protection Agency (USEPA)

1.2 METHODOLOGY

EPA Methods 5 and Method 29 were used in a combined sample train to determine the PM and TSM at the test location. In Method 5/29, a sample of the gas stream was withdrawn isokinetically from the exhaust duct and the PM collected in a glass lined sample probe and on a quartz fiber filter. TSM were collected in the glass lined probe, on the quartz fiber filter and in a series of chilled impingers charged with metals absorbing solutions. The mass of filterable and gaseous TSM, collected within the sample train, combined with the volume of dry gas withdrawn from the test location was used to calculate the TSM concentration. Analysis of samples for PM and TSM was conducted by ElementOne, Inc. at their laboratory located in Wilmington, North Carolina. PM results are expressed in units of grains per dry standard cubic foot (gr/dscf) and pounds per hour (lb/hr). Results for TSM are reported in units of microgram per dry standard cubic meter (ug/dscm) and lb/hr.

In order to convert the concentration of each constituent to a mass emissions rate, the volumetric flow rate through the test location was determined concurrently with each test run using EPA Methods 1, 2, 3A and 4.

¹ For this test program, TSM will include the following constituents: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, phosphorus, selenium, silver, thallium and zinc.

1.3 PARAMETERS

The following parameters were determined at the test location during each test run:

- gas temperature
- gas velocity
- carbon dioxide concentration
- oxygen concentration
- moisture concentration
- particulate matter concentration
- TSM concentrations

1.4 RESULTS

TABLE 1-1 EXECUTIVE SUMMARY

Pollutant	Method	Results (lb/hr)
PM	EPA Method 5	1.90
TSM	EPA Method 29	0.0973

A complete summary of test results is presented in Tables 2 - 1 and 2 - 2².

A TSM audit sample was submitted to ERA and analysis was conducted. The results of all audits may be found in the Laboratory section of the Appendix.

Due to the location of the test ports, a heated flexible ambilocal was used to connect the sampling probe to the impinger box. This is a modification from the Methods 5/29 procedures.

Run 3 did not meet the post leak check requirements. The results obtained with this sampling train were not analyzed and an additional run was performed to replace Run 3.

The blank correction used for the PM results was adjusted to 0.001% of the weight of the acetone. 222 ml of acetone was used for the field blank. The blank correction was calculated as follows: Blank sample volume X specific gravity X 0.001/100. The specific calculation was: $(222 \times 0.791 \times .001)/100 = 0.0018$

² MEASUREMENT UNCERTAINTY STATEMENT

Both qualitative and quantitative factors contribute to field measurement uncertainty and should be taken into consideration when interpreting the results contained within this report. Whenever possible, Montrose personnel reduce the impact of these uncertainty factors through the use of approved and validated test methods. In addition, Montrose personnel perform routine instrument and equipment calibrations and ensure that the calibration standards, instruments, and equipment used during test events meet, at a minimum, test method specifications as well as the specifications of the Montrose Quality Manual and ASTM D7036-04. The limitations of the various methods, instruments, equipment, and materials utilized during this test have been reasonably considered, but the ultimate impact of the cumulative uncertainty of this project is not fully identified within the results of this report.

2.0 SUMMARY OF RESULTS

TABLE 2 – 1
SUMMARY OF PM RESULTS

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Gas Conditions					
Temperature (°F)	120	117	120	117	119
Volume Metered Standard, $V_{m(std)}$ (ft ³)	64.68	69.74	62.11	63.41	64.99
Volumetric Flow Rate (acfm)	66,300	71,200	65,500	66,100	67,300
Volumetric Flow Rate (scfm)	60,400	64,900	59,600	60,300	61,300
Volumetric Flow Rate (dscfm)	57,000	61,500	55,900	56,700	57,800
Carbon Dioxide (% dry)	0.40	0.30	0.39	0.40	0.37
Oxygen (% dry)	20.80	20.90	20.79	20.80	20.82
Moisture (%)	5.59	5.36	6.24	6.04	5.81
Particulate Results					
Concentration (grains/dscf)	0.00318	0.00398	0.00460	0.00361	0.00384
Emission Rate (lb/hr)	1.55	2.10	2.21	1.75	1.90

TABLE 2 – 2
SUMMARY OF TSM RESULTS

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Gas Conditions					
Temperature (°F)	120	117	120	117	119
Volumetric Flow Rate (acfm)	66,300	71,200	65,500	66,100	67,300
Volumetric Flow Rate (scfm)	60,400	64,900	59,600	60,300	61,300
Volumetric Flow Rate (dscfm)	57,000	61,500	55,900	56,700	57,800
Carbon Dioxide (% dry)	0.40	0.30	0.39	0.40	0.37
Oxygen (% dry)	20.80	20.90	20.79	20.80	20.82
Moisture (%)	5.59	5.36	6.24	6.04	5.81
Antimony - Sb					
Concentration (µg/dscm)	0.312*	0.379	0.371	0.237*	0.325
Concentration (gr/dscf)	1.36E-07*	1.66E-07	1.62E-07	1.04E-07*	1.42E-07
Emission Rate (lb/hr)	0.0000667*	0.0000874	0.0000778	0.0000504*	0.0000706
Arsenic - As					
Concentration (µg/dscm)	0.140*	0.152*	<0.114	<0.111	0.129
Concentration (gr/dscf)	6.13E-08*	6.66E-08*	<4.97E-08	<4.87E-08	5.66E-08
Emission Rate (lb/hr)	0.0000300*	0.0000351*	<0.0000238	<0.0000237	0.0000281
Barium - Ba					
Concentration (µg/dscm)	2.58	4.73	2.24	1.93	2.87
Concentration (gr/dscf)	1.13E-06	2.07E-06	9.79E-07	8.45E-07	1.25E-06
Emission Rate (lb/hr)	0.000551	0.00109	0.000469	0.000411	0.000630
Beryllium - Be					
Concentration (µg/dscm)	<0.0273	<0.0253	<0.0284	<0.0278	<0.0272
Concentration (gr/dscf)	<1.19E-08	<1.11E-08	<1.24E-08	<1.22E-08	<1.19E-08
Emission Rate (lb/hr)	<0.00000583	<0.00000583	<0.00000595	<0.00000592	<0.00000588

< indicates the results of both fractions were below the detection limit of the Method

* indicates one fraction was below the detection limit of the Method

TABLE 2 – 2
SUMMARY OF TSM RESULTS (CONTINUED)

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Cadmium - Cd					
Concentration (µg/dscm)	1.86*	1.00*	1.08	0.886*	1.21
Concentration (gr/dscf)	8.13E-07*	4.38E-07*	4.72E-07	3.87E-07*	5.28E-07
Emission Rate (lb/hr)	0.000398*	0.000231*	0.000226	0.000188*	0.000261
Chromium - Cr					
Concentration (µg/dscm)	1.35	1.59	1.38	1.10	1.35
Concentration (gr/dscf)	5.89E-07	6.93E-07	6.02E-07	4.83E-07	5.92E-07
Emission Rate (lb/hr)	0.000288	0.000365	0.000289	0.000235	0.000294
Cobalt - Co					
Concentration (µg/dscm)	<0.109	0.138*	<0.114	<0.111	<0.118
Concentration (gr/dscf)	<4.77E-08	6.04E-08*	<4.97E-08	<4.87E-08	<5.16E-08
Emission Rate (lb/hr)	<0.0000233	0.0000318*	<0.0000238	<0.0000237	<0.0000257
Copper - Cu					
Concentration (µg/dscm)	1.47	3.10	1.76	5.14	2.87
Concentration (gr/dscf)	6.44E-07	1.36E-06	7.70E-07	2.24E-06	1.25E-06
Emission Rate (lb/hr)	0.000315	0.000714	0.000369	0.00109	0.000622
Lead - Pb					
Concentration (µg/dscm)	4.93	7.43	5.44	3.42	5.30
Concentration (gr/dscf)	2.15E-06	3.25E-06	2.38E-06	1.49E-06	2.32E-06
Emission Rate (lb/hr)	0.00105	0.00171	0.00114	0.000727	0.001158
Manganese - Mn					
Concentration (µg/dscm)	4.01	4.82	5.42	3.48	4.43
Concentration (gr/dscf)	1.75E-06	2.11E-06	2.37E-06	1.52E-06	1.94E-06
Emission Rate (lb/hr)	0.000857	0.00111	0.00114	0.000738	0.000960

< indicates the results of both fractions were below the detection limit of the Method

* indicates one fraction was below the detection limit of the Method

TABLE 2 – 2
SUMMARY OF TSM RESULTS (CONTINUED)

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Nickel - Ni					
Concentration (µg/dscm)	1.63	2.55	1.36	0.930	1.62
Concentration (gr/dscf)	7.14E-07	1.12E-06	5.92E-07	4.06E-07	7.07E-07
Emission Rate (lb/hr)	0.000349	0.000588	0.000284	0.000198	0.000355
Phosphorous - P					
Concentration (µg/dscm)	18.2	19.6	15.2	13.7	16.7
Concentration (gr/dscf)	7.93E-06	8.56E-06	6.66E-06	6.00E-06	7.29E-06
Emission Rate (lb/hr)	0.00388	0.00451	0.00319	0.00292	0.00363
Selenium - Se					
Concentration (µg/dscm)	0.698	1.17	<0.114	0.160	0.535
Concentration (gr/dscf)	3.05E-07	5.10E-07	<4.97E-08	6.98E-08	2.34E-07
Emission Rate (lb/hr)	0.000149	0.000269	<0.0000238	0.0000340	0.000189
Silver - Ag					
Concentration (µg/dscm)	<0.109	<0.101	1.61*	<0.111	<0.482
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	7.02E-07*	<4.87E-08	<2.11E-07
Emission Rate (lb/hr)	<0.0000233	<0.0000233	0.000337*	<0.0000237	<0.000102
Thallium - Tl					
Concentration (µg/dscm)	<0.109	<0.101	<0.114	<0.111	<0.109
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	<4.97E-08	<4.87E-08	<4.76E-08
Emission Rate (lb/hr)	<0.0000233	<0.0000233	<0.0000238	<0.0000237	<0.0000235
Zinc - Zn					
Concentration (µg/dscm)	351	345	312	265	318
Concentration (gr/dscf)	1.53E-04	1.51E-04	1.36E-04	1.16E-04	1.39E-04
Emission Rate (lb/hr)	0.0750	0.0795	0.0654	0.0563	0.0690

< indicates the results of both fractions were below the detection limit of the Method

* indicates one fraction was below the detection limit of the Method

TABLE 2 – 2
SUMMARY OF TSM RESULTS (CONTINUED)

Test Parameters	Run 1	Run 2	Run 4	Run 5	Average
Date	6/13/18	6/13/18	6/14/18	6/14/18	
Start Time	11:49	15:15	10:56	13:45	
Stop Time	13:40	17:09	12:45	15:33	
Mercury - Hg					
Concentration (µg/dscm)	136*	50.6*	176*	11.0*	93.5
Concentration (gr/dscf)	5.96E-05*	2.21E-05*	7.68E-05*	4.82E-06*	4.08E-05
Emission Rate (lb/hr)	0.0291*	0.0117*	0.0368*	0.00234*	0.0200
Total Select Metals					
Emission Rate (lb/hr)	0.112	0.102	0.110	0.0654	0.0973

< indicates the results of both fractions were below the detection limit of the Method

* indicates at least one fraction was below the detection limit of the Method

3.0 TEST PROCEDURES

3.1 METHOD LISTING

The test methods found in 40 CFR Part 60, Appendix A were referenced for the test program. The following individual methods were referenced:

Method 1	Sample and velocity traverse for stationary sources
Method 2	Determination of stack gas velocity and volumetric flow rate (type S pitot tube)
Method 3A	Determination of oxygen and carbon dioxide concentrations in emissions from stationary sources (Instrumental analyzer procedure)
Method 4	Determination of moisture content in stack gases
Method 5	Determination of particulate emissions from stationary sources
Method 29	Determination of Metals Emissions from Stationary Sources

3.2 METHOD DESCRIPTIONS

3.2.1 Method 1

Method 1 was used to determine the suitability of the test location and to determine the sample points used for the volumetric flow rate determinations. The test location conformed to the minimum requirements of being located at least 2.0 diameters downstream and at least 0.5 diameters upstream from the nearest flow disturbance.

The Hammermill Shredder test location was a round, vertical duct with a diameter of 50.0 inches. Eight points were sampled at each of the two test ports. The test location was approximately 6.0 diameters downstream and approximately 12.0 diameters upstream from the nearest flow disturbances. A cross section of the sampling location, showing the sample points, can be found in Figure 1 of the Appendix.

3.2.2 Method 2

EPA Method 2 was used to determine the gas velocity at the test location using an “S” type pitot tube and incline oil manometer. The manometer was leveled and “zeroed” prior to each test run. The sample trains were leak checked before and after each run by pressurizing the positive or “high” side, of each pitot tube and creating a 3 in. H₂O deflection on the manometer. The leak check was considered valid if the manometer remained stable for 15 seconds. This procedure was repeated on the negative side by generating a vacuum of at least 3 in. H₂O. The velocity head pressure and gas temperature were then determined at each point specified in Method 1. The static pressure of the duct was measured using water filled U-tube manometer. In addition, the barometric pressure was measured and recorded. A diagram of the Method 2 apparatus is shown in Figure 2 as part of the Method 5/29 sampling train.

3.2.3 Method 3A

The carbon dioxide and oxygen contents were determined at the test location using EPA Method 3A. A gas sample was collected into a Tedlar bag from the back of each sample train for the duration of each test run. Analysis was performed using a Servomex 1440 infrared carbon dioxide analyzer/paramagnetic oxygen analyzer. The analyzers were calibrated immediately prior to analysis of the bag samples using the procedures outlined in Method 3A using EPA Protocol calibration gases.

The carbon dioxide content and oxygen content were used to calculate the dry molecular weight of the gas stream. The molecular weight was then used, along with the moisture content determined by EPA Method 4, for the calculation of the volumetric flow rate. For these calculations, the balance of the gas stream was assumed to be nitrogen since the other gas stream components are insignificant for the purposes of calculating molecular weight.

3.2.4 Method 4

The moisture content at the test location was determined using Method 4. A known volume of sample gas was withdrawn from the source and the moisture was condensed and measured. The dry standard volume of the sample gas was then compared to the volume of moisture collected to determine the moisture content of the sample gas. A diagram of the Method 4 apparatus is shown in Figure 2 as part of the Method 5/29 sampling trains.

To condense the water vapor, the gas sample passed through a series of impingers charged as outlined in Methods 29. After exiting the impinger system, the sample train was leak checked prior to the test run by capping the probe tip and pulling a vacuum of at least 15 inches Hg. The sample train was leak checked prior to the test run by capping the probe tip and pulling a vacuum higher than the value expected during the run. A leak check was considered valid if the leak rate was less than 0.02 cubic feet per minute.

The volume of dry gas exiting the gas condenser system was measured with a dry gas meter. After leaving the dry gas meter, the sample stream passed through an orifice used to meter the flow rate through the sample train. The pressure drop across the orifice was measured with an incline plane, oil manometer. The gas meter reading, gas meter inlet and outlet temperatures, gas meter static pressure and pump vacuum were recorded for each sample point.

After the test run, the sample train was leak checked at the highest vacuum encountered during the test run. The tests were considered valid since the leak rate was less than 0.02 cfm. The amount of water collected in the condenser system was measured gravimetrically. The net weight gain of water was converted to a volume of wet gas and then compared to the amount of dry gas sampled to determine the moisture content.

3.2.5 Method 5/29

Methods 5 and 29 were used to determine the PM and TSM concentration in a combined sample train at the test location. A sample of the gas stream was withdrawn isokinetically from the stack and the PM in the sample gas stream was collected in a glass probe liner and on a quartz filter. The metals were collected in the glass probe liner, on the quartz filter and in a series of chilled impingers. A diagram of the Method 5/29 sampling train is shown in Figure 2 of the Appendix.

To prevent contamination, all components of the sample train were glass or Teflon with no metal connections. Prior to testing all components were washed with hot tap water then hot soapy water, rinsed three times with tap water and then rinsed three times with de-ionized, ultra filtered (DIUF) water. All glassware was then soaked for a minimum of four hours in a 10% nitric acid solution. After soaking, the glassware was rinsed three times with DIUF water and then rinsed with acetone. After drying, all components were sealed with parafilm.

The sample probe used consisted of a glass liner and glass nozzle. The liner was housed in a heated sheath maintained at a temperature of 248°F (+/- 25°F). Sample gas passed through the nozzle and probe assembly and then through a quartz fiber filter heated to 248°F (+/- 25°F). After exiting the filter, the sample gas passed through a series of six glass impingers. The first and second impingers contained 100ml of a 5 percent nitric acid (HNO_3)/10 percent hydrogen peroxide (H_2O_2) solution to collect all the metals except mercury. The third impinger remained empty to prevent cross contamination of the separate solutions. The fourth and fifth impingers contained 100ml of a 4 percent potassium permanganate (KMnO_4)/10 percent sulfuric acid (H_2SO_4) solution to absorb mercury. The sixth impinger contained a known quantity of silica gel. The dry gas exiting the moisture condenser system then passed through a sample pump and a dry gas meter to measure the gas volume. After leaving the dry gas meter, the sample stream passed through an orifice, which was used to meter the flow rate through the sample train. The pressure drop across the orifice was measured with an incline plane oil manometer.

Prior to the test run the filter was weighed to the nearest 0.0001g until a constant weight was achieved. The weight of the filter was considered constant only when two consecutive weights taken at least six hours apart were within 0.0005g of each other. The filter was then loaded into a glass filter holder with a Teflon support screen that was prepared in the same manner as the other components of the sample train. The probe was thoroughly cleaned with acetone and the probe wash saved as a quality assurance check. The condenser system was then loaded as outlined above. After assembly, the sample train was leak checked prior to the test run by capping the probe tip and pulling a vacuum of at least 15 in.Hg. A leak check was considered valid if the leak rate was below 0.02 cubic feet per minute.

The probe tip was placed at the first of the sample points determined in Method 1. The velocity at the sample point was determined using Method 2 by reading the velocity pressure from the oil manometer. Sample was withdrawn from the source at a rate such that the velocity at the opening of the nozzle matched the velocity of the stack gas at the sample point (isokinetically). During the test run the train was moved to each of the Method 1 sample points. The sample time at each point was calculated based on the number of sample points and the total run time. The run time and sample rate was

determined such that a minimum sample volume of 60 dry standard cubic feet (dscf) was collected. The gas velocity pressure (ΔP), stack temperature, gas meter reading, gas meter inlet and outlet temperatures, gas meter orifice pressure (ΔH), probe and filter temperatures, and pump vacuum was recorded for each sample point.

After the test run, the train was leak checked at the highest vacuum encountered during the test run. The sample train was then transferred to the on-site laboratory for recovery. The filter was removed from the holder and placed in a glass petri dish. The front half of the sample train, consisting of the nozzle, probe liner and filter holder, was brushed with a non-metallic brush and rinsed with 0.1 N nitric acid. The rinse was saved in a 250ml trace clean amber glass sample jar. The contents of the first two impingers were recovered and saved in two 500ml sample jars. The impingers were then rinsed with 0.1N nitric acid, and the rinses added to the sample jars. The contents of the third impinger, which was originally empty, was recovered and saved separately in a 500ml sample jar. The impinger was rinsed with nitric acid and the rinse added to the sample jar. The contents of the fourth and fifth impingers was recovered and saved in two 500ml sample jars. The impingers were rinsed with fresh potassium permanganate and the rinse added to the sample jars. If deposits remained on the potassium permanganate impinger surface, the impingers were rinsed with 25 ml of 8 N hydrochloric acid (HCl) and the rinse saved in a separate 250ml sample jar.

Analysis of the samples for particulate and metals followed procedures outlined in EPA Method 29. The front half rinse and filter were digested with HNO_3 . This fraction and the sample fraction acquired from the first three impingers were analyzed separately for all the metals listed using ICP and GFAA. These two fractions were also analyzed for mercury using CVAA. The KMnO_4 impinger sample, the HCl rinse and the empty impinger sample were then analyzed separately for mercury using CVAA.

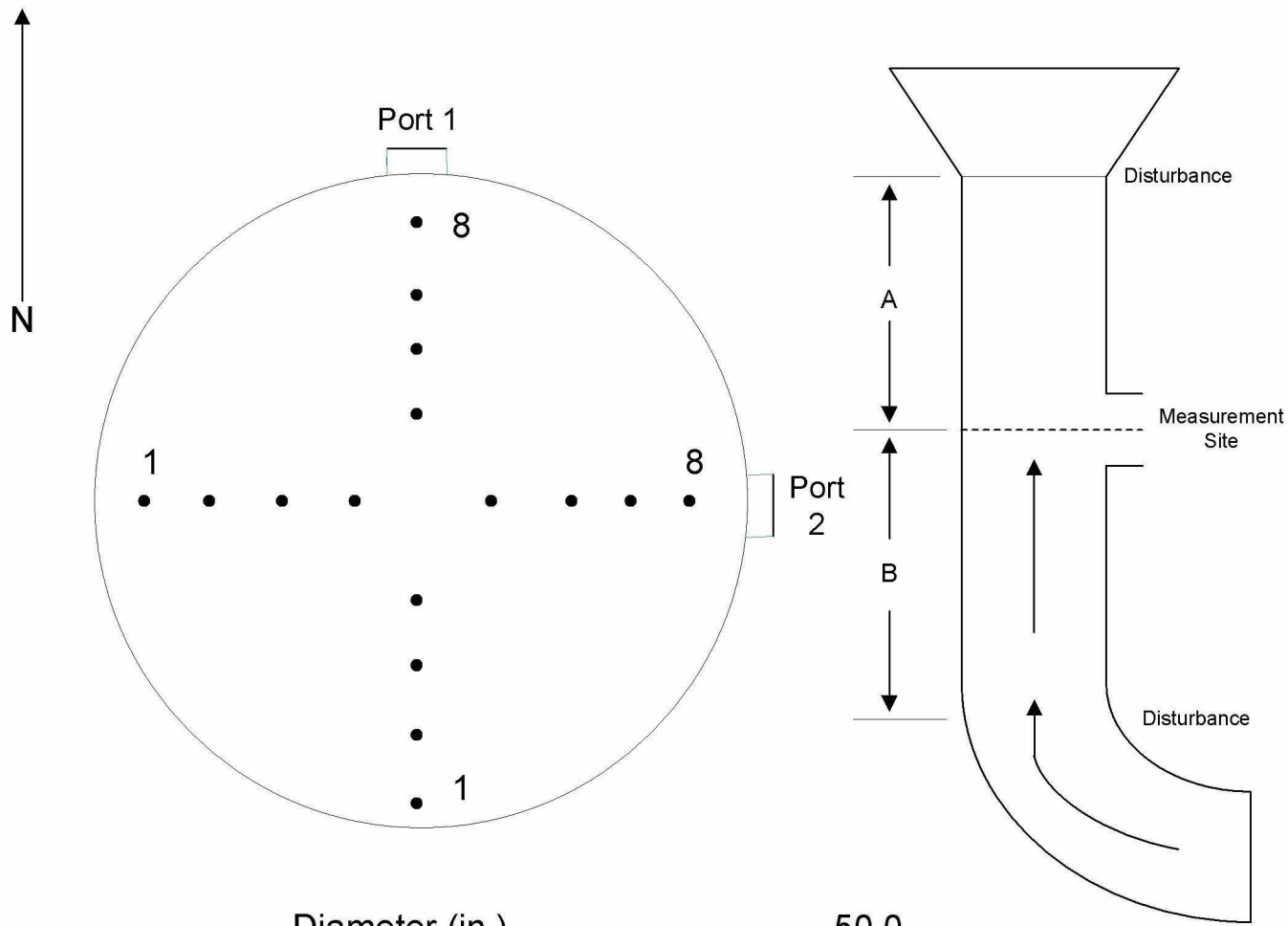
Analysis of the samples for PM and TSM was performed by ElementOne located in Wilmington, North Carolina.

4.0 DESCRIPTION OF INSTALLATION

General Iron Industries, Inc. (General Iron) is an existing scrap metal recycling facility located at 1909 N. Clifton Avenue, Chicago, Illinois (see Figure 1). General Iron receives and shreds mixed scrap metal in various forms to produce uniform grades of ferrous and non-ferrous metals. Existing scrap handling and processing activities include receiving, sorting, shredding, metal separation and recovery of ferrous and nonferrous metals.

Testing was performed in the exhaust duct of the hammermill shredder air handling system, downstream of a cyclone separator, a roll media filter, and the induced draft fan.

APPENDIX A FIGURES



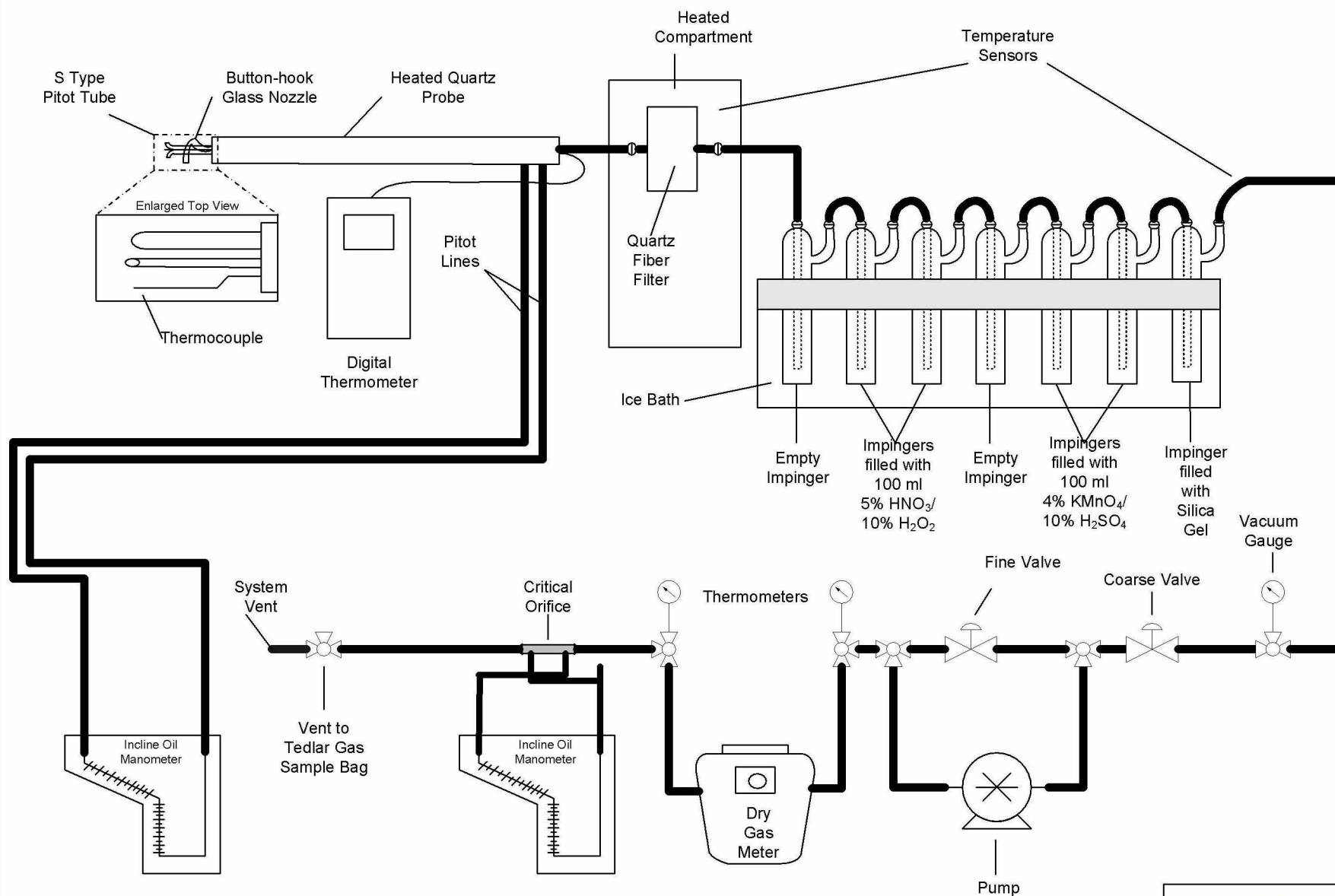
Diameter (in.)	50.0
Port Length (in.)	14.5
Distance A (Duct Diameters)	12.0
Distance B (Duct Diameters)	6.0

Point	Distance From Wall (in.)
1	1.6
2	5.3
3	9.7
4	16.2
5	33.8
6	40.3
7	44.8
8	48.4

Cross Section of the Hammermill Shredder
Test Location
General Iron Industries Corporation

Figure 1





EPA Methods 2, 4, 5 and 29:
Particulate and Multi-Metals Sampling Train

Figure 2

APPENDIX B

SAMPLE CALCULATIONS

Sample Calculations for Method 5/29, Run 1

Area of Sample Location

$$A_s = (\pi) \left(\frac{d_s}{2 \times 12} \right)^2$$

$$A_s = (\pi) \left(\frac{50.0}{2 \times 12} \right)^2$$

$$A_s = 13.6 \text{ ft}^2$$

where:

- A_s = area of stack (ft²)
- D_s = diameter of stack (in)
- 12 = conversion factor (in/ft)
- 2 = conversion factor (diameter to radius)

Stack Pressure Absolute

$$P_a = P_b + \frac{P_s}{13.6}$$

$$P_a = 29.85 + \frac{1.3}{13.6}$$

$$P_a = 29.95 \text{ in. Hg}$$

where:

- P_a = stack pressure absolute (in. Hg)
- P_b = barometric pressure (in. Hg)
- P_s = static pressure (in. H₂O)
- 13.6 = conversion factor (in. H₂O/in. Hg)

Volume of Dry Gas Collected Corrected to Standard Conditions

$$V_{m(std)} = \frac{17.64(V_m)(Y_d)\left(P_b + \frac{\Delta H}{13.6}\right)}{(T_m + 460)}$$
$$V_{m(std)} = \frac{17.64(69.19)(0.9987)\left(29.85 + \frac{1.62}{13.6}\right)}{(105 + 460)}$$
$$V_{m(std)} = 64.68 scf$$

where:

$V_{m(std)}$	= volume of gas collected at standard conditions (scf)
V_m	= volume of gas sampled at meter conditions (ft ³)
Y_d	= gas meter correction factor (dimensionless)
P_b	= barometric pressure (in. Hg)
ΔH	= average sample pressure (in. H ₂ O)
T_m	= average gas meter temperature (°F)
13.6	= conversion factor (in. H ₂ O/in. Hg)
17.64	= ratio of standard temperature over standard pressure (°R/in. Hg)
460	= conversion (°F to °R)

Volume of Water Vapor Collected Corrected to Standard Conditions

$$V_{w(std)} = 0.04715 \times V_{wc} + 0.04715 \times V_{wsg}$$
$$V_{w(std)} = 0.04715 \times 68.5 + 0.04715 \times 12.8$$
$$V_{w(std)} = 3.83 scf$$

where:

$V_{w(std)}$	= volume of water vapor at standard conditions (scf)
V_{wc}	= weight of liquid collected (g)
V_{wsg}	= weight gain of silica gel (g)
0.04715	= volume occupied by one gram water at standard conditions (ft ³ /g)

Percent Moisture

$$B_{ws} = 100 \times \left[\frac{V_{w(std)}}{(V_{m(std)} + V_{w(std)})} \right]$$

$$B_{ws} = 100 \times \left[\frac{3.83}{(64.68 + 3.83)} \right]$$

$$B_{ws} = 5.59\%$$

where:

- B_{ws} = moisture content of the gas stream (%)
- $V_{m(std)}$ = volume of gas collected at standard conditions (scf)
- $V_{w(std)}$ = volume of water vapor at standard conditions (scf)
- 100 = conversion factor

Molecular Weight of Dry Gas Stream³

$$M_d = \left(44 \times \frac{\%CO_2}{100} \right) + \left(32 \times \frac{\%O_2}{100} \right) + \left(28 \times \frac{(\%N_2)}{100} \right)$$

$$M_d = \left(44 \times \frac{0.4}{100} \right) + \left(32 \times \frac{20.8}{100} \right) + \left(28 \times \frac{78.8}{100} \right)$$

$$M_d = 28.90 \text{ lbs / lb - mole}$$

where:

- M_d = molecular weight of the dry gas stream (lb/lb-mole)
- $\%CO_2$ = carbon dioxide content of the dry gas stream (%)
- 44 = molecular weight of carbon dioxide (lb/lb-mole)
- $\%O_2$ = oxygen content of the dry gas stream (%)
- 32 = molecular weight of oxygen (lb/lb-mole)
- $\%CO$ = carbon monoxide content of the dry gas stream (%)
- $\%N_2$ = nitrogen content of the dry gas stream (%)
- 28 = molecular weight of nitrogen (lb/lb-mole)
- 100 = conversion factor

³ The remainder of the gas stream after subtracting carbon dioxide and oxygen is assumed to be nitrogen.

Molecular Weight of Wet Gas Stream

$$M_s = \left(M_d \times \left(1 - \frac{B_{ws}}{100} \right) \right) + \left(18 \times \frac{B_{ws}}{100} \right)$$

$$M_s = \left(28.90 \times \left(1 - \frac{5.59}{100} \right) \right) + \left(18 \times \frac{5.59}{100} \right)$$

$$M_s = 28.29 \text{ lbs / lb - mole}$$

where:

M_s	= molecular weight of the wet gas stream (lb/lb-mole)
M_d	= molecular weight of the dry gas stream (lb/lb-mole)
B_{ws}	= moisture content of the gas stream (%)
18	= molecular weight of water (lb/lb-mole)
100	= conversion factor

Velocity of Gas Stream

$$V_s = 85.49 (C_p) \left(\sqrt{\Delta P} \right) \sqrt{\frac{(T_s + 460)}{(M_s) \left(P_b + \frac{P_s}{13.6} \right)}}$$

$$V_s = 85.49 (0.84) (1.36) \sqrt{\frac{(120 + 460)}{(28.29) \left(29.85 + \frac{1.3}{13.6} \right)}}$$

$$V_s = 81.0 \text{ ft / sec}$$

where:

V_s	= average velocity of the gas stream (ft/sec)
C_p	= pitot tube coefficient dimensionless
$\sqrt{\Delta P}$	= average square root of velocity pressures (in. H ₂ O) ^{1/2}
T_s	= average stack temperature (°F)
M_s	= molecular weight of the wet gas stream (lb/lbmole)
P_b	= barometric pressure (in. Hg)
P_s	= static pressure of gas stream (in. H ₂ O)
85.49	= pitot tube constant (ft/sec)/[(lb/lbmole)(in. Hg)]/[(°R)(in. H ₂ O)] ^{1/2}
460	= conversion (°F to °R)
13.6	= conversion factor (in. H ₂ O/in Hg)

Volumetric Flow of Gas Stream - Actual Conditions

$$Q_a = 60(V_s)(A_s)$$

$$Q_a = 60(81.0)(13.6)$$

$$Q_a = 66,269 \text{ acfm}$$

where:

- Q_a = volumetric flow rate of the gas stream at actual conditions (acfm)
- V_s = average velocity of the gas stream (ft/sec)
- A_s = area of duct or stack (ft²)
- 60 = conversion factor (sec/min)

Volumetric Flow of Gas Stream - Standard Conditions

$$Q_{\text{std}} = \frac{17.64(Q_a)(P_a)}{(T_s + 460)}$$

$$Q_{\text{std}} = \frac{17.64(66,269)(29.95)}{(120 + 460)}$$

$$Q_{\text{std}} = 60,368 \text{ scfm}$$

where:

- Q_{std} = volumetric flow rate of the gas stream at standard conditions (scfm)
- Q_a = volumetric flow rate of the gas stream at actual conditions (acfm)
- T_s = average stack temperature (°F)
- P_a = stack pressure absolute (in. Hg)
- 17.64 = ratio of standard temperature over standard pressure (°R/in. Hg)
- 460 = conversion (°F to °R)

Volumetric Flow of Gas Stream - Standard Conditions - Dry Basis

$$Q_{\text{dstd}} = Q_{\text{std}} \left(1 - \frac{B_{\text{ws}}}{100} \right)$$

$$Q_{\text{dstd}} = 60,368 \left(1 - \frac{5.59}{100} \right)$$

$$Q_{\text{dstd}} = 57,013 \text{ dscfm}$$

where:

- Q_{dstd} = volumetric flow rate of the dry gas stream at standard conditions (dscfm)
 Q_{std} = volumetric flow rate of the gas stream at standard conditions (scfm)
 B_{ws} = moisture content of the gas stream (%)
100 = conversion factor

Area of Nozzle

$$A_n = \pi \times \left(\frac{d_n}{2 \times 12} \right)^2$$

$$A_n = \pi \times \left(\frac{0.170}{2 \times 12} \right)^2$$

$$A_n = 0.000158 \text{ ft}^2$$

where:

- A_n = area of nozzle (ft²)
 d_n = diameter of nozzle (in)
12 = conversion factor (in/ft)
2 = conversion factor (diameter to radius)

Percent Isokinetic

$$I = \frac{0.0945(T_s + 460)(V_{m(std)})}{\left(P_b + \frac{P_s}{13.6}\right)(v_s)(A_n)(\Theta)\left(1 - \frac{B_{ws}}{100}\right)}$$

$$I = \frac{0.0945(120 + 460)(64.68)}{\left(29.85 + \frac{1.3}{13.6}\right)(81.0)(0.000158)(96)\left(1 - \frac{5.59}{100}\right)}$$

$$I = 102.3\%$$

where:

I	= percent isokinetic (%)
T _s	= average stack temperature (°F)
V _{m(std)}	= volume of gas collected at standard temperature and pressure (scf)
P _b	= barometric pressure (in. Hg)
P _s	= static pressure of gas stream (in. H ₂ O)
V _s	= average velocity of the gas stream (ft/sec)
A _n	= cross sectional area of nozzle (ft ²)
Θ	= sample time (min)
B _{wsat}	= moisture saturation point of the gas stream (%)
0.0945	= constant (°R/in. Hg)
460	= conversion (°F to °R)
13.6	= conversion factor (in. H ₂ O/in Hg)
100	= conversion factor

Acetone Wash Blank Correction

$$W_a = \frac{(m_{ab})(v_{aw})}{v_{awb}}$$

$$W_a = \frac{(0.0018)(134)}{222}$$

$$W_a = 0.0011g$$

where:

W _a	= maximum allowable particulate mass in acetone wash blank (g)
m _{ab}	= mass collected, acetone wash blank (g)
v _{aw}	= mass of acetone wash (g)
v _{awb}	= mass of acetone wash blank (g)

Particulate Catch

$$M_n = m_f + (m_a - W_a)$$

$$M_n = 0.0052 + (0.0092 - 0.0011)$$

$$M_n = 0.0133g$$

where:

M_n	= particulate catch (g)
m_f	= particulate on filter (g)
m_a	= particulate in wash (g)
W_a	= particulate mass in acetone wash blank (g)

Particulate Concentration, grains/dscf

$$C = \frac{(M_n)(15.43)}{V_{m(std)}}$$

$$C = \frac{(0.0133)(15.43)}{64.68}$$

$$C = 0.00318gr / dscf$$

where:

C	= particulate concentration (grains/dscf)
M_n	= particulate catch (g)
$V_{m(std)}$	= volume of gas collected at standard temperature and pressure (scf)
15.43	= conversion factor (grains/g)

Particulate Emission Rate (lb/hr)

$$E_{lb/hr} = \frac{(M_n)(Q_{std})(60)}{(V_{m(std)})(453.6)}$$

$$E_{lb/hr} = \frac{(0.0133)(57,013)(60)}{(64.68)(453.6)}$$

$$E_{lb/hr} = 1.55 lb/hr$$

where:

$E_{lb/hr}$	= particulate emission rate (lb/hr)
M_n	= particulate catch (g)
$V_{m(std)}$	= volume of dry gas collected at standard temperature and pressure (scf)
Q_{std}	= volumetric flow rate of the gas stream at standard conditions, on a dry basis (dscfm)
60	= conversion factor (min/hr)
453.6	= conversion factor (g/lb)

Concentration of Lead in Flue Gas, ug/dscm⁴

$$C_{ug/dscm} = \frac{(M_c)}{(V_{m(std)})} (35.31)$$

$$C_{ug/dscm} = \frac{(9.03)}{(64.68)} (35.31)$$

$$C_{ug/dscm} = 4.93 ug/dscm$$

where:

$C_{ug/dscm}$	= concentration of lead in flue gas (ug/dscm)
M_c	= mass of lead in sample (ug)
$V_{m(std)}$	= volume of gas collected at standard temperature and pressure (scf)
35.31	= conversion factor (ft ³ /m ³)

⁴ The concentrations of all TSM are calculated in a similar manner.

Concentration of Lead in Flue Gas, gr/dscf⁵

$$C_{gr/dscf} = \frac{(C_{ug/dscm})(15.43)}{(35.32)(10^6)}$$

$$C_{gr/dscf} = \frac{(4.93)(15.43)}{(35.32)(10^6)}$$

$$C_{gr/dscf} = 2.15E^{-6} \text{ gr / dscf}$$

where:

$C_{gr/dscf}$	= concentration of lead in flue gas (gr/dscf)
$C_{ug/dscm}$	= concentration of lead in flue gas (ug/dscm)
15.43	= conversion factor (grains/g)
35.32	= conversion factor (ft ³ /m ³)
10 ⁶	= conversion factor (ug/g)

Lead Emission Rate, lb/hr⁶

$$E_{lb/hr} = \frac{(C_{ug/dscm})(Q_{dstd})(60)}{(35.315)(10^6)(453.6)}$$

$$E_{lb/hr} = \frac{(4.93)(57,013)(60)}{(35.315)(10^6)(453.6)}$$

$$E_{lb/hr} = 0.00105 \text{ lb / hr}$$

where:

$E_{lb/hr}$	= lead emission rate (lb/hr)
$C_{ug/dscm}$	= lead concentration (ug/dscm)
Q_{dstd}	= volumetric flow rate of dry gas stream at standard conditions (dscfm)
10 ³	= conversion factor (ug/mg)
35.315	= conversion factor (ft ³ /m ³)
60.0	= conversion factor (min/hr)

⁵ The concentrations of all TSM are calculated in a similar manner.

⁶ The emission rates of all TSM are calculated in a similar manner.

APPENDIX C PARAMETERS

EPA Methods 1-4 Parameters	Run 1	Run 2	Run 4	Run 5
Date	6/13/2018	6/13/2018	6/14/2018	6/14/2018
Start Time	11:49	15:15	10:56	13:45
Stop Time	13:40	17:09	12:45	15:33
Dimensions of Sample Location, D_s (in)	50.0	50.0	50.0	50.0
Velocity Pressure, $\Delta P^{1/2}$ avg (in. $H_2O^{1/2}$)	1.36	1.47	1.35	1.36
Barometric Pressure, P_b (Inches Hg)	29.85	29.79	29.85	29.80
Static Pressure, P_s (Inches H_2O)	1.3	1.0	1.0	1.0
Pitot Coefficient, C_p	0.84	0.84	0.84	0.84
Sample Location Temperature, T_s ($^{\circ}F$)	120	117	120	117
Volume Metered, V_m (ft^3)	69.19	75.29	65.49	66.40
Meter Temperature, T_m ($^{\circ}F$)	105	109	96.5	91.8
Average Sample Pressure, ΔH_{avg} (in. H_2O)	1.62	1.86	1.51	1.54
Gas Meter Correction Factor, Y_d	0.9987	0.9987	0.9987	0.9987
Carbon Dioxide (% dry)	0.40	0.30	0.39	0.40
Oxygen (% dry)	20.8	20.9	20.8	20.8
Weight of Water Collected, V_{wc} (g)	68.5	64.7	72.6	74.6
Silica Gel Net Weight, V_{wsg} (g)	12.8	19.1	15.1	11.8
Diameter of Nozzle, D_n (in)	0.170	0.170	0.170	0.170
Run Time, θ (minutes)	96	96	96	96

EPA METHODS 1-4 RESULTS

Area of Sample Location, A_s (ft^2)	13.6	13.6	13.6	13.6
Stack Pressure Absolute (inches Hg)	29.95	29.86	29.92	29.87
Volume Metered Standard, $V_{m(std)}$ (ft^3)	64.68	69.74	62.11	63.41
Volume of Water Vapor, $V_{w(std)}$ (ft^3)	3.83	3.95	4.14	4.07
Percent Moisture, B_{ws} (%)	5.59	5.36	6.24	6.04
Moisture Saturation Point, B_{wsat} (%)	11.5	10.7	11.6	10.7
Dry Molecular Weight, M_d (lbs/lb mole)	28.90	28.88	28.89	28.90
Wet Molecular Weight, M_s (lbs/lb mole)	28.29	28.30	28.21	28.24
Gas Velocity, V_s (ft/sec)	81.0	87.0	80.1	80.8
Average Flowrate, Q_a (acfm)	66,269	71,167	65,533	66,101
Standard Flowrate, Q_{std} (scfm)	60,368	64,946	59,615	60,350
Dry Standard Flowrate, Q_{dstd} (dscfm)	57,013	61,489	55,916	56,729
Area of Nozzle, A_n (ft^2)	0.000158	0.000158	0.000158	0.000158
Isokinetics (%)	102.3	102.3	100.2	100.8
F1/2 Particulate Matter (mg)	14.4	18.7	19.4	15.5
F1/2 Particulate Matter, blank corrected (g)	0.0133	0.0180	0.0185	0.0148
Concentration (gr/dscf)	0.00318	0.00398	0.00460	0.00361
Emission Rate (lb/hr)	1.55	2.10	2.21	1.75

EPA Method 5 Parameters		Blank	Run 1	Run 2	Run 4	Run 5
<u>Filter</u>			31347	31346	31457	31460
Filter tare weight (g)		0.4022	0.4015	0.4031	0.3679	0.3551
Filter final weight (g)		0.4035	0.4067	0.4118	0.3759	0.3618
Filter net weight, m_f (g)		0.0013	0.0052	0.0087	0.0080	0.0067
<u>Front Half Wash</u>						
	<i>Beaker ID</i>	895	758	737	597	x23
Beaker tare weight (g)		10.2526	10.8814	11.0158	10.1119	9.9149
Beaker final weight (g)	Average	10.2550	10.8906	11.0258	10.1233	9.9237
Volume of Wash, V_{aw} (ml)		222	134	88	108	84
Beaker net weight, m_a (g)		0.0018	0.0092	0.0100	0.0114	0.0088

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
Front Half (ug)	0.472	0.6225	0.388	0.326
Back Half (ug)	<0.1	0.127	0.265	<0.1
Antimony - Sb, (µg)	0.572	0.749	0.653	0.426
Front Half (ug)	0.157	0.201	<0.1	<0.1
Back Half (ug)	<0.1	<0.1	<0.1	<0.1
Arsenic - As, (µg)	0.257	0.301	<0.2	<0.2
Front Half (ug)	3.95	3.96	2.80	2.73
Back Half (ug)	0.774	5.38	1.14	0.741
Barium - Ba, (µg)	4.724	9.34	3.94	3.47
Front Half (ug)	<0.025	<0.025	<0.025	<0.025
Back Half (ug)	<0.025	<0.025	<0.025	<0.025
Beryllium - Be, (µg)	<0.050	<0.050	<0.050	<0.050
Front Half (ug)	3.31	1.88	1.74	1.49
Back Half (ug)	<0.1	<0.1	0.159	<0.1
Cadmium - Cd, (µg)	3.41	1.98	1.90	1.59
Front Half (ug)	2.01	2.14	1.76	1.58
Back Half (ug)	0.460	0.997	0.664	0.404
Chromium - Cr, (µg)	2.47	3.13	2.42	1.98
Front Half (ug)	<0.1	<0.1	<0.1	<0.1
Back Half (ug)	<0.1	0.173	<0.1	<0.1
Cobalt - Co, (µg)	<0.2	0.273	<0.2	<0.2
Front Half (ug)	1.63	1.79	1.55	1.35
Back Half (ug)	1.07	4.34	1.55	7.87
Copper - Cu, (µg)	2.70	6.13	3.100	9.22
Front Half (ug)	7.70	10.7	8.68	5.67
Back Half (ug)	1.33	3.98	0.884	0.471
Lead - Pb, (µg)	9.03	14.7	9.56	6.14
Front Half (ug)	4.04	4.52	3.97	4.02
Back Half (ug)	3.31	5.00	5.57	2.22
Manganese - Mn, (µg)	7.35	9.52	9.54	6.24
Front Half (ug)	2.54	2.64	0.974	0.864
Back Half (ug)	0.452	2.41	1.41	0.805
Nickel - Ni, (µg)	2.99	5.05	2.38	1.67
Front Half (ug)	5.96	8.86	5.22	4.46
Back Half (ug)	27.3	29.9	21.6	20.2
Phosphorous - P, (µg)	33.3	38.7	26.8	24.7

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
Front Half (ug)	0.943	1.74	<0.1	0.186
Back Half (ug)	0.336	0.569	<0.1	0.101
Selenium - Se, (ug)	1.28	2.30	<0.2	0.287
Front Half (ug)	<0.1	<0.1	<0.1	<0.1
Back Half (ug)	<0.1	<0.1	2.726	<0.1
Silver - Ag, (ug)	<0.2	<0.2	2.83	<0.2
Front Half (ug)	<0.1	<0.1	<0.1	<0.1
Back Half (ug)	<0.1	<0.1	<0.1	<0.1
Thallium - Tl, (ug)	<0.2	<0.2	<0.2	<0.2
Front Half (ug)	612	629	524	455
Back Half (ug)	30.9	52.6	25.1	21.0
Zinc - Zn, (ug)	643	682	549	476
Mercury - Hg				
Front-Half Trial 1	<0.1	<0.1	<0.1	<0.1
Front-Half Trial 2	<0.1	<0.1	<0.1	<0.1
Front-Half (ug)	<0.1	<0.1	<0.1	<0.1
H ₂ O ₂ /HNO ₃ Impingers Trial 1	<0.5	<0.3	<0.3	<0.4
H ₂ O ₂ /HNO ₃ Impingers Trial 2	<0.5	<0.3	<0.3	<0.4
H ₂ O ₂ /HNO ₃ Impingers (ug)	<0.5	<0.3	<0.3	<0.4
Empty Impinger Trial 1	<0.2	<0.2	<0.2	<0.2
Empty Impinger Trial 2	<0.2	<0.2	<0.2	<0.2
Empty Impinger (ug)	<0.2	<0.2	<0.2	<0.2
H ₂ SO ₄ /KMnO ₄ Impingers Trial 1	232	80.3	205	9.65
H ₂ SO ₄ /KMnO ₄ Impingers Trial 2	233	80.2	211	9.66
H ₂ SO ₄ /KMnO ₄ (ug)	233	80.3	208	9.66
8N HCl Rinse Trial 1	17.5	19.8	101	10.2
8N HCl Rinse Trial 2	17.5	19.6	101	10.2
8N HCl Rinse (ug)	17.5	19.7	101	10.2
Total Mercury - Hg (ug)	250	100	309	19.8

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
<i>Antimony - Sb</i>				
Concentration (µg/dscm)	0.312	0.379	0.371	0.237
Concentration (gr/dscf)	1.36E-07	1.66E-07	1.62E-07	1.04E-07
Emission Rate (lb/hr)	0.0000667	0.0000874	0.0000778	0.0000504
<i>Arsenic - As</i>				
Concentration (µg/dscm)	0.140	0.152	<0.114	<0.111
Concentration (gr/dscf)	6.13E-08	6.66E-08	<4.97E-08	<4.87E-08
Emission Rate (lb/hr)	0.0000300	0.0000351	<0.0000238	<0.0000237
<i>Barium - Ba</i>				
Concentration (µg/dscm)	2.58	4.73	2.24	1.93
Concentration (gr/dscf)	1.13E-06	2.07E-06	9.79E-07	8.45E-07
Emission Rate (lb/hr)	0.000551	0.00109	0.000469	0.000411
<i>Beryllium - Be</i>				
Concentration (µg/dscm)	<0.0273	<0.0253	<0.0284	<0.0278
Concentration (gr/dscf)	<1.19E-08	<1.11E-08	<1.24E-08	<1.22E-08
Emission Rate (lb/hr)	<0.00000583	<0.00000583	<0.00000595	<0.00000592
<i>Cadmium - Cd</i>				
Concentration (µg/dscm)	1.86	1.00	1.08	0.886
Concentration (gr/dscf)	8.13E-07	4.38E-07	4.72E-07	3.87E-07
Emission Rate (lb/hr)	0.000398	0.000231	0.000226	0.000188
<i>Chromium - Cr</i>				
Concentration (µg/dscm)	1.35	1.59	1.38	1.10
Concentration (gr/dscf)	5.89E-07	6.93E-07	6.02E-07	4.83E-07
Emission Rate (lb/hr)	0.000288	0.000365	0.000289	0.000235
<i>Cobalt - Co</i>				
Concentration (µg/dscm)	<0.109	0.138	<0.114	<0.111
Concentration (gr/dscf)	<4.77E-08	6.04E-08	<4.97E-08	<4.87E-08
Emission Rate (lb/hr)	<0.0000233	0.0000318	<0.0000238	<0.0000237
<i>Copper - Cu</i>				
Concentration (µg/dscm)	1.47	3.10	1.76	5.14
Concentration (gr/dscf)	6.44E-07	1.36E-06	7.70E-07	2.24E-06
Emission Rate (lb/hr)	0.000315	0.000714	0.000369	0.00109

EPA METHOD 29 RESULTS	Run 1	Run 2	Run 4	Run 5
<i>Lead - Pb</i>				
Concentration (µg/dscm)	4.93	7.43	5.44	3.42
Concentration (gr/dscf)	2.15E-06	3.25E-06	2.38E-06	1.49E-06
Emission Rate (lb/hr)	0.00105	0.00171	0.00114	0.000727
<i>Manganese - Mn</i>				
Concentration (µg/dscm)	4.01	4.82	5.42	3.48
Concentration (gr/dscf)	1.75E-06	2.11E-06	2.37E-06	1.52E-06
Emission Rate (lb/hr)	0.000857	0.001110	0.001136	0.000738
<i>Nickel - Ni</i>				
Concentration (µg/dscm)	1.63	2.55	1.36	0.930
Concentration (gr/dscf)	7.14E-07	1.12E-06	5.92E-07	4.06E-07
Emission Rate (lb/hr)	0.000349	0.000588	0.000284	0.000198
<i>Phosphorous - P</i>				
Concentration (µg/dscm)	18.2	19.6	15.2	13.7
Concentration (gr/dscf)	7.93E-06	8.56E-06	6.66E-06	6.00E-06
Emission Rate (lb/hr)	0.00388	0.00451	0.00319	0.00292
<i>Selenium - Se</i>				
Concentration (µg/dscm)	0.70	1.17	<0.114	0.160
Concentration (gr/dscf)	3.05E-07	5.10E-07	<4.97E-08	6.98E-08
Emission Rate (lb/hr)	0.000149	0.000269	<0.0000238	0.0000340
<i>Silver - Ag</i>				
Concentration (µg/dscm)	<0.109	<0.101	1.61	<0.111
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	7.02E-07	<4.87E-08
Emission Rate (lb/hr)	<0.0000233	<0.0000233	0.000337	<0.0000237
<i>Thallium - Tl</i>				
Concentration (µg/dscm)	<0.109	<0.101	<0.114	<0.111
Concentration (gr/dscf)	<4.77E-08	<4.42E-08	<4.97E-08	<4.87E-08
Emission Rate (lb/hr)	<0.0000233	<0.0000233	<0.0000238	<0.0000237
<i>Zinc - Zn</i>				
Concentration (µg/dscm)	351	345	312	265
Concentration (gr/dscf)	1.53E-04	1.51E-04	1.36E-04	1.16E-04
Emission Rate (lb/hr)	0.0750	0.0795	0.0654	0.0563
<i>Mercury - Hg</i>				
Concentration (µg/dscm)	136	50.6	176	11.0
Concentration (gr/dscf)	5.96E-05	2.21E-05	7.68E-05	4.82E-06
Emission Rate (lb/hr)	0.0291	0.0117	0.0368	0.00234

APPENDIX D

FIELD DATA PRINTOUTS

Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/13/2018
Meter ID	M-39
Y _d	0.9987
Pitot C _p	0.84

Nozzle Diameter (in)	0.170
Filter ID	31347
Train Type	IMP
Train ID	IB-18
P ₁ (Inches Hg)	29.85
P ₂ (Inches H ₂ O)	1.3
Start Time	11:49
Stop Time	13:40

Place an "x" in the
appropriate Box

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	642.4	681.4	39.0
Impinger 2	713.4	733.9	20.5
Impinger 3	752.7	758.0	5.3
Impinger 4	605.6	607.9	2.3
Impinger 5	630.7	632.1	1.4
Impinger 6	737.2	737.2	0.0
Silica Gel	911.1	923.9	12.8
Weight of Water Collected, V _{wc} (g)			68.5
Silica Gel Net Weight, V _{wsg} (g)			12.8

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.40	NA	20.8
Trial 2	0.40	NA	20.8
Trial 3	0.40	NA	20.8
Average	0.40	NA	20.8

Run 1

Traverse Point	Min/Pt 6	Velocity Pressure Δ P (in. H ₂ O)	Orifice Setting Δ H (in. H ₂ O)	Gas Sample Volume Initial (ft ³) 807.36	Stack Temp. (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root Δ P	Stack Gas Velocity Vs (ft/sec)	Volume Metered Vmstd (ft ³)	Isokinetics (%)
	Elapsed Time										
1-1	6	1.60	1.40	811.55	114	93	89	1.265	74.8	4.013	108.9
1-2	12	1.90	1.60	815.92	119	96	91	1.378	81.8	4.168	104.2
1-3	18	1.80	1.50	820.20	119	101	91	1.342	79.7	4.063	104.4
1-4	24	1.70	1.50	824.50	120	103	93	1.304	77.5	4.067	107.6
1-5	30	1.60	1.40	828.90	121	105	95	1.265	75.2	4.146	113.2
1-6	36	2.20	1.90	832.84	120	107	98	1.483	88.1	3.701	86.1
1-7	42	2.40	2.10	837.60	120	109	100	1.549	92.1	4.457	99.3
1-8	48	2.00	1.70	842.10	121	110	102	1.414	84.1	4.198	102.5
2-1	54	1.50	1.30	846.14	121	107	104	1.225	72.8	3.769	106.3
2-2	60	1.60	1.40	850.25	120	110	104	1.265	75.2	3.825	104.3
2-3	66	1.70	1.50	854.30	120	112	106	1.304	77.5	3.757	99.4
2-4	72	1.60	1.40	858.35	121	115	108	1.265	75.2	3.739	102.1
2-5	78	1.70	1.50	862.45	120	115	109	1.304	77.5	3.783	100.1
2-6	84	2.20	1.90	867.22	123	116	110	1.483	88.4	4.398	102.6
2-7	90	2.20	1.90	871.82	118	116	111	1.483	88.0	4.238	98.4
2-8	96	2.20	1.90	876.55	121	116	111	1.483	88.2	4.357	101.4

Totals and Averages

96	1.62	69.19	120	105	1.36	81.0	64.68	102.3
----	------	-------	-----	-----	------	------	-------	-------

Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/13/2018
Meter ID	M-39
Y_d	0.9987
Pitot C_p	0.84

Nozzle Diameter (in)	0.170
Filter ID	31346
Train Type	IMP
Train ID	IB-16
P_s (Inches Hg)	29.79
P_s (Inches H ₂ O)	1.0
Start Time	15:15
Stop Time	17:09

Place an "x" in the
appropriate Box

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	736.9	769.0	32.1
Impinger 2	736.0	753.1	17.1
Impinger 3	661.4	667.8	6.4
Impinger 4	733.7	741.5	7.8
Impinger 5	735.8	737.1	1.3
Silica Gel	946.1	965.2	19.1
Weight of Water Collected, V_{wc} (g)			64.7
Silica Gel Net Weight, V_{wsg} (g)			19.1

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.30	NA	20.9
Trial 2	0.30	NA	20.9
Trial 3	0.30	NA	20.9
Average	0.30	NA	20.9

Run 2

Traverse Point	Min/Pt 6	Velocity Pressure ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume Initial (ft ³)	Stack Temp. (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root ΔP	Stack Gas Velocity V_s (ft/sec)	Volume Metered Vmstd (ft ³)	Isokinetics (%)
	Elapsed Time										
				878.51							
1-1	6	2.90	2.60	883.75	113	107	106	1.703	100.7	4.886	98.3
1-2	12	2.70	2.30	888.90	115	109	106	1.643	97.3	4.790	100.0
1-3	18	2.50	2.20	893.95	116	111	106	1.581	93.7	4.687	101.8
1-4	24	2.10	1.80	899.08	117	113	107	1.449	86.0	4.744	112.6
1-5	30	2.40	2.10	903.60	118	115	108	1.549	92.0	4.172	92.7
1-6	36	2.00	1.70	908.45	118	115	108	1.414	84.0	4.472	108.8
1-7	42	2.10	1.80	913.30	115	117	110	1.449	85.8	4.458	105.6
1-8	48	1.90	1.60	917.70	119	118	111	1.378	81.9	4.035	100.8
2-1	54	2.70	2.30	923.25	120	107	109	1.643	97.8	5.157	108.2
2-2	60	2.10	1.80	928.05	119	108	108	1.449	86.1	4.455	105.9
2-3	66	1.60	1.40	932.16	122	109	107	1.265	75.4	3.811	104.0
2-4	72	2.00	1.70	936.50	118	110	107	1.414	84.0	4.023	97.9
2-5	78	1.90	1.60	940.72	117	109	106	1.378	81.8	3.918	97.7
2-6	84	2.00	1.70	945.15	117	110	106	1.414	83.9	4.110	99.9
2-7	90	1.90	1.60	949.45	116	110	106	1.378	81.7	3.989	99.4
2-8	96	1.80	1.50	953.80	116	109	105	1.342	79.5	4.041	103.5

Totals and Averages

96	1.86	75.29	117	109	1.47	87.0	69.74	102.3
----	------	-------	-----	-----	------	------	-------	-------

Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/14/2018
Meter ID	M-39
Y_d	0.9987
Pitot C_p	0.84

Nozzle Diameter (in)	0.170
Filter ID	31457
Train Type	IMP
Train ID	IB-16
P_0 (Inches Hg)	29.85
P_2 (Inches H ₂ O)	1.0
Start Time	10:56
Stop Time	12:45

Place an "x" in the
appropriate Box

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	687.8	741.5	53.7
Impinger 2	765.2	777.6	12.4
Impinger 3	609.1	611.4	2.3
Impinger 4	622.8	624.3	1.5
Impinger 5	732.8	735.5	2.7
Silica Gel	848.0	863.1	15.1
Weight of Water Collected, V_{wc} (g)			72.6
Silica Gel Net Weight, V_{wsg} (g)			15.1

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.39	NA	20.79
Trial 2	0.39	NA	20.79
Trial 3	0.39	NA	20.79
Average	0.39	NA	20.79

Run 4

Traverse Point	Min/Pt 6	Velocity Pressure ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume Initial (ft ³) 1.058.74	Stack Temp. (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root ΔP	Stack Gas Velocity V_s (ft/sec)	Volume Metered Vmstd (ft ³)	Isokinetics (%)
	Elapsed Time										
1-1	6	1.90	1.60	1062.82	111	89	86	1.378	81.4	3.934	98.3
1-2	12	2.00	1.70	1067.10	119	95	87	1.414	84.1	4.102	100.6
1-3	18	1.80	1.50	1071.25	120	99	88	1.342	79.9	3.957	102.4
1-4	24	1.90	1.60	1075.42	121	100	89	1.378	82.1	3.970	100.0
1-5	30	1.70	1.40	1079.45	122	100	90	1.304	77.7	3.832	102.2
1-6	36	1.90	1.60	1083.66	121	101	90	1.378	82.1	4.001	100.8
1-7	42	1.70	1.40	1087.90	123	102	92	1.304	77.8	4.017	107.2
1-8	48	2.10	1.70	1092.17	119	102	93	1.449	86.2	4.045	96.8
2-1	54	1.40	1.20	1095.70	120	98	94	1.183	70.4	3.349	98.2
2-2	60	1.50	1.20	1099.30	121	100	94	1.225	73.0	3.409	96.7
2-3	66	1.50	1.20	1103.05	123	102	94	1.225	73.1	3.545	100.7
2-4	72	1.50	1.20	1106.80	122	103	95	1.225	73.0	3.538	100.4
2-5	78	2.00	1.70	1111.11	123	104	96	1.414	84.4	4.064	100.0
2-6	84	1.80	1.50	1115.35	120	105	97	1.342	79.9	3.989	103.2
2-7	90	2.20	1.80	1119.75	120	105	97	1.483	88.3	4.143	96.9
2-8	96	2.20	1.80	1124.23	119	105	97	1.483	88.2	4.218	98.6

Totals and Averages

96	1.51	65.49	120	96.5	1.35	80.1	62.11	100.2
----	------	-------	-----	------	------	------	-------	-------

Project Number	451738
Client	Iron Industries
Plant	Chicago, IL
Location	Hammer Mill Shredder
Date	6/14/2018
Meter ID	M-39
Y_d	0.9987
Pitot C_p	0.84

Nozzle Diameter (in)	0.170
Filter ID	31460
Train Type	IMP
Train ID	IB-18
P_s (Inches Hg)	29.80
P_s (Inches H_2O)	1.0
Start Time	13:45
Stop Time	15:33

Place an "x" in the
appropriate Box

Circular?	x
Rectangular?	
Diameter	50
Length	
Width	

Moisture	Tare Wt (g)	Final Wt (g)	Net Wt (g)
Impinger 1	743.2	800.3	57.1
Impinger 2	738.0	749.5	11.5
Impinger 3	665.9	668.9	3.0
Impinger 4	746.9	748.7	1.8
Impinger 5	744.2	745.4	1.2
Silica Gel	964.4	976.2	11.8
Weight of Water Collected, V_{wc} (g)			74.6
Silica Gel Net Weight, V_{wsg} (g)			11.8

Analyzer	%CO ₂	%CO ₂ +%O ₂	%O ₂
Trial 1	0.40	NA	20.80
Trial 2	0.40	NA	20.80
Trial 3	0.40	NA	20.80
Average	0.40	NA	20.80

Run 5

Traverse Point	Min/Pt 6	Velocity Pressure ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume Initial (ft ³) 124.85	Stack Temp. (°F)	DGM Inlet (°F)	DGM Outlet (°F)	Square Root ΔP	Stack Gas Velocity V_s (ft/sec)	Volume Metered V_{mstd} (ft ³)	Isokinetics (%)
	Elapsed Time										
1-1	6	2.00	1.70	129.10	107	88	88	1.414	83.3	4.089	99.1
1-2	12	1.70	1.40	133.10	116	93	88	1.304	77.4	3.828	101.4
1-3	18	1.50	1.20	136.92	120	95	88	1.225	72.9	3.647	103.3
1-4	24	1.50	1.20	140.68	119	95	89	1.225	72.9	3.587	101.5
1-5	30	1.70	1.40	144.66	118	95	89	1.304	77.5	3.798	100.8
1-6	36	1.90	1.60	148.86	119	95	89	1.378	82.0	4.010	100.8
1-7	42	2.00	1.70	153.05	116	95	89	1.414	83.9	4.002	97.8
1-8	48	2.10	1.70	157.50	118	95	89	1.449	86.1	4.250	101.5
2-1	54	1.90	1.60	161.67	117	94	89	1.378	81.9	3.985	100.0
2-2	60	1.90	1.60	165.93	117	95	89	1.378	81.9	4.068	102.1
2-3	66	1.80	1.50	169.40	118	96	89	1.342	79.8	3.309	85.4
2-4	72	1.80	1.50	174.20	117	97	89	1.342	79.7	4.574	117.9
2-5	78	1.60	1.30	178.05	119	96	89	1.265	75.3	3.670	100.5
2-6	84	1.90	1.60	182.20	119	95	90	1.378	82.0	3.959	99.5
2-7	90	2.20	1.80	186.71	119	96	90	1.483	88.2	4.301	100.4
2-8	96	2.20	1.80	191.25	116	96	89	1.483	88.0	4.333	100.9

Totals and Averages

96	1.54	66.40	117	91.8	1.36	80.8	63.41	100.8
----	------	-------	-----	------	------	------	-------	-------

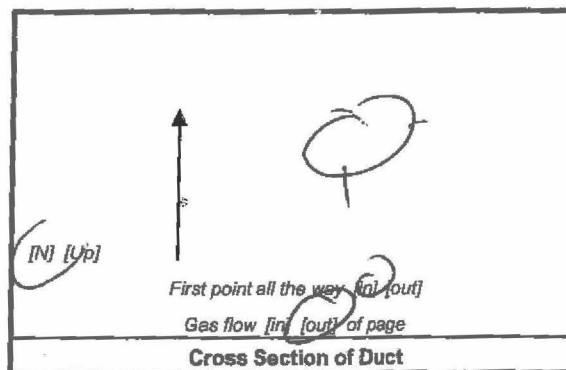
APPENDIX E FIELD DATA

MONTROSE AIR QUALITY SERVICES, LLC

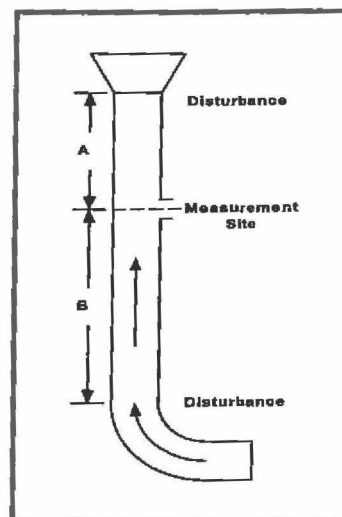
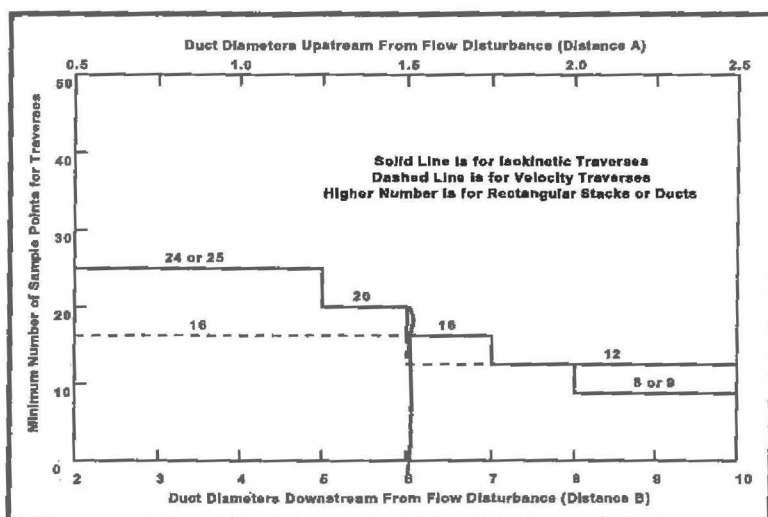
EPA Method 1

LOCATION Hammes m. Sample and Velocity Traverses Datasheet

Client	Iron Industries Inc
Project No:	451738
Plant	Chemp IC
Date	6-13-18
Technician	CS
Duct Diameter (in.)	50
Port Diameter (in.)	4.75
Port Length (in.)	14.5
Port Type	nipple
Distance A (ft)	50
Distance B (ft)	25
Distance A (Duct Diameters)	12
Distance B (Duct Diameters)	6



For rectangular ducts $ED = \frac{2LW}{(L+W)}$



Location Schematic and Notes	Traverse Point	Distance (in.)
<p>Distance B includes 17" of a 12° curve, per EPA guidance document "Guidelines for sampling in tapered stacks" anything less than 15° is considered a non disturbance.</p> <p>Indicate sample ports, height from grade, types of disturbances, access, unistrut configuration, etc.</p> <p>Distance to point must include length of port</p>	1	16.11
	2	19.74
	3	21.19
	4	30.66
	5	48.34
	6	54.81
	7	59.26
	8	62.89
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	

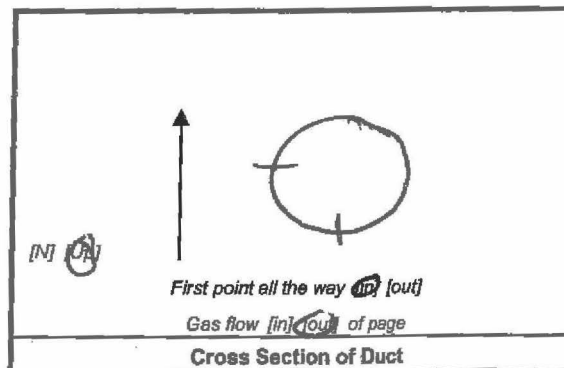
MONTROSE AIR QUALITY SERVICES, LLC

EPA Method 1

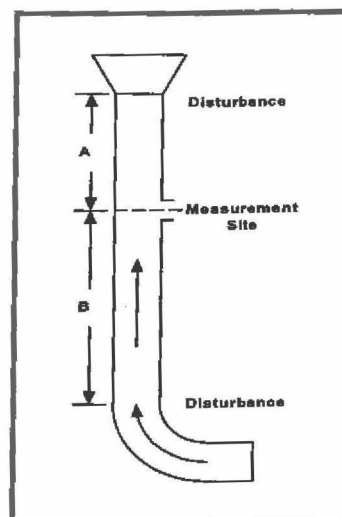
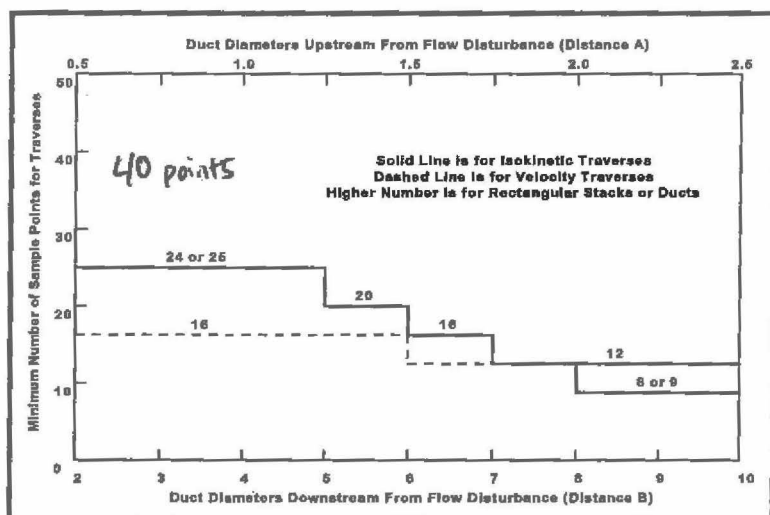
LOCATION Hammer Mill Sample and Velocity Traverses Datasheet

Shredder

Client	Iron Industries
Project No:	451738
Plant	Chicago, IL
Date	6/14/18
Technician	BH
Duct Diameter (in.)	50
Port Diameter (in.)	4
Port Length (in.)	8
Port Type	M - Nipple
Distance A (ft)	250
Distance B (ft)	25
Distance A (Duct Diameters)	12
Distance B (Duct Diameters)	6



For rectangular ducts $ED = \frac{2LW}{(L+W)}$



3D FLOW POINTS

Location Schematic and Notes		Traverse Point	Distance (in.)
<p><u>A=13.6354</u></p> <p>Dist</p> <p>Indicate sample ports, height from grade, types of disturbances, access, unistrut configuration, etc. Distance to point must include length of port</p>		1	8.63
		2	9.95
		3	11.35
		4	12.84
		5	14.46
		6	16.23
		7	18.21
		8	20.50
		9	23.32
		10	27.41
		11	38.99
		12	42.68
		13	45.50
		14	47.79
		15	49.77
		16	51.54
		17	53.16
		18	54.65
		19	56.05
		20	57.37

Cyclonic Flow Traverse Datasheet

Diagram illustrating a cross-section of a duct. An upward-pointing arrow indicates the direction of flow. The flow is labeled as "First point all the way [in] [out]" and "Gas flow [in] or [out] of page". The flow direction is also indicated by the handwritten text "[N] [Up]" with a circled arrow pointing upwards.

G|0000309

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE:

PM / Metals

RUN NO.

1

METHOD NO.

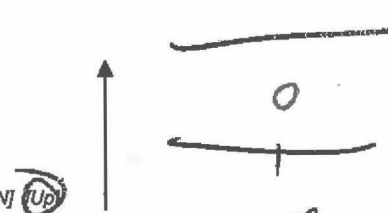
5/29

Page

of

2

Client <u>Iron Industries Inc.</u>					
Plant <u>Chicago, IL</u>					
Location <u>Hammer Mill Shredder</u>					
Date <u>6/13/18</u>		Project No. <u>451738</u>			
Meter Operator <u>zm</u>					
Probe Operator <u>CS</u>					
Meter ID	<u>M-39</u>	Yd	<u>.9987</u>	Pitot Cp	<u>.84</u>
ΔH@	<u>1.899</u>	Kf	<u>.86</u>	Leak check <input checked="" type="checkbox"/>	
Pre Leak Check	<u>0.000</u>	(cfm) [lpm] @	<u>15</u>	(inHg)	
Post Leak Check	<u>0.000</u>	(cfm) [lpm] @	<u>15</u>	(inHg)	



First point all the way (in) (out)

Gas flow (in) (out) of page

Cross Section of Duct

Barometric (in. Hg)	<u>29.85</u>	Water (ml) (g)	<u>68.5</u>
Ambient Temp. (°F)	<u>80</u>	Silica gel (g)	<u>12.8</u>
Static (in. H ₂ O) Zm	<u>-1.013</u>	Total Vlc	<u>81.3</u>
Probe ID	<u>5-6-7</u>	Liner Type	<u>G/ass</u>
Nozzle ID	<u>.170</u>	Nozzle Dia (in.)	<u>.170</u>
Filter ID	<u>31347</u>		
Train ID	<u>18-18</u>	Train Type	<u>Imp</u>
Duct Dim. (in.)	<u>50</u>	Port Lgth. (in.)	<u>8.14.5</u>
Start Time <u>11:49</u>		Stop Time <u>13:40</u>	

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial [] []	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
1-1	6	1.6	1.4	811.55	114	250	250	63	93	89	6	N/A	Initial Vol = 807.03, .36 zm
2	12	1.9	1.6	815.92	119	252	250	62	96	91	6		
3	18	1.8	1.5	820.20	119	253	257	60	101	91	6		
4	24	1.9	1.6	824.50	120	250	250	62	103	93	6		1.7 = ΔP, 1.5 ΔH
5	30	1.6	1.4	828.90	121	252	250	63	105	95	6		
6	36	2.2	1.9	832.84	120	250	250	63	107	98	6		
7	42	2.4	2.1	837.60	120	251	253	62	109	100	6		
8	48	2.0	1.7	842.10	121	253	252	62	110	102	6		
2-1	54	1.5	1.3	846.14	121	251	250	61	107	104	6		
2	60	1.6	1.4	850.25	120	252	252	60	110	104	6		
3	66	1.7	1.5	854.30	120	253	253	56	112	106	6		
4	72	1.6	1.4	858.35	121	250	250	54	115	108	6		
Total	96	21.8123	18.7	69.19	1136				1268	1181			
Average		1.619	1.6		119.9				104.8				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE:

PM / Metals

RUN NO.

1 (Cont)

METHOD NO.

5/29

Page

2

of

2

Client		Iron Industries Inc.				Barometric (in. Hg)		29.85		Water (ml) (g)		68.5					
Plant		Chicago, IL				Ambient Temp. (°F)		80		Silica gel (g)		12.8					
Location		Hammer Mill Shredder				Static (in. H ₂ O)		1.3		Total Vlc		61.3					
Date		6/3/18				Project No.		451738		Probe ID		5-6-7		Liner Type		Glass	
Meter Operator		ZM				Nozzle ID		.170		Nozzle Dia (in.)		.170		Filter ID		31347	
Probe Operator		CS		Train ID		1B-18 CB-3		Train Type		Imp		Duct Dim. (in.)		50			
Meter ID		M-39		Yd		.9987		Pitot Cp		.84		Port Lgth. (in.)		14.6			
ΔH@		1.899		Kf		.86		Leak check				* BH					
Pre Leak Check		0.000		(cfm) (lpm) @		15		(inHg)				Start Time		11:49			
Post Leak Check		0.000		(cfm) (lpm) @		15		(inHg)				Stop Time		13:40			

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (ft ³)	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
2-5	78	2.2	1.9	862.45	120	253	253	57	115	109	6	N/A	Initial Vol = 807.36
6	84	2.2	1.9	867.22	123	251	251	56	116	110	6		ΔP = 1.7, ΔH = 1.5
7	90	2.4	1.8	871.82	118	254	255	57	116	117	6		ΔP = 2.2, ΔH = 1.9
8	96	2.2	1.9	876.58	121	254	254	58	116	111	6		
				2m 122	253	252	58	116	111	6			
Total	96	21.8123	7.2	69.19	482				463	441			
Average		1.3633	1.6		419.9				109.8				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE:

PM / Metals

RUN NO.

2

METHOD NO.

5/29

Page

of

2

Client	Iron Industries Inc			<p>First point all the way in [in] [out] Gas flow [in] [out] of page</p>	Barometric (In. Hg)	29.79	Water (ml) (g)	64.2
Plant	Chicago IL				Ambient Temp. (°F)	80	Silica gel (g)	19.1
Location	Hammer Mill Shredder				Static (in. H ₂ O)	1.0	Total Vlc	83.2
Date	6/13/18	Project No.	451738		Probe ID	5-6-7	Liner Type	Glass
Meter Operator	ZM				Nozzle ID	170	Nozzle Dia (in.)	170
Probe Operator	CS				Filter ID	B1346		
Meter ID	M-39	Yd	.9987		Pitot Cp	.84	Train ID	18-16
ΔH@	1.899	Kf	.87		Leak check	<input checked="" type="checkbox"/>	Train Type	Imp
Pre Leak Check	0.000	(cfm) [lpm] @	18		(inHg)		Duct Dim. (in.)	50
Post Leak Check	0.000	(cfm) [lpm] @	15		(inHg)		Port Lgth. (in.)	14.5
Cross Section of Duct				Start Time	1515	Stop Time	1709	

Traverse Point	Min/Point	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial [I] [L]	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
	Elapsed Time												
1	6	2.9	2.58	883.75	113	250	250	62	107	106	11	N/A	ΔH = 2.6
2	12	2.7	2.3	888.90	115	253	250	54	109	104	11		DGM out = 106
3	18	2.5	2.2	893.95	116	253	250	53	111	106	11		
4	24	2.1	1.8	899.08	114	251	250	57	113	107	11		Stack temp = 117
5	30	2.4	2.1	903.60	115	251	251	59	115	108	11		Stack temp = 118
6	36	2.0	1.7	908.45	118	251	250	61	115	108	11		New K _f = .85
7	42	2.1	1.8	913.30	115	251	251	61	117	110	11		
8	48	1.9	1.6	917.70	119	250	251	62	118	111	11		Resume 16:20
2-1	54	2.7	2.3	923.25	120	250	250	60	107	109	11		vacuum = 10
2	60	2.1	1.8	928.05	119	250	250	53	108	108	11		Vacuum = 11
3	66	1.6	1.4	932.16	122	250	250	58	109	107	9		K _f = .86
4	72	2.0	1.7	936.50	118	250	250	59	110	107	9		
Total	96	23.814	23.3	95.29	1410				1339	1293			
Average		1.4657	1.85625		47.25				109.15				

Circle correct bracketed [] units

Train Type denotes Impingers, knockouts, etc.

General Testing Datasheet

TESTING TYPE:

Pm	metals
----	--------

RUN NO.

2 (cont.)

METHOD NO.

5/29

Page

2

of

2

Client	Iron Industries Inc.				Barometric (in. Hg)	29.79	Water (ml) (g)	64.2	
Plant	Chicago, IL				Ambient Temp. (°F)	80	Silica gel (g)	19.1	
Location	Hammermill Shredder				Static (in. H ₂ O)	1.0	Total Vlc	83.8	
Date	6/13/18	Project No.	45/738		Probe ID	5-6-7	Liner Type	G/45	
Meter Operator	ZM				Nozzle ID	.170	Nozzle Dia (in.)	.170	
Probe Operator	CS				Filter ID	3/348			
Meter ID	M-39	Yd	.9987	Pitot Cp	.84	Train ID	18-16	Train Type	Imp
ΔH@	1.899	Kf	.86	Leak check	<input checked="" type="checkbox"/>	Duct Dim. (in.)	50	Port Lgth. (in.)	24.0
Pre Leak Check	0.000	(cfm) (lpm) @	18	(inHg)		Start Time	1515	Stop Time	17:09
Post Leak Check	0.000	(cfm) (lpm) @	15	(inHg)					

First point all the way ☒ in ☐ out

Gas flow ☒ in ☐ out of page

Cross Section of Duct

Traverse Point	Min/Point	Velocity	Orifice	Gas Sample	Stack Temp (°F)	Probe	Filter	Impinger	DGM	DGM	Pump Vacuum (In Hg)	Auxiliary Temp (°F)	Notes
	6	Pressure	Setting	Volume		Temp (°F)	Temp (°F)	Outlet Temp (°F)	Inlet Temp (°F)	Outlet Temp (°F)			
	Elapsed Time	ΔP (In H ₂ O)	ΔH (In H ₂ O)	Initial Flow [l]									
2-5	78	1.9	4.5	940.72	117	250	250	61	109	106	9	N/A	
6	84	2.0	1.7	945.15	119	250	250	62	110	106	9		
7	90	1.9	1.6	949.45	116	250	250	63	110	106	9		
8	96	1.8	1.5	953.80	116	250	250	64	109	105	9		
Total	96	234514	6.4	75.29	466				438	423			
Average		1.4657	1.85625		117.28				109.15				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE:

PM / Metals

RUN NO.

4

METHOD NO.

5/29

Page

of

2

Client	Iron Industries Inc.			Barometric (in. Hg)	29.85	Water (ml) (g)	72.6
Plant	Chicago IL			Ambient Temp. (°F)	85	Silica gel (g)	15.1
Location	Hammer Hill Shredder			Static (in. H ₂ O)	1.0	Total Vic	87.7
Date	6/14/18	Project No.	451738	Probe ID	5-6-7	Liner Type	Class
Meter Operator	ZM			Nozzle ID	.170	Nozzle Dia (in.)	.170
Probe Operator	CS			Filter ID	31457		
Meter ID	M-39	Yd	.9987	Train ID	zm	Train Type	Imp
AH@	1.899	Kf	.83	Duct Dim. (in.)	50	Port Lgth. (in.)	14.5
Pre Leak Check	0.000	(cfm) (lpm) @	20	(inHg)			
Post Leak Check	0.000	(cfm) (lpm) @	15	(inHg)			

First point all the way [in] [out] of page

Cross Section of Duct

Start Time	1053	Stop Time	1245
------------	------	-----------	------

Traverse Point	Min/Point Elapsed Time	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (l) [l]	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
1-1	6	1.9	1.6	1062.82	111	250	250	65	89	86	7	N/A	
2	18	2.0	1.7	1066.25	119	250	250	65	95	87	9		1067.10 = vol.
3	18	1.8	1.5	1071.25	120	250	250	65	99	88	8		
4	24	1.9	1.6	1075.42	121	250	250	65	100	89	8		
5	30	1.7	1.4	1079.45	122	250	250	65	100	90	8		
6	36	1.9	1.6	1083.66	121	250	250	65	101	90	8		
7	42	1.7	1.4	1087.90	123	250	250	60	102	92	8		
8	48	2.1	1.7	1092.17	119	251	256	59	102	93	9		
2-1	54	1.4	1.2	1095.70	120	252	253	65	98	94	6		Rebore 1144 Pause port change
2	50	1.5	1.2	1099.30	121	250	250	57	100	94	6		
3	66	1.5	1.2	1103.05	123	250	250	58	102	94	6		
4	72	1.5	1.2	1106.80	122	251	250	61	103	95	6		
Total	96	21.5277	1.73	65.49	1242				1191	1092			
Average		1.3455	1.50625		120.25				96.5				

Circle correct bracketed [] units

Train Type denotes impingers, knockouts, etc.

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE:

Pm / Metals

RUN NO.

4

METHOD NO.

5/29

Page

2

of

2

Client <u>Iron Industries Inc.</u>								Barometric (in. Hg) <u>29.85</u>		Water (ml) (g) <u>72.6</u>	
Plant <u>Chicago, IL</u>								Ambient Temp. (°F) <u>85</u>		Silica gel (g) <u>15.1</u>	
Location <u>Hammer Mill Shredder</u>								Static (in. H ₂ O) <u>1.0</u>		Total Vic <u>87.7</u>	
Date <u>6/14/18</u> Project No. <u>451738</u>								Probe ID <u>5-6-7</u>		Liner Type <u>Glass</u>	
Meter Operator <u>ZM</u>								Nozzle ID <u>.170</u>		Nozzle Dia (in.) <u>.170</u>	
Probe Operator <u>CS</u>				Filter ID <u>31457</u>		Train ID <u>IB16</u> <u>60-3.2M</u> Train Type <u>Imp</u>					
Meter ID	<u>M-39</u>	Yd	<u>.9987</u>	Pitot Cp	<u>.84</u>	Duct Dlm. (in.) <u>50</u>		Port Lgth. (in.) <u>814.5</u>			
AH@	<u>1.899</u>	Kf	<u>.83</u>	Leak check	<input checked="" type="checkbox"/>	Start Time <u>1056</u>		Stop Time <u>1245</u>			
Pre Leak Check	<u>0.000</u>	(cfm) (lpm) @	<u>20</u>	(inHg)							
Post Leak Check	<u>0.008</u>	(cfm) (lpm) @	<u>15</u>	(inHg)							

Traverse Point	Min/Point Elapsed Time	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial (°F) (l)	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
				<u>1058.74</u>		<u>250</u>	<u>250</u>						
<u>2-5</u>	<u>78</u>	<u>2.0</u>	<u>1.7</u>	<u>111.11</u>	<u>123</u>	<u>250</u>	<u>250</u>	<u>63</u>	<u>104</u>	<u>96</u>	<u>10</u>	<u>N/A</u>	
<u>6</u>	<u>84</u>	<u>1.2</u>	<u>1.5</u>	<u>115.35</u>	<u>120</u>	<u>250</u>	<u>250</u>	<u>63</u>	<u>105</u>	<u>97</u>	<u>10</u>		
<u>7</u>	<u>90</u>	<u>2.2</u>	<u>1.8</u>	<u>119.75</u>	<u>120</u>	<u>251</u>	<u>251</u>	<u>65</u>	<u>105</u>	<u>97</u>	<u>10</u>		
<u>8</u>	<u>96</u>	<u>2.2</u>	<u>1.8</u>	<u>124.23</u>	<u>116.2</u>	<u>250</u>	<u>250</u>	<u>65</u>	<u>105</u>	<u>97</u>	<u>10</u>		<u>Stack @ 119</u>
Total	<u>96</u>	<u>21.52</u>	<u>6.8</u>	<u>65.49</u>	<u>482</u>				<u>419</u>	<u>387</u>			
Average		<u>1.3455</u>	<u>1.50625</u>		<u>120.25</u>				<u>96.5</u>				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

MONTROSE AIR QUALITY SERVICES, LLC

General Testing Datasheet

TESTING TYPE:

PM/Metals

RUN NO.

5

METHOD NO.

5/29

Page

1

of

2

Client	Iron Industries Inc.				Barometric (in. Hg)	29.80	Water (ml) (g)	74.6
Plant	Chicago, IL				Ambient Temp. (°F)	85	Silica gel (g)	11.8
Location	Hammer Mill Shredder				Static (in. H ₂ O)	1.0	Total Vlc	86.4
Date	6/14/18	Project No.	451738		Probe ID	5-6-7	Liner Type	6/28
Meter Operator	ZM				Nozzle ID	170	Nozzle Dia (in.)	170
Probe Operator	CS			Filter ID	31460			
Meter ID	M-39	Yd	.9987	Pitot Cp	.84			
ΔH@	1.899	Kf	.83	Leak check	✓			
Pre Leak Check	0.000	(cfm) [lpm] @	72	(inHg)				
Post Leak Check	0.000	(cfm) [lpm] @	74	(inHg)				
Cross Section of Duct					Start Time	1345	Stop Time	1533

Traverse Point	Min/Point Elapsed Time	Velocity Pressure ΔP (in H ₂ O)	Orifice Setting ΔH (in H ₂ O)	Gas Sample Volume Initial [l]	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Outlet Temp (°F)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Pump Vacuum (in Hg)	Auxiliary Temp (°F)	Notes
1-1	6	2.0	1.7	124.67	107	250	250	55	88	88	7	N/A	124.85
2	12	1.7	1.4	133.10	116	250	251	53	93	88	7		
3	18	1.5	1.2	136.92	120	250	250	52	95	88	7		
4	24	1.5	1.2	140.68	119	250	250	54	95	89	7		
5	30	1.7	1.4	144.66	118	252	252	54	95	89	7		
6	36	1.9	1.6	148.86	119	250	250	53	95	89	7		
7	42	2.0	1.7	153.05	116	250	252	53	95	89	7		
8	48	2.1	1.7	157.50	118	253	252	54	95	89	7		Resume 1445
2-1	54	1.9	1.6	161.67	117	250	250	53	94	89	8		
2	60	1.9	1.6	165.93	117	250	251	52	95	89	8		
3	66	1.8	1.5	169.40	118	251	253	52	96	89	9		169.40 ZM
4	72	1.8	1.5	174.20	117	253	255	52	97	89	9		
Total	96	21.763	18.1	174.20	1402				1133	1065			
Average		1.3602	0.5775	66.40	117.1875				91.8				

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

General Testing Datasheet

PM / Mepal

RUN NO.

5

METHOD NO.

5/29

Page	2	of	2
------	---	----	---

Client	Evan Industries Inc.			Barometric (in. Hg)	29.80	Water (ml) (g)	74.6
Plant	Chicago, IL			Ambient Temp. (°F)	85	Silica gel (g)	11.6
Location	Hammer Mill Shredder			Static (in. H ₂ O)	1.0	Total Vlc	86.4
Date	2/14/18	Project No.	451738	Probe ID	5-6-7	Liner Type	Glass
Meter Operator	ZM			Nozzle ID	170	Nozzle Dia (in.)	170
Probe Operator	CS			Filter ID	31460		
Meter ID	14-39	Yd	.9967	Pitot Cp	.81	Train ID	18-18
ΔH@	1.899	Kf	.83	Leak check	✓	Train Type	Imp
Pre Leak Check	0.000	(cfm) [lpm] @	22	(inHg)		Duct Dim. (in.)	50
Post Leak Check	0.000	(cfm) [lpm] @	14	(inHg)		Port Lgth. (in.)	14.5

First point all the way [in] [out]
Gas flow [in] [out] of page

Cross Section of Duct

Start Time	1345	Stop Time	1533
------------	------	-----------	------

Traverse Point	Min/Point	Velocity	Orifice	Gas Sample	Stack Temp (°F)	Probe	Filter	Impinger Outlet Temp (°F)	DGM	DGM	Pump Vacuum (in Hg)	Auxiliary	Notes
	6	Pressure	Setting	Volume		Temp (°F)	Temp (°F)		Inlet	Outlet		Temp (°F)	
Elapsed Time	ΔP (in H ₂ O)	ΔH (in H ₂ O)	Initial (FD) [I]										
2-5	78	1.6	1.3	178.05	119	252	250	52	96	89	10	W/A	Initial Vol. = 124.85 ΔH = 1.6
6	84	1.9	4.5	182.20	119	253	250	53	95	90	10		
7	90	2.2	1.8	186.71	119	250	251	53	96	90	10		
8	96	2.2	1.8	191.25	116	250	252	53	96	89	10		

Circle correct bracketed [] units
Train Type denotes impingers, knockouts, etc.

G10000317

MONTROSE AIR QUALITY SERVICES, LLC

Impinger Weights Datasheet

PROJECT NO. 451738

Page 1 of 2

Client	Iron Industries Inc.		
Plant	Chicago, IL		
Location	Hammer Mill Shredder		
Date	6/13/18	Unit	
Operator	Bil		

Run No.	1	Train ID	1B-18	Filter No.	31347
Method No.	5/29				
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	Empty	642.4	681.4	39.0	
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	713.4	733.9	20.5	
Impinger No. 3	10% H ₂ O ₂ 5% HNO ₃	752.7	758.0	5.3	
Impinger No. 4	Empty	605.6	607.9	2.3	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	630.7	632.1	1.4	
Impinger No. 6	10% H ₂ SO ₄ 4% KMnO ₄	737.2	737.2	0.0	
Impinger No. 7	Silica	911.1	923.9	12.8	
Additional Rinse					
			Net Weight (g)	81.3	

Run No.	2	Train ID	1B-16	Filter No.	31346
Method No.	5/29				
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	736.9	769.0	32.1	Low Moisture, decided to eliminate first "empty imp" at Bil
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	736.0	753.1	17.1	
Impinger No. 3	Empty	661.4	667.8	6.4	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	738.7	741.5	7.8	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	738.8	737.1	1.3	
Impinger No. 6	Silica	946.1	965.2	19.1	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	83.8	

Run No.	3	Train ID	1B-16	Filter No.	31345
Method No.	5/29				
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	740.4	739.0	22.6	
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	756.0	759.4	3.4	
Impinger No. 3	Empty	608.9	610.0	1.1	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	624.3	629.0	4.7	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	734.1	735.3	1.2	
Impinger No. 6	Silica	923.1	940.0	16.9	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	45.9	

MONTROSE AIR QUALITY SERVICES, LLC
Impinger Weights Datasheet

PROJECT NO. 451730

Page 2 of 2

Client	Iron Industries		
Plant	Chicago, IL		
Location	Hammer Mill Shredder		
Date	6/13/18	Unit	
Operator	BH		

Run No.	FB	Train ID	1B-1C	Filter No.	31344
Method No.	5/29				
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	743.1	743.2	.10	
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	738.0	737.8	-.20	
Impinger No. 3	Empty	665.6	665.6	0.0	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	738.4	738.1	-.30	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	738.6	737.8	-.80	
Impinger No. 6	Silica	964.2	964.2	0.0	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	- .20	

Run No.	4	Train ID	1B-1C	Filter No.	31457
Method No.	5/29				
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	743.1	741.5	53.7	687.8 mH
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	738.0	777.6	12.4	765.2
Impinger No. 3	Empty	609.1	611.4	2.3	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	622.8	624.3	1.5	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	737.8	735.5	2.7	
Impinger No. 6	Silica	848.0	863.1	15.1	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	87.7	

Run No.	5	Train ID	1B-1B	Filter No.	31460
Method No.	5/29				
	Contents	Tare with Contents (g)	Final (g)	Total (g)	Notes
Impinger No. 1	10% H ₂ O ₂ 5% HNO ₃	743.2	800.3	57.1	
Impinger No. 2	10% H ₂ O ₂ 5% HNO ₃	738.0	549.5	11.5	
Impinger No. 3	Empty	665.9	668.9	3.0	
Impinger No. 4	10% H ₂ SO ₄ 4% KMnO ₄	746.9	748.7	1.8	
Impinger No. 5	10% H ₂ SO ₄ 4% KMnO ₄	744.2	745.4	1.2	
Impinger No. 6	Silica	964.4	976.2	11.8	
Impinger No. 7					
Additional Rinse					
			Net Weight (g)	96.4	

MONTROSE AIR QUALITY SERVICES, LLC

EPAMethod 3B

Orsat Analyzer Datasheet

Page 1 of 1

Client	Iron Industries	Project No.	451738
Plant	Chicago IL	Pre Leak Check	
Location	Hammer Mill	Post Leak Check	

Shredder

$$\% \text{ Difference} = \frac{\text{ABS}[\text{Orsat Avg. Cal Gas}]}{\text{Cal Gas}} \times 100$$

Cal Gas	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1	4.82	NA	20.85	BH/ML	6/13/18	9:40
	2	9.86		9.96	%O ₂ Difference	%CO ₂ Difference	
	3	0.00		0.00			
	Average						

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
1	1	.40	NA	20.8	BH	6/13/18	13:50
	2						
	3						
	Average	.46		20.8			

2	1	.30	NA	20.9	BH	6/13/18	17:20
	2						
	3						
	Average	.30		20.9			

3	1				BH	6/13/18	
	2						
	3						
	Average						

RUN VOIDED, Failed Leak Check

Cal Gas	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1	10.1		20.95	MH	6/14/18	13:00
	2	4.9		9.96	%O ₂ Difference	%CO ₂ Difference	
	3	0.00		0.00			
	Average						

Run No.	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
4	1	.39		20.75	BH	6/14/18	14:15
	2						
	3						
	Average	0.39		20.79			

5	1	.40		20.80	BH	6/14/18	15:40
	2						
	3						
	Average	.40		20.80			

	1						
	2						
	3						
	Average						

Cal Gas	Trial No.	%CO ₂	%CO ₂ +%O ₂	%O ₂	Analyst	Date	Time
	1						
	2				%O ₂ Difference	%CO ₂ Difference	
	3						
	Average						

20.95 - O₂ / 4.885 - CO₂ : XLO251718
 9.971 - O₂ / 9.854 - CO₂ : CC167397

Cylinder Numbers

Cylinder Number	
Concentration (%)	%O ₂ %CO ₂

Notes:

Run an ambient air check to verify Oxsorb.

Measurements must be made to the nearest 0.2%.

Three different trials should be performed for each sample.

The differences between the trials must not be greater than 0.2% overall.

Expected F_o Ranges

Wood Bark	1.000-1.120	Residual Oil	1.210-1.370
Anthracite/Lignite	1.015-1.130	Distillate Oil	1.260-1.413
Municipal Waste	1.043-1.177	Nat. Gas	1.600-1.836
Bituminous	1.083-1.230		

APPENDIX F LABORATORY DATA

Montrose Air Quality Services, LLC

1371 Brummel Avenue
Elk Grove, IL 60007

Project Number: 451738

Particulate Matter, Antimony, Arsenic, Barium,
Beryllium, Cadmium, Chromium, Cobalt, Copper,
Lead, Manganese, Nickel, Phosphorus, Selenium,
Silver, Thallium, Zinc & Mercury

EPA Methods 5 & 29 Analyses

Analytical Report
31368



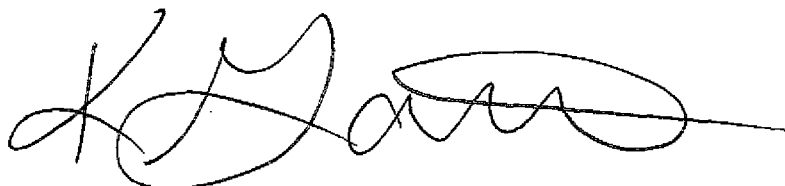
Element One, Inc.

6319-D Carolina Beach Rd., Wilmington, NC 28412

910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 31368
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

A handwritten signature in black ink, appearing to read 'Katie Gattis', with a long horizontal flourish extending to the right.

Katie Gattis, B.S. Chemist
June 21, 2018

Report Reviewed and Finalized By:

A handwritten signature in black ink, appearing to read 'Ken Smith', with a long horizontal flourish extending to the right.

Ken Smith, Laboratory Director
June 21, 2018

SUMMARY OF RESULTS

Summary of Analysis

Hammermill Shredder - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H ₂ O ₂ /HNO ₃ µg	Empty Impinger µg	KMnO ₄ µg	HCl µg
M29/5-R1	#1	250	< 0.1	< 0.5	< 0.2	232	17.5
	#2		< 0.1	< 0.5	< 0.2	233	17.5
M29/5-R2	#1	100	< 0.1	< 0.3	< 0.2	80.3	19.8
	#2		< 0.1	< 0.3	< 0.2	80.2	19.6
M29/5-R4	#1	309	< 0.1	< 0.3	< 0.2	205	101
	#2		< 0.1	< 0.3	< 0.2	211	101
M29/5-R5	#1	19.8	< 0.1	< 0.4	< 0.2	9.65	10.2
	#2		< 0.1	< 0.4	< 0.2	9.66	10.2
Field Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
Reagent Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Hammermill Shredder - Summary of Method 5 Particulate Analysis

Fraction	M29/5-R1 e31368-1 Catch, mg	M29/5-R2 e31368-2 Catch, mg	M29/5-R4 e31368-3 Catch, mg	M29/5-R5 e31368-4 Catch, mg
Filter	5.2	8.7	8.0	6.7
Rinse	9.2	10.0	11.4	8.8
Total PM	14.4	18.7	19.4	15.5

	Field Blank e31368-5 Catch, mg	Reagent Blank e31368-6 Catch, mg
Fraction		
Filter	1.3	---
Rinse	1.8	2.4
Total PM	3.1	2.4

elementOne

31368 MAQS M5 29 Report Packet

Page 4 of 64

GI0000325

Summary of Analysis

Front Half - Hammermill Shredder- Summary of Method 29 Metals Analysis

Element	M29/5-R1 e31368-1 FH Total µg	M29/5-R2 e31368-2 FH Total µg	M29/5-R2 e31368-2 FH dup Total µg	M29/5-R4 e31368-3 FH Total µg	M29/5-R5 e31368-4 FH Total µg
Antimony	0.472	0.621	0.624	0.388	0.326
Arsenic	0.157	0.194	0.208	< 0.1	< 0.1
Barium	3.95	4.04	3.88	2.80	2.73
Beryllium	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Cadmium	3.31	1.97	1.79	1.74	1.49
Chromium	2.01	2.16	2.11	1.76	1.58
Cobalt	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Copper	1.63	1.82	1.76	1.55	1.35
Lead	7.70	10.8	10.6	8.68	5.67
Manganese	4.04	4.64	4.40	3.97	4.02
Nickel	2.54	2.68	2.59	0.974	0.864
Phosphorus	5.96	8.88	8.83	5.22	4.46
Selenium	0.943	1.70	1.77	< 0.1	0.186
Silver	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	612	630	628	524	455

Back Half - Hammermill Shredder- Summary of Method 29 Metals Analysis

Element	M29/5-R1 e31368-1 BH Total µg	M29/5-R2 e31368-2 BH Total µg	M29/5-R2 e31368-2 BH dup Total µg	M29/5-R4 e31368-3 BH Total µg	M29/5-R5 e31368-4 BH Total µg
Antimony	< 0.1	0.123	0.130	0.265	< 0.1
Arsenic	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Barium	0.774	5.49	5.26	1.14	0.741
Beryllium	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Cadmium	< 0.1	< 0.1	< 0.1	0.159	< 0.1
Chromium	0.460	1.022	0.972	0.664	0.404
Cobalt	< 0.1	0.177	0.169	< 0.1	< 0.1
Copper	1.07	4.44	4.23	1.55	7.87
Lead	1.33	4.01	3.94	0.884	0.471
Manganese	3.31	5.05	4.95	5.57	2.22
Nickel	0.452	2.44	2.38	1.41	0.805
Phosphorus	27.3	30.1	29.6	21.6	20.2
Selenium	0.336	0.593	0.545	< 0.1	0.101
Silver	< 0.1	< 0.1	< 0.1	2.726	< 0.1
Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	30.9	52.5	52.7	25.1	21.0

Summary of Analysis

Blanks - Summary of Method 29 Metals Analysis

Element	Field Blank	Reagent Blank	Field Blank	Reagent Blank
	Front Half	Front Half	Back Half	Back Half
	e31368-5 FH Total µg	e31368-6 FH Total µg	e31368-5 BH Total µg	e31368-6 BH Total µg
Antimony	< 0.1	< 0.1	< 0.1	0.135
Arsenic	< 0.1	< 0.1	< 0.1	< 0.1
Barium	3.14	3.09	0.567	< 0.1
Beryllium	< 0.025	< 0.025	< 0.025	< 0.025
Cadmium	< 0.1	< 0.1	< 0.1	< 0.1
Chromium	1.21	1.21	0.318	0.371
Cobalt	< 0.1	< 0.1	< 0.1	< 0.1
Copper	0.375	0.220	0.539	0.394
Lead	0.346	0.216	0.348	< 0.1
Manganese	0.714	0.671	5.31	0.354
Nickel	2.00	2.14	0.324	0.257
Phosphorus	< 2	< 2	16.2	19.8
Selenium	1.11	< 0.1	< 0.1	< 0.1
Silver	< 0.1	< 0.1	< 0.1	< 0.1
Thallium	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	6.02	2.70	7.57	3.38

SUMMARY OF AUDITS



A Waters Company

Stationary Source Audit Testing Data Reporting Form

Project #: 061318S

31368

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Metals on Filter Paper (cat# 1425)

Method Description EPA 29 Rev/Ed 1

Analysis Date (mm-dd) 06-19 Analyst DMR Workgroup OPTIONAL

TNI Code	Analyte	Units	PTL	Concentration Range	Reported Value
1005	Antimony	µg/Filter	19.0	25.0 to 250	40.7
1010	Arsenic	µg/Filter	15.0	20.0 to 250	38.7
1015	Barium	µg/Filter	15.0	20.0 to 250	39.7
1020	Beryllium	µg/Filter	7.50	10.0 to 250	21.7
1030	Cadmium	µg/Filter	8.00	10.0 to 250	16.0
1040	Chromium	µg/Filter	12.0	15.0 to 250	26.7
1050	Cobalt	µg/Filter	7.50	10.0 to 250	23.1
1055	Copper	µg/Filter	7.50	10.0 to 250	30.2
1075	Lead	µg/Filter	16.0	20.0 to 350	35.9
1090	Manganese	µg/Filter	7.00	10.0 to 250	41.6
1105	Nickel	µg/Filter	14.0	20.0 to 250	38.6
1140	Selenium	µg/Filter	14.0	20.0 to 250	38.7
1150	Silver	µg/Filter	21.0	30.0 to 250	59.5
1165	Thallium	µg/Filter	22.0	30.0 to 250	53.8
1190	Zinc	µg/Filter	14.0	20.0 to 250	45.9

4 of 6

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com



elementOne

31368 MAQS M5 29 Report Packet
Page 8 of 64

GI0000329



A Waters Company

Stationary Source Audit Testing Data Reporting Form Project #: 061318S

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Metals in Impinger Solution (cat# 1426)

Method Description	EPA 29			Rev/Ed	
Analysis Date (mm-dd)	06-19	Analyst	DMP	Workgroup	COMPTON

TNI Code	Analyte	Units	PTL	Concentration Range	Reported Value
1005	Antimony	µg/mL	0.190	0.250 to 20.0	0.896
1010	Arsenic	µg/mL	0.150	0.200 to 20.0	1.13
1015	Barium	µg/mL	0.110	0.150 to 25.0	3.28
1020	Beryllium	µg/mL	0.0350	0.0500 to 20.0	1.41
1030	Cadmium	µg/mL	0.0800	0.100 to 20.0	1.07
1040	Chromium	µg/mL	0.160	0.200 to 20.0	4.05
1050	Cobalt	µg/mL	0.0750	0.100 to 25.0	2.02
1055	Copper	µg/mL	0.150	0.200 to 20.0	3.74
1075	Lead	µg/mL	0.150	0.200 to 20.0	2.96
1090	Manganese	µg/mL	0.0750	0.100 to 20.0	1.86
1105	Nickel	µg/mL	0.120	0.150 to 30.0	2.65
1140	Selenium	µg/mL	0.110	0.150 to 25.0	1.90
1150	Silver	µg/mL	0.380	0.500 to 20.0	4.71
1165	Thallium	µg/mL	0.110	0.150 to 25.0	3.02
1190	Zinc	µg/mL	0.110	0.150 to 25.0	2.86

3 of 6

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com



elementOne

31368 MAQS M5 29 Report Packet
Page 9 of 64

GI0000330



A Waters Company

Stationary Source Audit Testing Data Reporting Form
Project #: 061318S

31368

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Mercury on Filter Paper (cat# 1427)

Method Description	EP A 29	Rev/Ed			
Analysis Date (mm-dd)	06 - 20	Analyst	MMP		
		Workgroup	COMPTON		
TNI Code	Analyte	Units	PTRL	Concentration Range	Reported Value
1095	Mercury	µg/Filter	0.750	1.00 to 75.0	16.2

5 of 6

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com



elementOne

31368 MAQS M5 29 Report Packet

Page 10 of 64

GI0000331



A Waters Company

Stationary Source Audit Testing Data Reporting Form
Project #: 061318S

31368

Lab Name: Element One Inc

ERA Customer Number: E533235

INSTRUCTIONS:

Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #061318S. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Testing Mercury in Impinger Solution (cat# 1428)

Method Description	EPA 29	Rev/Ed	
Analysis Date (mm-dd)	06-19	Analyst	mmp
		OPTIONAL	
		Workgroup	OPTION

TNI Code	Analyte	Units	PTRL	Concentration Range	Reported Value
1095	Mercury	ng/mL	0.680	0.900 to 200	13.3

6 of 6

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com



elementOne

31368 MAQS M5 29 Report Packet
Page 11 of 64

GI0000332

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	Montrose Air Quality Services, LLC	Element One #:	31368
Client ID:	451738 General Iron	Analyst:	JGP, MMP, DMR
Method:	Methods 5 & 29	Dates Received:	06/15/18
Analytes:	PM, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Ni, P, Se, Ag, Tl, Zn & Hg	Dates Analyzed:	06/18-21/18

Summary of Analysis

The Method 5 particulate samples were analyzed in accordance with EPA Method 5 guidelines. Particulate samples were weighed to a constant weight of $\pm 0.5\text{mg}$ and reported to the nearest 0.1mg . The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer. The samples were analyzed for metals on a PerkinElmer Nexlon 350X ICP-MS.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was $0.004\text{ }\mu\text{g}$ per aliquot analyzed. The ICP-MS instrument reporting limits were $0.25\text{ }\mu\text{g/L}$ for beryllium, $20.0\text{ }\mu\text{g/L}$ for phosphorus and $1.0\text{ }\mu\text{g/L}$ for the other metals.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD), spike sample recovery, and second source calibration verification data are summarized in the Quality Control Section.

*Ref. page 17; Hammermill Shredder-R4 spike recoveries for arsenic and selenium were outside of laboratory guidelines of 75-125% with 63% and 59%, respectively. Sample was reanalyzed at a five-fold dilution resulting in recoveries of 85% for arsenic and 83% for selenium.

All other QA/QC data was within the criteria of the method.

The audit results for the Stationary Source Audit Program have been reported to ERA for Project #061318S. Copies of the audit reporting forms are included in the Summary of Audits section of this report.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values. The Method 5 blank correction factor has not been implemented. The reported results relate only to the items tested or calibrated.

The ICP analysis of the blank samples revealed detectable traces of metals. The unprepared back half, c9 fraction was analyzed with similar results to the prepared fraction. The unprepared 0.1N HNO_3 , c8a fraction was analyzed with detectable traces of selenium and zinc, suggesting the other metals were in the filter portion of the prepared front half sample.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Hammermill Shredder - Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

Run Number	Front Half	H ₂ O ₂ /HNO ₃	Empty Imp	KMnO ₄	HCl
M29/5-R1	NA	NA	NA	0.5%	0.3%
M29/5-R2	NA	NA	NA	0.2%	0.9%
M29/5-R4	NA	NA	NA	3.1%	0.0%
M29/5-R5	NA	NA	NA	0.1%	0.2%
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Hammermill Shredder - Mercury Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

Run Number		Front Half	H ₂ O ₂ /HNO ₃	Empty Imp	KMnO ₄	HCl
M29/5-R4	#1	119%	99%	98%	90%	103%
	#2	118%	98%	97%	92%	101%

Summary of Quality Control Data

Hammermill Shredder - Metals Duplicate Analysis RPD

(Method 29 QC limits: < 20% for RPD)

Element	M29/5-R2 Front Half	M29/5-R2 Back Half
	RPD	RPD
Antimony	0.5%	6.0%
Arsenic	7.0%	NA
Barium	4.2%	4.3%
Beryllium	NA	NA
Cadmium	9.7%	NA
Chromium	2.4%	5.0%
Cobalt	NA	4.5%
Copper	3.2%	4.8%
Lead	1.8%	1.6%
Manganese	5.4%	2.1%
Nickel	3.2%	2.1%
Phosphorus	0.6%	1.7%
Selenium	3.9%	8.4%
Silver	NA	NA
Thallium	NA	NA
Zinc	0.3%	0.4%

Summary of Quality Control Data

Hammermill Shredder - Metals Analysis Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

Element	M29/5-R4 Front Half Recovery	M29/5-R4 Back Half Recovery
Antimony	106%	111%
Arsenic	79%	63%*
Barium	102%	104%
Beryllium	94%	84%
Cadmium	100%	99%
Chromium	100%	96%
Cobalt	101%	100%
Copper	101%	101%
Lead	100%	103%
Manganese	100%	92%
Nickel	99%	99%
Phosphorus	94%	83%
Selenium	76%	59%*
Silver	108%	107%
Thallium	98%	100%
Zinc	99%	97%

*See Analytical Narrative, page 13.

Summary of Quality Control Data

Second Source Calibration Check Recoveries

(Method 29 QC limits: $\pm 10\%$ for Second Source Continuing Check Standard*)

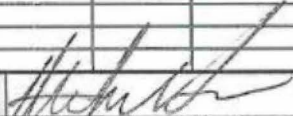
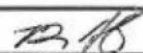
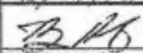
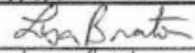
Element	0.25 ppb	1 ppb	50 ppb	100 ppb*	250 ppb
Antimony		102%	107%	101%	101%
Arsenic		118%	98%	100%	99%
Barium		92%	98%	100%	100%
Beryllium	101%	105%	102%	101%	101%
Cadmium		81%	98%	98%	98%
Chromium		101%	98%	101%	101%
Cobalt		97%	98%	100%	100%
Copper		102%	98%	101%	101%
Lead		97%	100%	98%	98%
Manganese		95%	100%	100%	100%
Nickel		110%	96%	99%	99%
Selenium		85%	103%	101%	99%
Silver		103%	100%	102%	102%
Thallium		100%	98%	100%	100%
Zinc		119%	104%	102%	101%

Element	21 ppb	250 ppb	1100 ppb*	2500 ppb
Phosphorus	113%	98%	103%	99%

SAMPLE CUSTODY

31368

CHAIN OF CUSTODY

Project Number	451738	Location	Hammermill Shredder	Analysis Requested						Page	2	of	4	
Client	General Iron	Date	6/14/2018											
Plant	Chicago, IL	Completed By	Michael Hess											
FH/BH Separate. Don't combine FH and BH Samples Please. 3BD TAT!!! TSM-Sb, As, Ba, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Ti, Ag, Zn, Be Zn 6/15/19				Method 29										
ID No.	Run No.	Date	Sample Description		Notes									
R1-FHR-29	1	6/13/2018	Method 29 Front Half 0.1 N HNO ₃ Rinse		X									
R2-FHR-29	2	6/13/2018	Method 29 Front Half 0.1 N HNO ₃ Rinse		X									
R4-FHR-29	4	6/14/2018	Method 29 Front Half 0.1 N HNO ₃ Rinse		X									
R5-FHR-29	5	6/14/2018	Method 29 Front Half 0.1 N HNO ₃ Rinse		X									
RB	RB	6/14/2018	Method 29 Front Half 0.1 N HNO ₃ Rinse		X									
FB-FHR-29	FB	6/14/2018	Method 29 Front Half 0.1 N HNO ₃ Rinse		X									
Relinquished By (signature)  (printed) Michael Hess				Relinquished By (signature)  (printed) Ben Higendorf				Carrier Laboratory						
Date/Time 6/14/18				Date/Time 6/14/18 1950				Address						
Accepted By (signature)  (printed) Ben Higendorf				Accepted By (signature)  (printed) Lisa Brater				Phone						
Date/Time 6/14/18 1950				Date/Time 6/15/18 0955				Fax						
								Date/Time						

MONTROSE AIR QUALITY SERVICES, LLC

CHAIN OF CUSTODY

31368

Project Number	451738	Location	Hammermill Shredder	Analysis Requested	Page	3	of	4
Client	General Iron	Date	6/14/2018					
Plant	Chicago, IL	Completed By	Michael Hess					
FH/BH Separate. Don't combine FH and BH Samples Please. 3BD TAT!!! TSM-Sb, As, Ba, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, P, Se, Tl, Ag, Zn, Be. <i>25 6.15.18</i>								
				Method 29				
ID No.	Run No.	Date	Sample Description					Notes
R1-IMP-5-6	1	6/13/2018	Method 29 Back Half H2SO4/KMnO4 Impinger Contents	X				
R2-IMP-5-6	2	6/13/2018	Method 29 Back Half H2SO4/KMnO4 Impinger Contents	X				
R4-IMP-5-6	4	6/14/2018	Method 29 Back Half H2SO4/KMnO4 Impinger Contents	X				
R5-IMP-5-6	5	6/14/2018	Method 29 Back Half H2SO4/KMnO4 Impinger Contents	X				
RB	RB	6/14/2018	Method 29 Back Half H2SO4/KMnO4 Impinger Contents	X				
FB-IMP-5-6	FB	6/14/2018	Method 29 Back Half H2SO4/KMnO4 Impinger Contents	X				
R1-8N-Rinse	1	6/13/2018	Method 29 Back Half HCl Rinse	X				
R2-8N-Rinse	2	6/13/2018	Method 29 Back Half HCl Rinse	X				
R4-8N-Rinse	4	6/14/2018	Method 29 Back Half HCl Rinse	X				
R5-8N-Rinse	5	6/14/2018	Method 29 Back Half HCl Rinse	X				
FB-HCl-29	FB	6/14/2018	Method 29 Back Half HCl Rinse	X				
RB	RB	6/14/2018	Method 29 Back Half HCl Rinse					
Relinquished By (signature)	<i>Michael Hess</i>	Relinquished By (signature)	<i>B. H.</i>	Carrier				
(printed)	Michael Hess	(printed)	Ben Hilgendorf	Laboratory				
Date/Time	6/14/18	Date/Time	6/14/18 1930	Contact				
Accepted By (signature)	<i>B. H.</i>	Accepted By (signature)	<i>Lisa Burton</i>	Address				
(printed)	Ben Hilgendorf	(printed)	Lisa Burton	Phone				
Date/Time	6/14/18 1:30	Date/Time	6.15.18 0955	Fax				
				Date/Time				

elementOne

31368 MAQS M5 29 Report Packet

Page 22 of 64

GI0000343

ANALYTICAL DATA

Analytical Calculations

Metals-

$$\text{Element Results } (\mu\text{g}) = \text{ICP Results } (\mu\text{g/L}) * \text{Dilution} * \text{Final Volume (L)}$$

Where-

ICP Results= Raw sample concentration (ppb)--*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$ --*ICP-MS Run Sheet*

Final Volume= FH= Final Volume (FV)--*Sample Submission*
BH= $\frac{\text{Received Volume (BV)} * \text{Final Volume (FV)}}{\text{Aliquot (Used)}}$ --*Sample Submission*

Mercury-

$$\text{Mercury Results } (\mu\text{g}) = \frac{\text{CVAA Results } (\mu\text{g}) * \text{Final Volume (ml)}}{\text{Aliquot (ml)}}$$

Where-

CVAA Results= Raw sample reading (μg)--*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)--*Hg-Data Sheet*

Final Volume= Final Volume (FV)*--*Sample Submission*
* With the exception of the BH fraction where-
= Received Volume (BV)--*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\text{Spike (\%)} = \frac{(\text{Spiked Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Spike Amount } (\mu\text{g/L})} \times 100$$

Where-

Spike Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Sample Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Spike Amount--*ICP-MS Spike Table*

Duplicate Analysis RPD-

$$\text{RPD (\%)} = \frac{(\text{Duplicate Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Average } (\mu\text{g/L})} \times 100$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (ppb)--*ICP-Data Sheet*

$$\text{Average} = \frac{(\text{Duplicate} + \text{Sample Results})}{2}$$

FH/BH Separate
RUSH---3 DAY TATAnalysis Due Date 06.18.18
QA/QC Report Due Date 06.19.18

Client	Montrose Air Quality Services, LLC (Airtch)	Date Rec	06.15.18
Project No	451738	Time Rec	0955
HNO ₃ Lot: 1117100	HF Lot: 5114072	HCl Lot: 4117040	Ref. Method: 29 / 5
Volume Marked Y / N	Volume Loss Y / N / ?	Acetone: 56315	

Sample Identification

1	Hammermill Shredder-M29/5-R1	5	Field Blank	7	061318S-Cat 1425 Fil
2	Hammermill Shredder-M29/5-R2	6	Reagent Blank	8	061318S-Cat 1426 Imp
	Hammermill Shredder-M29/5-R2 Duplicate			9	061318S-Cat 1427 Fil& Imp
3	Hammermill Shredder-M29/5-R4			10	061318S-Cat 1428 Imp
	Hammermill Shredder-M29/5-R4 Spike				
4	Hammermill Shredder-M29/5-R5				
Analyses Requested		Samples 1-8 Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn Ni; P, Se, Ti, Ag, Zn			
		Samples 1-6, 9-10 Hg			
		Samples 1-6 PM			

Runs / FB	Fil / Ace (FH)		HNO ₃ (FH)		5% HNO ₃ /10% H ₂ O ₂ (BH)			HNO ₃ (A)		KMnO ₄ (B)		HCl (C)	
			pH <2.0 \odot Y N		pH <2.0 \odot Y N			pH <2.0 \odot Y N		pH <2.0 \odot N		pH <2.0 \odot Y N	
Lab ID	Fil ID	BV ml	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1	31347	134	80	100	505	253	50	98	200	405	500	210	400
2.D	31346	88	118	↓	40	155	↓	100	↓	400	↓	240	↓
3.S	31457	108	56	↓	325	103	↓	116	↓	375	↓	220	↓
4	31480	84	62	↓	360	175	↓	104	↓	390	↓	225	↓
5	31344	102	50	↓	330	115	↓	110	↓	380	↓	225	↓

M-29 Reagent Blank

Lab ID	Fraction	BV, ml	FV, ml	Comments
6	C 7 FH	222	100	
	C 8A FH	325	100	used 100 mlis 88A
	C 8A A	336	—	Combined 100ml C8A + 200ml 506A 30A
	C 8B B	—	—	
	C 9 BH	305	50	
	C 10 B	200	—	used 100ml C10 & 33 ml DI TA
	C 11 C	225	400	
	C 12 FH	Filter		

Audits

See Attached Audit Instructions

Sample ID	Analyses Requested	Prep By / Date
7	061318S-Cat 1425 Fil	Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn Ni, P, Se, Ti, Ag, Zn, Hg
8	061318S-Cat 1426 Imp	Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn Ni, P, Se, Ti, Ag, Zn, Hg
9	061318S-Cat 1427 Fil& Imp	Hg
10	061318S-Cat 1428 Imp	Hg

Lab Communications

UCB+spiked w/ 0.1mls 25ppm Hg standards A, B, C, F (02/14/18-B, BCF)
 Fractions Received: Runs: C1, C2, C3, C4, C5A, C5B, C5C; RB: C12, C7, C8A, C9, C10, C11; 4 Audits—06.15.18 LLB Hg+spiked w/ 0.2mls 25ppm

SS Page 1 of 1

6/15/2018 11:04:42 AM

SS Form By

Labeled By/Date

FH Prep By/Date MNP 6/19/18 A Prep By/Date DCH 6/15/18

BH Prep By/Date MNP 6/19/18 B Prep By/Date TAD 6/18/18

BH/FH Prep By/Date MNP 6/19/18 C Prep By/Date TAD 6/19/18

PM Prep By/Date SGP 6.15.18 ID Verification By / Date JGO 6.15.18

HGP prep DCH 6/15/18



**Instructions for Catalog # 1425
Stationary Source Audit Program
Air and Emissions Metals on Filter Paper**
Revision 051517

Description:

- This standard is packaged in a 50mm polystyrene petri dish containing a single 47mm glass fiber filter.
- This standard is designed for use with EPA Method 29.
- This standard is not preserved.
- This standard can be stored at room temperature.
- This standard will contain the following analytes in the concentration ranges shown;

Antimony.....	25 – 250 µg/filter	Lead.....	20 – 350 µg/filter
Arsenic.....	20 – 250 µg/filter	Manganese	10 – 250 µg/filter
Barium.....	20 – 250 µg/filter	Nickel.....	20 – 250 µg/filter
Beryllium.....	10 – 250 µg/filter	Selenium.....	20 – 250 µg/filter
Cadmium.....	10 – 250 µg/filter	Silver	30 – 250 µg/filter
Chromium.....	15 – 250 µg/filter	Thallium.....	30 – 250 µg/filter
Cobalt	10 – 250 µg/filter	Zinc	20 – 250 µg/filter
Copper	10 – 250 µg/filter		

- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Before you begin:

- This standard must be prepared and analyzed following the procedure specified in EPA Method 29.
- This standard should be analyzed as soon as possible after it is prepared.

Instructions:

1. Carefully open the Metals on Filter Paper standard and using tweezers or a gloved hand place the filter into your digestion vessel.
2. Digest & analyze the standard following the procedure specified in EPA Method 29.
3. Report your results as µg/filter for each of the metals.
4. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Material Safety Data Sheets (MSDS) for all ERA products are available by calling 1-800-372-0122.



A Waters Company

31368



Instructions for Catalog # 1426
Stationary Source Audit Program
Air and Emissions Metals in Impinger Solution
Revision 051517

Description:

- This standard is packaged in a 15 mL screw top vial containing approximately 14 mL of standard concentrate.
- This standard is designed for use with EPA Method 29.
- This standard is preserved with approximately 2% (v/v) nitric acid and 1% (w/v) tartaric acid.
- This standard can be stored at room temperature.
- This standard will contain the following analytes in the concentration ranges shown:

Antimony.....	0.25 – 20 µg/mL	Lead.....	0.2 – 20 µg/mL
Arsenic.....	0.2 – 20 µg/mL	Manganese	0.1 – 20 µg/mL
Barium.....	0.15 – 25 µg/mL	Nickel.....	0.15 – 30 µg/mL
Beryllium.....	0.05 – 20 µg/mL	Selenium.....	0.15 – 25 µg/mL
Cadmium.....	0.1 – 20 µg/mL	Silver.....	0.5 – 20 µg/mL
Chromium.....	0.2 – 20 µg/mL	Thallium.....	0.15 – 25 µg/mL
Cobalt.....	0.1 – 25 µg/mL	Zinc.....	0.15 – 25 µg/mL
Copper.....	0.2 – 20 µg/mL		

- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Before you begin:

- The sample resulting from the dilution described below will have a nitric acid concentration of approximately 0.02% before any acid is added. You may add a volume of acid different from the 4 to 10 mL of HNO₃ suggested in order to matrix match your calibration standards or meet any other method criteria.
- This standard must be prepared and analyzed following the procedure specified in EPA Method 29.
- This standard should be analyzed as soon as possible after the concentrate is diluted.

Instructions:

1. Add 100-200 mL of deionized water and approximately 4 to 10 mL of nitric acid to a clean 1000 mL class A volumetric flask.
2. Shake the Metals in Impinger Solution vial prior to opening.
3. Using a clean, dry, class A pipet, volumetrically pipet 5.0 mL of the concentrate into the 1000 mL volumetric flask.
4. Dilute the flask to final volume with deionized water.
5. Cap the flask and mix well.
6. Immediately analyze the diluted sample by the procedures specified in EPA Method 29.
7. Report your results as µg/mL for the diluted sample.
8. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the



A Waters Company

31368



Instructions for Catalog # 1427
Stationary Source Audit Program
Mercury on Filter Paper
Revision 051517

Description:

- This standard is packaged in a 2 mL flame-sealed ampule containing approximately 2 mL of standard concentrate and a 50 mm polystyrene petri dish containing a single 47 mm glass fiber filter.
- This standard is designed for use with EPA Method 29.
- The standard concentrate is preserved with 2% (v/v) HNO_3 .
- This standard can be stored at room temperature.
- This standard will contain Mercury in the range of 1-75 $\mu\text{g}/\text{filter}$.
- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Helpful Hints:

- This standard has been prepared as a concentrate intended for spiking onto the supplied glass fiber filter and must be prepared prior to use.
- This standard must be prepared and analyzed following the procedure specified in EPA Method 29.
- This standard should be digested and analyzed as soon as possible after it is prepared using these instructions.

Instructions:

1. Open the container and using tweezers or a gloved hand, place the glass fiber filter onto a clean surface for spiking.
2. Carefully snap the top off the Mercury on Filter ampule.
3. Using a clean, dry, class A pipet or syringe, transfer 100 μL of concentrate onto the glass fiber filter.
4. Place the spiked filter into your digestion vessel.
5. Digest & analyze the standard following the procedure specified in EPA Method 29.
6. Report your results as $\mu\text{g}/\text{filter}$.
7. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Material Safety Data Sheets (MSDS) for all ERA products are available by calling 1-800-372-0122.



A Waters Company

31368



**Instructions for Catalog # 1428
Stationary Source Audit Program
Mercury in Impinger Solution**

Revision 051517

Description:

- This standard is packaged in a 15 mL screw-top vial containing approximately 14 mL of standard concentrate.
- This standard is designed for use with EPA Method 29 and EPA Method 101A.
- This standard is preserved with approximately 2% (v/v) nitric acid.
- This standard can be stored at room temperature.
- The diluted standard will contain Mercury in the range of 0.9-200 ng/mL.
- This standard is stable, unopened, for 1 year from receipt of the standard.
- **NOTE:** This standard **MUST** be analyzed at the same time, using the same personnel, and the same procedures as the test samples.

Before you begin:

- This standard has been prepared as a concentrate and must be diluted prior to analysis.
- Mercury is present as a mixture of organic and inorganic forms and must, therefore, be analyzed as Total Mercury.
- This standard must be prepared and analyzed following the procedure specified in EPA Method 29 or EPA Method 101A.
- This standard should be analyzed as soon as possible after the concentrate is diluted.

Instructions:

1. Add 100-200 mL of deionized water and approximately 4 to 10 mL of nitric acid to a clean 1000 mL class A volumetric flask.
2. Shake the Mercury in Impinger Solution vial prior to opening.
3. Using a clean, dry, class A pipet, volumetrically pipet 5.0 mL of the concentrate into the 1000 mL volumetric flask.
4. Dilute the flask to final volume with deionized water.
5. Cap the flask and mix well.
6. Immediately analyze the diluted sample by the procedure specified in EPA Method 29 or EPA Method 101A.
7. Report your results as ng/mL for the diluted sample.
8. Report your results to 3 significant figures.

Safety:

ERA products may be hazardous and are intended for use by professional laboratory personnel trained in the competent handling of such materials. Responsibility for the safe use of these products rests entirely with the buyer and/or user. Material Safety Data Sheets (MSDS) for all ERA products are available by calling 1-800-372-0122.

elementOne

Method 5 Particulate

Lab # 31368

Client Air Tech

Page 1 of 1

Balance checks

Date: 06.18.18

2g = 2.0000

Acetone Concentration

Date:

2g =

1.37E-05

mg/mg

Date:

2g =

Filters										
Sample ID #	Filter ID	Tin ID	A	B		B		B		Catch Description and Loading
			Filter Tare, g	Date - 06.18.18 Initials - JGP		Date - 06.18.18 Initials - JGP		Date Initials		
				Time	Filter Weight, g	Time	Filter Weight, g	Time	Filter Weight, g	
31368-1	31347	1	0.4015	820	0.4067	1420	0.4069			
31368-2	31346	2	0.4031	820	0.4118	1420	0.4121			
31368-3	31457	3	0.3679	820	0.3759	1420	0.3761			
31368-4	31450	4	0.3551	820	0.3618	1420	0.3619			
31368-5	31344	5	0.4022	820	0.4035	1420	0.4037			
Client Blk										
E1 Blank										
Acetone Rinses										
Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 06.18.18 Initials - JGP		Date - 06.18.18 Initials - JGP		Date Initials		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
31368-1	134	758	10.8814	820	10.8907	1420	10.8906			Oily Residue
31368-2	88	737	11.0158	820	11.0258	1420	11.0260			Oily Residue
31368-3	108	597	10.1119	820	10.1235	1420	10.1233			Oily Residue
31368-4	84	x23	9.9149	820	9.9237	1420	9.9238			Oily Residue
31368-5	102	528	9.8710	820	9.8728	1420	9.8728			Oily Residue
Client Ace Blk	222	895	10.2526	820	10.2553	1420	10.2550			Oily Residue
E1 Acetone Blank	100	987	9.9053	820	9.9057	1420	9.9054			
Total Catches										
Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg		Acetone Bag ID	Bag Tare, g	Final Bag + Ace Catch, g	Acetone Catch, mg	Total Catch, mg
31368-1	31347	0.4015	0.4067	5.2		758	10.8814	10.8906	9.2	14.4
31368-2	31346	0.4031	0.4118	8.7		737	11.0158	11.0258	10.0	18.7
31368-3	31457	0.3679	0.3759	8.0		597	10.1119	10.1233	11.4	19.4
31368-4	31450	0.3551	0.3618	6.7		x23	9.9149	9.9237	8.8	15.5
31368-5	31344	0.4022	0.4035	1.3		528	9.871	9.8728	1.8	3.1
Client Blk						895	10.2528	10.2550	2.4	2.4
E1 Blank						987	9.9053	9.9054	0.1	0.1

Element One, Inc. Form 100 R 0

elementOne

31368 MAQS M5 29 Report Packet

Page 31 of 64

GI0000352

Sample/Batch Report

Paula Reid
6/20/18

User Name: r2d2
Computer Name: PESERVICE-PC
Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\Sample\c2.sam
Report Date/Time: Wednesday, June 20, 2018 10:49:07

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
5		QC Std 2		Sample					
1		QC Std 1		Sample					
401		LRB FH		Sample					
402	s	LRB FH		Spike - 1 of 3					
403		31368-1 FH		Sample					
404		31368-2 FH		Sample					
405	d	31368-2 FH		Duplicate of 6					
406		31368-3 FH		Sample					
407	s	31368-3 FH		Spike - 1 of 8					
408		31368-4 FH		Sample					
409		31368-5 FH		Sample					
410		31368-6 FH		Sample					
411		LRB BH		Sample					
412	s	LRB BH		Spike - 1 of 13					
413		31368-1 BH		Sample					
414		31368-2 BH		Sample					
415	d	31368-2 BH		Duplicate of 16					
416		31368-3 BH		Sample					
417	s	31368-3 BH		Spike - 1 of 18					
418		31368-4 BH		Sample					
419		31368-5 BH		Sample					
420		31368-6 BH		Sample					
421	x10	31368-7		Sample					
422	x10s	31368-7		Spike - 1 of 23					
423	x500	31368-8		Sample					
424	x500s	31368-8		Spike - 1 of 25					
425	x50x50	31368-8		Sample					
426	x50x50s	31368-8		Spike - 1 of 27					
1		QC Std 1		Sample					
5		QC Std 2		Sample					
3		QC Std 3		Spike - 3 of 29					
5		QC Std 2		Sample					

Dataset Report

David J. Paul
6/20/18

User Name: r2d2

Computer Name: PESERVICE-PC

Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\061918-5a\

Report Date/Time: Wednesday, June 20, 2018 10:11:41

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant Prep. Vol.	Aliquot Vol.	Diluted Vol.
16:45:11 Tue 19-Jun-18	Blank			Blank			
16:48:17 Tue 19-Jun-18	Standard 1			Standard #1			
16:51:24 Tue 19-Jun-18	Standard 2			Standard #2			
16:54:30 Tue 19-Jun-18	Standard 3			Standard #3			
16:57:37 Tue 19-Jun-18	QC Std 1			QC Std #1			
17:00:44 Tue 19-Jun-18	QC Std 2			QC Std #2			
17:03:50 Tue 19-Jun-18	QC Std 3			QC Std #3			
17:06:57 Tue 19-Jun-18	QC Std 4			QC Std #4			
17:10:05 Tue 19-Jun-18	QC Std 5			QC Std #5			
17:13:12 Tue 19-Jun-18	QC Std 6			QC Std #6			
17:16:19 Tue 19-Jun-18	QC Std 7			QC Std #7			
17:19:25 Tue 19-Jun-18	QC Std 8			QC Std #8			
17:22:32 Tue 19-Jun-18	QC Std 2			Sample			
17:25:20 Tue 19-Jun-18	QC Std 1			Sample			
17:28:27 Tue 19-Jun-18	LRB FH			Sample			
17:31:34 Tue 19-Jun-18	LRB FH	s		Spike - 1 of 15			
17:34:40 Tue 19-Jun-18	31368-1 FH			Sample			
17:37:46 Tue 19-Jun-18	31368-2 FH			Sample			
17:40:53 Tue 19-Jun-18	31368-2 FH	d		Duplicate of 18			
17:43:59 Tue 19-Jun-18	31368-3 FH			Sample			
17:47:05 Tue 19-Jun-18	31368-3 FH	s		Spike - 1 of 20			
17:50:12 Tue 19-Jun-18	31368-4 FH			Sample			
17:53:20 Tue 19-Jun-18	QC Std 1			QC Std #1			
17:56:26 Tue 19-Jun-18	QC Std 4			QC Std #4			
17:59:35 Tue 19-Jun-18	31368-5 FH			Sample			
18:02:41 Tue 19-Jun-18	31368-6 FH			Sample			
18:05:48 Tue 19-Jun-18	LRB BH			Sample			
18:08:55 Tue 19-Jun-18	LRB BH	s		Spike - 1 of 27			
18:12:02 Tue 19-Jun-18	31368-1 BH			Sample			
18:15:08 Tue 19-Jun-18	31368-2 BH			Sample			
18:18:15 Tue 19-Jun-18	31368-2 BH	d		Duplicate of 30			
18:21:22 Tue 19-Jun-18	31368-3 BH			Sample			
18:24:28 Tue 19-Jun-18	31368-3 BH	s		Spike - 1 of 32			
18:27:34 Tue 19-Jun-18	31368-4 BH			Sample			
18:30:43 Tue 19-Jun-18	QC Std 1			QC Std #1			
18:33:49 Tue 19-Jun-18	QC Std 4			QC Std #4			
18:36:57 Tue 19-Jun-18	31368-5 BH			Sample			
18:40:04 Tue 19-Jun-18	31368-6 BH			Sample			
18:43:10 Tue 19-Jun-18	31368-7	x10		Sample			
18:46:17 Tue 19-Jun-18	31368-7	x10s		Spike - 1 of 39			
18:49:23 Tue 19-Jun-18	31368-8	x500		Sample			
18:52:30 Tue 19-Jun-18	31368-8	x500s		Spike - 1 of 41			
18:55:37 Tue 19-Jun-18	31368-8	x50x50		Sample			
18:58:43 Tue 19-Jun-18	31368-8	x50x50s		Spike - 1 of 43			
19:01:51 Tue 19-Jun-18	QC Std 1			Sample			
19:04:58 Tue 19-Jun-18	QC Std 2			Sample			
19:08:05 Tue 19-Jun-18	QC Std 2-4			Spike - 3 of 45			
19:11:12 Tue 19-Jun-18	QC Std 1			QC Std #1			
19:14:19 Tue 19-Jun-18	QC Std 4			QC Std #4			

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Tuesday, June 19, 2018 16:54:30

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\061918-5a\Standard 3.004

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Be	Linear Thru Zero	0.004	0.999911	0.00
P	Linear Thru Zero	0.002	0.999991	0.00
Sc	Linear Thru Zero			
Cr	Linear Thru Zero	0.032	0.999987	0.00
Cr	Linear Thru Zero	0.004	0.999982	0.00
Mn	Linear Thru Zero	0.054	0.999996	0.00
Co	Linear Thru Zero	0.036	0.999998	0.00
Ni	Linear Thru Zero	0.008	0.999996	0.00
Cu	Linear Thru Zero	0.019	0.999996	0.00
Cu	Linear Thru Zero	0.008	0.999984	0.00
Zn	Linear Thru Zero	0.004	0.999994	0.00
Zn	Linear Thru Zero	0.001	0.999985	0.00
Zn	Linear Thru Zero	0.003	0.999997	0.00
As	Linear Thru Zero	0.004	0.999988	0.00
Se	Linear Thru Zero	0.000	0.999447	0.00
Se	Linear Thru Zero	0.000	0.999775	0.00
Rh	Linear Thru Zero			
Ag	Linear Thru Zero	0.019	0.999998	0.00
Ag	Linear Thru Zero			
Cd	Linear Thru Zero	0.007	0.999993	0.00
Cd	Linear Thru Zero	0.026	0.999998	0.00
Sb	Linear Thru Zero			
Sb	Linear Thru Zero	0.004	0.999995	0.00
Ba	Linear Thru Zero			
Ba	Linear Thru Zero	0.004	1.000000	0.00
Ho	Linear Thru Zero			
Ti	Linear Thru Zero	0.028	0.999999	0.00
Pb	Linear Thru Zero	0.037	1.000000	0.00
Kr	Linear Thru Zero			

Job Number:
14

[illegible]

Time	Process	Location	Sample	QC...	Report	Notes
Analysis	Mass (µg/L)	Scale Table 1 (Conc.)	Scale Table 2 (Conc.)	Scale Table 3 (Conc.)	Scale Table 4 (Conc.)	Scale Table 5 (Conc.)
1	50	5.1122	25	1	100	1
2	10	10.9435	25	1	100	1
3	10	10.9435	25	1	100	1
4	10	10.9435	25	1	100	1
5	10	10.9435	25	1	100	1
6	10	10.9435	25	1	100	1
7	10	10.9435	25	1	100	1
8	10	10.9435	25	1	100	1
9	10	10.9435	25	1	100	1
10	10	10.9435	25	1	100	1
11	10	10.9435	25	1	100	1
12	10	10.9435	25	1	100	1
13	10	10.9435	25	1	100	1
14	10	10.9435	25	1	100	1
15	10	10.9435	25	1	100	1
16	10	10.9435	25	1	100	1
17	10	10.9435	25	1	100	1
18	10	10.9435	25	1	100	1
19	10	10.9435	25	1	100	1
20	10	10.9435	25	1	100	1
21	10	10.9435	25	1	100	1
22	10	10.9435	25	1	100	1
23	10	10.9435	25	1	100	1
24	10	10.9435	25	1	100	1
25	10	10.9435	25	1	100	1
26	10	10.9435	25	1	100	1
27	10	10.9435	25	1	100	1
28	10	10.9435	25	1	100	1
29	10	10.9435	25	1	100	1
30	10	10.9435	25	1	100	1
31	10	10.9435	25	1	100	1
32	10	10.9435	25	1	100	1
33	10	10.9435	25	1	100	1
34	10	10.9435	25	1	100	1
35	10	10.9435	25	1	100	1
36	10	10.9435	25	1	100	1
37	10	10.9435	25	1	100	1
38	10	10.9435	25	1	100	1
39	10	10.9435	25	1	100	1
40	10	10.9435	25	1	100	1
41	10	10.9435	25	1	100	1
42	10	10.9435	25	1	100	1
43	10	10.9435	25	1	100	1
44	10	10.9435	25	1	100	1
45	10	10.9435	25	1	100	1
46	10	10.9435	25	1	100	1
47	10	10.9435	25	1	100	1
48	10	10.9435	25	1	100	1
49	10	10.9435	25	1	100	1
50	10	10.9435	25	1	100	1
51	10	10.9435	25	1	100	1
52	10	10.9435	25	1	100	1
53	10	10.9435	25	1	100	1
54	10	10.9435	25	1	100	1
55	10	10.9435	25	1	100	1
56	10	10.9435	25	1	100	1
57	10	10.9435	25	1	100	1
58	10	10.9435	25	1	100	1
59	10	10.9435	25	1	100	1
60	10	10.9435	25	1	100	1
61	10	10.9435	25	1	100	1
62	10	10.9435	25	1	100	1
63	10	10.9435	25	1	100	1
64	10	10.9435	25	1	100	1
65	10	10.9435	25	1	100	1
66	10	10.9435	25	1	100	1
67	10	10.9435	25	1	100	1
68	10	10.9435	25	1	100	1
69	10	10.9435	25	1	100	1
70	10	10.9435	25	1	100	1
71	10	10.9435	25	1	100	1
72	10	10.9435	25	1	100	1
73	10	10.9435	25	1	100	1
74	10	10.9435	25	1	100	1
75	10	10.9435	25	1	100	1
76	10	10.9435	25	1	100	1
77	10	10.9435	25	1	100	1
78	10	10.9435	25	1	100	1
79	10	10.9435	25	1	100	1
80	10	10.9435	25	1	100	1
81	10	10.9435	25	1	100	1
82	10	10.9435	25	1	100	1
83	10	10.9435	25	1	100	1
84	10	10.9435	25	1	100	1
85	10	10.9435	25	1	100	1
86	10	10.9435	25	1	100	1
87	10	10.9435	25	1	100	1
88	10	10.9435	25	1	100	1
89	10	10.9435	25	1	100	1
90	10	10.9435	25	1	100	1
91	10	10.9435	25	1	100	1
92	10	10.9435	25	1	100	1
93	10	10.9435	25	1	100	1
94	10	10.9435	25	1	100	1
95	10	10.9435	25	1	100	1
96	10	10.9435	25	1	100	1
97	10	10.9435	25	1	100	1
98	10	10.9435	25	1	100	1
99	10	10.9435	25	1	100	1
100	10	10.9435	25	1	100	1

Sample/Batch Report

User Name: r2d2

Computer Name: PESERVICE-PC

Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Sample\c3.sam

Report Date/Time: Wednesday, June 20, 2018 16:38:31

Handwritten signature
6/20/18

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
5		QC Std 2		Sample					
421	x10	31368-7		Sample					
422	x10s	31368-7		Spike - 1 of 2					
423	x50	31368-7		Sample					
424	x50s	31368-7		Spike - 1 of 4					
425	x50x50	31368-8		Sample					
426	x50x50s	31368-8		Spike - 1 of 6					
427	x50x100	31368-8		Sample					
428	x50x100s	31368-8		Spike - 1 of 8					
429		31368-5 FH		Sample					
430		31368-6 FH		Sample					
431		31368-6 C8A		Sample					
432		31368-5 BH		Sample					
433		31368-5 BH Unprep		Sample					
434		31368-6 BH		Sample					
435		31368-6 C8A-C9		Sample					

Dataset Report

Daniel Reid
6/20/18

User Name: r2d2

Computer Name: PESERVICE-PC

Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\062018-1a\

Report Date/Time: Wednesday, June 20, 2018 16:37:53

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant Prep. Vol.	Aliquot Vol.	Diluted Vol.
12:11:56 Wed 20-Jun-18	Blank		Blank				
12:14:57 Wed 20-Jun-18	Standard 1		Standard #1				
12:17:57 Wed 20-Jun-18	Standard 2		Standard #2				
12:20:58 Wed 20-Jun-18	Standard 3		Standard #3				
12:23:59 Wed 20-Jun-18	QC Std 1		QC Std #1				
12:27:00 Wed 20-Jun-18	QC Std 2		QC Std #2				
12:30:01 Wed 20-Jun-18	QC Std 3		QC Std #3				
12:33:01 Wed 20-Jun-18	QC Std 4		QC Std #4				
12:36:03 Wed 20-Jun-18	QC Std 5		QC Std #5				
12:39:03 Wed 20-Jun-18	QC Std 6		QC Std #6				
12:42:04 Wed 20-Jun-18	QC Std 7		QC Std #7				
12:45:04 Wed 20-Jun-18	QC Std 8		QC Std #8				
12:48:05 Wed 20-Jun-18	QC Std 2		Sample				
12:50:44 Wed 20-Jun-18	31368-7	x10	Sample				
12:53:44 Wed 20-Jun-18	31368-7	x10s	Sample				
12:56:45 Wed 20-Jun-18	31368-7	x50	Sample				
12:59:45 Wed 20-Jun-18	31368-7	x50s	Sample				
13:02:46 Wed 20-Jun-18	31368-8	x50x50	Sample				
13:05:47 Wed 20-Jun-18	31368-8	x50x50s	Sample				
13:08:47 Wed 20-Jun-18	31368-8	x50x100	Sample				
13:11:48 Wed 20-Jun-18	31368-8	x50x100s	Sample				
13:14:49 Wed 20-Jun-18	31368-5 FH		Sample				
13:17:51 Wed 20-Jun-18	QC Std 1		QC Std #1				
13:20:51 Wed 20-Jun-18	QC Std 4		QC Std #4				
13:23:53 Wed 20-Jun-18	31368-6 FH		Sample				
13:26:54 Wed 20-Jun-18	31368-6 C8A		Sample				
13:29:54 Wed 20-Jun-18	31368-5 BH		Sample				
13:32:55 Wed 20-Jun-18	31368-5 BH Unprep		Sample				
13:35:55 Wed 20-Jun-18	31368-6 BH		Sample				
13:38:56 Wed 20-Jun-18	31368-6 C8A-C9		Sample				
13:41:58 Wed 20-Jun-18	Blank		Sample				
13:44:58 Wed 20-Jun-18	Standard 1		Sample				
13:47:59 Wed 20-Jun-18	Standard 2		Sample				
13:51:00 Wed 20-Jun-18	QC Std 1		QC Std #1				
13:54:00 Wed 20-Jun-18	QC Std 2		QC Std #2				
13:57:01 Wed 20-Jun-18	QC Std 4		QC Std #4				
14:00:48 Wed 20-Jun-18	Blank		Blank				

No P, Cr, As, Se, Zn, Cd
DWR 6/20/18

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Wednesday, June 20, 2018 12:20:58

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\DataSet\062018-1a\Standard 3.004

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Be	Linear Thru Zero	0.005	0.999959	0.00
P	Linear Thru Zero	0.002	0.989600	0.00
Sc	Linear Thru Zero			
Cr	Linear Thru Zero	0.030	0.999981	0.00
Cr	Linear Thru Zero	0.003	0.999946	0.00
Mn	Linear Thru Zero	0.048	0.999991	0.00
Ni	Linear Thru Zero	0.008	0.999994	0.00
Cu	Linear Thru Zero	0.018	0.999994	0.00
Cu	Linear Thru Zero	0.008	0.999987	0.00
Zn	Linear Thru Zero	0.004	0.999861	0.00
Zn	Linear Thru Zero	0.001	0.999895	0.00
Zn	Linear Thru Zero	0.003	0.999781	0.00
As	Linear Thru Zero	0.005	0.999994	0.00
Se	Linear Thru Zero	0.000	0.997326	0.00
Se	Linear Thru Zero	0.000	0.999923	0.00
Rh	Linear Thru Zero			
Ag	Linear Thru Zero	0.020	0.999995	0.00
Ag	Linear Thru Zero			
Cd	Linear Thru Zero	0.007	0.999996	0.00
Cd	Linear Thru Zero	0.026	1.000000	0.00
Sb	Linear Thru Zero			
Sb	Linear Thru Zero	0.004	0.999990	0.00
Ba	Linear Thru Zero			
Ba	Linear Thru Zero	0.004	0.999988	0.00
Ho	Linear Thru Zero			
Pb	Linear Thru Zero	0.038	1.000000	0.00
Kr	Linear Thru Zero			

Job Number:
14

[illegible]

S:\Forms\Blank Forms\F208 R2 ICP-MS Run Sheet

Sample/Batch Report

User Name: r2d2

Computer Name: PESERVICE-PC


Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Sample\o4.sam

Report Date/Time: Thursday, June 21, 2018 14:08:50

David J. [Signature]
6/21/18

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
5		QC Std 2		Sample					
1		QC Std 1		Sample					
401		LRB FH		Sample					
402	s	LRB FH		Spike - 1 of 3					
411		LRB BH		Sample					
412	s	LRB BH		Spike - 1 of 5					
436	x50	31368-1 FH		Sample					
437	x50	31368-2 FH		Sample					
438	x50d	31368-2 FH		Duplicate of 8					
439	x50	31368-3 FH		Sample					
440	x50s	31368-3 FH		Spike - 1 of 10					
441	x50	31368-4 FH		Sample					
442	x10	31368-2 BH		Sample					
443	x10d	31368-2 BH		Duplicate of 13					
444	x5	31368-3 BH		Sample					
445	x5s	31368-3 BH		Spike - 1 of 15					
421	x10	31368-7		Sample					
422	x10s	31368-7		Spike - 1 of 17					
423	x50	31368-7		Sample					
424	x50s	31368-7		Spike - 1 of 19					
425	x50x50	31368-8		Sample					
426	x50x50s	31368-8		Spike - 1 of 21					
403		31368-1 FH		Sample					
404		31368-2 FH		Sample					
405	d	31368-2 FH		Duplicate of 24					
406		31368-3 FH		Sample					
407	s	31368-3 FH		Spike - 1 of 26					
408		31368-4 FH		Sample					
413		31368-1 BH		Sample					
414		31368-2 BH		Sample					
415	d	31368-2 BH		Duplicate of 30					
416		31368-3 BH		Sample					
417	s	31368-3 BH		Spike - 1 of 32					
418		31368-4 BH		Sample					
449	x5	31368-1 BH		Sample					
418		31368-4 BH		Sample					
450	x5	31368-2 BH		Sample					
451	x5d	31368-2 BH		Duplicate of 37					
421	x10	31368-7		Sample					
422	x10s	31368-7		Spike - 1 of 39					
425	x50x50	31368-8		Sample					
426	x50x50s	31368-8		Spike - 1 of 41					
452		31368-6 BH		Sample					
427	x50x100	31368-8		Sample					
428	x50x100s	31368-8		Sample					

Sample/Batch Report


6/21/18

User Name: r2d2

Computer Name: PESERVICE-PC

Sample File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Sample\c9.sam

Report Date/Time: Thursday, June 21, 2018 15:02:45

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
1		QC Std 1		Sample					
3		QC Std 4		Spike - 3 of 1					
201		31369-5 FH		Sample					
202		31369-6 FH		Sample					
203		31369-5 BH		Sample					
204		31369-6 FH		Sample					

Dataset Report

User Name: r2d2

Computer Name: PESERVICE-PC

Dataset File Path: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\062118-1a\

Report Date/Time: Thursday, June 21, 2018 14:22:11

Donnell
6/21/18

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant Prep. Vol.	Aliquot Vol.	Diluted Vol.
11:05:25 Thu 21-Jun-18	Blank			Blank			
11:07:22 Thu 21-Jun-18	Standard 1			Standard #1			
11:09:20 Thu 21-Jun-18	Standard 2			Standard #2			
11:11:17 Thu 21-Jun-18	Standard 3			Standard #3			
11:13:15 Thu 21-Jun-18	QC Std 1			QC Std #1			
11:15:12 Thu 21-Jun-18	QC Std 2			QC Std #2			
11:17:09 Thu 21-Jun-18	QC Std 3			QC Std #3			
11:19:07 Thu 21-Jun-18	QC Std 4			QC Std #4			
11:21:04 Thu 21-Jun-18	QC Std 5			QC Std #5			
11:23:01 Thu 21-Jun-18	QC Std 6			QC Std #6			
11:24:58 Thu 21-Jun-18	QC Std 7			QC Std #7			
11:26:55 Thu 21-Jun-18	QC Std 8			QC Std #8			
11:28:53 Thu 21-Jun-18	QC Std 2			Sample			
11:30:30 Thu 21-Jun-18	QC Std 1			Sample			
11:33:00 Thu 21-Jun-18	Blank			Blank			
11:34:57 Thu 21-Jun-18	Standard 1			Standard #1			
11:36:55 Thu 21-Jun-18	Standard 2			Standard #2			
11:38:52 Thu 21-Jun-18	Standard 3			Standard #3			
11:40:50 Thu 21-Jun-18	QC Std 1			QC Std #1			
11:42:48 Thu 21-Jun-18	QC Std 2			QC Std #2			
11:44:45 Thu 21-Jun-18	QC Std 3			QC Std #3			
11:46:43 Thu 21-Jun-18	QC Std 4			QC Std #4			
11:48:41 Thu 21-Jun-18	QC Std 5			QC Std #5			
11:50:38 Thu 21-Jun-18	QC Std 6			QC Std #6			
11:52:36 Thu 21-Jun-18	QC Std 7			QC Std #7			
11:54:33 Thu 21-Jun-18	QC Std 8			QC Std #8			
11:56:31 Thu 21-Jun-18	QC Std 2			Sample			
11:58:08 Thu 21-Jun-18	QC Std 1			Sample			
12:00:06 Thu 21-Jun-18	LRB FH			Sample			
12:02:04 Thu 21-Jun-18	LRB FH	s		Spike - 1 of 29			
12:04:02 Thu 21-Jun-18	LRB BH			Sample			
12:05:59 Thu 21-Jun-18	LRB BH	s		Spike - 1 of 31			
12:07:58 Thu 21-Jun-18	31368-1 FH	x50		Sample			
12:09:55 Thu 21-Jun-18	31368-2 FH	x50		Sample			
12:11:53 Thu 21-Jun-18	31368-2 FH	x50d		Duplicate of 34			
12:13:50 Thu 21-Jun-18	31368-3 FH	x50		Sample			
12:15:48 Thu 21-Jun-18	31368-3 FH	x50s		Spike - 1 of 36			
12:17:47 Thu 21-Jun-18	QC Std 1			QC Std #1			
12:19:44 Thu 21-Jun-18	QC Std 4			QC Std #4			
12:21:43 Thu 21-Jun-18	31368-4 FH	x50		Sample			
12:23:40 Thu 21-Jun-18	31368-2 BH	x10		Sample			
12:25:38 Thu 21-Jun-18	31368-2 BH	x10d		Duplicate of 41			
12:27:35 Thu 21-Jun-18	31368-3 BH	x5		Sample			
12:29:33 Thu 21-Jun-18	31368-3 BH	x5s		Spike - 1 of 43			
12:31:31 Thu 21-Jun-18	31368-7	X10		Sample			
12:33:28 Thu 21-Jun-18	31368-7	X10s		Spike - 1 of 45			
12:35:26 Thu 21-Jun-18	31368-7	X50		Sample			
12:37:23 Thu 21-Jun-18	31368-7	X50s		Spike - 1 of 47			
12:39:20 Thu 21-Jun-18	31368-8	x50x50		Sample			

Page 1

elementOne

31368 MAQS M5 29 Report Packet

Page 44 of 64

G10000365

12:41:18 Thu 21-Jun-18	31368-8	<i>250x50s</i>	Spike - 1 of 49
12:43:17 Thu 21-Jun-18	QC Std 1		QC Std #1
12:45:14 Thu 21-Jun-18	QC Std 4		QC Std #4
12:47:13 Thu 21-Jun-18	31368-1 FH		Sample
12:49:10 Thu 21-Jun-18	31368-2 FH		Sample
12:51:07 Thu 21-Jun-18	31368-2 FH	d	Duplicate of 54
12:53:05 Thu 21-Jun-18	31368-3 FH		Sample
12:55:02 Thu 21-Jun-18	31368-3 FH	s	Spike - 1 of 56
12:57:00 Thu 21-Jun-18	31368-4 FH		Sample
12:58:58 Thu 21-Jun-18	31368-1 BH		Sample
13:00:56 Thu 21-Jun-18	31368-2 BH		Sample
13:02:53 Thu 21-Jun-18	31368-2 BH	d	Duplicate of 60
13:04:51 Thu 21-Jun-18	31368-3 BH		Sample
13:06:48 Thu 21-Jun-18	31368-3 BH	s	Spike - 1 of 62
13:08:47 Thu 21-Jun-18	QC Std 1		QC Std #1
13:10:45 Thu 21-Jun-18	QC Std 4		QC Std #4
13:13:22 Thu 21-Jun-18	31368-1 BH	x5	Sample
13:15:20 Thu 21-Jun-18	31368-4 BH		Sample
13:17:18 Thu 21-Jun-18	31368-2 BH	x5	Sample
13:19:16 Thu 21-Jun-18	31368-2 BH	x5d	Duplicate of 68
13:21:15 Thu 21-Jun-18	QC Std 1		QC Std #1
13:23:12 Thu 21-Jun-18	QC Std 2		QC Std #2
13:25:10 Thu 21-Jun-18	QC Std 4		QC Std #4
13:27:10 Thu 21-Jun-18	QC Std 4		Sample
13:29:17 Thu 21-Jun-18	Blank		Blank
13:31:08 Thu 21-Jun-18	Standard 1		Standard #1
13:32:59 Thu 21-Jun-18	Standard 2		Standard #2
13:34:50 Thu 21-Jun-18	Standard 3		Standard #3
13:36:42 Thu 21-Jun-18	QC Std 1		QC Std #1
13:38:34 Thu 21-Jun-18	QC Std 2		QC Std #2
13:40:25 Thu 21-Jun-18	QC Std 3		QC Std #3
13:42:17 Thu 21-Jun-18	QC Std 4		QC Std #4
13:44:08 Thu 21-Jun-18	QC Std 5		QC Std #5
13:45:59 Thu 21-Jun-18	QC Std 6		QC Std #6
13:47:50 Thu 21-Jun-18	QC Std 7		QC Std #7
13:49:43 Thu 21-Jun-18	31368-7	x10	Sample
13:51:34 Thu 21-Jun-18	31368-7	x10s	Spike - 1 of 85
13:53:27 Thu 21-Jun-18	31368-8	x50x50	Sample
13:55:18 Thu 21-Jun-18	31368-8	x50x50s	Spike - 1 of 87
13:57:11 Thu 21-Jun-18	31368-6 BH		Sample
13:59:46 Thu 21-Jun-18	31368-8	x50x100	Sample
14:01:37 Thu 21-Jun-18	31368-8	x50x100s	Spike - 1 of 90
14:13:08 Thu 21-Jun-18	31368-8	x50x100	Sample
14:15:00 Thu 21-Jun-18	31368-8	x50x100s	Spike - 1 of 92
14:16:53 Thu 21-Jun-18	QC Std 1		QC Std #1
14:18:44 Thu 21-Jun-18	QC Std 2		QC Std #2
14:20:36 Thu 21-Jun-18	QC Std 4		QC Std #4
14:43:20 Thu 21-Jun-18	QC Std 1		Sample
14:44:45 Thu 21-Jun-18	QC Std 4		Spike - 3 of 97
14:46:31 Thu 21-Jun-18	31369-5 FH		Sample
14:48:17 Thu 21-Jun-18	31369-6 FH		Sample
14:50:02 Thu 21-Jun-18	31369-5 BH		Sample
14:51:48 Thu 21-Jun-18	31369-6 BH		Sample
14:53:35 Thu 21-Jun-18	QC Std 1		QC Std #1
14:55:20 Thu 21-Jun-18	QC Std 2		QC Std #2
14:57:06 Thu 21-Jun-18	QC Std 4		QC Std #4

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Thursday, June 21, 2018 11:38:52

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\062118-1a\Standard 3.018

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Be	Linear Thru Zero	0.004	1.000000	0.00
P	Linear Thru Zero	0.003	0.999962	0.00
Sc	Linear Thru Zero			
Zn	Linear Thru Zero	0.004	0.999999	0.00
Zn	Linear Thru Zero	0.001	0.999999	0.00
Zn	Linear Thru Zero	0.003	0.999999	0.00
As	Linear Thru Zero	0.004	1.000000	0.00
Se	Linear Thru Zero	0.000	0.999930	0.00
Se	Linear Thru Zero	0.000	0.999998	0.00
Rh	Linear Thru Zero			
Ho	Linear Thru Zero			
Kr	Linear Thru Zero			

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date/Time: Thursday, June 21, 2018 13:34:50

Sample Description:

Number of Replicates: 3

Batch ID:

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\CPMS\DataSet\062118-1a\Standard 3.077

Sample Prep Volume (mL):

Initial Sample Quantity (mg):

Aliquot Volume (mL):

Diluted To Volume (mL):

Autosampler Position: 4

Calibration

Analyte	Curve Type	Slope	Correlation Coefficient	Intercept
Li	Linear Thru Zero			
Sc	Linear Thru Zero			
Rh	Linear Thru Zero			
Ag	Linear Thru Zero	0.022	0.999965	0.00
Ag	Linear Thru Zero			
Cd	Linear Thru Zero	0.013	0.999981	0.00
Cd	Linear Thru Zero	0.041	0.999981	0.00
Ho	Linear Thru Zero			
Kr	Linear Thru Zero			

elementOne
Analyst:--DMR--

ICP-MS RUN SHEET
6/21/2018

Job Number:
14

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
5		QC Std 2		Sample		
401		LRB FH		Sample		100
402	s	LRB FH		Spike - 1 of 3		100
411		LRB BH		Sample		50x2
412	s	LRB BH		Spike - 1 of 5		50x2
436	x50	31368-1 FH		Sample		100
437	x50	31368-2 FH		Sample		100
438	x50d	31368-2 FH		Duplicate of 8		100
439	x50	31368-3 FH		Sample		100
440	x50s	31368-3 FH		Spike - 1 of 10		100
441	x50	31368-4 FH		Sample		100
442	x10	31368-2 BH		Sample		50x2
443	x10d	31368-2 BH		Duplicate of 13		50x2
444	x5	31368-3 BH		Sample		50x2
445	x5s	31368-3 BH		Spike - 1 of 15		50x2
421	x10	31368-7		Sample		50
422	x10s	31368-7		Spike - 1 of 17		50
423	x50	31368-7		Sample		50
424	x50s	31368-7		Spike - 1 of 19		50
425	x50x50	31368-8		Sample		5/1000/1000
426	x50x50s	31368-8		Spike - 1 of 21		5/1000/1000
403		31368-1 FH		Sample		100
404		31368-2 FH		Sample		100
405	d	31368-2 FH		Duplicate of 24		100
406		31368-3 FH		Sample		100
407	s	31368-3 FH		Spike - 1 of 26		100
408		31368-4 FH		Sample		100
413		31368-1 BH		Sample		50x2
414		31368-2 BH		Sample		50x2
415	d	31368-2 BH		Duplicate of 30		50x2
416		31368-3 BH		Sample		50x2
417	s	31368-3 BH		Spike - 1 of 32		50x2
418		31368-4 BH		Sample		50x2
449	x5	31368-1 BH		Sample		50x2
418		31368-4 BH		Sample		50x2
450	x5	31368-2 BH		Sample		50x2
451	x5d	31368-2 BH		Duplicate of 37		50x2
452		31368-6 BH		Sample		50x2
427	x50x100	31368-8		Sample		5/1000/1000
428	x50x100s	31368-8		Spike - 1 of 44		5/1000/1000

Spikes are post at 0.02mL of 25ppm spiking solutions lot 021418-ABC&F in a final volume of 10mL

Submitted for QC by:	Date/Time:		QC Review By:	Date/Time:	
DMR	6/21/18 13:59		<i>WJ</i>	6/21/18 @ 1500	
Re-Test Required:	No:	Yes: <input checked="" type="checkbox"/>	Comments:		
Resubmitted for QC by:	Date/Time:		QC Review:	By:	Date/Time:

S:\Jobs\Jobs - Active\31368 MAQS Airtech General Iron M29-5 4R, FB, RB, Audits---RUSH\062118-1a ICP-MS Run Sheet

elementOne

Job Number:
14

[illegible]

ICP-MS QC Values Table

Element or Test	ICP Element Mass	Element symbol	Lowest Reported Value (ug)	Upper Reported Value (ug)	Report ing Unit	QC #1	QC #2	QC #3	QC #4	QC #5	QC #6 A	QC #7 AB	QC #8 .25	QC #9 LRB	QC #10 LRB+	QC #11 LRB+
Lithium	6	Li	1	500	mg/L	0	1	250	100	50				0	50	100
Beryllium	9	Be	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Boron	10	B	5	500	mg/L	0	1	250	100	50				0	50	100
Boron	11	B	5	500	mg/L	0	1	250	100	50				0	50	100
Sodium	23	Na	20	5500	mg/L	0	21	2500	1100	250	5000	5000		0	718	
Magnesium	24	Mg	20	5500	mg/L	0	21	2500	1100	250	5000	5000		0	550	
Magnesium	25	Mg	20	5500	mg/L	0	21	2500	1100	250				0	550	
Aluminum	27	Al	1	500	mg/L	0	1	250	100	50	5000	5000		0	50	100
Phosphorus	31	P	20	5000	mg/L	0	20	2500	1000	250	5000	5000		0	200	
Potassium	39	K	20	5500	mg/L	0	20	2000	1000	200	5000	5000		0	500	
Calcium	44	Ca	50	5500	mg/L	0	21	2500	1100	250	5000	5000		0	550	
Titanium	47	Ti	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100
Titanium	49	Ti	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100
Vanadium	51	V	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100
Vanadium	51	V	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100
Chromium	52	Cr	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Chromium	53	Cr	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Iron	54	Fe	20	5500	mg/L	0	21	2500	1100	250	5000	0		0		
Manganese	55	Mn	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Iron	57	Fe	20	5500	mg/L	0	21	2500	1100	250	5000	0		0		
Cobalt	59	Co	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100
Nickel	60	Ni	1	500	mg/L	0	1	250	100	50	0	2	0.25	0	50	100
Copper	63	Cu	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Copper	65	Cu	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Zinc	66	Zn	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Zinc	67	Zn	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Zinc	68	Zn	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Germanium	72	Ge	1	500	mg/L	0	1	250	100	50				0	50	100
Arsenic	75	As	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Selenium	77	Se	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Selenium	82	Se	1	500	mg/L	0	1	250	100	50	0	1	0.25	0	50	100
Strontium	88	Sr	1	500	mg/L	0	1	250	100	50				0	50	100
Molybdenum	95	Mo	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100
Molybdenum	97	Mo	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100
Molybdenum	98	Mo	1	500	mg/L	0	1	250	100	50	100	100	0.25	0	50	100
Rhodium	103															
Silver	107	Ag	1	500	mg/L	0	1	250	100	50	0	1		0	50	100
Silver	109	Ag	1	500	mg/L	0	1	250	100	50				0	50	100
Cadmium	111	Cd	1	500	mg/L	0	1	250	100	50	0	0.5	0.25	0	50	100
Cadmium	114	Cd	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Tin	118	Sn	1	500	mg/L	0	1	250	100	50				0	50	100
Antimony	121	Sb	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Antimony	123	Sb	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Tellurium	128	Te	1	500	mg/L	0	1	250	100	50				0	50	100
Cesium	133															
Barium	135	Ba	1	500	mg/L	0	1	250	100	50				0	50	100
Barium	137	Ba	1	500	mg/L	0	1	250	100	50				0	50	100
Lanthanum	139	La	1	500	mg/L	0	1	250	100	50				0	50	100
Tantalum	159	Ta	1	500	mg/L	0	1	250	100	50				0	50	100
Platinum	195	Pt	1	500	mg/L	0	1	250	100	50				0	50	100
Gold	181	Au	1	500	mg/L	0	1	250	100	50				0	50	100
Thallium	205	Tl	1	500	mg/L	0	1	250	100	50				0	50	100
Lead	208	Pb	1	500	mg/L	0	1	250	100	50			0.25	0	50	100
Bismuth	209	Bi	1	500	mg/L	0	1	250	100	50				0	50	100
Thorium	232	Th	1	500	mg/L	0	1	250	100	50				0	50	100
Uranium	238	U	1	500	mg/L	0	1	250	100	50				0	50	100
Krypton	83															

MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 06/18/18 Prep By: MMP/TAD SIF File #: 06/18/18-1
 Block #1 Temperature: 98.87 Start Time: 8:52 A.M. Machine ID: 2
 Block #2 Temperature: 94.75 Stop Time: 9:52 A.M. Batch Analyst: MMP
 Block #3 Temperature: — Typed By: TAD Verified By: MMP

A/S	Curve & QC's	0.4ug/ml working std		BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0		40	40	Standard #1 (for working std)
2	0.004 ug	0.01ml		40	40	Lot #: <u>4705145</u>
3	0.04 ug	0.10ml		40	40	Working Standard
4	0.08 ug	0.20ml		40	40	Lot #: <u>Hg3-012-1</u> by: <u>MMP</u>
5	0.16 ug	0.40ml		40	40	Standard #2 (QC #2):
6	0.20ug	0.50ml		40	40	Lot #: <u>Hg3-012-2</u>
						Standard #3 (QC #3):
						Lot #: <u>Hg3-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std		40	40	
8	QC #3= 0.08ug	0.2ml #3 std		40	40	Curve prepared by: <u>MMP</u>

Initial Review By: MMP Date: 6/18/18 Time: 12:30
 Final QC Review By: TAD Date: 6-18-18 Time: 5:04
 Comments: 31368-10 @ 0.05 31350-12 @ 0.025 31350-11 @ 0.05

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	30811-31QC	✓ 7470A			0.05	5	TV=9.88
10	✓ 16	✓ ↓			1	1	TV=0.008
11	31368-10	✓ m29			0.05	5	
12	-10	↓			0.1	↓	
13	-10	↓			0.2	↓	
14	31368-18H	✓			4	505	
15	-28H	↓				310	
16	-28HD	↓				↓	
17	-38H	↓				325	
18	-38H1	↓				↓	
19	-48H	↓				350	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 117100 HCl Lot # 4117040
 Persulfate Lot # Hg3-002-5 KMnO₄ Lot # Hg3-008-10 Hydrox Lot # Hg3-002-15

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: de1818-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
20	31368-53H	m29			4	230	
21	-68H					205	
22	-1A					200	
23	-2A						
24	-2AD						
25	-3A						
26	-3A+						
27	-4A						
28	-5A						
29	-6A						
30	31339-1B					500	
31	-2C					400	
32	-2CD						
33	31350-12				0.05	5	
34	-12				0.1		
35	-12				0.2		
36	31350-12BPH				4	100	
37	-12BPH				1.6		
38	-1PH				4		
39	-2PH						
40	-2PHD						
41	-3PH						
42	-3PH+						
43	-4PH						
44	-5PH						
45	-5PHD						
46	-6PH						
47	-6PH+						
48	-7PH						
49	-8PH						
50	-11				1		
51	-11				2		
52	-11				4		
53	-11amp				1	100	
54	-11amp				2		

SIF File #: 061818-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
55	31350-11amp	fn 29			4	100	
56	31351-1 PH				0.1	1	
57	- 2 PH						
58	- 2 PH						
59	- 3 PH						
60	- 3 PH						
61	- 4 PH						
62	- 9 PH						
63	- 10 PH						
64	- 10 PH						
65	- 11 PH						
66	- 11 PH						
67	- 12 PH						
68	- 17 PH						
69	- 18 PH						
70	- 18 PH						
71	- 19 PH						
72	- 19 PH						
73	- 20 PH						
74							
75							
76							
77							
78							
79							
80							
81							
82							
83							
84							
85							
86							
87							
88							
89							

MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 06/18/18 Prep By: mmp SIF File #: 06/19/18-1
 Block #1 Temperature: 71.84 Start Time: 5:45a Machine ID: 1
 Block #2 Temperature: 92.19 Stop Time: 8:00a Batch Analyst: mmp
 Block #3 Temperature: ~95 Typed By: mmp Verified By: DKH

A/S	Curve & QC's	0.4ug/ml working std		BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0		40	40	Standard #1 (for working std)
2	0.004 ug	0.01ml		40	40	Lot #: <u>4705145</u>
3	0.04 ug	0.10ml		40	40	Working Standard
4	0.08 ug	0.20ml		40	40	Lot #: <u>423-012-1</u> by: <u>mmp</u>
5	0.16 ug	0.40ml		40	40	Standard #2 (QC #2):
6	0.20ug	0.50ml		40	40	Lot #: <u>423-012-2</u>
						Standard #3 (QC #3):
						Lot #: <u>423-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std		40	40	
8	QC #3= 0.08ug	0.2ml #3 std		40	40	Curve prepared by: <u>DKH</u>

Initial Review By: mmp Date: 6/19/18 Time: 2:55
 Final QC Review By: DKH Date: 06.19.18 Time: 3:57
 Comments: 31364-BLK + Spk 31364-2 @ 5+10 31368-1B + 3B @ 0.4
31368-4B @ 10ml 31368-2B @ 0.5

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	30811-31 QC	✓ 1470A			0.05	5	TV=9.88
10	4L	✓ ↓			1	1	TV=0.008
11	31368-10	✓ m29			0.05	5	
12	-10D	↓			↓	↓	
13	-10+	↓			↓	↓	
14	31368-1B	✓			4	500	
15	-2B	↓			↓	↓	
16	-2BD	↓			↓	↓	
17	-3B	↓			↓	↓	
18	-3B+	↓			↓	↓	
19	-4B	↓			↓	↓	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 1117100 HCl Lot #: 4117040
 Persulfate Lot # Hg3-012-6 KMnO₄ Lot # Hg3-008-8 Hydrox Lot#: Hg3-009-2

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: 061918-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
20	31368-5B	✓ M29			4	500	
21	-6B				↓	↓	
22	31350-12				0.025	5	
23	-12D				↓	↓	
24	-12+				↓	↓	
25	31350-11	✓			0.5	100	
26	-11D				↓	↓	
27	-11+				↓	↓	
28	-1B				4	500	
29	-2B						
30	-2BD						
31	-3B						
32	-3B+						
33	-4B						
34	-5B						
35	-5BD						
36	-6B						
37	-6B+						
38	-7B						
39	-8B				↓	↓	
40	-1C				4	400	
41	-2C						
42	-2CD						
43	-3C						
44	-3C+						
45	-4C						
46	-5C						
47	-5CD						
48	-6C						
49	-6C+						
50	-7C						
51	-8C				↓	↓	
52	31364/370-6B+ 7470A				4	1	
53	-6B+ +				0.2	↓	TV=0.100
54	31364-1+ 1	✓ ↓	0.5053/50	4	0.0404	↓	

SIF File #: 061918-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
55	31364-1 D+ ⁺	✓ 7470A	0.5093/50	4	0.0404	1	
56	31370-1 D+ ⁺	✓ ↓	0.5055/50	↓	0.0404	↓	
57	-1 D+ ⁺	↓	↓	↓	↓	↓	
58	31360-1	✓ 7470A			0.4	1	
59	-2	↓			↓	↓	
60	-2D	↓			↓	↓	
61	-3	↓			↓	↓	
62	-3+	↓			↓	↓	
63	-4	↓			↓	↓	
64	-5	↓			↓	↓	
65	31364-SRP-BLK	7470A			20	1	
66	-BLK+	↓			↓	↓	
67	31364-1	↓			↓	↓	
68	-10	↓			↓	↓	
69	31364-BLK	↓			↓	↓	
70	-BLK+	↓			↓	↓	
71	31364-2	↓			↓	↓	
72	-2+	↓			↓	↓	
73							
74							
75							
76							
77							
78							
79							
80							
81							
82							
83							
84							
85							
86							
87							
88							
89							

MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 06/19/18 Prep By: mmf SIF File #: 062018-1
 Block #1 Temperature: 49.49 Start Time: 5:45a Machine ID: 1
 Block #2 Temperature: ~95 Stop Time: 8:00a Batch Analyst: mmf
 Block #3 Temperature: 93.84 Typed By: mmf Verified By: DLH

A/S	Curve & QC's	0.4ug/ml working std	BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0	40	40	Standard #1 (for working std)
2	0.004 ug	0.01ml	40	40	Lot #: <u>4705145</u>
3	0.04 ug	0.10ml	40	40	Working Standard
4	0.08 ug	0.20ml	40	40	Lot #: <u>Hg3-012-1</u> by: <u>mmf</u>
5	0.16 ug	0.40ml	40	40	Standard #2 (QC #2):
6	0.20ug	0.50ml	40	40	Lot #: <u>Hg3-012-2</u>
					Standard #3 (QC #3):
					Lot #: <u>Hg3-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std	40	40	
8	QC #3= 0.08ug	0.2ml #3 std	40	40	Curve prepared by: <u>mmf</u>

Initial Review By: mmf

Date: 6/20/18

Time: 1:31

Final QC Review By: DLH

Date: 6/20/18

Time: 9:00

Comments: 31368-1B-4B were typed in wrong -> initial volume needs to be changed
31351-2A @ 0.5mls 31367-1C audit

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	31306-17QC	7470A			0.05	5	TV=11.1
10	4/L	↓			1	1	TV=0.008
11	31368-9	m29			1	100	
12	-9n	↓			2	↓	
13	-9	↓			4	↓	
14	31368-1C	↓			↓	400	
15	-2c	↓			↓	↓	
16	-2cd	↓			↓	↓	
17	-3c	↓			↓	↓	
18	-3ct	↓			↓	↓	
19	-4c	↓			↓	↓	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"*" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 117100 HCl Lot #: 4117040

Persulfate Lot # Hg3-002-8 KMnO₄ Lot # Hg3-013-6 Hydrox Lot#: Hg3-009-2

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: 062018-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
✓ 20	31368-5C	m79			4	400	
21	-6C				↓	↓	
22	-1B				0.4	500	
23	-2B				0.5	↓	
24	-2BD				↓	↓	
25	-3B				0.4	↓	
26	-3B+				↓	↓	
27	-4B				↓	↓	
28	-4BPH				4	100	
29	-4BPH+				1.6	↓	
30	-1PH				4	↓	
31	-2PH				↓	↓	
32	-2PHD				↓	↓	
33	-3PH				↓	↓	
34	-3PH+				↓	↓	
35	-4PH				↓	↓	
36	-5PH				↓	↓	
37	-6PH				↓	↓	
✓ 38	31351-29				1	1000	
39	-29D				↓	↓	
40	-29+				↓	↓	
41	-9BH				0.5	570	
42	-17BH				0.5	112	
43	-19BH				0.5	118	
44	-19BH+				↓	↓	
45	31367-6				4	100	
46	-6D				↓	↓	
47	-6+	← missed tube			↓	↓	
48	-1BH				4	900	
49	-2BH				↓	935	
50	-2BH+D				↓	↓	
51	-3BH				↓	970	
52	-3BH+				↓	↓	
53	-4BH				↓	330	
54	-5BH				↓	220	

SIF File #: 062018-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
✓ 55	31367-7	m29			0.05	5	
56	-7	↓			0.1	↓	
57	-7	↓			0.2	↓	
✓ 58	31354-2B1K	7470A			20	1	
59	-B1K+	↓			↓	↓	
✓ 60	31354-2	↓			↓	↓	
✓ 61	31364-B1K	7470A			20	1	
62	-B1K+	↓			↓	↓	
✓ 63	31364-2	↓			10	↓	
64	-2+	↓			10	↓	
65	-2	↓			5	↓	
✓ 66	-2+	↓			5	↓	
✓ 67	31351-13BH	m29			4	715	
✓ 68	313108-9	↓			0.5	100	
69	-9D	↓			↓	↓	
70	-9+	↓			↓	↓	
71	-2C	↓			2	400	2x dil
72	-2CD	↓			2	400	2x dil
73	-3C	↓			0.4	↓	
74	-3C+	↓			0.4	↓	
75							
76							
77							
78							
79							
80							
81							
82							
83							
84							
85							
86							
87							
88							
89							

MERCURY BATCH DIGESTION - RUN WORKSHEET

ed/Digested: 062018 Prep By: mmp SIF File #: 062118-1
 Block #1 Temperature: 94.4 Start Time: 5:45a Machine ID: 2
 Block #2 Temperature: 92.7 Stop Time: 8:00a Batch Analyst: mmp
 Block #3 Temperature: 295 Typed By: mmp Verified By: DKH

A/S	Curve & QC's	0.4ug/ml working std		BV, ml	FV, ml	Standard Lot Numbers
1	Lab BLK (3/ batch)	0		40	40	Standard #1 (for working std) Lot #: <u>4705145</u>
2	0.004 ug	0.01ml		40	40	Working Standard
3	0.04 ug	0.10ml		40	40	Lot #: <u>493-012-1</u> by: <u>mmp</u>
4	0.08 ug	0.20ml		40	40	Standard #2 (QC #2):
5	0.16 ug	0.40ml		40	40	Lot #: <u>493-012-2</u>
6	0.20ug	0.50ml		40	40	Standard #3 (QC #3): Lot #: <u>493-012-3</u>
7	QC #2= 0.08ug	0.2ml #2 std		40	40	
8	QC #3= 0.08ug	0.2ml #3 std		40	40	Curve prepared by: <u>DKH</u>

Initial Review By: mmp Date: 6/21/18 Time:
 Final QC Review By: DKH Date: ↓ Time:
 Comments:

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
9	31306-17QC	7470A			0.05	5	TV=11.1
10	41C (spike)	↓			1	1	TV=0.008
11	31368-69	m29			0.5	100	
12	-9D	↓			↓	↓	
13	-9+	↓			↓	↓	
14	31368-4A	↓			4	200	
15	31367-6	↓			↓	100	
16	-6D	↓			↓	↓	
17	-6+	↓			↓	↓	
18	31367-1A	↓			4	200	
19	-2A	↓			↓	↓	

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... Persulfate @ 3.2ml..... KMnO₄ @ 6.0ml

H₂SO₄ Lot # 177436 HNO₃ Lot # 117100 HCl Lot #: 4117040

Persulfate Lot # 493-002-8 KMnO₄ Lot # 493-013-7 Hydrox Lot#: 493-009-1

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: 062118-1

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
20	31367-2AD	m79			4	200	
21	-3A				↓	↓	
22	-3A+				↓	↓	
23	-4A				↓	↓	
24	-5A				↓	↓	
25	-1B					500	
26	-2B					↓	
27	-2B0					500	
28	-3B					↓	
29	-3B+					↓	
30	-4B					↓	
31	-5B				↓	↓	
32	31367-1C				4	500	
33	-2C				↓	↓	
34	-2C0				↓	↓	
35	-3C				↓	↓	
36	-3C+				↓	↓	
37	-4C				↓	↓	
38	-5C				↓	↓	
39	31367-7				0.05	5	
40	-7D				↓	↓	
41	-7+				↓	↓	
42	31351-3A				4	200	
43	-3A+				↓	↓	
44	31351-29				0.5	1000	
45	-29D				↓	↓	
46	-29+				↓	↓	
47	31366/370-BK	7470A			20	1	
48	-BK+				↓	↓	
49	31366				↓	↓	
50	31370-1				↓	↓	
51	-2				↓	↓	
52	-2D				↓	↓	
53	-3				↓	↓	
54	-3+				↓	↓	

SIF File #: 0621181

A/S	LAB #	Method	Wt (g)/ FV (mL)	Prep Aliquot Used, mL	Aliquot or Calc Mass	FV, mL or "1" for conc.	Comments
55	31370-4	7470A			20	1	
56	-5						
57	-6						
58	-6+						
59	-7						
60	-8						
61	-9						
62	-9+						
63	-10						
64	31371-1						
65	-10						
66	-2						
67	-2+	↓				↓	
68	31368-1B	mag				500	
69	-38 ^{mag}	↓				↓	
70	-38+	↓				↓	
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							
81							
82							
83							
84							
85							
86							
87							
88							
89							

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date: Tuesday, June 19, 2018 16:45:11

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3934.1		ppb
-	Be	9	1.7		ppb
-	P	31	1596.7		ppb
>	Sc	45	6083.1		ppb
-	Cr	52	575		ppb
-	Cr	53	432.7		ppb
-	Mn	55	107		ppb
-	Co	59	17.3		ppb
-	Ni	60	10.3		ppb
-	Cu	63	54.3		ppb
-	Cu	65	24.7		ppb
-	Zn	66	24.7		ppb
-	Zn	67	16		ppb
-	Zn	68	99.7		ppb
-	As	75	38.1		ppb
-	Se	77	60.3		ppb
-	Se	82	0.8		ppb
>	Rh	103	4735.1		ppb
-	Ag	107	16		ppb
-	Ag	109	17		ppb
-	Cd	111	11.3		ppb
-	Cd	114	12.1		ppb
-	Sb	121	43.7		ppb
-	Sb	123	28.2		ppb
-	Ba	135	20.7		ppb
-	Ba	137	31		ppb
>	Ho	165	45790.2		ppb
-	Tl	205	87.3		ppb
-	Pb	208	218.7		ppb
-	Kr	83	25.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Tuesday, June 19, 2018 16:48:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4121.4		ppb
-	Be	9	17.3	0.86067	ppb
-	P	31	1782.1	8.46315	ppb
>	Sc	45	6380.8		ppb
-	Cr	52	766	0.78793	ppb
-	Cr	53	507.3	2.23881	ppb
-	Mn	55	362.3	0.96919	ppb
-	Co	59	185.7	0.94774	ppb
-	Ni	60	42.7	0.83734	ppb
-	Cu	63	151	1.04471	ppb
-	Cu	65	64.3	0.96039	ppb
-	Zn	66	44.3	0.91436	ppb
-	Zn	67	14.7	-0.54654	ppb
-	Zn	68	115.7	0.9504	ppb
-	As	75	62.9	1.13953	ppb
-	Se	77	59.7	-2.06343	ppb
-	Se	82	3.1	1.45291	ppb
>	Rh	103	4853.1		ppb
-	Ag	107	100.7	0.9166	ppb
-	Ag	109	91.7		ppb
-	Cd	111	35.8	0.73273	ppb
-	Cd	114	135.1	0.98013	ppb
-	Sb	121	242.7		ppb
-	Sb	123	198.7	0.97724	ppb
-	Ba	135	104		ppb
-	Ba	137	208.7	0.90205	ppb
>	Ho	165	47377.2		ppb
-	Tl	205	1413.4	0.9841	ppb
-	Pb	208	1907.7	0.95205	ppb
-	Kr	83	27		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Tuesday, June 19, 2018 16:51:24

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4349.8		ppb
-	Be	9	1788.4	93.33241	ppb
-	P	31	15679.9	1017.6585	ppb
>	Sc	45	6866.6		ppb
-	Cr	52	22294.3	97.43378	ppb
-	Cr	53	2985.2	97.28293	ppb
-	Mn	55	27976	98.55799	ppb
-	Co	59	19038.2	99.09757	ppb
-	Ni	60	4104	98.52348	ppb
-	Cu	63	9804.6	98.54359	ppb
-	Cu	65	4314.4	97.21147	ppb
-	Zn	66	2248.1	98.34052	ppb
-	Zn	67	347	97.72093	ppb
-	Zn	68	1624.4	98.73451	ppb
-	As	75	2232.6	97.51044	ppb
-	Se	77	165	83.64266	ppb
-	Se	82	152.8	89.39875	ppb
>	Rh	103	5261.6		ppb
-	Ag	107	9888.3	99.05469	ppb
-	Ag	109	9205.4		ppb
-	Cd	111	3527.9	98.1012	ppb
-	Cd	114	13725.1	100.94902	ppb
-	Sb	121	24311.8		ppb
-	Sb	123	18578.8	101.50503	ppb
-	Ba	135	10810.3		ppb
-	Ba	137	20644.5	99.87348	ppb
>	Ho	165	49950.5		ppb
-	Tl	205	142946.2	100.80089	ppb
-	Pb	208	186272.9	99.90119	ppb
-	Kr	83	30.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Tuesday, June 19, 2018 16:54:30

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4266.3		ppb
-	Be	9	9409.4	501.3338	ppb
-	P	31	67535.4	4996.5145	ppb
>	Sc	45	6630.9		ppb
-	Cr	52	107988.7	500.51367	ppb
-	Cr	53	12878	500.54094	ppb
-	Mn	55	138399.4	500.28846	ppb
-	Co	59	93893.7	500.18059	ppb
-	Ni	60	20336.6	500.29563	ppb
-	Cu	63	48440.2	500.29119	ppb
-	Cu	65	21615	500.55779	ppb
-	Zn	66	11076.5	500.33207	ppb
-	Zn	67	1667.1	500.45891	ppb
-	Zn	68	7607.8	500.2532	ppb
-	As	75	11035.4	500.49763	ppb
-	Se	77	642	503.2776	ppb
-	Se	82	834.8	502.11935	ppb
>	Rh	103	5145.5		ppb
-	Ag	107	48763.2	500.18923	ppb
-	Ag	109	46576		ppb
-	Cd	111	17546.3	500.38029	ppb
-	Cd	114	66410.7	499.81024	ppb
-	Sb	121	119188.1		ppb
-	Sb	123	89452.1	499.69904	ppb
-	Ba	135	52099.6		ppb
-	Ba	137	101099.7	500.0255	ppb
>	Ho	165	48910.8		ppb
-	Tl	205	693784	499.83985	ppb
-	Pb	208	912049	500.01986	ppb
-	Kr	83	31.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 16:57:37

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3944		ppb
-	Be	9	3	0.07531	ppb
-	P	31	1411.4	-17.95806	ppb
>	Sc	45	6223.4		ppb
-	Cr	52	638.3	0.24874	ppb
-	Cr	53	485.3	1.82359	ppb
-	Mn	55	113	0.01533	ppb
-	Co	59	24.7	0.03981	ppb
-	Ni	60	14.3	0.10015	ppb
-	Cu	63	62.3	0.0771	ppb
-	Cu	65	23.3	-0.04416	ppb
-	Zn	66	24	-0.05617	ppb
-	Zn	67	11.3	-1.60861	ppb
-	Zn	68	104.7	0.22266	ppb
-	As	75	79.7	1.98229	ppb
-	Se	77	51.7	-9.12114	ppb
-	Se	82	3.8	1.92323	ppb
>	Rh	103	4824.5		ppb
-	Ag	107	48	0.34669	ppb
-	Ag	109	52		ppb
-	Cd	111	8.1	-0.10624	ppb
-	Cd	114	18.1	0.04679	ppb
-	Sb	121	45.7		ppb
-	Sb	123	38.3	0.05787	ppb
-	Ba	135	28		ppb
-	Ba	137	32	0.0038	ppb
>	Ho	165	46260.1		ppb
-	Tl	205	146	0.04407	ppb
-	Pb	208	284	0.03661	ppb
-	Kr	83	23.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Tuesday, June 19, 2018 17:00:44

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4003.5		ppb
-	Be	9	18.7	0.96418	ppb
-	P	31	1607.7	-5.27464	ppb
>	Sc	45	6380.5		ppb
-	Cr	52	811.3	1.00869	ppb
-	Cr	53	529.3	3.15843	ppb
-	Mn	55	354.7	0.95042	ppb
-	Co	59	187.3	0.96597	ppb
-	Ni	60	52.3	1.09982	ppb
-	Cu	63	147.3	1.01768	ppb
-	Cu	65	72	1.16214	ppb
-	Zn	66	33.7	0.41493	ppb
-	Zn	67	13	-1.06245	ppb
-	Zn	68	113	0.82913	ppb
-	As	75	101.5	3.04992	ppb
-	Se	77	60.7	-0.64747	ppb
-	Se	82	0.1	-0.46167	ppb
>	Rh	103	4815.5		ppb
-	Ag	107	110.3	1.0315	ppb
-	Ag	109	110		ppb
-	Cd	111	38	0.80585	ppb
-	Cd	114	141.2	1.03705	ppb
-	Sb	121	268.3		ppb
-	Sb	123	200.6	1.01706	ppb
-	Ba	135	107.3		ppb
-	Ba	137	207.7	0.92342	ppb
>	Ho	165	46229.4		ppb
-	Tl	205	1397.4	0.99814	ppb
-	Pb	208	1893.4	0.9704	ppb
-	Kr	83	29.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Tuesday, June 19, 2018 17:03:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	4093.3		ppb
-	Be	9	4409.7	244.55514	ppb
-	P	31	31783.9	2365.4739	ppb
>	Sc	45	6406.8		ppb
-	Cr	52	53092.3	253.20892	ppb
-	Cr	53	6506.5	252.65596	ppb
-	Mn	55	66895.7	249.11229	ppb
-	Co	59	45660.7	250.76455	ppb
-	Ni	60	9739.6	246.92187	ppb
-	Cu	63	23647.2	251.51075	ppb
-	Cu	65	10485.9	250.0511	ppb
-	Zn	66	5337.6	248.00151	ppb
-	Zn	67	818	250.56926	ppb
-	Zn	68	3885.3	260.03341	ppb
-	As	75	5418	252.44451	ppb
-	Se	77	354	261.40207	ppb
-	Se	82	414.4	256.83518	ppb
>	Rh	103	4990.5		ppb
-	Ag	107	24018.2	253.90043	ppb
-	Ag	109	22916.8		ppb
-	Cd	111	8363.4	245.80421	ppb
-	Cd	114	31938.5	247.81755	ppb
-	Sb	121	57797.7		ppb
-	Sb	123	43843.4	251.70458	ppb
-	Ba	135	25556.7		ppb
-	Ba	137	49021.7	249.18015	ppb
>	Ho	165	47579.9		ppb
-	Tl	205	337372.2	249.83664	ppb
-	Pb	208	435317.1	245.28197	ppb
-	Kr	83	30.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 17:06:57

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	4248.1		ppb
-	Be	9	1766.4	94.35078	ppb
-	P	31	14896.1	989.18781	ppb
>	Sc	45	6687.9		ppb
-	Cr	52	22171.8	99.56037	ppb
-	Cr	53	2937.8	98.47395	ppb
-	Mn	55	27802.1	97.60709	ppb
-	Co	59	18955.2	98.32578	ppb
-	Ni	60	4040	96.6452	ppb
-	Cu	63	9596.2	96.10669	ppb
-	Cu	65	4277.4	96.05555	ppb
-	Zn	66	2252.8	98.197	ppb
-	Zn	67	338.3	94.79465	ppb
-	Zn	68	1635.7	99.12493	ppb
-	As	75	2335.2	101.70176	ppb
-	Se	77	179	95.05403	ppb
-	Se	82	163.4	95.35152	ppb
>	Rh	103	5279.6		ppb
-	Ag	107	9990	99.72632	ppb
-	Ag	109	9480.8		ppb
-	Cd	111	3603.4	99.87654	ppb
-	Cd	114	13363.9	97.9512	ppb
-	Sb	121	23929.4		ppb
-	Sb	123	17940	100.09717	ppb
-	Ba	135	10647.3		ppb
-	Ba	137	20170.8	99.65189	ppb
>	Ho	165	48903.5		ppb
-	Tl	205	139052.4	100.14122	ppb
-	Pb	208	183756.7	100.66229	ppb
-	Kr	83	32.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date: Tuesday, June 19, 2018 17:10:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4288		ppb
-	Be	9	956.4	50.54924	ppb
-	P	31	3918.3	159.09649	ppb
>	Sc	45	6777.9		ppb
-	Cr	52	11421.6	49.17767	ppb
-	Cr	53	1740.1	49.67159	ppb
-	Mn	55	14026.6	49.76277	ppb
-	Co	59	9303.1	48.91934	ppb
-	Ni	60	1978.1	47.87503	ppb
-	Cu	63	4861.5	49.10553	ppb
-	Cu	65	2187.1	49.52918	ppb
-	Zn	66	1114.7	48.70211	ppb
-	Zn	67	179	48.43047	ppb
-	Zn	68	871	50.23273	ppb
-	As	75	1228.6	53.42694	ppb
-	Se	77	120.7	46.96166	ppb
-	Se	82	99.4	58.67938	ppb
>	Rh	103	5202.9		ppb
-	Ag	107	4961.5	50.16929	ppb
-	Ag	109	4702.1		ppb
-	Cd	111	1740	48.76041	ppb
-	Cd	114	6688.9	49.69685	ppb
-	Sb	121	12810.6		ppb
-	Sb	123	9681.5	53.46226	ppb
-	Ba	135	5328.9		ppb
-	Ba	137	10058.4	49.16867	ppb
>	Ho	165	49339.6		ppb
-	Tl	205	69021.2	49.2335	ppb
-	Pb	208	91853.5	49.80823	ppb
-	Kr	83	29		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Tuesday, June 19, 2018 17:13:12

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	5735.5		ppb
-	Be	9	3	0.02235	ppb
-	P	31	91832	4889.4066	ppb
>	Sc	45	9211.7		ppb
-	Cr	52	664.3	-0.69201	ppb
-	Cr	53	710.3	1.59725	ppb
-	Mn	55	142.7	-0.0405	ppb
-	Co	59	20.3	-0.02045	ppb
-	Ni	60	11.7	-0.06498	ppb
-	Cu	63	60.3	-0.1517	ppb
-	Cu	65	22	-0.24624	ppb
-	Zn	66	47	0.35162	ppb
-	Zn	67	27.7	0.88748	ppb
-	Zn	68	122.3	-1.21254	ppb
-	As	75	101.2	1.51213	ppb
-	Se	77	86.7	-1.59502	ppb
-	Se	82	-3.6	-2.11544	ppb
>	Rh	103	6996		ppb
-	Ag	107	27.7	0.03048	ppb
-	Ag	109	18.7		ppb
-	Cd	111	4.9	-0.24549	ppb
-	Cd	114	11	-0.03764	ppb
-	Sb	121	67		ppb
-	Sb	123	47.5	0.02498	ppb
-	Ba	135	21.7		ppb
-	Ba	137	29	-0.05908	ppb
>	Ho	165	66983.6		ppb
-	Tl	205	45.3	-0.04336	ppb
-	Pb	208	195.3	-0.04986	ppb
-	Kr	83	33.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Tuesday, June 19, 2018 17:16:19

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	5704		ppb
-	Be	9	3.7	0.05143	ppb
-	P	31	90387.8	4850.1443	ppb
>	Sc	45	9135		ppb
-	Cr	52	948	0.28738	ppb
-	Cr	53	892.7	7.10172	ppb
-	Mn	55	477.3	0.84262	ppb
-	Co	59	511.3	1.89166	ppb
-	Ni	60	136.7	2.18454	ppb
-	Cu	63	202	0.91701	ppb
-	Cu	65	82	0.76898	ppb
-	Zn	66	73.3	1.216	ppb
-	Zn	67	26.7	0.64647	ppb
-	Zn	68	158.3	0.50203	ppb
-	As	75	112.6	1.86546	ppb
-	Se	77	94.3	2.9861	ppb
-	Se	82	-2.9	-1.80809	ppb
>	Rh	103	7035		ppb
-	Ag	107	11849.1	88.75013	ppb
-	Ag	109	11313.2		ppb
-	Cd	111	19.9	0.06306	ppb
-	Cd	114	97.9	0.44047	ppb
-	Sb	121	50.7		ppb
-	Sb	123	39.9	-0.00374	ppb
-	Ba	135	19.3		ppb
-	Ba	137	22.7	-0.08085	ppb
>	Ho	165	66166.8		ppb
-	Tl	205	21.7	-0.05566	ppb
-	Pb	208	160	-0.06322	ppb
-	Kr	83	31.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Tuesday, June 19, 2018 17:19:25

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	8218.3		ppb
-	Be	9	9	0.15295	ppb
-	P	31	1228.4	-85.2174	ppb
>	Sc	45	13182.1		ppb
-	Cr	52	826	-0.98221	ppb
-	Cr	53	1221.4	5.77839	ppb
-	Mn	55	352.3	0.22225	ppb
-	Co	59	103	0.17625	ppb
-	Ni	60	85.3	0.78319	ppb
-	Cu	63	336	1.14177	ppb
-	Cu	65	153	1.16783	ppb
-	Zn	66	323	6.16031	ppb
-	Zn	67	68.3	5.18515	ppb
-	Zn	68	334	4.00481	ppb
-	As	75	66.7	-0.35473	ppb
-	Se	77	108.3	-9.5545	ppb
-	Se	82	3.1	0.42285	ppb
>	Rh	103	10203.7		ppb
-	Ag	107	18	-0.08528	ppb
-	Ag	109	18.7		ppb
-	Cd	111	27.8	0.04938	ppb
-	Cd	114	75	0.18606	ppb
-	Sb	121	196		ppb
-	Sb	123	143.2	0.24707	ppb
-	Ba	135	51		ppb
-	Ba	137	90	0.06738	ppb
>	Ho	165	94191.1		ppb
-	Tl	205	665.3	0.18173	ppb
-	Pb	208	1699.4	0.35585	ppb
-	Kr	83	28		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Tuesday, June 19, 2018 17:22:32

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3790.7		ppb
-	Be	9	20.3	1.12141	ppb
-	P	31	1433	-15.75893	ppb
>	Sc	45	6202.4		ppb
-	Cr	52	833	1.23039	ppb
-	Cr	53	680.7	10.33551	ppb
-	Mn	55	347.3	0.89487	ppb
-	Co	59	191	0.9652	ppb
-	Ni	60	49	0.98683	ppb
-	Cu	63	146.3	0.97332	ppb
-	Cu	65	48.7	0.55949	ppb
-	Zn	66	39.3	0.65076	ppb
-	Zn	67	13.7	-0.93629	ppb
-	Zn	68	109	0.38648	ppb
-	As	75	89.7	2.39872	ppb
-	Se	77	71	7.65715	ppb
-	Se	82	-3.3	-2.59239	ppb
>	Rh	103	4915.1		ppb
-	Ag	107	108.3	0.98527	ppb
-	Ag	109	104		ppb
-	Cd	111	35.3	0.7035	ppb
-	Cd	114	126.9	0.90152	ppb
-	Sb	121	261		ppb
-	Sb	123	189	0.98757	ppb
-	Ba	135	110.7		ppb
-	Ba	137	181	0.8156	ppb
>	Ho	165	44718		ppb
-	Tl	205	1385.4	1.02475	ppb
-	Pb	208	1754.7	0.92439	ppb
-	Kr	83	36.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 17:25:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3896.8		ppb
-	Be	9	2.3	0.04001	ppb
-	P	31	1150.7	-38.59908	ppb
>	Sc	45	6194.1		ppb
-	Cr	52	611	0.12805	ppb
-	Cr	53	674	10.09758	ppb
-	Mn	55	86.3	-0.08584	ppb
-	Co	59	11.7	-0.03359	ppb
-	Ni	60	6.7	-0.10069	ppb
-	Cu	63	46	-0.10104	ppb
-	Cu	65	17	-0.19938	ppb
-	Zn	66	28.7	0.17807	ppb
-	Zn	67	13	-1.05406	ppb
-	Zn	68	99.7	-0.09574	ppb
-	As	75	65.4	1.31523	ppb
-	Se	77	68.3	6.71819	ppb
-	Se	82	1.1	0.19959	ppb
>	Rh	103	4800.5		ppb
-	Ag	107	10.3	-0.0646	ppb
-	Ag	109	12.7		ppb
-	Cd	111	2.2	-0.2846	ppb
-	Cd	114	9	-0.02613	ppb
-	Sb	121	31		ppb
-	Sb	123	24.9	-0.01869	ppb
-	Ba	135	8.3		ppb
-	Ba	137	15	-0.08344	ppb
>	Ho	165	45181.8		ppb
-	Tl	205	14.7	-0.05578	ppb
-	Pb	208	83.3	-0.0786	ppb
-	Kr	83	27.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date: Tuesday, June 19, 2018 17:28:27

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3959.4		ppb
-	Be	9	4.3	0.15124	ppb
-	P	31	1240	-33.40788	ppb
>	Sc	45	6322.1		ppb
-	Cr	52	587	-0.05127	ppb
-	Cr	53	112.3	-14.27394	ppb
-	Mn	55	250.3	0.52874	ppb
-	Co	59	8.7	-0.05184	ppb
-	Ni	60	13.7	0.07389	ppb
-	Cu	63	103	0.5053	ppb
-	Cu	65	41.7	0.39145	ppb
-	Zn	66	54	1.34679	ppb
-	Zn	67	14	-0.77699	ppb
-	Zn	68	136	2.27747	ppb
-	As	75	74	1.64652	ppb
-	Se	77	13	-45.25413	ppb
-	Se	82	-4.3	-3.20133	ppb
>	Rh	103	4912.1		ppb
-	Ag	107	11.3	-0.05709	ppb
-	Ag	109	10		ppb
-	Cd	111	4.4	-0.21794	ppb
-	Cd	114	6.8	-0.04472	ppb
-	Sb	121	46.3		ppb
-	Sb	123	39.5	0.07035	ppb
-	Ba	135	14		ppb
-	Ba	137	16.7	-0.0744	ppb
>	Ho	165	45166.8		ppb
-	Tl	205	11.3	-0.0584	ppb
-	Pb	208	205.7	-0.0059	ppb
-	Kr	83	34		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date: Tuesday, June 19, 2018 17:31:34

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4169.8		ppb
-	Be	9	855	46.46178	ppb
-	P	31	3574.3	149.65171	ppb
>	Sc	45	6387.1		ppb
-	Cr	52	10797.7	49.34288	ppb
-	Cr	53	1260.7	33.7458	ppb
-	Mn	55	13183.8	48.57766	ppb
-	Co	59	8781.9	47.95939	ppb
-	Ni	60	1865.1	46.89031	ppb
-	Cu	63	4547.4	47.68644	ppb
-	Cu	65	2072.8	48.75726	ppb
-	Zn	66	1088	49.40012	ppb
-	Zn	67	177	49.9005	ppb
-	Zn	68	840	50.35116	ppb
-	As	75	1040.8	46.79297	ppb
-	Se	77	72.3	7.53232	ppb
-	Se	82	71.1	43.54737	ppb
>	Rh	103	5009.8		ppb
-	Ag	107	4870.1	51.13864	ppb
-	Ag	109	4648.1		ppb
-	Cd	111	1651.4	48.05175	ppb
-	Cd	114	6199.5	47.82784	ppb
-	Sb	121	11793.8		ppb
-	Sb	123	8834.1	52.02147	ppb
-	Ba	135	5056.2		ppb
-	Ba	137	9618.5	50.14534	ppb
>	Ho	165	46265.8		ppb
-	Tl	205	64148.2	48.79891	ppb
-	Pb	208	86757.6	50.17135	ppb
-	Kr	83	31.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 FH

Sample Date: Tuesday, June 19, 2018 17:34:40

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4113.7		ppb
-	Be	9	3.7	0.10539	ppb
-	P	31	1986.7	21.21745	ppb
>	Sc	45	6528.2		ppb
-	Cr	52	4847.5	20.05214	ppb
-	Cr	53	572.7	4.46069	ppb
-	Mn	55	11099.8	40.37435	ppb
-	Co	59	150.3	0.71376	ppb
-	Ni	60	1026.7	25.3962	ppb
-	Cu	63	1614.4	16.3456	ppb
-	Cu	65	727	16.49885	ppb
-	Zn	66	136597.5	6281.9616	ppb
-	Zn	67	19983.3	6153.6025	ppb
-	Zn	68	92528.6	6262.7792	ppb
-	As	75	125.3	3.91513	ppb
-	Se	77	27.3	-32.99427	ppb
-	Se	82	21.8	12.79795	ppb
>	Rh	103	5065.2		ppb
-	Ag	107	36.7	0.20346	ppb
-	Ag	109	48.7		ppb
-	Cd	111	1155.1	33.13585	ppb
-	Cd	114	4208.1	32.08141	ppb
-	Sb	121	1165		ppb
-	Sb	123	849.3	4.72213	ppb
-	Ba	135	4107.3		ppb
-	Ba	137	7788.2	39.54644	ppb
>	Ho	165	47459		ppb
-	Tl	205	162.7	0.05359	ppb
-	Pb	208	136426.6	76.97321	ppb
-	Kr	83	31		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date: Tuesday, June 19, 2018 17:37:46

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4078.5		ppb
-	Be	9	2.3	0.0338	ppb
-	P	31	2437.5	59.19231	ppb
>	Sc	45	6413.5		ppb
-	Cr	52	5096.9	21.64156	ppb
-	Cr	53	590.3	5.59574	ppb
-	Mn	55	12667.9	46.44633	ppb
-	Co	59	201.3	0.99585	ppb
-	Ni	60	1074.4	26.75632	ppb
-	Cu	63	1780.1	18.21636	ppb
-	Cu	65	784.3	17.97803	ppb
-	Zn	66	141363.2	6544.8223	ppb
-	Zn	67	20719.9	6423.4359	ppb
-	Zn	68	95361.9	6498.2276	ppb
-	As	75	98.9	2.71497	ppb
-	Se	77	36	-25.11006	ppb
-	Se	82	28.7	17.13755	ppb
>	Rh	103	5031.8		ppb
-	Ag	107	38	0.21984	ppb
-	Ag	109	34.7		ppb
-	Cd	111	687.2	19.70545	ppb
-	Cd	114	2561.7	19.62546	ppb
-	Sb	121	1472.4		ppb
-	Sb	123	1094.6	6.21039	ppb
-	Ba	135	4132		ppb
-	Ba	137	7870.2	40.43765	ppb
>	Ho	165	46909.3		ppb
-	Tl	205	119.7	0.02266	ppb
-	Pb	208	189356.1	108.14814	ppb
-	Kr	83	34.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date: Tuesday, June 19, 2018 17:40:53

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3996.1		ppb
-	Be	9	3.7	0.11261	ppb
-	P	31	2322.4	50.28091	ppb
>	Sc	45	6410.5		ppb
-	Cr	52	4986.2	21.12833	ppb
-	Cr	53	558	4.25545	ppb
-	Mn	55	12113.3	43.99032	ppb
-	Co	59	191.3	0.933	ppb
-	Ni	60	1050.4	25.92538	ppb
-	Cu	63	1741.7	17.64218	ppb
-	Cu	65	782.7	17.76982	ppb
-	Zn	66	140192	6432.5081	ppb
-	Zn	67	20282.2	6231.0752	ppb
-	Zn	68	94346.4	6370.8553	ppb
-	As	75	108.3	3.11969	ppb
-	Se	77	34.3	-26.85585	ppb
-	Se	82	33.1	19.67719	ppb
>	Rh	103	5077.2		ppb
-	Ag	107	40.7	0.24524	ppb
-	Ag	109	23.3		ppb
-	Cd	111	630.6	17.8882	ppb
-	Cd	114	2482.4	18.83838	ppb
-	Sb	121	1487.7		ppb
-	Sb	123	1103.8	6.23845	ppb
-	Ba	135	4050.3		ppb
-	Ba	137	7571.5	38.75605	ppb
>	Ho	165	47079.3		ppb
-	Tl	205	124	0.02562	ppb
-	Pb	208	186670.7	106.23288	ppb
	Kr	83	31.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date: Tuesday, June 19, 2018 17:43:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3956.1		ppb
-	Be	9	4.3	0.15254	ppb
-	P	31	1928.4	21.37242	ppb
>	Sc	45	6325.1		ppb
-	Cr	52	4196.7	17.58583	ppb
-	Cr	53	435.7	-0.59411	ppb
-	Mn	55	10546.9	39.67355	ppb
-	Co	59	152.3	0.75265	ppb
-	Ni	60	387.3	9.73932	ppb
-	Cu	63	1478.4	15.45744	ppb
-	Cu	65	636.3	14.8926	ppb
-	Zn	66	113721.4	5410.3323	ppb
-	Zn	67	16580.8	5281.8948	ppb
-	Zn	68	76645	5365.8812	ppb
-	As	75	107.2	3.23127	ppb
-	Se	77	12.3	-45.96379	ppb
-	Se	82	5.4	2.86974	ppb
>	Rh	103	4898.5		ppb
-	Ag	107	21.7	0.05565	ppb
-	Ag	109	18		ppb
-	Cd	111	591	17.36972	ppb
-	Cd	114	2194.5	17.25599	ppb
-	Sb	121	837.3		ppb
-	Sb	123	687.7	3.87962	ppb
-	Ba	135	2827.2		ppb
-	Ba	137	5398.2	27.97325	ppb
>	Ho	165	46424.4		ppb
-	Tl	205	86.7	-0.00136	ppb
-	Pb	208	150535	86.84033	ppb
	Kr	83	29.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date: Tuesday, June 19, 2018 17:47:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3969.5		ppb
-	Be	9	897.7	51.26987	ppb
-	P	31	4405.7	215.69977	ppb
>	Sc	45	6376.5		ppb
-	Cr	52	14512.5	67.42324	ppb
-	Cr	53	1650.4	50.20846	ppb
-	Mn	55	23774.3	89.6743	ppb
-	Co	59	9052	50.41179	ppb
-	Ni	60	2304.4	59.13747	ppb
-	Cu	63	6153.8	66.04698	ppb
-	Cu	65	2788.8	67.1096	ppb
-	Zn	66	116231.6	5511.27	ppb
-	Zn	67	16976.4	5389.7622	ppb
-	Zn	68	78397.7	5470.2629	ppb
-	As	75	1132	52.10587	ppb
-	Se	77	56.7	-5.40683	ppb
-	Se	82	78.1	48.80033	ppb
>	Rh	103	4912.5		ppb
-	Ag	107	5019.2	53.7641	ppb
-	Ag	109	4707.1		ppb
-	Cd	111	2260.9	67.24434	ppb
-	Cd	114	8665	68.2298	ppb
-	Sb	121	12989.7		ppb
-	Sb	123	9772.1	57.07894	ppb
-	Ba	135	8133.3		ppb
-	Ba	137	15249.7	78.95236	ppb
>	Ho	165	46653.8		ppb
-	Tl	205	65121.4	49.12765	ppb
-	Pb	208	237758.6	136.5811	ppb
-	Kr	83	34.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 FH

Sample Date: Tuesday, June 19, 2018 17:50:12

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4186.2		ppb
-	Be	9	3.7	0.10262	ppb
-	P	31	1818.4	5.38715	ppb
>	Sc	45	6656.9		ppb
-	Cr	52	4037.3	15.82462	ppb
-	Cr	53	409.7	-2.56297	ppb
-	Mn	55	11293.2	40.19191	ppb
-	Co	59	99.7	0.42737	ppb
-	Ni	60	364.3	8.63824	ppb
-	Cu	63	1370.4	13.4721	ppb
-	Cu	65	603.3	13.28406	ppb
-	Zn	66	102218.9	4599.7897	ppb
-	Zn	67	15087.9	4544.9711	ppb
-	Zn	68	68895.8	4560.7237	ppb
-	As	75	114.5	3.3065	ppb
-	Se	77	15	-44.18829	ppb
-	Se	82	3.7	1.77442	ppb
>	Rh	103	5177.2		ppb
-	Ag	107	20.3	0.02848	ppb
-	Ag	109	21		ppb
-	Cd	111	538.4	14.92327	ppb
-	Cd	114	2138.8	15.90671	ppb
-	Sb	121	763		ppb
-	Sb	123	600.5	3.26202	ppb
-	Ba	135	2859.5		ppb
-	Ba	137	5431.3	27.29864	ppb
>	Ho	165	47855.8		ppb
-	Tl	205	84.3	-0.00515	ppb
-	Pb	208	101437.4	56.72952	ppb
-	Kr	83	35.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 17:53:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4118.3		ppb
-	Be	9	1.7	-0.00454	ppb
-	P	31	1201.7	-39.22355	ppb
>	Sc	45	6510.2		ppb
-	Cr	52	609	-0.03085	ppb
-	Cr	53	770	12.61333	ppb
-	Mn	55	108.7	-0.02588	ppb
-	Co	59	7	-0.06301	ppb
-	Ni	60	8.3	-0.06987	ppb
-	Cu	63	55.7	-0.02911	ppb
-	Cu	65	18.3	-0.19162	ppb
-	Zn	66	46.3	0.89478	ppb
-	Zn	67	18.7	0.42942	ppb
-	Zn	68	119.7	0.82452	ppb
-	As	75	69.4	1.28436	ppb
-	Se	77	72.3	6.45517	ppb
-	Se	82	-6.6	-4.49673	ppb
>	Rh	103	5111.2		ppb
-	Ag	107	7.3	-0.10308	ppb
-	Ag	109	14.3		ppb
-	Cd	111	2.4	-0.28322	ppb
-	Cd	114	10.6	-0.01786	ppb
-	Sb	121	29.3		ppb
-	Sb	123	21.6	-0.04117	ppb
-	Ba	135	13.3		ppb
-	Ba	137	22	-0.04886	ppb
>	Ho	165	46279.5		ppb
-	Tl	205	18	-0.05348	ppb
-	Pb	208	101.3	-0.06936	ppb
-	Kr	83	30		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 17:56:26

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4331.2		ppb
-	Be	9	1781.7	93.38763	ppb
-	P	31	14785	957.0674	ppb
>	Sc	45	6833.9		ppb
-	Cr	52	22324	98.04267	ppb
-	Cr	53	3246.2	108.04207	ppb
-	Mn	55	28024	96.75223	ppb
-	Co	59	18969.5	96.76946	ppb
-	Ni	60	4159.7	97.86528	ppb
-	Cu	63	9833.9	96.85152	ppb
-	Cu	65	4323.4	95.45555	ppb
-	Zn	66	2333.4	100.05253	ppb
-	Zn	67	350.7	96.6773	ppb
-	Zn	68	1600.7	95.11075	ppb
-	As	75	2285.9	97.86007	ppb
-	Se	77	181.3	94.50433	ppb
-	Se	82	155.7	89.37705	ppb
>	Rh	103	5368.6		ppb
-	Ag	107	10288.5	101.01014	ppb
-	Ag	109	9675.9		ppb
-	Cd	111	3582.3	97.63305	ppb
-	Cd	114	13356.1	96.26622	ppb
-	Sb	121	24219.4		ppb
-	Sb	123	18236	100.87648	ppb
-	Ba	135	10808.7		ppb
-	Ba	137	20418.3	100.00695	ppb
>	Ho	165	49325.3		ppb
-	Tl	205	139942.3	99.92099	ppb
-	Pb	208	183299.3	99.54492	ppb
-	Kr	83	35		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 FH

Sample Date: Tuesday, June 19, 2018 17:59:35

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3970.1		ppb
-	Be	9	5.3	0.20932	ppb
-	P	31	1467.4	-12.53805	ppb
>	Sc	45	6176.8		ppb
-	Cr	52	3002.5	12.10634	ppb
-	Cr	53	373	-2.87376	ppb
-	Mn	55	1956.1	7.13912	ppb
-	Co	59	55.7	0.21543	ppb
-	Ni	60	772.3	20.04224	ppb
-	Cu	63	394.3	3.74538	ppb
-	Cu	65	160.3	3.34859	ppb
-	Zn	66	1411.4	67.08136	ppb
-	Zn	67	200.3	59.71646	ppb
-	Zn	68	1003	64.26601	ppb
-	As	75	90.3	2.49893	ppb
-	Se	77	27.3	-31.7177	ppb
-	Se	82	26.1	16.20108	ppb
>	Rh	103	4817.5		ppb
-	Ag	107	24.7	0.0917	ppb
-	Ag	109	21		ppb
-	Cd	111	8.9	-0.07934	ppb
-	Cd	114	25.9	0.11047	ppb
-	Sb	121	181.7		ppb
-	Sb	123	137	0.66281	ppb
-	Ba	135	3065.9		ppb
-	Ba	137	5878.7	31.3927	ppb
>	Ho	165	45077.6		ppb
-	Tl	205	39.7	-0.03618	ppb
-	Pb	208	6034.9	3.46329	ppb
-	Kr	83	28.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 FH

Sample Date: Tuesday, June 19, 2018 18:02:41

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4001.8		ppb
-	Be	9	4.3	0.14964	ppb
-	P	31	1483.7	-14.22008	ppb
>	Sc	45	6332.8		ppb
-	Cr	52	3082.9	12.12088	ppb
-	Cr	53	339.3	-4.6933	ppb
-	Mn	55	2345.4	8.28522	ppb
-	Co	59	37.7	0.10639	ppb
-	Ni	60	859.3	21.42683	ppb
-	Cu	63	275.7	2.31069	ppb
-	Cu	65	117.7	2.17697	ppb
-	Zn	66	706	31.56517	ppb
-	Zn	67	126	33.94115	ppb
-	Zn	68	572	31.8998	ppb
-	As	75	92.9	2.43784	ppb
-	Se	77	12.7	-45.91554	ppb
-	Se	82	11.1	6.26181	ppb
>	Rh	103	5017.8		ppb
-	Ag	107	16.7	-0.00263	ppb
-	Ag	109	11		ppb
-	Cd	111	15.8	0.11439	ppb
-	Cd	114	16.2	0.02568	ppb
-	Sb	121	161		ppb
-	Sb	123	120.9	0.53978	ppb
-	Ba	135	3279.2		ppb
-	Ba	137	5999.7	30.93802	ppb
>	Ho	165	46678.2		ppb
-	Tl	205	22	-0.05054	ppb
-	Pb	208	3987.1	2.16344	ppb
-	Kr	83	25		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date: Tuesday, June 19, 2018 18:05:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4059.8		ppb
-	Be	9	3	0.07318	ppb
-	P	31	1325.7	-26.41223	ppb
>	Sc	45	6322.1		ppb
-	Cr	52	639.7	0.20575	ppb
-	Cr	53	65.7	-16.24241	ppb
-	Mn	55	175.7	0.25059	ppb
-	Co	59	13.3	-0.02515	ppb
-	Ni	60	10.7	0.0013	ppb
-	Cu	63	81.7	0.28221	ppb
-	Cu	65	32.7	0.18075	ppb
-	Zn	66	221	9.38225	ppb
-	Zn	67	28.3	3.83411	ppb
-	Zn	68	246	10.1423	ppb
-	As	75	68.5	1.41994	ppb
-	Se	77	9.3	-48.64826	ppb
-	Se	82	0.8	0.04222	ppb
>	Rh	103	4866.8		ppb
-	Ag	107	12.7	-0.04082	ppb
-	Ag	109	9.7		ppb
-	Cd	111	7.4	-0.12665	ppb
-	Cd	114	9	-0.02705	ppb
-	Sb	121	21		ppb
-	Sb	123	15.5	-0.07489	ppb
-	Ba	135	22		ppb
-	Ba	137	38	0.03921	ppb
>	Ho	165	45291		ppb
-	Tl	205	19.3	-0.05215	ppb
-	Pb	208	287.7	0.04227	ppb
-	Kr	83	30.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date: Tuesday, June 19, 2018 18:08:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3991.6		ppb
-	Be	9	910	51.66258	ppb
-	P	31	3638.9	164.39813	ppb
>	Sc	45	6179.8		ppb
-	Cr	52	10903	51.60859	ppb
-	Cr	53	1202	33.0178	ppb
-	Mn	55	13524	51.31677	ppb
-	Co	59	9002	50.61945	ppb
-	Ni	60	1910.4	49.45226	ppb
-	Cu	63	4726.8	51.07394	ppb
-	Cu	65	2100.4	50.88181	ppb
-	Zn	66	1248.7	58.59084	ppb
-	Zn	67	196.7	57.84853	ppb
-	Zn	68	948.7	59.71224	ppb
-	As	75	1110.9	51.58923	ppb
-	Se	77	60.7	-1.14364	ppb
-	Se	82	77.7	48.94389	ppb
>	Rh	103	4866.8		ppb
-	Ag	107	4780.8	51.6907	ppb
-	Ag	109	4548.7		ppb
-	Cd	111	1625.4	48.69714	ppb
-	Cd	114	6084.2	48.32564	ppb
-	Sb	121	12135.3		ppb
-	Sb	123	9314	55.91584	ppb
-	Ba	135	5151.5		ppb
-	Ba	137	9971	52.99289	ppb
>	Ho	165	45395.5		ppb
-	Tl	205	64384.5	49.92703	ppb
-	Pb	208	86061.4	50.72366	ppb
-	Kr	83	32		ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 BH

Sample Date: Tuesday, June 19, 2018 18:12:02

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3988.3		ppb
-	Be	9	3.7	0.11216	ppb
-	P	31	4917.8	263.58449	ppb
>	Sc	45	6257.8		ppb
-	Cr	52	1518.7	4.59635	ppb
-	Cr	53	146.3	-12.77076	ppb
-	Mn	55	8628.5	33.11626	ppb
-	Co	59	155.3	0.78881	ppb
-	Ni	60	181.3	4.52093	ppb
-	Cu	63	1015.7	10.67507	ppb
-	Cu	65	455.7	10.73162	ppb
-	Zn	66	6381.8	309.25617	ppb
-	Zn	67	944.7	302.67267	ppb
-	Zn	68	4383.1	306.80325	ppb
-	As	75	88.9	2.45257	ppb
-	Se	77	15	-43.17188	ppb
-	Se	82	11.1	6.66633	ppb
>	Rh	103	4789.8		ppb
-	Ag	107	77	0.67053	ppb
-	Ag	109	57		ppb
-	Cd	111	37.3	0.79002	ppb
-	Cd	114	113.3	0.81755	ppb
-	Sb	121	165.7		ppb
-	Sb	123	124.2	0.58721	ppb
-	Ba	135	782.7		ppb
-	Ba	137	1466.4	7.73901	ppb
>	Ho	165	44906.3		ppb
-	Tl	205	42	-0.03421	ppb
-	Pb	208	22511	13.31728	ppb
-	Kr	83	30.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Tuesday, June 19, 2018 18:15:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3959.4		ppb
-	Be	9	3.7	0.1146	ppb
-	P	31	5270.2	300.05335	ppb
>	Sc	45	6139.4		ppb
-	Cr	52	2609.8	10.21721	ppb
-	Cr	53	280.3	-6.81524	ppb
-	Mn	55	12886	50.53794	ppb
-	Co	59	320.7	1.76746	ppb
-	Ni	60	915.4	24.3565	ppb
-	Cu	63	3983.7	44.42098	ppb
-	Cu	65	1723.4	43.06206	ppb
-	Zn	66	11491.6	567.60381	ppb
-	Zn	67	1711.7	562.38745	ppb
-	Zn	68	7688.8	553.46142	ppb
-	As	75	126	4.38107	ppb
-	Se	77	17.7	-40.37433	ppb
-	Se	82	22.4	14.23524	ppb
>	Rh	103	4707.1		ppb
-	Ag	107	82.3	0.74568	ppb
-	Ag	109	84		ppb
-	Cd	111	34.7	0.73013	ppb
-	Cd	114	131.3	0.98132	ppb
-	Sb	121	305.3		ppb
-	Sb	123	225.2	1.22741	ppb
-	Ba	135	5139.5		ppb
-	Ba	137	10030	54.88303	ppb
>	Ho	165	44089.2		ppb
-	Tl	205	46.7	-0.02991	ppb
-	Pb	208	66114.8	40.09176	ppb
-	Kr	83	30		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Tuesday, June 19, 2018 18:18:15

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3947.6		ppb
-	Be	9	2.7	0.05733	ppb
-	P	31	5197.2	295.18599	ppb
>	Sc	45	6123.1		ppb
-	Cr	52	2504.5	9.71967	ppb
-	Cr	53	287	-6.4875	ppb
-	Mn	55	12599.8	49.50448	ppb
-	Co	59	306.7	1.68915	ppb
-	Ni	60	894.7	23.84043	ppb
-	Cu	63	3792.3	42.33158	ppb
-	Cu	65	1729.1	43.31103	ppb
-	Zn	66	11251.9	556.68399	ppb
-	Zn	67	1650.7	543.05207	ppb
-	Zn	68	7624.5	549.59344	ppb
-	As	75	70.6	1.62035	ppb
-	Se	77	21.3	-36.93827	ppb
-	Se	82	3.4	1.61215	ppb
>	Rh	103	4700.4		ppb
-	Ag	107	87	0.79889	ppb
-	Ag	109	80		ppb
-	Cd	111	39.8	0.89528	ppb
-	Cd	114	122	0.90762	ppb
-	Sb	121	291.7		ppb
-	Sb	123	238.6	1.30299	ppb
-	Ba	135	5193.9		ppb
-	Ba	137	9661.2	52.59664	ppb
>	Ho	165	44311.9		ppb
-	Tl	205	45.3	-0.0312	ppb
-	Pb	208	65372.7	39.44154	ppb
-	Kr	83	31.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Tuesday, June 19, 2018 18:21:22

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3974.1		ppb
-	Be	9	3.3	0.09374	ppb
-	P	31	4062	198.37903	ppb
>	Sc	45	6187.8		ppb
-	Cr	52	1914.4	6.64036	ppb
-	Cr	53	203.3	-10.23923	ppb
-	Mn	55	14377.1	55.74108	ppb
-	Co	59	121	0.59591	ppb
-	Ni	60	542	14.12729	ppb
-	Cu	63	1446	15.53039	ppb
-	Cu	65	661	15.92209	ppb
-	Zn	66	5153.9	250.77432	ppb
-	Zn	67	772	247.58774	ppb
-	Zn	68	3559.9	249.14481	ppb
-	As	75	72	1.64332	ppb
-	Se	77	10	-47.80896	ppb
-	Se	82	1.8	0.61826	ppb
>	Rh	103	4766.1		ppb
-	Ag	107	2476.8	27.26241	ppb
-	Ag	109	2363.8		ppb
-	Cd	111	63	1.58549	ppb
-	Cd	114	280.8	2.18336	ppb
-	Sb	121	589		ppb
-	Sb	123	462	2.64777	ppb
-	Ba	135	1144		ppb
-	Ba	137	2143.4	11.40168	ppb
>	Ho	165	44861.2		ppb
-	Tl	205	22.3	-0.04966	ppb
-	Pb	208	15004.4	8.84468	ppb
-	Kr	83	29.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Tuesday, June 19, 2018 18:24:28

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	4079.8		ppb
-	Be	9	835	46.3609	ppb
-	P	31	6359.5	370.6895	ppb
>	Sc	45	6367.8		ppb
-	Cr	52	11833.8	54.5186	ppb
-	Cr	53	1291.7	35.23022	ppb
-	Mn	55	26531.4	101.81348	ppb
-	Co	59	8811.6	49.90566	ppb
-	Ni	60	2441.1	63.72608	ppb
-	Cu	63	6057.7	66.1076	ppb
-	Cu	65	2663.1	65.15669	ppb
-	Zn	66	6229.1	299.23003	ppb
-	Zn	67	919.4	291.82658	ppb
-	Zn	68	4238.7	293.91091	ppb
-	As	75	1054.3	49.23399	ppb
-	Se	77	54.3	-6.73169	ppb
-	Se	82	61.5	38.91039	ppb
>	Rh	103	4831.1		ppb
-	Ag	107	7424.1	80.95906	ppb
-	Ag	109	7068.7		ppb
-	Cd	111	1690.6	51.03568	ppb
-	Cd	114	6360.1	50.89424	ppb
-	Sb	121	12313.7		ppb
-	Sb	123	9415.4	57.93191	ppb
-	Ba	135	6306.5		ppb
-	Ba	137	11648	63.47998	ppb
>	Ho	165	44287.2		ppb
-	Tl	205	63094.2	50.14103	ppb
-	Pb	208	99672.5	60.23544	ppb
-	Kr	83	27.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 BH

Sample Date: Tuesday, June 19, 2018 18:27:34

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	4122		ppb
-	Be	9	3	0.07032	ppb
-	P	31	4002	190.81045	ppb
>	Sc	45	6238.8		ppb
-	Cr	52	1405	4.03935	ppb
-	Cr	53	135.3	-13.22339	ppb
-	Mn	55	5915.4	22.24029	ppb
-	Co	59	73	0.3118	ppb
-	Ni	60	319.3	8.04776	ppb
-	Cu	63	7243.7	78.71967	ppb
-	Cu	65	3191.9	77.74452	ppb
-	Zn	66	4410.4	210.24945	ppb
-	Zn	67	684.3	214.61487	ppb
-	Zn	68	3091.5	211.14891	ppb
-	As	75	92.2	2.55994	ppb
-	Se	77	12.7	-45.53938	ppb
-	Se	82	3.8	1.8968	ppb
>	Rh	103	4859.1		ppb
-	Ag	107	30	0.14716	ppb
-	Ag	109	30		ppb
-	Cd	111	9.7	-0.05833	ppb
-	Cd	114	51.8	0.31509	ppb
-	Sb	121	80.3		ppb
-	Sb	123	56.7	0.17742	ppb
-	Ba	135	731.3		ppb
-	Ba	137	1400	7.40556	ppb
>	Ho	165	44757.7		ppb
-	Tl	205	22.7	-0.04938	ppb
-	Pb	208	8065.5	4.70522	ppb
-	Kr	83	28.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 18:30:43

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4431.2		ppb
-	Be	9	2	0.00529	ppb
-	P	31	1195.4	-43.80503	ppb
>	Sc	45	6813.6		ppb
-	Cr	52	625	-0.08588	ppb
-	Cr	53	892.7	16.02609	ppb
-	Mn	55	104.7	-0.05577	ppb
-	Co	59	12	-0.03894	ppb
-	Ni	60	8	-0.08618	ppb
-	Cu	63	47.7	-0.1372	ppb
-	Cu	65	19	-0.19792	ppb
-	Zn	66	27.3	-0.02494	ppb
-	Zn	67	13	-1.51458	ppb
-	Zn	68	108.7	-0.24919	ppb
-	As	75	102.5	2.57735	ppb
-	Se	77	68.3	0.18122	ppb
-	Se	82	5.5	2.49242	ppb
>	Rh	103	5350.2		ppb
-	Ag	107	11	-0.0698	ppb
-	Ag	109	13		ppb
-	Cd	111	12	-0.01889	ppb
-	Cd	114	9.2	-0.03173	ppb
-	Sb	121	21		ppb
-	Sb	123	18.9	-0.0639	ppb
-	Ba	135	14		ppb
-	Ba	137	16.3	-0.08378	ppb
>	Ho	165	49444.5		ppb
-	Tl	205	24	-0.05011	ppb
-	Pb	208	86.7	-0.08109	ppb
-	Kr	83	27.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 18:33:49

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4697.5		ppb
-	Be	9	1934.4	93.41292	ppb
-	P	31	15420.4	916.13984	ppb
>	Sc	45	7406.8		ppb
-	Cr	52	23891.4	96.78163	ppb
-	Cr	53	3592.3	110.71271	ppb
-	Mn	55	29819.4	96.25475	ppb
-	Co	59	20495.1	97.75759	ppb
-	Ni	60	4362	95.93971	ppb
-	Cu	63	10444.2	96.17252	ppb
-	Cu	65	4717.8	97.4091	ppb
-	Zn	66	2413.1	96.69249	ppb
-	Zn	67	366	94.22938	ppb
-	Zn	68	1772.1	98.69976	ppb
-	As	75	2546.7	102.01122	ppb
-	Se	77	199	98.51068	ppb
-	Se	82	176.7	94.8386	ppb
>	Rh	103	5742		ppb
-	Ag	107	11102.1	101.91101	ppb
-	Ag	109	10498.5		ppb
-	Cd	111	3804.8	96.95633	ppb
-	Cd	114	14234.8	95.92249	ppb
-	Sb	121	25526		ppb
-	Sb	123	19420	101.20321	ppb
-	Ba	135	11597.4		ppb
-	Ba	137	21839.5	100.77668	ppb
>	Ho	165	52358.8		ppb
-	Tl	205	148812.3	100.09923	ppb
-	Pb	208	194759.6	99.64289	ppb
-	Kr	83	33.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH

Sample Date: Tuesday, June 19, 2018 18:36:57

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4107.8		ppb
-	Be	9	2.3	0.03149	ppb
-	P	31	3392.6	147.24713	ppb
>	Sc	45	6113.1		ppb
-	Cr	52	1207.4	3.1835	ppb
-	Cr	53	192.7	-10.59615	ppb
-	Mn	55	13820.2	53.06848	ppb
-	Co	59	57	0.22463	ppb
-	Ni	60	133.3	3.2356	ppb
-	Cu	63	542	5.38757	ppb
-	Cu	65	239.3	5.31208	ppb
-	Zn	66	1587.1	75.675	ppb
-	Zn	67	240.3	72.738	ppb
-	Zn	68	1150.4	74.87212	ppb
-	As	75	47.1	0.40135	ppb
-	Se	77	14	-44.20179	ppb
-	Se	82	-5.2	-3.91302	ppb
>	Rh	103	4809.8		ppb
-	Ag	107	15.7	-0.00673	ppb
-	Ag	109	16.3		ppb
-	Cd	111	7.7	-0.11475	ppb
-	Cd	114	48.9	0.29562	ppb
-	Sb	121	63.7		ppb
-	Sb	123	50.3	0.14121	ppb
-	Ba	135	557		ppb
-	Ba	137	1070.4	5.66988	ppb
>	Ho	165	44403.4		ppb
-	Tl	205	41	-0.03473	ppb
-	Pb	208	5969.9	3.47832	ppb
-	Kr	83	30		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date: Tuesday, June 19, 2018 18:40:04

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3961		ppb
-	Be	9	2.3	0.0368	ppb
-	P	31	3860.3	191.0782	ppb
>	Sc	45	6013.7		ppb
-	Cr	52	1290	3.70803	ppb
-	Cr	53	148.3	-12.43361	ppb
-	Mn	55	1007.4	3.54334	ppb
-	Co	59	24	0.03901	ppb
-	Ni	60	106.3	2.56701	ppb
-	Cu	63	404.3	3.93775	ppb
-	Cu	65	186	4.06665	ppb
-	Zn	66	737.3	35.08458	ppb
-	Zn	67	108.3	30.48297	ppb
-	Zn	68	554	32.96347	ppb
-	As	75	61.5	1.18686	ppb
-	Se	77	10.3	-47.44129	ppb
-	Se	82	-4.9	-3.68903	ppb
>	Rh	103	4733.1		ppb
-	Ag	107	13.3	-0.02932	ppb
-	Ag	109	13.7		ppb
-	Cd	111	8.6	-0.08361	ppb
-	Cd	114	43.8	0.25704	ppb
-	Sb	121	385.3		ppb
-	Sb	123	286.5	1.64979	ppb
-	Ba	135	49.7		ppb
-	Ba	137	89.7	0.33973	ppb
>	Ho	165	43074.4		ppb
-	Tl	205	25.3	-0.04651	ppb
-	Pb	208	710	0.31404	ppb
-	Kr	83	34.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Tuesday, June 19, 2018 18:43:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	4652.3		ppb
-	Be	9	866.3	42.20833	ppb
-	P	31	2302.8	31.89704	ppb
>	Sc	45	7070		ppb
-	Cr	52	12900	53.47189	ppb
-	Cr	53	5657.3	195.0241	ppb
-	Mn	55	23159.7	83.20925	ppb
-	Co	59	8708.2	46.2165	ppb
-	Ni	60	3155.5	77.27087	ppb
-	Cu	63	5915.7	60.45465	ppb
-	Cu	65	2589.1	59.33643	ppb
-	Zn	66	1997.1	89.06516	ppb
-	Zn	67	327	93.68904	ppb
-	Zn	68	1442.7	88.83992	ppb
-	As	75	1816.4	80.7037	ppb
-	Se	77	448.7	333.60688	ppb
-	Se	82	121.7	72.7355	ppb
>	Rh	103	5154.9		ppb
-	Ag	107	11957.2	122.30326	ppb
-	Ag	109	11509		ppb
-	Cd	111	1171.2	33.01941	ppb
-	Cd	114	4705.2	35.26124	ppb
-	Sb	121	18741.7		ppb
-	Sb	123	14150.1	81.34657	ppb
-	Ba	135	7877.6		ppb
-	Ba	137	15586.2	79.32334	ppb
>	Ho	165	47449.3		ppb
-	Tl	205	145012.4	107.64233	ppb
-	Pb	208	127400.9	71.88585	ppb
	Kr	83	38.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Tuesday, June 19, 2018 18:46:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	4760.5		ppb
-	Be	9	1944.7	92.6501	ppb
-	P	31	4379.4	170.82102	ppb
>	Sc	45	7278.7		ppb
-	Cr	52	24357.5	100.53587	ppb
-	Cr	53	6901.6	234.71591	ppb
-	Mn	55	37183.3	130.17454	ppb
-	Co	59	18218.3	94.14251	ppb
-	Ni	60	5230.2	124.71276	ppb
-	Cu	63	10945.4	109.28361	ppb
-	Cu	65	4882.1	109.26679	ppb
-	Zn	66	3040.2	132.43505	ppb
-	Zn	67	504.3	143.24223	ppb
-	Zn	68	2223.1	136.75507	ppb
-	As	75	2969.7	129.38565	ppb
-	Se	77	475.3	345.92608	ppb
-	Se	82	226.4	131.90979	ppb
>	Rh	103	5300.9		ppb
-	Ag	107	17450.1	173.67026	ppb
-	Ag	109	16864		ppb
-	Cd	111	2697	74.37253	ppb
-	Cd	114	10808.1	78.88638	ppb
-	Sb	121	30837.7		ppb
-	Sb	123	23517.6	132.40468	ppb
-	Ba	135	12801.6		ppb
-	Ba	137	25415.6	126.68594	ppb
>	Ho	165	48483.6		ppb
-	Tl	205	214199.8	155.63319	ppb
-	Pb	208	218389.7	120.68731	ppb
	Kr	83	28		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Tuesday, June 19, 2018 18:55:37

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4581.2		ppb
-	Be	9	2228.1	110.34054	ppb
-	P	31	4144.7	160.85891	ppb
>	Sc	45	7121.3		ppb
-	Cr	52	75274.2	323.78666	ppb
-	Cr	53	9058.3	321.24513	ppb
-	Mn	55	44996.8	148.45118	ppb
-	Co	59	33121.9	161.28235	ppb
-	Ni	60	9435.4	212.09576	ppb
-	Cu	63	31662.7	298.82222	ppb
-	Cu	65	14192.4	300.27455	ppb
-	Zn	66	5562	229.08559	ppb
-	Zn	67	814	220.51669	ppb
-	Zn	68	3905.6	231.05191	ppb
-	As	75	2381.7	97.29162	ppb
-	Se	77	257.7	148.42239	ppb
-	Se	82	288.8	158.5942	ppb
>	Rh	103	5628.3		ppb
-	Ag	107	39185.2	367.71917	ppb
-	Ag	109	39783.3		ppb
-	Cd	111	3284.2	85.35729	ppb
-	Cd	114	12078.6	83.04527	ppb
-	Sb	121	17821		ppb
-	Sb	123	13454.6	71.71829	ppb
-	Ba	135	29517.1		ppb
-	Ba	137	56252.2	266.00547	ppb
>	Ho	165	51164		ppb
-	Tl	205	351123.3	241.85028	ppb
-	Pb	208	451736.5	236.73493	ppb
	Kr	83	29.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Tuesday, June 19, 2018 18:58:43

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4500.6		ppb
-	Be	9	3214.2	162.09	ppb
-	P	31	6693.9	353.82527	ppb
>	Sc	45	6936		ppb
-	Cr	52	84843.4	375.20853	ppb
-	Cr	53	10071	369.3922	ppb
-	Mn	55	59033.3	200.22139	ppb
-	Co	59	42651	213.40015	ppb
-	Ni	60	11209.8	258.98676	ppb
-	Cu	63	36043	349.58092	ppb
-	Cu	65	16069.8	349.43329	ppb
-	Zn	66	6586.5	279.01526	ppb
-	Zn	67	985.7	275.80753	ppb
-	Zn	68	4547.1	277.75561	ppb
-	As	75	3487.8	147.28989	ppb
-	Se	77	294	184.01902	ppb
-	Se	82	350.8	197.84587	ppb
>	Rh	103	5476.6		ppb
-	Ag	107	44116.7	425.02865	ppb
-	Ag	109	44534		ppb
-	Cd	111	4974.3	133.01699	ppb
-	Cd	114	18827.3	133.04396	ppb
-	Sb	121	30618.4		ppb
-	Sb	123	23383.2	126.14758	ppb
-	Ba	135	34626.3		ppb
-	Ba	137	64827.9	309.89653	ppb
>	Ho	165	50600.5		ppb
-	Tl	205	414450.8	288.61392	ppb
-	Pb	208	535021	283.52104	ppb
	Kr	83	31.7		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Tuesday, June 19, 2018 19:01:51

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4337.7		ppb
-	Be	9	3.3	0.07846	ppb
-	P	31	1124.7	-46.79813	ppb
>	Sc	45	6631.9		ppb
-	Cr	52	651	0.11266	ppb
-	Cr	53	531.7	2.42379	ppb
-	Mn	55	124.3	0.01863	ppb
-	Co	59	23.7	0.02284	ppb
-	Ni	60	13	0.03622	ppb
-	Cu	63	60	-0.00461	ppb
-	Cu	65	20.7	-0.15328	ppb
-	Zn	66	23	-0.19662	ppb
-	Zn	67	17	-0.23781	ppb
-	Zn	68	106.3	-0.29682	ppb
-	As	75	66.4	1.06652	ppb
-	Se	77	58.3	-7.49203	ppb
-	Se	82	1.8	0.52086	ppb
>	Rh	103	5268.2		ppb
-	Ag	107	390.7	3.73792	ppb
-	Ag	109	305.7		ppb
-	Cd	111	5.8	-0.18963	ppb
-	Cd	114	8.6	-0.03516	ppb
-	Sb	121	130.7		ppb
-	Sb	123	96.6	0.3838	ppb
-	Ba	135	21		ppb
-	Ba	137	36.7	0.02182	ppb
>	Ho	165	47817.4		ppb
-	Tl	205	123.3	0.02365	ppb
-	Pb	208	227.7	-0.00037	ppb
-	Kr	83	28.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Tuesday, June 19, 2018 19:04:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4399.3		ppb
-	Be	9	21	0.98463	ppb
-	P	31	1391.4	-26.59712	ppb
>	Sc	45	6636.2		ppb
-	Cr	52	829.3	0.94005	ppb
-	Cr	53	555.3	3.36137	ppb
-	Mn	55	382.7	0.93017	ppb
-	Co	59	226.7	1.07778	ppb
-	Ni	60	47	0.85404	ppb
-	Cu	63	159.7	1.00116	ppb
-	Cu	65	61.3	0.769	ppb
-	Zn	66	51	1.03799	ppb
-	Zn	67	14.7	-0.92453	ppb
-	Zn	68	113.3	0.15204	ppb
-	As	75	94.3	2.30335	ppb
-	Se	77	65	-1.85517	ppb
-	Se	82	4.5	2.1271	ppb
>	Rh	103	5273.2		ppb
-	Ag	107	224.3	2.06824	ppb
-	Ag	109	361		ppb
-	Cd	111	42.6	0.83546	ppb
-	Cd	114	147.1	0.98178	ppb
-	Sb	121	344.3		ppb
-	Sb	123	262.9	1.32549	ppb
-	Ba	135	124.7		ppb
-	Ba	137	216.7	0.92671	ppb
>	Ho	165	48084.9		ppb
-	Tl	205	1424.4	0.97682	ppb
-	Pb	208	1948.7	0.95899	ppb
-	Kr	83	25.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Tuesday, June 19, 2018 19:08:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4583		ppb
-	Be	9	1898.7	93.99634	ppb
-	P	31	15064.9	912.49343	ppb
>	Sc	45	7261.1		ppb
-	Cr	52	23680.5	97.87472	ppb
-	Cr	53	3148.2	96.97962	ppb
-	Mn	55	29348.9	96.27599	ppb
-	Co	59	20091.7	97.38815	ppb
-	Ni	60	4259.7	95.20792	ppb
-	Cu	63	10404.8	97.38966	ppb
-	Cu	65	4569.4	95.88193	ppb
-	Zn	66	2455.5	100.05807	ppb
-	Zn	67	366.3	95.97632	ppb
-	Zn	68	1771.1	100.35827	ppb
-	As	75	2480.9	100.98401	ppb
-	Se	77	177.3	83.79766	ppb
-	Se	82	165.8	90.43155	ppb
>	Rh	103	5650		ppb
-	Ag	107	10835.7	101.08189	ppb
-	Ag	109	10584.6		ppb
-	Cd	111	3774.2	97.74347	ppb
-	Cd	114	14184.8	97.1412	ppb
-	Sb	121	25708.5		ppb
-	Sb	123	19326.7	101.55461	ppb
-	Ba	135	11619.7		ppb
-	Ba	137	21866.6	101.73	ppb
>	Ho	165	51932.9		ppb
-	Tl	205	146847.4	99.59099	ppb
-	Pb	208	192474.7	99.27889	ppb
	Kr	83	29.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 12:23:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2430.2		ppb
-	Be	9	3.3		ppb
-	P	31	5423.6		ppb
>	Sc	45	3683.3		ppb
-	Cr	52	490		ppb
-	Cr	53	330.7		ppb
-	Mn	55	82.7		ppb
-	Ni	60	8.3		ppb
-	Cu	63	60.7		ppb
-	Cu	65	23.3		ppb
-	Zn	66	75.7		ppb
-	Zn	67	22.3		ppb
-	Zn	68	102.3		ppb
-	As	75	53		ppb
-	Se	77	47		ppb
-	Se	82	-0.2		ppb
>	Rh	103	2965.5		ppb
-	Ag	107	28		ppb
-	Ag	109	24.3		ppb
-	Cd	111	5.5		ppb
-	Cd	114	14.2		ppb
-	Sb	121	67.7		ppb
-	Sb	123	56.7		ppb
-	Ba	135	12.7		ppb
-	Ba	137	18		ppb
>	Ho	165	26296.2		ppb
-	Pb	208	194.3		ppb
	Kr	83	20.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Wednesday, June 20, 2018 13:44:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2801		ppb
-	Be	9	18	1.01847	ppb
-	P	31	1539.4	-521.9543	ppb
>	Sc	45	3929.3		ppb
-	Cr	52	556.3	0.28477	ppb
-	Cr	53	295.7	-4.23904	ppb
-	Mn	55	219	0.89855	ppb
-	Ni	60	26.3	0.77147	ppb
-	Cu	63	90	0.50075	ppb
-	Cu	65	37	0.53481	ppb
-	Zn	66	34.3	-3.4237	ppb
-	Zn	67	13.7	-5.02413	ppb
-	Zn	68	81.3	-2.85072	ppb
-	As	75	85.4	2.07538	ppb
-	Se	77	31.3	-30.91776	ppb
-	Se	82	0.5	0.76234	ppb
>	Rh	103	3077.9		ppb
-	Ag	107	70.3	0.66619	ppb
-	Ag	109	64.3		ppb
-	Cd	111	29	1.06555	ppb
-	Cd	114	94.4	0.98581	ppb
-	Sb	121	164.3		ppb
-	Sb	123	126.4	0.6171	ppb
-	Ba	135	60.7		ppb
-	Ba	137	114.3	0.91508	ppb
>	Ho	165	28395.8		ppb
-	Pb	208	1161	0.8818	ppb
-	Kr	83	21.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Wednesday, June 20, 2018 13:47:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2918.8		ppb
-	Be	9	1385.4	95.49706	ppb
-	P	31	10216.4	504.63693	ppb
>	Sc	45	4061.3		ppb
-	Cr	52	13248.5	103.02362	ppb
-	Cr	53	1757.1	99.10782	ppb
-	Mn	55	15531.5	97.83602	ppb
-	Ni	60	2440.8	98.35558	ppb
-	Cu	63	5753	98.28759	ppb
-	Cu	65	2565.5	97.51925	ppb
-	Zn	66	1367	92.87956	ppb
-	Zn	67	219	95.82645	ppb
-	Zn	68	955.4	90.22896	ppb
-	As	75	1609.3	101.41533	ppb
-	Se	77	100.7	80.96985	ppb
-	Se	82	103.8	106.20265	ppb
>	Rh	103	3284.5		ppb
-	Ag	107	6536.5	98.3948	ppb
-	Ag	109	6434.5		ppb
-	Cd	111	2304.6	98.66696	ppb
-	Cd	114	8703.4	100.41982	ppb
-	Sb	121	14668		ppb
-	Sb	123	10946.2	97.77022	ppb
-	Ba	135	5604.6		ppb
-	Ba	137	11225.9	102.45829	ppb
>	Ho	165	29936.2		ppb
-	Pb	208	114429	100.35868	ppb
-	Kr	83	21.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Wednesday, June 20, 2018 12:20:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2630.7		ppb
-	Be	9	6538.5	500.90055	ppb
-	P	31	48652.6	5101.2404	ppb
>	Sc	45	4046		ppb
-	Cr	52	61913.9	499.39671	ppb
-	Cr	53	7363.4	500.18891	ppb
-	Mn	55	74862.3	500.433	ppb
-	Ni	60	11722.1	500.32934	ppb
-	Cu	63	27474.8	500.34348	ppb
-	Cu	65	12366.1	500.49708	ppb
-	Zn	66	6638.5	501.43294	ppb
-	Zn	67	984.7	500.84676	ppb
-	Zn	68	4545.1	501.96191	ppb
-	As	75	7293.9	499.71478	ppb
-	Se	77	336.7	503.86987	ppb
-	Se	82	463.8	498.75995	ppb
>	Rh	103	3109.5		ppb
-	Ag	107	31359.3	500.32171	ppb
-	Ag	109	30360.8		ppb
-	Cd	111	11041.2	500.26648	ppb
-	Cd	114	40983	499.91607	ppb
-	Sb	121	69843.1		ppb
-	Sb	123	52971.9	500.44672	ppb
-	Ba	135	25811.7		ppb
-	Ba	137	51912.8	499.50851	ppb
>	Ho	165	28437.5		ppb
-	Pb	208	540655.7	499.9285	ppb
-	Kr	83	24		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 12:23:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2430.2		ppb
-	Be	9	3.3	-0.00029	ppb
-	P	31	5423.6	0.55212	ppb
>	Sc	45	3683.3		ppb
-	Cr	52	490	0.00457	ppb
-	Cr	53	330.7	-0.0042	ppb
-	Mn	55	82.7	0.00019	ppb
-	Ni	60	8.3	0.0006	ppb
-	Cu	63	60.7	-0.00026	ppb
-	Cu	65	23.3	-0.00025	ppb
-	Zn	66	75.7	-0.00088	ppb
-	Zn	67	22.3	-0.00917	ppb
-	Zn	68	102.3	0.0022	ppb
-	As	75	53	-0.00095	ppb
-	Se	77	47	0.04247	ppb
-	Se	82	-0.2	-0.00763	ppb
>	Rh	103	2965.5		ppb
-	Ag	107	28	-0.00002	ppb
-	Ag	109	24.3		ppb
-	Cd	111	5.5	0.0001	ppb
-	Cd	114	14.2	0.00001	ppb
-	Sb	121	67.7		ppb
-	Sb	123	56.7	-0.00002	ppb
-	Ba	135	12.7		ppb
-	Ba	137	18	-0.00019	ppb
>	Ho	165	26296.2		ppb
-	Pb	208	194.3	-0.00005	ppb
-	Kr	83	20.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Wednesday, June 20, 2018 12:27:00

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2558.5		ppb
-	Be	9	16	0.98256	ppb
-	P	31	4854.5	-101.0308	ppb
>	Sc	45	3843		ppb
-	Cr	52	567	0.47789	ppb
-	Cr	53	371.7	2.02069	ppb
-	Mn	55	216	0.88646	ppb
-	Ni	60	23	0.62114	ppb
-	Cu	63	108.3	0.84363	ppb
-	Cu	65	40.3	0.66457	ppb
-	Zn	66	68	-0.80795	ppb
-	Zn	67	22.7	-0.21527	ppb
-	Zn	68	112.7	0.79154	ppb
-	As	75	37.7	-1.21284	ppb
-	Se	77	52.3	6.44325	ppb
-	Se	82	-4.5	-4.77262	ppb
>	Rh	103	3069.5		ppb
-	Ag	107	77	0.77724	ppb
-	Ag	109	67.7		ppb
-	Cd	111	28.3	1.0349	ppb
-	Cd	114	97.5	1.02317	ppb
-	Sb	121	194.7		ppb
-	Sb	123	156.2	0.97013	ppb
-	Ba	135	62.7		ppb
-	Ba	137	119.7	1.01948	ppb
>	Ho	165	27127		ppb
-	Pb	208	1178.3	0.9484	ppb
-	Kr	83	23		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Wednesday, June 20, 2018 12:30:01

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2598.3		ppb
-	Be	9	3259.2	252.67229	ppb
-	P	31	24904.1	2326.8386	ppb
>	Sc	45	3961.3		ppb
-	Cr	52	31635	258.46822	ppb
-	Cr	53	3839	254.13358	ppb
-	Mn	55	37749.8	247.10575	ppb
-	Ni	60	5795.7	242.27234	ppb
-	Cu	63	13791.8	245.61576	ppb
-	Cu	65	6255.1	247.70743	ppb
-	Zn	66	3348.6	244.94608	ppb
-	Zn	67	508.3	247.32578	ppb
-	Zn	68	2333.4	246.62345	ppb
-	As	75	3605	240.03694	ppb
-	Se	77	193.7	246.259	ppb
-	Se	82	221.5	233.42068	ppb
>	Rh	103	3173.2		ppb
-	Ag	107	15771.3	246.47865	ppb
-	Ag	109	16064.8		ppb
-	Cd	111	5595.9	248.38575	ppb
-	Cd	114	20853.8	249.25154	ppb
-	Sb	121	34752.1		ppb
-	Sb	123	25979.7	246.37689	ppb
-	Ba	135	12842.3		ppb
-	Ba	137	25902.4	250.3653	ppb
>	Ho	165	28298.7		ppb
-	Pb	208	267069	248.0635	ppb
-	Kr	83	26		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, June 20, 2018 12:33:01

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2717.2		ppb
-	Be	9	1306.4	96.67848	ppb
-	P	31	12388.1	775.41356	ppb
>	Sc	45	4026		ppb
-	Cr	52	13188.5	103.43365	ppb
-	Cr	53	1789.4	102.50745	ppb
-	Mn	55	15519.8	99.12972	ppb
-	Ni	60	2378.1	97.203	ppb
-	Cu	63	5637.6	97.65254	ppb
-	Cu	65	2552.1	98.4089	ppb
-	Zn	66	1352.4	93.23026	ppb
-	Zn	67	223.7	99.61459	ppb
-	Zn	68	968.4	93.05026	ppb
-	As	75	1522.3	97.04986	ppb
-	Se	77	121	117.46595	ppb
-	Se	82	96.1	99.13598	ppb
>	Rh	103	3239.9		ppb
-	Ag	107	6462.8	98.57794	ppb
-	Ag	109	6385.8		ppb
-	Cd	111	2363.6	102.69775	ppb
-	Cd	114	8623.1	100.86115	ppb
-	Sb	121	14547.9		ppb
-	Sb	123	10963.6	99.86155	ppb
-	Ba	135	5452.9		ppb
-	Ba	137	10824	100.73444	ppb
>	Ho	165	29358.6		ppb
-	Pb	208	111471.9	99.69004	ppb
-	Kr	83	24.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date: Wednesday, June 20, 2018 12:36:03

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2635.6		ppb
-	Be	9	650.7	49.53112	ppb
-	P	31	4952.5	-118.7098	ppb
>	Sc	45	4038.3		ppb
-	Cr	52	6676.9	50.05687	ppb
-	Cr	53	1086.7	51.83937	ppb
-	Mn	55	7694.2	49.62266	ppb
-	Ni	60	1204	49.76658	ppb
-	Cu	63	2827.8	49.16536	ppb
-	Cu	65	1306.4	50.67235	ppb
-	Zn	66	702.3	46.2827	ppb
-	Zn	67	123.3	50.41663	ppb
-	Zn	68	538	47.20256	ppb
-	As	75	803.8	50.25026	ppb
-	Se	77	85.3	59.26702	ppb
-	Se	82	47.8	50.30527	ppb
>	Rh	103	3189.5		ppb
-	Ag	107	3170.5	48.90124	ppb
-	Ag	109	3020.5		ppb
-	Cd	111	1150.4	50.58969	ppb
-	Cd	114	4207.7	49.87985	ppb
-	Sb	121	7626.8		ppb
-	Sb	123	5727.8	53.12434	ppb
-	Ba	135	2564.8		ppb
-	Ba	137	5327.6	50.64648	ppb
>	Ho	165	28687.5		ppb
-	Pb	208	54787.8	50.04939	ppb
-	Kr	83	23.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Wednesday, June 20, 2018 12:39:03

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	3055.1		ppb
-	Be	9	2	-0.14493	ppb
-	P	31	50233.8	4700.5543	ppb
>	Sc	45	4488.1		ppb
-	Cr	52	514	-0.60995	ppb
-	Cr	53	373.3	-1.89406	ppb
-	Mn	55	97.3	-0.00145	ppb
-	Ni	60	8	-0.07066	ppb
-	Cu	63	54.3	-0.28334	ppb
-	Cu	65	21	-0.23708	ppb
-	Zn	66	46.7	-2.91032	ppb
-	Zn	67	18.3	-3.72203	ppb
-	Zn	68	88.3	-3.29374	ppb
-	As	75	41.8	-1.2598	ppb
-	Se	77	52.3	-5.20261	ppb
-	Se	82	0.8	0.98851	ppb
>	Rh	103	3510.6		ppb
-	Ag	107	15	-0.25764	ppb
-	Ag	109	17		ppb
-	Cd	111	8.1	0.06526	ppb
-	Cd	114	13	-0.04244	ppb
-	Sb	121	64.7		ppb
-	Sb	123	59.2	-0.07677	ppb
-	Ba	135	13		ppb
-	Ba	137	13.7	-0.06923	ppb
>	Ho	165	31649.7		ppb
-	Pb	208	136.7	-0.08078	ppb
-	Kr	83	21.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Wednesday, June 20, 2018 12:42:04

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2833.9		ppb
-	Be	9	2	-0.13357	ppb
-	P	31	49138.6	4765.0735	ppb
>	Sc	45	4336.7		ppb
-	Cr	52	603	0.19892	ppb
-	Cr	53	409.3	1.35283	ppb
-	Mn	55	259.3	0.96522	ppb
-	Ni	60	71	2.32781	ppb
-	Cu	63	123.7	0.84874	ppb
-	Cu	65	53.3	0.93264	ppb
-	Zn	66	61.7	-1.87304	ppb
-	Zn	67	17	-4.30906	ppb
-	Zn	68	107.3	-1.32818	ppb
-	As	75	46.9	-0.95833	ppb
-	Se	77	49	-9.94595	ppb
-	Se	82	3.8	3.89319	ppb
>	Rh	103	3493.6		ppb
-	Ag	107	6482.2	91.67444	ppb
-	Ag	109	6216.8		ppb
-	Cd	111	17.4	0.44133	ppb
-	Cd	114	67.5	0.55087	ppb
-	Sb	121	59.7		ppb
-	Sb	123	50.9	-0.14135	ppb
-	Ba	135	14		ppb
-	Ba	137	17	-0.03844	ppb
>	Ho	165	31192.4		ppb
-	Pb	208	152.3	-0.06595	ppb
-	Kr	83	21		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Wednesday, June 20, 2018 12:45:04

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	4356.4		ppb
-	Be	9	11.3	0.24822	ppb
-	P	31	2494.1	-523.3384	ppb
>	Sc	45	6401.2		ppb
-	Cr	52	571.3	-1.44017	ppb
-	Cr	53	810.7	10.64832	ppb
-	Mn	55	183	0.15883	ppb
-	Ni	60	38.3	0.61692	ppb
-	Cu	63	153	0.5246	ppb
-	Cu	65	70.3	0.73061	ppb
-	Zn	66	162.3	1.43025	ppb
-	Zn	67	41	0.69388	ppb
-	Zn	68	170	-0.5372	ppb
-	As	75	16	-3.17502	ppb
-	Se	77	89.3	8.11884	ppb
-	Se	82	-3.5	-2.13081	ppb
>	Rh	103	5152.9		ppb
-	Ag	107	16.3	-0.31166	ppb
-	Ag	109	12.3		ppb
-	Cd	111	12.1	0.0716	ppb
-	Cd	114	44.6	0.14512	ppb
-	Sb	121	134.7		ppb
-	Sb	123	86	-0.0802	ppb
-	Ba	135	22		ppb
-	Ba	137	40.3	0.05126	ppb
>	Ho	165	46240.4		ppb
-	Pb	208	868	0.29962	ppb
-	Kr	83	23.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Wednesday, June 20, 2018 12:48:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2585.7		ppb
-	Be	9	12.7	0.71302	ppb
-	P	31	2491.1	-393.7418	ppb
>	Sc	45	3792		ppb
-	Cr	52	564.3	0.52726	ppb
-	Cr	53	533.3	14.75403	ppb
-	Mn	55	223.3	0.93957	ppb
-	Ni	60	28.3	0.85866	ppb
-	Cu	63	100.3	0.70303	ppb
-	Cu	65	46.3	0.91957	ppb
-	Zn	66	44.7	-2.58795	ppb
-	Zn	67	20.3	-1.43304	ppb
-	Zn	68	97.7	-0.90666	ppb
-	As	75	63.1	0.60312	ppb
-	Se	77	53.3	8.65925	ppb
-	Se	82	2.8	3.3476	ppb
>	Rh	103	3058.2		ppb
-	Ag	107	70.3	0.67471	ppb
-	Ag	109	75		ppb
-	Cd	111	26.9	0.9753	ppb
-	Cd	114	93.5	0.97803	ppb
-	Sb	121	193		ppb
-	Sb	123	131.3	0.71015	ppb
-	Ba	135	66.3		ppb
-	Ba	137	110	0.91206	ppb
>	Ho	165	27411.7		ppb
-	Pb	208	1104.3	0.86581	ppb
-	Kr	83	21.3		ppb

elementOne

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Wednesday, June 20, 2018 12:56:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2623.3		ppb
-	Be	9	117	8.69477	ppb
-	P	31	2052.1	-454.578	ppb
>	Sc	45	3858.3		ppb
-	Cr	52	1853.1	11.42703	ppb
-	Cr	53	1068.7	54.10754	ppb
-	Mn	55	2532.5	16.52215	ppb
-	Ni	60	352	14.82061	ppb
-	Cu	63	729.3	12.28057	ppb
-	Cu	65	324.7	12.29774	ppb
-	Zn	66	264.7	14.33885	ppb
-	Zn	67	67	23.01253	ppb
-	Zn	68	245.7	15.87264	ppb
-	As	75	250.2	13.63158	ppb
-	Se	77	112.3	112.59571	ppb
-	Se	82	6.1	6.91613	ppb
>	Rh	103	3084.5		ppb
-	Ag	107	1391.7	21.97691	ppb
-	Ag	109	1438		ppb
-	Cd	111	175.7	7.77852	ppb
-	Cd	114	685.9	8.25886	ppb
-	Sb	121	2429.1		ppb
-	Sb	123	1829.9	17.04967	ppb
-	Ba	135	863		ppb
-	Ba	137	1723.1	16.7078	ppb
>	Ho	165	27917.2		ppb
-	Pb	208	15826.9	14.71905	ppb
-	Kr	83	24.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Wednesday, June 20, 2018 12:59:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2558.8		ppb
-	Be	9	765	59.9978	ppb
-	P	31	2004.7	-451.8508	ppb
>	Sc	45	3732.6		ppb
-	Cr	52	7681.2	63.39811	ppb
-	Cr	53	1614.1	99.12903	ppb
-	Mn	55	9704.6	67.31403	ppb
-	Ni	60	1481	65.7537	ppb
-	Cu	63	3346.6	62.68768	ppb
-	Cu	65	1508.4	62.94066	ppb
-	Zn	66	876.3	63.97697	ppb
-	Zn	67	150.7	69.89105	ppb
-	Zn	68	675.7	67.74766	ppb
-	As	75	916.8	62.31557	ppb
-	Se	77	134.7	160.46985	ppb
-	Se	82	50.8	57.2412	ppb
>	Rh	103	2974.8		ppb
-	Ag	107	4395.1	72.90748	ppb
-	Ag	109	4330.4		ppb
-	Cd	111	1262.8	59.56197	ppb
-	Cd	114	4658.7	59.24315	ppb
-	Sb	121	9486.1		ppb
-	Sb	123	7165.6	69.8084	ppb
-	Ba	135	3401.6		ppb
-	Ba	137	6644.9	66.2427	ppb
>	Ho	165	27381.3		ppb
-	Pb	208	66984	64.1628	ppb
-	Kr	83	23		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Wednesday, June 20, 2018 13:02:46

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2563.8		ppb
-	Be	9	1439.4	112.91286	ppb
-	P	31	3636.6	-257.1303	ppb
>	Sc	45	3868.6		ppb
-	Cr	52	39395	331.11088	ppb
-	Cr	53	4905.5	340.8911	ppb
-	Mn	55	22430.7	152.25599	ppb
-	Ni	60	5045.2	219.06618	ppb
-	Cu	63	16351.3	302.71473	ppb
-	Cu	65	7341.4	302.1569	ppb
-	Zn	66	2876.2	217.79353	ppb
-	Zn	67	471.7	237.8691	ppb
-	Zn	68	2049.8	223.8922	ppb
-	As	75	1378.2	92.96486	ppb
-	Se	77	150.3	182.06869	ppb
-	Se	82	118.8	130.11527	ppb
>	Rh	103	3054.9		ppb
-	Ag	107	20093.5	325.81454	ppb
-	Ag	109	21237.4		ppb
-	Cd	111	1836.8	84.52797	ppb
-	Cd	114	6845.3	84.8372	ppb
-	Sb	121	9260.4		ppb
-	Sb	123	6879.1	67.20207	ppb
-	Ba	135	13141.5		ppb
-	Ba	137	26192.7	262.4112	ppb
>	Ho	165	27303.9		ppb
-	Pb	208	245854.7	236.6859	ppb
-	Kr	83	21.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Wednesday, June 20, 2018 13:05:47

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2613.1		ppb
-	Be	9	2118.1	163.21367	ppb
-	P	31	3525.2	-257.112	ppb
>	Sc	45	3748.3		ppb
-	Cr	52	46052.7	400.01939	ppb
-	Cr	53	5488.3	397.20459	ppb
-	Mn	55	30359.1	210.30097	ppb
-	Ni	60	6177.1	273.56903	ppb
-	Cu	63	18988.2	358.72504	ppb
-	Cu	65	8546.1	358.91459	ppb
-	Zn	66	3543.3	275.26302	ppb
-	Zn	67	576.3	299.39954	ppb
-	Zn	68	2515.1	283.27419	ppb
-	As	75	2079.7	145.21436	ppb
-	Se	77	172.7	227.91252	ppb
-	Se	82	190.8	212.9626	ppb
>	Rh	103	2996.2		ppb
-	Ag	107	25673.5	425.11821	ppb
-	Ag	109	25047.6		ppb
-	Cd	111	3025.9	142.14183	ppb
-	Cd	114	11265.5	142.56984	ppb
-	Sb	121	17017.1		ppb
-	Sb	123	12824.4	123.98967	ppb
-	Ba	135	15648.6		ppb
-	Ba	137	31811.6	314.29404	ppb
>	Ho	165	27688.7		ppb
-	Pb	208	301006.5	285.76807	ppb
-	Kr	83	23.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 FH

Sample Date: Wednesday, June 20, 2018 13:14:49

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2683.1		ppb
-	Be	9	2.3	-0.10174	ppb
-	P	31	1842.1	-481.0837	ppb
>	Sc	45	3861		ppb
-	Cr	52	1950.1	12.24534	ppb
-	Cr	53	279	-5.04725	ppb
-	Mn	55	1164.4	7.3131	ppb
-	Ni	60	497.7	21.17518	ppb
-	Cu	63	274.3	3.91638	ppb
-	Cu	65	131.3	4.4025	ppb
-	Zn	66	855	60.21956	ppb
-	Zn	67	131.7	57.21068	ppb
-	Zn	68	632.3	60.35312	ppb
-	As	75	77.3	1.6045	ppb
-	Se	77	21	-49.11776	ppb
-	Se	82	10.8	12.20081	ppb
>	Rh	103	3068.9		ppb
-	Ag	107	118	1.44405	ppb
-	Ag	109	282		ppb
-	Cd	111	6.9	0.05258	ppb
-	Cd	114	19.6	0.06035	ppb
-	Sb	121	208.3		ppb
-	Sb	123	165.5	1.02087	ppb
-	Ba	135	1573		ppb
-	Ba	137	3217.9	31.47037	ppb
>	Ho	165	27823.1		ppb
-	Pb	208	3954.5	3.54409	ppb
-	Kr	83	22		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 13:17:51

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2681		ppb
-	Be	9	2.7	-0.07607	ppb
-	P	31	1657.4	-499.4706	ppb
>	Sc	45	3775		ppb
-	Cr	52	439.3	-0.54946	ppb
-	Cr	53	313.7	-1.90818	ppb
-	Mn	55	89.3	0.0493	ppb
-	Ni	60	7.3	-0.04288	ppb
-	Cu	63	47.3	-0.25265	ppb
-	Cu	65	18.7	-0.19547	ppb
-	Zn	66	25	-4.05594	ppb
-	Zn	67	12	-5.6097	ppb
-	Zn	68	77	-2.97615	ppb
-	As	75	44.8	-0.59802	ppb
-	Se	77	31.7	-28.0043	ppb
-	Se	82	-1.2	-1.2265	ppb
>	Rh	103	2954.5		ppb
-	Ag	107	17.3	-0.17678	ppb
-	Ag	109	11		ppb
-	Cd	111	4.7	-0.04391	ppb
-	Cd	114	11.7	-0.03138	ppb
-	Sb	121	49.7		ppb
-	Sb	123	42.9	-0.15449	ppb
-	Ba	135	9		ppb
-	Ba	137	11	-0.07614	ppb
>	Ho	165	27078		ppb
-	Pb	208	104.7	-0.09279	ppb
-	Kr	83	22.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, June 20, 2018 13:20:51

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2733.2		ppb
-	Be	9	1335.4	98.23644	ppb
-	P	31	10055.4	494.56135	ppb
>	Sc	45	4029		ppb
-	Cr	52	12886.7	100.92171	ppb
-	Cr	53	1776.1	101.47747	ppb
-	Mn	55	15033.5	100.04532	ppb
-	Ni	60	2385.8	101.56631	ppb
-	Cu	63	5477.9	98.84819	ppb
-	Cu	65	2511.1	100.85127	ppb
-	Zn	66	1291.7	92.72703	ppb
-	Zn	67	214.3	99.56354	ppb
-	Zn	68	947.7	95.04831	ppb
-	As	75	1469.1	97.55665	ppb
-	Se	77	95	80.34799	ppb
-	Se	82	85.5	92.01556	ppb
>	Rh	103	3109.5		ppb
-	Ag	107	6268.1	99.65985	ppb
-	Ag	109	6166.8		ppb
-	Cd	111	2326.2	105.17532	ppb
-	Cd	114	8273.1	100.78372	ppb
-	Sb	121	13692.4		ppb
-	Sb	123	10416.4	97.75169	ppb
-	Ba	135	5279.9		ppb
-	Ba	137	10506.5	100.74262	ppb
>	Ho	165	28493.9		ppb
-	Pb	208	107952.2	99.46842	ppb
	Kr	83	25		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 FH

Sample Date: Wednesday, June 20, 2018 13:23:53

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2558.1		ppb
-	Be	9	1.3	-0.17107	ppb
-	P	31	1745.4	-488.5891	ppb
>	Sc	45	3780.6		ppb
-	Cr	52	1907.1	12.22374	ppb
-	Cr	53	263.3	-5.81213	ppb
-	Mn	55	1015	6.71079	ppb
-	Ni	60	473.3	21.33558	ppb
-	Cu	63	171.3	2.19972	ppb
-	Cu	65	67.7	1.94914	ppb
-	Zn	66	403	27.00435	ppb
-	Zn	67	58	20.23902	ppb
-	Zn	68	333.3	28.32865	ppb
-	As	75	37.1	-1.09111	ppb
-	Se	77	13	-61.95975	ppb
-	Se	82	-0.5	-0.34678	ppb
>	Rh	103	2896.8		ppb
-	Ag	107	14	-0.22831	ppb
-	Ag	109	28.3		ppb
-	Cd	111	6.9	0.06982	ppb
-	Cd	114	11.1	-0.0351	ppb
-	Sb	121	131		ppb
-	Sb	123	91.9	0.35153	ppb
-	Ba	135	1532.7		ppb
-	Ba	137	3119.5	31.98244	ppb
>	Ho	165	26536.4		ppb
-	Pb	208	2372	2.15725	ppb
	Kr	83	23		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 C8A

Sample Date: Wednesday, June 20, 2018 13:26:54

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2704.8		ppb
-	Be	9	2.7	-0.07781	ppb
-	P	31	1535	-502.0593	ppb
>	Sc	45	3539.9		ppb
-	Cr	52	466.7	-0.03966	ppb
-	Cr	53	69.7	-20.26539	ppb
-	Mn	55	116.7	0.22626	ppb
-	Ni	60	6.3	-0.09407	ppb
-	Cu	63	62.7	0.02002	ppb
-	Cu	65	36	0.5152	ppb
-	Zn	66	91	1.11867	ppb
-	Zn	67	18.3	-2.33765	ppb
-	Zn	68	119.3	1.79898	ppb
-	As	75	52.3	-0.11146	ppb
-	Se	77	7.7	-72.51584	ppb
-	Se	82	5.2	5.95857	ppb
>	Rh	103	3011.2		ppb
-	Ag	107	9.7	-0.30952	ppb
-	Ag	109	10		ppb
-	Cd	111	5.4	-0.00757	ppb
-	Cd	114	9.5	-0.06274	ppb
-	Sb	121	41.7		ppb
-	Sb	123	38.5	-0.20394	ppb
-	Ba	135	13.7		ppb
-	Ba	137	14.7	-0.04133	ppb
>	Ho	165	27580.9		ppb
-	Pb	208	122	-0.07803	ppb
-	Kr	83	16.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH

Sample Date: Wednesday, June 20, 2018 13:29:54

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2517.9		ppb
-	Be	9	3.7	0.01725	ppb
-	P	31	2968.5	-309.6197	ppb
>	Sc	45	3568.9		ppb
-	Cr	52	778.3	2.80615	ppb
-	Cr	53	105	-17.46464	ppb
-	Mn	55	7614.2	56.01999	ppb
-	Ni	60	92	3.99325	ppb
-	Cu	63	334	5.60901	ppb
-	Cu	65	142	5.40529	ppb
-	Zn	66	945.4	74.20965	ppb
-	Zn	67	126.7	61.0906	ppb
-	Zn	68	700	75.81444	ppb
-	As	75	55.2	0.38702	ppb
-	Se	77	9.7	-67.53684	ppb
-	Se	82	2.2	2.68922	ppb
>	Rh	103	2800.2		ppb
-	Ag	107	14.3	-0.21441	ppb
-	Ag	109	17.3		ppb
-	Cd	111	4.4	-0.04304	ppb
-	Cd	114	35.6	0.3001	ppb
-	Sb	121	64.3		ppb
-	Sb	123	52.7	-0.02167	ppb
-	Ba	135	274.3		ppb
-	Ba	137	514.3	5.37038	ppb
>	Ho	165	25329.5		ppb
-	Pb	208	3502.4	3.4425	ppb
-	Kr	83	21.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH Unprep

Sample Date: Wednesday, June 20, 2018 13:32:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2527.7		ppb
-	Be	9	3.3	-0.01171	ppb
-	P	31	2094.8	-417.1667	ppb
>	Sc	45	3439.9		ppb
-	Cr	52	626.7	1.61883	ppb
-	Cr	53	77.3	-19.44092	ppb
-	Mn	55	3523.2	26.67416	ppb
-	Ni	60	39	1.55423	ppb
-	Cu	63	164.3	2.30511	ppb
-	Cu	65	65	2.05648	ppb
-	Zn	66	427.7	31.70198	ppb
-	Zn	67	67	28.06098	ppb
-	Zn	68	320.3	29.73482	ppb
-	As	75	43.4	-0.39181	ppb
-	Se	77	8	-70.26333	ppb
-	Se	82	-4.2	-5.0791	ppb
>	Rh	103	2690.8		ppb
-	Ag	107	20.7	-0.08655	ppb
-	Ag	109	15.7		ppb
-	Cd	111	6.4	0.07251	ppb
-	Cd	114	27.4	0.20691	ppb
-	Sb	121	43.7		ppb
-	Sb	123	38.7	-0.16135	ppb
-	Ba	135	126		ppb
-	Ba	137	258.7	2.66583	ppb
>	Ho	165	24827		ppb
-	Pb	208	1612.7	1.5141	ppb
-	Kr	83	22.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date: Wednesday, June 20, 2018 13:35:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2554.6		ppb
-	Be	9	1.3	-0.17249	ppb
-	P	31	3350.2	-245.7817	ppb
>	Sc	45	3476.6		ppb
-	Cr	52	815.3	3.34123	ppb
-	Cr	53	90	-18.45506	ppb
-	Mn	55	486.3	3.1343	ppb
-	Ni	60	59	2.50375	ppb
-	Cu	63	255	4.15165	ppb
-	Cu	65	108.7	4.03735	ppb
-	Zn	66	456.3	33.75822	ppb
-	Zn	67	74.7	32.22678	ppb
-	Zn	68	362.3	34.65079	ppb
-	As	75	46.1	-0.21379	ppb
-	Se	77	7.7	-71.06822	ppb
-	Se	82	-1.5	-1.67176	ppb
>	Rh	103	2723.8		ppb
-	Ag	107	14.3	-0.20793	ppb
-	Ag	109	11.3		ppb
-	Cd	111	8.9	0.1987	ppb
-	Cd	114	33.2	0.28169	ppb
-	Sb	121	244		ppb
-	Sb	123	180	1.34862	ppb
-	Ba	135	29		ppb
-	Ba	137	49.3	0.3508	ppb
>	Ho	165	25109.6		ppb
-	Pb	208	467	0.29483	ppb
-	Kr	83	19.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 C8A-C9

Sample Date: Wednesday, June 20, 2018 13:38:56

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2494.1		ppb
-	Be	9	3.3	-0.0066	ppb
-	P	31	1965.7	-440.0187	ppb
>	Sc	45	3498.2		ppb
-	Cr	52	518.3	0.50122	ppb
-	Cr	53	61	-20.9097	ppb
-	Mn	55	245	1.26029	ppb
-	Ni	60	20.7	0.62026	ppb
-	Cu	63	71.3	0.30059	ppb
-	Cu	65	33.7	0.54082	ppb
-	Zn	66	91.7	1.79539	ppb
-	Zn	67	17.3	-2.07134	ppb
-	Zn	68	118	2.84673	ppb
-	As	75	63.3	1.05322	ppb
-	Se	77	7	-72.60078	ppb
-	Se	82	10.5	12.7856	ppb
>	Rh	103	2770.8		ppb
-	Ag	107	10.3	-0.28436	ppb
-	Ag	109	11.7		ppb
-	Cd	111	2.4	-0.1421	ppb
-	Cd	114	18.1	0.06588	ppb
-	Sb	121	30.3		ppb
-	Sb	123	25.7	-0.30329	ppb
-	Ba	135	12		ppb
-	Ba	137	17.3	0.00335	ppb
>	Ho	165	24961.1		ppb
-	Pb	208	125	-0.06261	ppb
-	Kr	83	16.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, June 20, 2018 13:51:00

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	2712.1		ppb
-	Be	9	1.7	-0.15152	ppb
-	P	31	1313	-543.0006	ppb
>	Sc	45	3761.3		ppb
-	Cr	52	464	-0.31515	ppb
-	Cr	53	314.3	-1.7921	ppb
-	Mn	55	83	0.00539	ppb
-	Ni	60	4.7	-0.1646	ppb
-	Cu	63	39.3	-0.40495	ppb
-	Cu	65	17.7	-0.2408	ppb
-	Zn	66	23.7	-4.17764	ppb
-	Zn	67	13.3	-4.8498	ppb
-	Zn	68	77.3	-2.92364	ppb
-	As	75	59.4	0.47357	ppb
-	Se	77	32.3	-27.05931	ppb
-	Se	82	-6.2	-6.86418	ppb
>	Rh	103	2957.2		ppb
-	Ag	107	10.3	-0.29434	ppb
-	Ag	109	13.7		ppb
-	Cd	111	4.7	-0.04092	ppb
-	Cd	114	8.8	-0.06918	ppb
-	Sb	121	30.3		ppb
-	Sb	123	28.6	-0.29935	ppb
-	Ba	135	11.3		ppb
-	Ba	137	12	-0.06743	ppb
>	Ho	165	27399		ppb
-	Pb	208	91.3	-0.10678	ppb
-	Kr	83	26		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Wednesday, June 20, 2018 13:54:00

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2822		ppb
-	Be	9	20.3	1.17321	ppb
-	P	31	1525.4	-520.1207	ppb
>	Sc	45	3848.6		ppb
-	Cr	52	573.7	0.52842	ppb
-	Cr	53	328	-1.30311	ppb
-	Mn	55	227.7	0.97038	ppb
-	Ni	60	28.3	0.85971	ppb
-	Cu	63	94.3	0.59276	ppb
-	Cu	65	41.7	0.72322	ppb
-	Zn	66	30	-3.72174	ppb
-	Zn	67	13.3	-5.11178	ppb
-	Zn	68	80.7	-2.82	ppb
-	As	75	62.4	0.58595	ppb
-	Se	77	36.3	-21.67855	ppb
-	Se	82	3.2	3.79257	ppb
>	Rh	103	3052.5		ppb
-	Ag	107	209	2.8836	ppb
-	Ag	109	204.3		ppb
-	Cd	111	130.9	5.68363	ppb
-	Cd	114	218.3	2.49361	ppb
-	Sb	121	321.7		ppb
-	Sb	123	255.2	1.96665	ppb
-	Ba	135	201		ppb
-	Ba	137	260.3	2.46337	ppb
>	Ho	165	27356.6		ppb
-	Pb	208	1552	1.31055	ppb
-	Kr	83	18.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Wednesday, June 20, 2018 13:57:01

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	2848.1		ppb
-	Be	9	1380	97.59129	ppb
-	P	31	9822.9	505.27079	ppb
>	Sc	45	3902.3		ppb
-	Cr	52	12615.8	102.04487	ppb
-	Cr	53	1710.7	100.79465	ppb
-	Mn	55	14933.1	98.76724	ppb
-	Ni	60	2353.8	99.58932	ppb
-	Cu	63	5498.9	98.62733	ppb
-	Cu	65	2469.8	98.57443	ppb
-	Zn	66	1301.7	92.8727	ppb
-	Zn	67	206	94.48057	ppb
-	Zn	68	922.7	91.62049	ppb
-	As	75	1447.9	95.52689	ppb
-	Se	77	91.7	73.29576	ppb
-	Se	82	83.8	89.75496	ppb
>	Rh	103	3128.2		ppb
-	Ag	107	6190.8	97.81248	ppb
-	Ag	109	6057.7		ppb
-	Cd	111	2305.4	103.63002	ppb
-	Cd	114	8297.2	100.46649	ppb
-	Sb	121	14012.3		ppb
-	Sb	123	10387.5	97.40339	ppb
-	Ba	135	5374.6		ppb
-	Ba	137	10826.7	103.73964	ppb
>	Ho	165	28516.6		ppb
-	Pb	208	108872.2	100.23947	ppb
-	Kr	83	20.7		ppb

elementOne

e 31368-Metals

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	143958		ppb
-	Be	9	3.7		ppb
-	P	31	2822.5		ppb
>	Sc	45	93878.6		ppb
-	Zn	66	216.3		ppb
	Zn	67	103		ppb
	Zn	68	280.7		ppb
	As	75	141.3		ppb
	Se	77	410.7		ppb
	Se	82	-0.4		ppb
>	Rh	103	74251.8		ppb
	Ho	165	557874.5		ppb
	Kr	83	51.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Thursday, June 21, 2018 11:34:57

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	167105		ppb
-	Be	9	654	0.94169	ppb
-	P	31	9710.9	21.38375	ppb
>	Sc	45	106329.4		ppb
-	Zn	66	631	1.14371	ppb
	Zn	67	150	0.58154	ppb
	Zn	68	526	0.8828	ppb
	As	75	489.4	1.01847	ppb
	Se	77	439	-2.29917	ppb
	Se	82	29.6	1.00692	ppb
>	Rh	103	87413.2		ppb
	Ho	165	607499.7		ppb
	Kr	83	56.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Thursday, June 21, 2018 11:36:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	165761.6		ppb
-	Be	9	68418.8	99.96597	ppb
-	P	31	321261.1	1045.4818	ppb
>	Sc	45	106205.8		ppb
-	Zn	66	32183.4	100.72754	ppb
	Zn	67	4903.8	100.32401	ppb
	Zn	68	21785.8	100.59638	ppb
	As	75	30799.3	100.15484	ppb
	Se	77	2425.5	105.05005	ppb
	Se	82	2909.8	101.10746	ppb
>	Rh	103	84244		ppb
	Ho	165	616939.9		ppb
	Kr	83	45		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Thursday, June 21, 2018 11:38:52

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	160840.4		ppb
-	Be	9	332032	500.00692	ppb
-	P	31	1544265.3	4990.8981	ppb
>	Sc	45	107812.7		ppb
-	Zn	66	160440.6	499.8542	ppb
	Zn	67	24231.1	499.93604	ppb
	Zn	68	108152.1	499.88096	ppb
	As	75	154753.8	499.969	ppb
	Se	77	9880	498.99659	ppb
	Se	82	14539.5	499.77849	ppb
>	Rh	103	85154.4		ppb
	Ho	165	632755.7		ppb
	Kr	83	50.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 11:40:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	143507.3		ppb
-	Be	9	33.7	0.05063	ppb
-	P	31	3100.2	0.84599	ppb
>	Sc	45	95435.5		ppb
-	Zn	66	247	0.09785	ppb
	Zn	67	89	-0.36135	ppb
	Zn	68	273.3	-0.06029	ppb
	As	75	210.6	0.24593	ppb
	Se	77	586.7	10.21472	ppb
	Se	82	12.6	0.5048	ppb
>	Rh	103	75333		ppb
	Ho	165	553104.8		ppb
	Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 11:42:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	156716.6		ppb
-	Be	9	682.7	1.04901	ppb
-	P	31	9508.8	22.65735	ppb
>	Sc	45	100132.1		ppb
-	Zn	66	601.3	1.27358	ppb
	Zn	67	162	1.21463	ppb
	Zn	68	523.7	1.15722	ppb
	As	75	482.4	1.17993	ppb
	Se	77	723	16.86353	ppb
	Se	82	22.3	0.85331	ppb
>	Rh	103	78041		ppb
	Ho	165	582788.2		ppb
	Kr	83	47		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Thursday, June 21, 2018 11:44:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	148477.6		ppb
-	Be	9	154283.3	251.72184	ppb
-	P	31	699270.8	2468.828	ppb
>	Sc	45	98456.9		ppb
-	Zn	66	73775.4	252.16548	ppb
	Zn	67	11067.8	249.69769	ppb
	Zn	68	48895.1	247.5903	ppb
	As	75	70085.7	248.55395	ppb
	Se	77	4754.5	252.12397	ppb
	Se	82	6540.1	246.96811	ppb
>	Rh	103	77497.3		ppb
	Ho	165	579451.4		ppb
	Kr	83	52.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 11:46:43

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	157892.1		ppb
-	Be	9	66019.7	101.27188	ppb
-	P	31	309993.7	1033.139	ppb
>	Sc	45	103702.1		ppb
-	Zn	66	31188.4	102.42146	ppb
	Zn	67	4804.8	103.19642	ppb
	Zn	68	21094.9	102.21322	ppb
	As	75	29420	100.35171	ppb
	Se	77	2420.1	111.1521	ppb
	Se	82	2781.7	101.38656	ppb
>	Rh	103	80308.8		ppb
	Ho	165	610751.3		ppb
	Kr	83	53		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date: Thursday, June 21, 2018 11:48:41

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	154290.5		ppb
-	Be	9	32585.9	51.14989	ppb
-	P	31	58772.7	195.43836	ppb
>	Sc	45	99645.2		ppb
-	Zn	66	15292.7	51.78785	ppb
	Zn	67	2338.4	50.96542	ppb
	Zn	68	10180.4	50.49869	ppb
	As	75	13852.4	48.82491	ppb
	Se	77	1578	67.20415	ppb
	Se	82	1365.6	51.72072	ppb
>	Rh	103	77302.7		ppb
	Ho	165	587508.8		ppb
	Kr	83	50		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Thursday, June 21, 2018 11:50:38

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	167268.4		ppb
-	Be	9	22.3	0.02618	ppb
-	P	31	1626655.9	4934.1557	ppb
>	Sc	45	114837.5		ppb
-	Zn	66	431.3	0.53736	ppb
	Zn	67	188.3	1.36103	ppb
	Zn	68	378	0.21503	ppb
	As	75	136.1	-0.0929	ppb
	Se	77	535.7	2.70017	ppb
	Se	82	-5.1	-0.15326	ppb
>	Rh	103	87399.2		ppb
	Ho	165	675252.9		ppb
	Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Thursday, June 21, 2018 11:52:36

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	166694.4		ppb
-	Be	9	3.7	-0.00084	ppb
-	P	31	1629531.5	4946.0963	ppb
>	Sc	45	114759.2		ppb
-	Zn	66	987.4	2.1918	ppb
	Zn	67	293.7	3.41179	ppb
	Zn	68	806.3	2.10642	ppb
	As	75	492.7	1.00929	ppb
	Se	77	584	4.84155	ppb
	Se	82	27.9	0.93852	ppb
>	Rh	103	88461.9		ppb
	Ho	165	676120		ppb
	Kr	83	52		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Thursday, June 21, 2018 11:54:33

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	279600.9		ppb
-	Be	9	297.7	0.25171	ppb
-	P	31	4149.7	-2.51245	ppb
>	Sc	45	181439.4		ppb
-	Zn	66	3488.9	6.03593	ppb
	Zn	67	600	5.33275	ppb
	Zn	68	2393.1	5.44762	ppb
	As	75	321.8	0.12626	ppb
	Se	77	978.4	7.48231	ppb
	Se	82	15.9	0.35834	ppb
>	Rh	103	136129.3		ppb
	Ho	165	1046807		ppb
	Kr	83	51.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 11:56:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	150100		ppb
-	Be	9	646	1.0362	ppb
-	P	31	9133	21.16916	ppb
>	Sc	45	100685		ppb
-	Zn	66	578	1.18502	ppb
	Zn	67	162	1.20012	ppb
	Zn	68	514	1.09615	ppb
	As	75	442.3	1.03071	ppb
	Se	77	441.7	0.47121	ppb
	Se	82	23	0.87365	ppb
>	Rh	103	78380		ppb
	Ho	165	590990.5		ppb
	Kr	83	46		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	143958		ppb
-	Be	9	3.7	-0.00001	ppb
-	P	31	2822.5	0.00122	ppb
>	Sc	45	93878.6		ppb
-	Zn	66	216.3	0.00006	ppb
	Zn	67	103	0.00015	ppb
	Zn	68	280.7	0.00011	ppb
	As	75	141.3	-0.00004	ppb
	Se	77	410.7	0.00315	ppb
	Se	82	-0.4	-0.00023	ppb
>	Rh	103	74251.8		ppb
	Ho	165	557874.5		ppb
	Kr	83	51.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date: Thursday, June 21, 2018 12:00:06

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	155595.4		ppb
-	Be	9	1.3	-0.00409	ppb
-	P	31	3744.6	2.11362	ppb
>	Sc	45	103687.9		ppb
-	Zn	66	769.3	1.41857	ppb
	Zn	67	124.7	-0.08854	ppb
	Zn	68	617.7	1.12274	ppb
	As	75	159.1	-0.05425	ppb
	Se	77	35.7	-23.25084	ppb
	Se	82	6.9	0.23412	ppb
>	Rh	103	93230.2		ppb
	Ho	165	602025		ppb
	Kr	83	52		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB FH

Sample Date: Thursday, June 21, 2018 12:02:04

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	161061.1		ppb
-	Be	9	30546	45.93023	ppb
-	P	31	57658.7	178.23308	ppb
>	Sc	45	106652.7		ppb
-	Zn	66	14707.3	40.89717	ppb
	Zn	67	2273.8	40.36159	ppb
	Zn	68	9949.3	40.39204	ppb
	As	75	13851.7	40.15649	ppb
	Se	77	833.3	15.15623	ppb
	Se	82	1266.9	39.56179	ppb
>	Rh	103	93776.2		ppb
	Ho	165	614930.4		ppb
	Kr	83	60.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date: Thursday, June 21, 2018 12:04:02

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	189515.8		ppb
-	Be	9	3.7	-0.00149	ppb
-	P	31	5987.7	6.82158	ppb
>	Sc	45	120701.4		ppb
-	Zn	66	2954.8	6.41419	ppb
	Zn	67	439	4.64619	ppb
	Zn	68	2144.1	6.25702	ppb
	As	75	131.2	-0.19308	ppb
	Se	77	24	-23.9842	ppb
	Se	82	-1.1	-0.01481	ppb
>	Rh	103	109228.4		ppb
	Ho	165	676666.5		ppb
	Kr	83	58.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: LRB BH

Sample Date: Thursday, June 21, 2018 12:05:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	196662.8		ppb
-	Be	9	35489.5	43.70419	ppb
-	P	31	63540.7	173.1261	ppb
>	Sc	45	120797.8		ppb
-	Zn	66	16871	40.0239	ppb
	Zn	67	2585.8	39.09717	ppb
	Zn	68	11565	40.06096	ppb
	As	75	14221.4	35.1155	ppb
	Se	77	770	6.68975	ppb
	Se	82	1163.5	30.98238	ppb
>	Rh	103	109911.8		ppb
	Ho	165	689560.9		ppb
	Kr	83	65.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 FH

Sample Date Thursday, June 21, 2018 12:07:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	158741		ppb
-	Be	9	4.3	0.00044	ppb
-	P	31	3337.9	0.91491	ppb
>	Sc	45	102123.5		ppb
-	Zn	66	39492.2	122.43805	ppb
	Zn	67	5814.3	118.06895	ppb
	Zn	68	26026.5	119.13127	ppb
	As	75	167.9	0.01709	ppb
	Se	77	312.3	-8.43106	ppb
	Se	82	10	0.35898	ppb
>	Rh	103	85186.9		ppb
	Ho	165	610579		ppb
	Kr	83	48.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:09:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	161364.6		ppb
-	Be	9	4	-0.00017	ppb
-	P	31	3549.9	1.70484	ppb
>	Sc	45	101584		ppb
-	Zn	66	40689.1	125.92311	ppb
	Zn	67	5942	120.49295	ppb
	Zn	68	26620.8	121.66997	ppb
	As	75	171.2	0.02823	ppb
	Se	77	305	-8.83748	ppb
	Se	82	25.3	0.88742	ppb
>	Rh	103	85335.1		ppb
	Ho	165	612084.2		ppb
	Kr	83	45.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:11:53

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	161418.3		ppb
-	Be	9	2.7	-0.00216	ppb
-	P	31	3451.9	1.33465	ppb
>	Sc	45	101860.4		ppb
-	Zn	66	40950.8	125.52844	ppb
	Zn	67	5978.4	120.07176	ppb
	Zn	68	26788	121.26454	ppb
	As	75	137.8	-0.08344	ppb
	Se	77	304	-9.03721	ppb
	Se	82	-0.8	-0.01116	ppb
>	Rh	103	86148.9		ppb
	Ho	165	609097.3		ppb
	Kr	83	57.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date Thursday, June 21, 2018 12:13:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	162679.9		ppb
-	Be	9	4	-0.00021	ppb
-	P	31	3298.6	0.93885	ppb
>	Sc	45	100719.5		ppb
-	Zn	66	34094.9	104.78132	ppb
	Zn	67	4907.8	98.51143	ppb
	Zn	68	22270.2	100.94223	ppb
	As	75	133.2	-0.09718	ppb
	Se	77	288.3	-9.80374	ppb
	Se	82	-4.7	-0.14726	ppb
>	Rh	103	85822.7		ppb
	Ho	165	612398.1		ppb
	Kr	83	52.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date Thursday, June 21, 2018 12:15:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	154259		ppb
-	Be	9	31542.9	49.52161	ppb
-	P	31	56923.8	192.78655	ppb
>	Sc	45	97740.4		ppb
-	Zn	66	47383.5	154.36081	ppb
	Zn	67	7017.3	150.23223	ppb
	Zn	68	31143.1	149.98017	ppb
	As	75	14026.1	47.05976	ppb
	Se	77	1146.7	38.78819	ppb
	Se	82	1365.6	49.26072	ppb
>	Rh	103	81189		ppb
	Ho	165	590131.9		ppb
	Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 12:17:47

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	149761.3		ppb
-	Be	9	12.3	0.01379	ppb
-	P	31	2870.5	0.31351	ppb
>	Sc	45	92722		ppb
-	Zn	66	227.3	-0.00311	ppb
	Zn	67	85.3	-0.52519	ppb
	Zn	68	256.7	-0.19811	ppb
	As	75	105.3	-0.15506	ppb
	Se	77	272.3	-9.28533	ppb
	Se	82	9	0.3529	ppb
>	Rh	103	78353		ppb
	Ho	165	568198.3		ppb
	Kr	83	46.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 12:19:44

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	154910.5		ppb
-	Be	9	61804.3	96.64489	ppb
-	P	31	280509.9	1004.9433	ppb
>	Sc	45	96425		ppb
-	Zn	66	28810.6	93.17313	ppb
	Zn	67	4445.1	93.83881	ppb
	Zn	68	19260.1	91.81443	ppb
	As	75	27106.1	91.08014	ppb
	Se	77	2022.4	87.10264	ppb
	Se	82	2682.1	96.34575	ppb
>	Rh	103	81491		ppb
	Ho	165	604856.6		ppb
	Kr	83	44.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 FH

Sample Date: Thursday, June 21, 2018 12:21:43

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	147740.4		ppb
-	Be	9	10.7	0.01132	ppb
-	P	31	3211.5	1.63299	ppb
>	Sc	45	92435.6		ppb
-	Zn	66	27434.7	91.03863	ppb
	Zn	67	3907.6	84.4463	ppb
	Zn	68	17888.7	87.45782	ppb
	As	75	152.1	0.00205	ppb
	Se	77	311	-7.28221	ppb
	Se	82	-7.4	-0.26121	ppb
>	Rh	103	79392.2		ppb
	Ho	165	577561.6		ppb
	Kr	83	56		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Thursday, June 21, 2018 12:23:40

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	151725.6		ppb
-	Be	9	6.3	0.00394	ppb
-	P	31	12459.4	34.56154	ppb
>	Sc	45	96546.8		ppb
-	Zn	66	16511.8	52.4517	ppb
	Zn	67	2434.5	49.69462	ppb
	Zn	68	10910.4	50.76084	ppb
	As	75	121.7	-0.11748	ppb
	Se	77	313	-7.83388	ppb
	Se	82	26	0.93736	ppb
>	Rh	103	82427.3		ppb
	Ho	165	591948		ppb
	Kr	83	44.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date: Thursday, June 21, 2018 12:25:38

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	155497.8		ppb
-	Be	9	5.3	0.00214	ppb
-	P	31	12580.8	34.4922	ppb
>	Sc	45	97623.9		ppb
-	Zn	66	16710.6	52.65052	ppb
	Zn	67	2491.1	50.46827	ppb
	Zn	68	11092.8	51.19787	ppb
	As	75	85.6	-0.23953	ppb
	Se	77	301	-8.61927	ppb
	Se	82	29.3	1.04754	ppb
>	Rh	103	83117.3		ppb
	Ho	165	600917.6		ppb
	Kr	83	46.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Thursday, June 21, 2018 12:27:35

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	162208.7		ppb
-	Be	9	3.7	-0.0007	ppb
-	P	31	17411.1	48.95686	ppb
>	Sc	45	102255.1		ppb
-	Zn	66	14798	44.49029	ppb
	Zn	67	2207.4	42.41883	ppb
	Zn	68	9799.3	43.04518	ppb
	As	75	135.1	-0.09492	ppb
	Se	77	253	-11.80652	ppb
	Se	82	-2.8	-0.08285	ppb
>	Rh	103	86876		ppb
	Ho	165	616940.5		ppb
	Kr	83	57		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Thursday, June 21, 2018 12:29:33

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	163358.9		ppb
-	Be	9	31949.1	47.36451	ppb
-	P	31	71387.8	230.78318	ppb
>	Sc	45	103296.3		ppb
-	Zn	66	28406.1	86.66489	ppb
	Zn	67	4090.3	81.21158	ppb
	Zn	68	18763	84.31071	ppb
	As	75	13460.8	42.41731	ppb
	Se	77	1003.7	27.53739	ppb
	Se	82	1218.6	41.33102	ppb
>	Rh	103	86323.5		ppb
	Ho	165	614041.6		ppb
	Kr	83	50.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date Thursday, June 21, 2018 12:31:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	166518.3		ppb
-	Be	9	29901.9	43.49039	ppb
-	P	31	18203	56.55662	ppb
>	Sc	45	94763.6		ppb
-	Zn	66	23148.7	91.76749	ppb
	Zn	67	3634.9	94.09572	ppb
	Zn	68	15358	89.73018	ppb
	As	75	18796.2	77.3551	ppb
	Se	77	2518.8	146.19415	ppb
	Se	82	1755.7	77.32069	ppb
>	Rh	103	66473.6		ppb
	Ho	165	566229.8		ppb
	Kr	83	49.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date Thursday, June 21, 2018 12:33:28

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	172186.1		ppb
-	Be	9	67047.5	94.30926	ppb
-	P	31	18659.3	56.47624	ppb
>	Sc	45	97258.5		ppb
-	Zn	66	35668.1	139.64115	ppb
	Zn	67	5511.6	141.72751	ppb
	Zn	68	23887.1	138.223	ppb
	As	75	30319.4	123.18302	ppb
	Se	77	3236.5	191.5665	ppb
	Se	82	2880.8	124.94146	ppb
>	Rh	103	67494.7		ppb
	Ho	165	573951		ppb
	Kr	83	41.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Thursday, June 21, 2018 12:39:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	156064.1		ppb
-	Be	9	70408.7	109.27587	ppb
-	P	31	60490.1	215.05302	ppb
>	Sc	45	93626.3		ppb
-	Zn	66	62714.6	205.94217	ppb
	Zn	67	9504.5	205.70842	ppb
	Zn	68	42575.9	206.98819	ppb
	As	75	26587.9	90.30722	ppb
	Se	77	2944.8	140.02309	ppb
	Se	82	4192.3	152.24311	ppb
>	Rh	103	80618.8		ppb
	Ho	165	590306.2		ppb
	Kr	83	49.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date: Thursday, June 21, 2018 12:41:18

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	151016.9		ppb
-	Be	9	97719.3	156.72004	ppb
-	P	31	59256.5	210.3908	ppb
>	Sc	45	93656.4		ppb
-	Zn	66	75231	252.30254	ppb
	Zn	67	11351.2	251.27509	ppb
	Zn	68	50769.2	252.26231	ppb
	As	75	39066.7	135.69011	ppb
	Se	77	3611.3	181.50145	ppb
	Se	82	5345.8	198.10778	ppb
>	Rh	103	78982.6		ppb
	Ho	165	583556.5		ppb
	Kr	83	53.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 12:43:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	145146		ppb
-	Be	9	29.7	0.04321	ppb
-	P	31	2653.5	-0.3162	ppb
>	Sc	45	90989.3		ppb
-	Zn	66	218.3	-0.00925	ppb
	Zn	67	77.3	-0.64779	ppb
	Zn	68	261.7	-0.12951	ppb
	As	75	127.3	-0.06197	ppb
	Se	77	251	-10.02138	ppb
	Se	82	-0.7	-0.01121	ppb
>	Rh	103	75801.1		ppb
	Ho	165	560669.3		ppb
	Kr	83	46.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 12:45:14

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	151839.2		ppb
-	Be	9	61492.9	98.11273	ppb
-	P	31	272095.3	997.07193	ppb
>	Sc	45	94284.9		ppb
-	Zn	66	27466.4	97.86353	ppb
	Zn	67	4209	97.95786	ppb
	Zn	68	18388.1	96.61411	ppb
	As	75	25763.5	95.3629	ppb
	Se	77	1956.7	94.45269	ppb
	Se	82	2506	99.12571	ppb
>	Rh	103	74014.4		ppb
	Ho	165	597006.9		ppb
	Kr	83	53.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 FH

Sample Date Thursday, June 21, 2018 12:47:13

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	178084.1		ppb
-	Be	9	64	0.08075	ppb
-	P	31	21295.1	59.55813	ppb
>	Sc	45	106117.4		ppb
-	Zn	66	1656898.3	4649.3139	ppb
	Zn	67	245293.7	4571.7301	ppb
	Zn	68	1099866.9	4584.6518	ppb
	As	75	719.6	1.56907	ppb
	Se	77	237	-13.67144	ppb
	Se	82	304.6	9.43231	ppb
>	Rh	103	94674.3		ppb
	Ho	165	647362.3		ppb
	Kr	83	52.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:49:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	172419.6		ppb
-	Be	9	33.7	0.04115	ppb
-	P	31	29498.1	88.77444	ppb
>	Sc	45	103739.1		ppb
-	Zn	66	1810497.4	5222.8203	ppb
	Zn	67	265124.4	5080.386	ppb
	Zn	68	1190212	5100.5951	ppb
	As	75	823.6	1.94108	ppb
	Se	77	380.7	-6.30629	ppb
	Se	82	535.2	17.03136	ppb
>	Rh	103	92094.3		ppb
	Ho	165	629962.1		ppb
	Kr	83	59.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 FH

Sample Date Thursday, June 21, 2018 12:51:07

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	177322.8		ppb
-	Be	9	36.3	0.04351	ppb
-	P	31	29996.3	88.28029	ppb
>	Sc	45	106020.4		ppb
-	Zn	66	1800710.2	5077.3281	ppb
	Zn	67	267701.3	5013.7591	ppb
	Zn	68	1187635.7	4974.5281	ppb
	As	75	892.1	2.08291	ppb
	Se	77	380	-6.76114	ppb
	Se	82	569.6	17.70826	ppb
>	Rh	103	94218.9		ppb
	Ho	165	648929.9		ppb
	Kr	83	49.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date Thursday, June 21, 2018 12:53:05

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	184846.5		ppb
-	Be	9	31.3	0.03485	ppb
-	P	31	19558	52.20774	ppb
>	Sc	45	108887.3		ppb
-	Zn	66	1455734.1	3949.7912	ppb
	Zn	67	214111.4	3858.5921	ppb
	Zn	68	948947.1	3824.6013	ppb
	As	75	378.2	0.53954	ppb
	Se	77	24	-23.87145	ppb
	Se	82	0.9	0.0457	ppb
>	Rh	103	97919.4		ppb
	Ho	165	665254		ppb
	Kr	83	54.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 FH

Sample Date Thursday, June 21, 2018 12:55:02

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	179351.2		ppb
-	Be	9	34748.8	46.92214	ppb
-	P	31	76441	240.61277	ppb
>	Sc	45	106271.1		ppb
-	Zn	66	1437798.2	4041.8217	ppb
	Zn	67	212304.8	3964.0104	ppb
	Zn	68	945521.8	3948.4183	ppb
	As	75	13657.8	39.27404	ppb
	Se	77	785	12.54075	ppb
	Se	82	1230.7	38.13596	ppb
>	Rh	103	94504.6		ppb
	Ho	165	642834		ppb
	Kr	83	47.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 FH

Sample Date Thursday, June 21, 2018 12:57:00

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	177917.9		ppb
-	Be	9	36	0.04287	ppb
-	P	31	16547.5	44.57939	ppb
>	Sc	45	104889.3		ppb
-	Zn	66	1245602.8	3529.8765	ppb
	Zn	67	181332.6	3412.8287	ppb
	Zn	68	819970.2	3451.4174	ppb
	As	75	475.5	0.87364	ppb
	Se	77	59.7	-22.10143	ppb
	Se	82	58.9	1.85785	ppb
>	Rh	103	93754.8		ppb
	Ho	165	643643.4		ppb
	Kr	83	58		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-1 BH

Sample Date Thursday, June 21, 2018 12:58:58

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	229405.9		ppb
-	Be	9	11	0.00547	ppb
-	P	31	98905.3	272.51945	ppb
>	Sc	45	122018.8		ppb
-	Zn	66	81249.2	190.16531	ppb
	Zn	67	11873.2	182.97369	ppb
	Zn	68	53613.4	185.707	ppb
	As	75	361.3	0.35506	ppb
	Se	77	95.3	-21.16755	ppb
	Se	82	129.3	3.3575	ppb
>	Rh	103	113065.1		ppb
	Ho	165	715585.2		ppb
	Kr	83	52		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date Thursday, June 21, 2018 13:00:56

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	217680.7		ppb
-	Be	9	15.7	0.01124	ppb
-	P	31	106766.5	301.2354	ppb
>	Sc	45	119579.7		ppb
-	Zn	66	145141.8	347.84863	ppb
	Zn	67	21242	336.57314	ppb
	Zn	68	95220.3	338.31044	ppb
	As	75	499.4	0.71901	ppb
	Se	77	150.3	-18.83978	ppb
	Se	82	223.5	5.92839	ppb
>	Rh	103	110620.2		ppb
	Ho	165	703141.6		ppb
	Kr	83	61.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-2 BH

Sample Date Thursday, June 21, 2018 13:02:53

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	212921.8		ppb
-	Be	9	16.7	0.01281	ppb
-	P	31	104054.8	296.28412	ppb
>	Sc	45	118405.1		ppb
-	Zn	66	143473.5	344.47103	ppb
	Zn	67	21113.6	335.13282	ppb
	Zn	68	95566.3	340.18369	ppb
	As	75	373.7	0.40793	ppb
	Se	77	170	-18.02499	ppb
	Se	82	204.9	5.4503	ppb
>	Rh	103	110419		ppb
	Ho	165	696678.6		ppb
	Kr	83	49.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Thursday, June 21, 2018 13:04:51

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	202535.5		ppb
-	Be	9	5.7	0.00059	ppb
-	P	31	74607.5	215.62928	ppb
>	Sc	45	115181.7		ppb
-	Zn	66	64927.5	163.6739	ppb
	Zn	67	9351.1	154.94794	ppb
	Zn	68	42058	156.8156	ppb
	As	75	186.6	-0.03335	ppb
	Se	77	28	-23.77067	ppb
	Se	82	14.3	0.41222	ppb
>	Rh	103	104911.7		ppb
	Ho	165	688561.6		ppb
	Kr	83	49.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-3 BH

Sample Date: Thursday, June 21, 2018 13:06:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	202405.2		ppb
-	Be	9	35147	42.06419	ppb
-	P	31	128467.2	381.42791	ppb
>	Sc	45	114428.6		ppb
-	Zn	66	75495.2	189.46152	ppb
	Zn	67	10989.7	181.56363	ppb
	Zn	68	49851	185.18592	ppb
	As	75	12338.9	31.71304	ppb
	Se	77	688.3	4.51941	ppb
	Se	82	1055	29.32131	ppb
>	Rh	103	105451.3		ppb
	Ho	165	687342.9		ppb
	Kr	83	48.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 13:08:47

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	156929.3		ppb
-	Be	9	6.3	0.00362	ppb
-	P	31	2571.8	-0.7061	ppb
>	Sc	45	91708.6		ppb
-	Zn	66	202.3	-0.07157	ppb
	Zn	67	76.3	-0.68755	ppb
	Zn	68	257	-0.16589	ppb
	As	75	117.8	-0.09986	ppb
	Se	77	228	-11.52677	ppb
	Se	82	1.3	0.06441	ppb
>	Rh	103	76506.9		ppb
	Ho	165	581944.2		ppb
	Kr	83	41.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 13:10:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	163638.6		ppb
-	Be	9	64904.2	96.06968	ppb
-	P	31	281076.7	1000.6377	ppb
>	Sc	45	97059.8		ppb
-	Zn	66	27723.4	90.05582	ppb
	Zn	67	4153.7	87.97966	ppb
	Zn	68	18519.9	88.66044	ppb
	As	75	26931.2	90.9227	ppb
	Se	77	1856.7	78.41039	ppb
	Se	82	2642.1	95.37193	ppb
>	Rh	103	81104.7		ppb
	Ho	165	621335.1		ppb
	Kr	83	48.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-4 BH

Sample Date: Thursday, June 21, 2018 13:15:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	219150.9		ppb
-	Be	9	5	-0.00065	ppb
-	P	31	72978.7	201.65602	ppb
>	Sc	45	120092.8		ppb
-	Zn	66	55146.4	130.59026	ppb
	Zn	67	8144.7	126.471	ppb
	Zn	68	36489.3	127.65142	ppb
	As	75	303.4	0.22518	ppb
	Se	77	47.3	-23.06058	ppb
	Se	82	37.9	1.00934	ppb
>	Rh	103	111542.3		ppb
	Ho	165	716024.7		ppb
	Kr	83	60		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 13:21:15

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	148886.5		ppb
-	Be	9	2.7	-0.00182	ppb
-	P	31	2407.8	-0.87314	ppb
>	Sc	45	87348.3		ppb
-	Zn	66	204.3	-0.02773	ppb
	Zn	67	68.7	-0.78271	ppb
	Zn	68	218	-0.30927	ppb
	As	75	103	-0.13389	ppb
	Se	77	222	-11.19678	ppb
	Se	82	-2	-0.06861	ppb
>	Rh	103	72755.4		ppb
	Ho	165	562227.7		ppb
	Kr	83	47.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 13:23:12

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	155852.2		ppb
-	Be	9	610.7	0.94289	ppb
-	P	31	8164.7	20.63553	ppb
>	Sc	45	91552.3		ppb
-	Zn	66	481.7	0.88911	ppb
	Zn	67	117.3	0.24389	ppb
	Zn	68	430.3	0.71556	ppb
	As	75	334.4	0.67377	ppb
	Se	77	212.7	-12.49772	ppb
	Se	82	20.6	0.80059	ppb
>	Rh	103	76942.6		ppb
	Ho	165	586059		ppb
	Kr	83	48.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 13:25:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	154843.8		ppb
-	Be	9	62068.6	97.07677	ppb
-	P	31	266341.8	992.03153	ppb
>	Sc	45	92742.8		ppb
-	Zn	66	26233.1	88.76075	ppb
	Zn	67	4032.7	89.00826	ppb
	Zn	68	17745	88.47886	ppb
	As	75	25613.8	90.07591	ppb
	Se	77	1814.7	80.28936	ppb
	Se	82	2590.1	97.3871	ppb
>	Rh	103	77847.7		ppb
	Ho	165	603963.4		ppb
	Kr	83	44.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 13:27:10

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	151109.6		ppb
-	Be	9	60957.6	97.70412	ppb
-	P	31	257884.3	980.28517	ppb
>	Sc	45	90865.8		ppb
-	Zn	66	25910.1	96.81333	ppb
	Zn	67	3894	94.99477	ppb
	Zn	68	17234.3	94.95524	ppb
	As	75	24193.6	93.9302	ppb
	Se	77	1816.4	91.31162	ppb
	Se	82	2317.1	96.15107	ppb
>	Rh	103	70546.1		ppb
	Ho	165	592682.2		ppb
	Kr	83	45.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date: Thursday, June 21, 2018 13:29:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	146502.1		ppb
	Sc	45	84260.1		ppb
>	Rh	103	67604.6		ppb
	Ag	107	115.3		ppb
	Ag	109	109		ppb
	Cd	111	26		ppb
	Cd	114	73.5		ppb
-	Ho	165	548864.6		ppb
	Kr	83	41.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Thursday, June 21, 2018 13:31:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	154808		ppb
	Sc	45	89451.8		ppb
>	Rh	103	71154.5		ppb
	Ag	107	1699.4	1.01611	ppb
	Ag	109	1764.1		ppb
	Cd	111	938.2	1.02355	ppb
	Cd	114	3105.3	1.04307	ppb
-	Ho	165	583082.3		ppb
	Kr	83	39.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Thursday, June 21, 2018 13:32:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	156832.1		ppb
	Sc	45	92777.2		ppb
>	Rh	103	72559.1		ppb
	Ag	107	165067	104.15659	ppb
	Ag	109	177212.9		ppb
	Cd	111	93551.2	103.04509	ppb
	Cd	114	305327.6	103.09996	ppb
-	Ho	165	604535		ppb
	Kr	83	36.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Thursday, June 21, 2018 13:34:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	154065.5		ppb
	Sc	45	94144.6		ppb
>	Rh	103	70726.2		ppb
	Ag	107	770579.8	499.16865	ppb
	Ag	109	802246.5		ppb
	Cd	111	441790.5	499.39093	ppb
	Cd	114	1441153.1	499.37992	ppb
-	Ho	165	608044		ppb
	Kr	83	38.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 13:36:42

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	145200.9		ppb
	Sc	45	86158.5		ppb
>	Rh	103	65168.2		ppb
	Ag	107	942.4	0.58479	ppb
	Ag	109	903.7		ppb
	Cd	111	126	0.12367	ppb
-	Cd	114	413.2	0.12862	ppb
	Ho	165	551514.8		ppb
	Kr	83	38.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 13:38:34

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	150053.8		ppb
	Sc	45	87194.8		ppb
>	Rh	103	65320.6		ppb
	Ag	107	1713.1	1.12371	ppb
	Ag	109	1747.4		ppb
	Cd	111	883.5	1.05075	ppb
-	Cd	114	2910.9	1.0656	ppb
	Ho	165	561879.2		ppb
	Kr	83	36		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date: Thursday, June 21, 2018 13:40:25

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	138190.8		ppb
	Sc	45	84318.3		ppb
>	Rh	103	62201		ppb
	Ag	107	337722.7	248.77938	ppb
	Ag	109	348936.4		ppb
	Cd	111	197709.5	254.08201	ppb
-	Cd	114	648308.1	255.43595	ppb
	Ho	165	546642.5		ppb
	Kr	83	34.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 13:42:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	148726.8		ppb
	Sc	45	90252.6		ppb
>	Rh	103	66161.4		ppb
	Ag	107	152772.8	105.72726	ppb
	Ag	109	160486		ppb
	Cd	111	85529.2	103.32465	ppb
-	Cd	114	287218	106.36492	ppb
	Ho	165	580957.9		ppb
	Kr	83	47.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date: Thursday, June 21, 2018 13:44:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	142098.1		ppb
	Sc	45	84237		ppb
>	Rh	103	63200.8		ppb
	Ag	107	70739.9	51.21627	ppb
	Ag	109	72460.5		ppb
	Cd	111	40259.4	50.90615	ppb
-	Cd	114	134003	51.94159	ppb
	Ho	165	548744.5		ppb
	Kr	83	37.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Thursday, June 21, 2018 13:45:59

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	155192.7		ppb
	Sc	45	96451.1		ppb
>	Rh	103	70087.4		ppb
	Ag	107	140.7	0.01384	ppb
	Ag	109	139.7		ppb
	Cd	111	25.6	-0.00155	ppb
-	Cd	114	88.7	0.00435	ppb
	Ho	165	627691.3		ppb
	Kr	83	37		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Thursday, June 21, 2018 13:47:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	156307.8		ppb
	Sc	45	98834		ppb
>	Rh	103	71351.7		ppb
	Ag	107	152240.5	97.68816	ppb
	Ag	109	157706.9		ppb
	Cd	111	499	0.52834	ppb
-	Cd	114	1590.4	0.51966	ppb
	Ho	165	640133.5		ppb
	Kr	83	48		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date: Thursday, June 21, 2018 13:49:43

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	152251.2		ppb
	Sc	45	84467.5		ppb
>	Rh	103	53823.6		ppb
	Ag	107	139869.6	118.99567	ppb
	Ag	109	141788		ppb
	Cd	111	21532.2	31.96142	ppb
-	Cd	114	87737.1	39.92709	ppb
	Ho	165	508096.7		ppb
	Kr	83	38.7		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-7

Sample Date Thursday, June 21, 2018 13:51:34

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	163211.3		ppb
	Sc	45	87895.6		ppb
>	Rh	103	55802.2		ppb
	Ag	107	210606.1	172.88748	ppb
	Ag	109	212408.9		ppb
	Cd	111	53619.4	76.80042	ppb
-	Cd	114	211361	92.81371	ppb
	Ho	165	529561.8		ppb
	Kr	83	41.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date Thursday, June 21, 2018 13:57:11

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	197221.1		ppb
	Sc	45	114200.3		ppb
>	Rh	103	104510		ppb
	Ag	107	3659.3	1.52628	ppb
	Ag	109	3708.9		ppb
	Cd	111	75	0.02655	ppb
-	Cd	114	-2123.5	-0.52469	ppb
	Ho	165	689629		ppb
	Kr	83	55		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Thursday, June 21, 2018 14:13:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	147171.6		ppb
	Sc	45	86151.2		ppb
>	Rh	103	66372		ppb
	Ag	107	272894.3	188.29844	ppb
	Ag	109	291655.9		ppb
	Cd	111	36382.6	43.80073	ppb
-	Cd	114	120521.1	44.48606	ppb
	Ho	165	570332.6		ppb
	Kr	83	35		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-8

Sample Date Thursday, June 21, 2018 14:15:00

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	145334.6		ppb
	Sc	45	85740.8		ppb
>	Rh	103	65954.2		ppb
	Ag	107	350615.9	243.50278	ppb
	Ag	109	369606.8		ppb
	Cd	111	36613.2	44.34943	ppb
-	Cd	114	120894.8	44.8946	ppb
	Ho	165	561550.1		ppb
	Kr	83	46.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 14:16:53

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	148600.2		ppb
	Sc	45	84422.3		ppb
>	Rh	103	69775.5		ppb
	Ag	107	432.3	0.2054	ppb
	Ag	109	380.7		ppb
	Cd	111	57.2	0.03513	ppb
-	Cd	114	163.7	0.03069	ppb
	Ho	165	563634.7		ppb
	Kr	83	41.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 14:18:44

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	152424.9		ppb
	Sc	45	84899.3		ppb
>	Rh	103	72768.8		ppb
	Ag	107	1878.7	1.10478	ppb
	Ag	109	2113.1		ppb
	Cd	111	1050.6	1.12317	ppb
-	Cd	114	3200.1	1.05119	ppb
	Ho	165	575807.2		ppb
	Kr	83	45		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 14:20:36

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	147390.2		ppb
	Sc	45	88611.4		ppb
>	Rh	103	66226.3		ppb
	Ag	107	152187.7	105.24755	ppb
	Ag	109	160841.7		ppb
	Cd	111	88362.8	106.67043	ppb
-	Cd	114	293878.3	108.78983	ppb
	Ho	165	580843.6		ppb
	Kr	83	37.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	143958		ppb
-	P	31	2822.5		ppb
>	Sc	45	93878.6		ppb
-	As	75	141.3		ppb
	Se	77	410.7		ppb
	Se	82	-0.4		ppb
>	Rh	103	74251.8		ppb
	Ho	165	557874.5		ppb
	Kr	83	51.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date Thursday, June 21, 2018 11:34:57

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	167105		ppb
-	P	31	9710.9	21.38375	ppb
>	Sc	45	106329.4		ppb
-	As	75	489.4	1.01847	ppb
	Se	77	439	-2.29917	ppb
	Se	82	29.6	1.00692	ppb
>	Rh	103	87413.2		ppb
	Ho	165	607499.7		ppb
	Kr	83	56.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date Thursday, June 21, 2018 11:36:55

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	165761.6		ppb
-	P	31	321261.1	1045.4818	ppb
>	Sc	45	106205.8		ppb
-	As	75	30799.3	100.15484	ppb
	Se	77	2425.5	105.05005	ppb
	Se	82	2909.8	101.10746	ppb
>	Rh	103	84244		ppb
	Ho	165	616939.9		ppb
	Kr	83	45		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date Thursday, June 21, 2018 11:38:52

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	160840.4		ppb
-	P	31	1544265.3	4990.8981	ppb
>	Sc	45	107812.7		ppb
-	As	75	154753.8	499.969	ppb
	Se	77	9880	498.99659	ppb
	Se	82	14539.5	499.77849	ppb
>	Rh	103	85154.4		ppb
	Ho	165	632755.7		ppb
	Kr	83	50.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 11:40:50

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	143507.3		ppb
-	P	31	3100.2	0.84599	ppb
>	Sc	45	95435.5		ppb
-	As	75	210.6	0.24593	ppb
	Se	77	586.7	10.21472	ppb
	Se	82	12.6	0.5048	ppb
>	Rh	103	75333		ppb
	Ho	165	553104.8		ppb
	Kr	83	50		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date Thursday, June 21, 2018 11:42:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	156716.6		ppb
-	P	31	9508.8	22.65735	ppb
>	Sc	45	100132.1		ppb
-	As	75	482.4	1.17993	ppb
	Se	77	723	16.86353	ppb
	Se	82	22.3	0.85331	ppb
>	Rh	103	78041		ppb
	Ho	165	582788.2		ppb
	Kr	83	47		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Date Thursday, June 21, 2018 11:44:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	148477.6		ppb
-	P	31	699270.8	2468.828	ppb
>	Sc	45	98456.9		ppb
-	As	75	70085.7	248.55395	ppb
	Se	77	4754.5	252.12397	ppb
	Se	82	6540.1	246.96811	ppb
>	Rh	103	77497.3		ppb
	Ho	165	579451.4		ppb
	Kr	83	52.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date Thursday, June 21, 2018 11:46:43

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	157892.1		ppb
-	P	31	309993.7	1033.139	ppb
>	Sc	45	103702.1		ppb
-	As	75	29420	100.35171	ppb
	Se	77	2420.1	111.1521	ppb
	Se	82	2781.7	101.38656	ppb
>	Rh	103	80308.8		ppb
	Ho	165	610751.3		ppb
	Kr	83	53		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Date Thursday, June 21, 2018 11:48:41

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	154290.5		ppb
-	P	31	58772.7	195.43836	ppb
>	Sc	45	99645.2		ppb
-	As	75	13852.4	48.82491	ppb
	Se	77	1578	67.20415	ppb
	Se	82	1365.6	51.72072	ppb
>	Rh	103	77302.7		ppb
	Ho	165	587508.8		ppb
	Kr	83	50		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 6

Sample Date: Thursday, June 21, 2018 11:50:38

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	167268.4		ppb
-	P	31	1626655.9	4934.1557	ppb
>	Sc	45	114837.5		ppb
-	As	75	136.1	-0.0929	ppb
	Se	77	535.7	2.70017	ppb
	Se	82	-5.1	-0.15326	ppb
>	Rh	103	87399.2		ppb
	Ho	165	675252.9		ppb
	Kr	83	50		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Date: Thursday, June 21, 2018 11:52:36

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	166694.4		ppb
-	P	31	1629531.5	4946.0963	ppb
>	Sc	45	114759.2		ppb
-	As	75	492.7	1.00929	ppb
	Se	77	584	4.84155	ppb
	Se	82	27.9	0.93852	ppb
>	Rh	103	88461.9		ppb
	Ho	165	676120		ppb
	Kr	83	52		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Date: Thursday, June 21, 2018 11:54:33

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	279600.9		ppb
-	P	31	4149.7	-2.51245	ppb
>	Sc	45	181439.4		ppb
-	As	75	321.8	0.12626	ppb
	Se	77	978.4	7.48231	ppb
	Se	82	15.9	0.35834	ppb
>	Rh	103	136129.3		ppb
	Ho	165	1046807		ppb
	Kr	83	51.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 11:56:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	150100		ppb
-	P	31	9133	21.16916	ppb
>	Sc	45	100685		ppb
-	As	75	442.3	1.03071	ppb
	Se	77	441.7	0.47121	ppb
	Se	82	23	0.87365	ppb
>	Rh	103	78380		ppb
	Ho	165	590990.5		ppb
	Kr	83	46		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 11:58:08

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	143958		ppb
-	P	31	2822.5	0.00122	ppb
>	Sc	45	93878.6		ppb
-	As	75	141.3	-0.00004	ppb
	Se	77	410.7	0.00315	ppb
	Se	82	-0.4	-0.00023	ppb
>	Rh	103	74251.8		ppb
	Ho	165	557874.5		ppb
	Kr	83	51.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Thursday, June 21, 2018 14:43:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	137691		ppb
-	P	31	2350.8	-0.48624	ppb
>	Sc	45	81986.5		ppb
-	As	75	112.1	0.01026	ppb
	Se	77	442.3	9.88131	ppb
	Se	82	3.1	0.17111	ppb
>	Rh	103	57320.3		ppb
	Ho	165	538423.9		ppb
	Kr	83	35		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 14:44:45

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	144581.4		ppb
-	P	31	256501.4	1017.6215	ppb
>	Sc	45	87099.8		ppb
-	As	75	21459.7	97.32006	ppb
	Se	77	1786.1	108.55434	ppb
	Se	82	2086.8	101.13835	ppb
>	Rh	103	60406.9		ppb
	Ho	165	576075.9		ppb
	Kr	83	33.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 FH

Sample Date: Thursday, June 21, 2018 14:46:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	156975.3		ppb
-	P	31	7979.6	18.46844	ppb
>	Sc	45	96181.3		ppb
-	As	75	410	0.88823	ppb
	Se	77	230	-11.97123	ppb
	Se	82	302.3	11.09113	ppb
>	Rh	103	79862.7		ppb
	Ho	165	606444.3		ppb
	Kr	83	43.3		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 FH

Sample Date Thursday, June 21, 2018 14:48:17

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	160263.1		ppb
-	P	31	7938.3	18.68471	ppb
>	Sc	45	94971.7		ppb
-	As	75	160.4	0.03472	ppb
	Se	77	21	-23.77796	ppb
	Se	82	4.6	0.1854	ppb
>	Rh	103	79010.3		ppb
	Ho	165	601309.2		ppb
	Kr	83	47.7		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-5 BH

Sample Date Thursday, June 21, 2018 14:50:02

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	202726.5		ppb
-	P	31	53557	161.85816	ppb
>	Sc	45	108476.5		ppb
-	As	75	155.9	-0.08244	ppb
	Se	77	46	-22.83755	ppb
	Se	82	30.3	0.92622	ppb
>	Rh	103	97057.1		ppb
	Ho	165	683778.1		ppb
	Kr	83	52.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: 31368-6 BH

Sample Date Thursday, June 21, 2018 14:51:48

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	205551.8		ppb
-	P	31	66469.2	198.06365	ppb
>	Sc	45	111272.8		ppb
-	As	75	116.6	-0.19917	ppb
	Se	77	14.7	-24.30429	ppb
	Se	82	-6.4	-0.17579	ppb
>	Rh	103	98680.4		ppb
	Ho	165	691653.1		ppb
	Kr	83	56		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date Thursday, June 21, 2018 14:53:35

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
	Li	6	152147		ppb
-	P	31	2784.8	0.64645	ppb
>	Sc	45	87248.7		ppb
-	As	75	130.9	-0.00505	ppb
	Se	77	230	-10.00336	ppb
	Se	82	-5.3	-0.21052	ppb
>	Rh	103	69367.8		ppb
	Ho	165	581706		ppb
	Kr	83	42		ppb

PerkinElmer Nexlon 350X ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Date: Thursday, June 21, 2018 14:55:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	157175.9		ppb
-	P	31	8469.8	22.84839	ppb
>	Sc	45	88669.3		ppb
-	As	75	323.1	0.71651	ppb
	Se	77	256	-8.85407	ppb
	Se	82	24.7	1.02295	ppb
>	Rh	103	71684.6		ppb
	Ho	165	597138.4		ppb
	Kr	83	39.3		ppb

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Date: Thursday, June 21, 2018 14:57:06

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
	Li	6	163934.3		ppb
-	P	31	270912.6	1013.5002	ppb
>	Sc	45	92368.3		ppb
-	As	75	24476	90.94526	ppb
	Se	77	1727.7	80.9151	ppb
	Se	82	2471.5	98.15579	ppb
>	Rh	103	73710.2		ppb
	Ho	165	626013.3		ppb
	Kr	83	42		ppb

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2	Cor. Coeff.
Calib Blank	6/18/2018	10:18:46 AM	0.0003108			µg			0.0002852			0.0003363			
STD1 = .004ug	6/18/2018	10:20:29 AM	0.0016067			µg			0.0016231			0.0015904			
STD2 = .04ug	6/18/2018	10:22:12 AM	0.0165419			µg			0.0167294			0.0163543			
STD3 = .08ug	6/18/2018	10:24:07 AM	0.0327106			µg			0.0331139			0.0323072			
STD4 = .16ug	6/18/2018	10:26:02 AM	0.064227			µg			0.0647892			0.0636647			
STD5 = .2ug	6/18/2018	10:27:56 AM	0.0775815			µg			0.0789415			0.0762215			
Reagent Blank	6/18/2018	10:29:49 AM	-1.28E-06	-3.24E-06	-3.24E-06	µg			-2.10E-06	-5.31E-06	-5.31E-06	-4.60E-07	-1.16E-06	-1.16E-06	
0.004ug = DL	6/18/2018	10:31:31 AM	0.0016736	0.0042352	0.0042352	µg			0.0017145	0.0043389	0.0043389	0.0016326	0.0041315	0.0041315	0.99941919
0.080ug = QC STD 3	6/18/2018	10:33:14 AM	0.0289509	0.0732643	0.0732643	µg			0.0293242	0.074209	0.074209	0.0285776	0.0723197	0.0723197	0.99941919
0.080ug = QC STD 2	6/18/2018	10:35:08 AM	0.0315163	0.0797564	0.0797564	µg			0.0318639	0.0806362	0.0806362	0.0311686	0.0788767	0.0788767	0.99941919
Reagent Blank	6/18/2018	10:37:00 AM	-7.34E-05	-0.0001858	-0.0001858	µg			-6.91E-05	-0.000175	-0.000175	-7.77E-05	-0.0001967	-0.0001967	0.99941919
31368-10	6/18/2018	10:42:21 AM	0.0511265	0.1293861	12.938607	µg	0.05	5	0.0510464	0.1291833	12.918335	0.0512066	0.1295888	12.95888	0.99941919
31368-1 BH	6/18/2018	10:48:07 AM	0.0002902	0.0007377	0.09314	µg	4	505	0.0003056	0.0007766	0.0980442	0.0002749	0.0006989	0.0882359	0.99941919
31368-2 BH	6/18/2018	10:49:49 AM	0.0007849	0.00019894	0.15418	µg	4	310	0.0007879	0.0019972	0.1547798	0.0007818	0.0019817	0.1535802	0.99941919
31368-2 BH DUP	6/18/2018	10:51:31 AM	0.0004349	0.0011037	0.0855396	µg	4	310	0.0004366	0.0011082	0.0858864	0.0004331	0.0010993	0.0851929	0.99941919
31368-3 BH	6/18/2018	10:53:14 AM	0.0003628	0.0009214	0.0748638	µg	4	325	0.0003753	0.0009529	0.0774261	0.0003504	0.0008899	0.0723014	0.99941919
31368-3 BH SPK	6/18/2018	10:54:56 AM	0.0310989	0.0787035	6.39466	µg	4	325	0.0313066	0.079229	6.4373552	0.0308913	0.078178	6.3519648	0.99941919
0.004ug = DL	6/18/2018	10:56:50 AM	0.0016403	0.0041509	0.0041509	µg			0.0016514	0.0041792	0.0041792	0.0016991	0.0041226	0.0041226	0.99941919
0.080ug = QC STD 2	6/18/2018	10:58:32 AM	0.0310667	0.0786186	0.0786186	µg			0.0311703	0.078881	0.078881	0.030963	0.0783562	0.0783562	0.99941919
Reagent Blank	6/18/2018	11:00:25 AM	-6.66E-05	-0.0001686	-0.0001686	µg			-9.57E-05	-0.0002421	-0.0002421	-3.76E-05	-9.51E-05	-9.51E-05	0.99941919
31368-4 BH	6/18/2018	11:02:07 AM	0.0002971	0.0007551	0.0660692	µg	4	350	0.0003063	0.0007783	0.0681046	0.0007318	0.0064037	0.0640337	0.99941919
31368-5 BH	6/18/2018	11:03:49 AM	0.0001904	0.0004851	0.0278947	µg	4	230	0.0001866	0.0004755	0.0273432	0.0001942	0.0004947	0.0284462	0.99941919
31368-6 BH	6/18/2018	11:05:32 AM	4.93E-05	0.0001281	0.0065635	µg	4	205	0.0001185	0.000303	0.0155304	-1.98E-05	-4.69E-05	-0.0024035	0.99941919
31368-1 A	6/18/2018	11:07:15 AM	-3.91E-05	-9.58E-05	-0.0047893	µg	4	200	-4.32E-05	-0.0001061	-0.0053028	-3.51E-05	-8.55E-05	-0.0042757	0.99941919
31368-2 A	6/18/2018	11:08:59 AM	-4.26E-05	-0.0001044	-0.0052224	µg	4	200	-5.15E-05	-0.0001272	-0.0063607	-3.36E-05	-8.17E-05	-0.0040841	0.99941919
31368-2 A DUP	6/18/2018	11:10:43 AM	-6.13E-06	-1.23E-05	-0.0006132	µg	4	200	-1.52E-05	-3.52E-05	-0.0017593	2.93E-06	1.07E-05	0.0005329	0.99941919
31368-3 A	6/18/2018	11:12:28 AM	-7.19E-05	-0.0001786	-0.0089305	µg	4	200	-9.08E-05	-0.0002264	-0.0113211	-5.30E-05	-0.0001308	-0.0065398	0.99941919
31368-3 A SPK	6/18/2018	11:14:11 AM	0.03081	0.0779723	3.8986143	µg	4	200	0.0309555	0.0783405	3.9170256	0.0306645	0.0776041	3.880203	0.99941919
31368-4 A	6/18/2018	11:16:05 AM	-7.47E-05	-0.0001859	-0.0092945	µg	4	200	-5.59E-05	-0.0001383	-0.0069153	-9.35E-05	-0.0002335	-0.0116736	0.99941919
31368-5 A	6/18/2018	11:17:47 AM	-7.42E-05	-0.0001845	-0.0092263	µg	4	200	-9.75E-05	-0.0002345	-0.0121757	-5.09E-05	-0.0002269	-0.0062769	0.99941919
0.004ug = DL	6/18/2018	11:19:30 AM	0.0016301	0.0041253	0.0041253	µg			0.0016526	0.0041821	0.0041821	0.0016077	0.0040686	0.0040686	0.99941919
0.080ug = QC STD 2	6/18/2018	11:21:12 AM	0.0311272	0.0787718	0.0787718	µg			0.0313464	0.0793266	0.0793266	0.0309079	0.0782169	0.0782169	0.99941919
Reagent Blank	6/18/2018	11:23:05 AM	-0.0001088	-0.0002752	-0.0002752	µg			-0.0001264	-0.0003198	-0.0003198	-9.11E-05	-0.0002306	-0.0002306	0.99941919
31368-6 A	6/18/2018	11:24:47 AM	9.70E-05	0.0002488	0.0124387	µg	4	200	9.12E-05	0.0002341	0.0117029	0.0001028	0.0002635	0.0131744	0.99941919
0.004ug = DL	6/18/2018	11:42:45 AM	0.0015948	0.0040357	0.0040357	µg			0.0015787	0.0039952	0.0039952	0.0016108	0.0040763	0.0040763	0.99941919
0.080ug = QC STD 2	6/18/2018	11:44:27 AM	0.0308811	0.0781491	0.0781491	µg			0.0308864	0.0781624	0.0781624	0.0308759	0.0781358	0.0781358	0.99941919
Reagent Blank	6/18/2018	11:46:20 AM	-8.25E-05	-0.0002088	-0.0002088	µg			-0.0001026	-0.0002597	-0.0002597	-6.24E-05	-0.0001579	-0.0001579	0.99941919
Calib Blank	6/19/2018	10:23:29 AM	0.001215			µg			0.0012991			0.0011308			
STD1 = .004ug	6/19/2018	10:25:11 AM	0.0013815			µg			0.0013765			0.0013865			
STD2 = .04ug	6/19/2018	10:26:54 AM	0.0153157			µg			0.015336			0.0152954			
STD3 = .08ug	6/19/2018	10:28:48 AM	0.0306179			µg			0.030669			0.0305668			
STD4 = .16ug	6/19/2018	10:30:42 AM	0.0612689			µg			0.0612672			0.0612706			
STD5 = .2ug	6/19/2018	10:32:36 AM	0.0766977			µg			0.0766077			0.0767878			
Reagent Blank	6/19/2018	10:34:28 AM	-0.000183	-0.0004775	-0.0004775	µg			-0.0002268	-0.0005918	-0.0005918	-0.0001392	-0.0003632	-0.0003632	
0.004ug = DL	6/19/2018	10:36:09 AM	0.0013828	0.0036085	0.0036085	µg			0.0013822	0.003607	0.003607	0.0013834	0.00361	0.00361	0.99999622
0.080ug = QC STD 3	6/19/2018	10:37:52 AM	0.0283737	0.0740426	0.0740426	µg			0.0283633	0.0740154	0.0740154	0.0283842	0.0740699	0.0740699	0.99999622
0.080ug = QC STD 2	6/19/2018	10:39:44 AM	0.0293522	0.076596	0.076596	µg			0.0293403	0.0765649	0.0765649	0.0293641	0.0766271	0.0766271	0.99999622
Reagent Blank	6/19/2018	10:41:37 AM	-0.0001871	-0.0004883	-0.0004883	µg			-0.0002377	-0.0006203	-0.0006203	-0.0001365	-0.0003562	-0.0003562	0.99999622
31368-10	6/19/2018	10:46:57 AM	0.0510971	0.1338178	13.381779	µg	0.05	5	0.0511403	0.1339306	13.39306	0.0510538	0.133705	13.370499	0.99999622
31368-10 DUP	6/19/2018	10:48:52 AM	0.050834	0.1331314	13.313138	µg	0.05	5	0.0508362	0.1331371	13.313705	0.0508318	0.1331257	13.31257	0.99999622
31368-10 SPK	6/19/2018	10:50:47 AM	0.0781564	0.2044304	20.443043	µg	0.05	5	0.0780306	0.2041021	20.410215	0.0782822	0.2047587	20.475871	0.99999622
0.004ug = DL	6/19/2018	11:02:04 AM	0.001405	0.0036665	0.0036665	µg			0.0013919	0.0036323	0.0036323	0.0014182	0.0037008	0.0037008	0.99999622
0.080ug = QC STD 2	6/19/2018	11:03:46 AM	0.02921	0.076225	0.076225	µg			0.0291619	0.0760994	0.0760994	0.0292582	0.0763507	0.0763507	0.99999622
Reagent Blank	6/19/2018	11:05:38 AM	-8.86E-05	-0.0002311	-0.0002311	µg			4.37E-05	0.0001142	0.0001142	-0.0002209	-0.0005764	-0.0005764	0.99999622
31368-5 B	6/19/2018	11:09:14 AM	0.0001764	0.0009378	0.1172268	µg	4	500	0.0001851	0.0009605	0.120059	0.0001677	0.0009152	0.1143946	0.99999622
31368-6 B	6/19/2018	11:10:56 AM	-1.23E-05	0.0004455	0.0556863	µg	4	500	2.41E-05	0.0005404	0.0675535	-4.87E-05	0.0003506	0.0438191	0.99999622
0.004ug = DL	6/19/2018	11:25:44 AM	0.001372	0.0035804	0.0035804	µg			0.0013461	0.0035128	0.0035128	0.0013979	0.003648	0.003648	0.99999622
0.080ug = QC STD 2	6/19/2018	11:27:26 AM	0.0292908	0.0764359	0.0764359	µg			0.0293017	0.0764642	0.0764642	0.02928	0.0764076	0.0764076	0.99999622
Reagent Blank	6/19/2018	11:29:19 AM	-0.0001229	-0.0003207	-0.0003207	µg			-0.0001841	-0.0004805	-0.0004805	-6.16E-05	-0.0001609	-0.0001609	0.99999622
Calib Blank	6/20/2018	9:12:41 AM	0.0002328			µg			0.0002248			0.0002409			
STD1 = .004ug	6/20/2018	9:14:22 AM	0.0013591			µg			0.0013564			0.0013618			
STD2 = .04ug	6/20/2018	9:16:05 AM	0.0134926			µg			0.0135189			0.0134663			
STD3 = .08ug	6/20/2018	9:18:00 AM	0.0269172			µg			0.0269939			0.0268404			
STD4 = .16ug	6/20/2018	9:19:54 AM	0.0540921			µg			0.0543094			0.0538748			
STD5 = .2ug	6/20/2018	9:21:48 AM	0.0670589			µg			0.067114			0.0670037			
Reagent Blank	6/20/2018	9:23:40 AM	2.26E-05	6.73E-05	6.73E-05	µg			1.14E-05	3.38E-05	3.38E-05	3.39E-05	0.0001007	0.0001007	
0.004ug = DL	6/20/2018	9:25:21 AM	0.0013982	0.0041561	0.0041561	µg			0.0014013	0.0041655	0.0041655	0.001395	0.0041467	0.0041467	0.9999798

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2	Cor. Coeff.
31368-LRB FH SPK	6/20/2018	10:20:16 AM	0.0252578	0.0750126	4.6882869	µg	1.6	100	0.0253153	0.0751834	4.6989595	0.0252004	0.0748418	4.6776143	0.99997981
31368-1 FH	6/20/2018	10:22:09 AM	0.0006871	0.0019752	0.0493792	µg	4	100	0.0006805	0.0019554	0.0488854	0.0006937	0.0019949	0.049873	0.99997981
31368-2 FH	6/20/2018	10:23:51 AM	0.0010339	0.0030059	0.0751486	µg	4	100	0.0010163	0.0029537	0.0738426	0.0010514	0.0030582	0.0764545	0.99997981
31368-2 FH DUP	6/20/2018	10:25:34 AM	0.0010568	0.0030742	0.0768551	µg	4	100	0.0010419	0.0030297	0.0757425	0.0010718	0.0031187	0.0779678	0.99997981
31368-3 FH	6/20/2018	10:27:17 AM	0.0011456	0.0033381	0.0834526	µg	4	100	0.0011486	0.003347	0.0836739	0.0011426	0.0033293	0.0832313	0.99997981
31368-3 FH SPK	6/20/2018	10:29:00 AM	0.0318873	0.0947188	2.3679703	µg	4	100	0.0319312	0.0948493	2.3712325	0.0318434	0.0945883	2.3647081	0.99997981
31368-4 FH	6/20/2018	10:30:54 AM	0.0005225	0.0014859	0.0371475	µg	4	100	0.0005278	0.0015017	0.0375429	0.0005172	0.0014701	0.0367521	0.99997981
31368-5 FH	6/20/2018	10:32:38 AM	0.0002848	0.0007794	0.0194854	µg	4	100	0.0002839	0.0007765	0.0194126	0.0002858	0.0007823	0.0195582	0.99997981
31368-6 FH	6/20/2018	10:34:22 AM	0.0004788	0.001356	0.0338998	µg	4	100	0.0004768	0.00135	0.0337512	0.0004808	0.0013619	0.0340484	0.99997981
0.004ug = DL	6/20/2018	10:37:58 AM	0.0015919	0.0047318	0.0047318	µg			0.0016049	0.0047705	0.0047705	0.0015788	0.0046931	0.0046931	0.99997981
0.080ug = QC STD 2	6/20/2018	10:39:40 AM	0.0285349	0.084821	0.084821	µg			0.0285812	0.0849585	0.0849585	0.0284886	0.0846835	0.0846835	0.99997981
Reagent Blank	6/20/2018	10:41:32 AM	0.0001354	0.0004024	0.0004024	µg			0.0001435	0.0004264	0.0004264	0.0001273	0.0003784	0.0003784	0.99997981
Calib Blank	6/20/2018	11:05:19 AM	0.0005793			µg			0.0002706			0.000888			
STD1 = .004ug	6/20/2018	11:07:02 AM	0.0019935			µg			0.0020501			0.0019369			
STD2 = .04ug	6/20/2018	11:08:44 AM	0.0163529			µg			0.0163667			0.0163391			
STD3 = .08ug	6/20/2018	11:10:39 AM	0.0320206			µg			0.0321378			0.0319033			
STD4 = .16ug	6/20/2018	11:12:34 AM	0.063096			µg			0.0630141			0.0631778			
STD5 = .2ug	6/20/2018	11:14:27 AM	0.0782141			µg			0.0781116			0.0783165			
Reagent Blank	6/20/2018	11:16:19 AM	0.0003454	0.0008779	0.0008779	µg			0.0003158	0.0008027	0.0008027	0.000375	0.0009531	0.0009531	
0.004ug = DL	6/20/2018	11:18:01 AM	0.0018703	0.0047536	0.0047536	µg			0.0018805	0.0047796	0.0047796	0.0018601	0.0047276	0.0047276	0.99986748
0.080ug = QC STD 3	6/20/2018	11:19:43 AM	0.0300584	0.0763958	0.0763958	µg			0.0300879	0.0764707	0.0764707	0.0300289	0.0763208	0.0763208	0.99986748
0.080ug = QC STD 2	6/20/2018	11:21:36 AM	0.0299669	0.0761631	0.0761631	µg			0.0298781	0.0759374	0.0759374	0.0300557	0.0763888	0.0763888	0.99986748
Reagent Blank	6/20/2018	11:23:28 AM	0.0003718	0.000945	0.000945	µg			0.0003477	0.0008837	0.0008837	0.0003959	0.0010063	0.0010063	0.99986748
0.004ug = DL	6/20/2018	12:32:28 PM	0.0018329	0.0046584	0.0046584	µg			0.0018454	0.0046903	0.0046903	0.0018204	0.0046266	0.0046266	0.99986748
0.080ug = QC STD 2	6/20/2018	12:34:10 PM	0.0321148	0.0816222	0.0816222	µg			0.0323356	0.0821833	0.0821833	0.0318941	0.0810612	0.0810612	0.99986748
Reagent Blank	6/20/2018	12:36:02 PM	0.0001575	0.0004004	0.0004004	µg			0.0001806	0.000459	0.000459	0.0001345	0.0003418	0.0003418	0.99986748
31368-2 C	6/20/2018	12:43:27 PM	0.0391313	0.0985774	19.715484	µg	2	400	0.0392966	0.0989975	19.799505	0.0389661	0.0981573	19.631463	0.99986748
31368-2 C DUP	6/20/2018	12:45:22 PM	0.0379677	0.09562	19.124002	µg	2	400	0.0377195	0.0949892	18.997842	0.0382159	0.0962508	19.250163	0.99986748
31368-3 C	6/20/2018	12:47:18 PM	0.0400097	0.1008099	100.80989	µg	0.4	400	0.0400159	0.1008255	100.82554	0.0400036	0.1007942	100.79424	0.99986748
31368-3 C SPK	6/20/2018	12:49:13 PM	0.0720337	0.1822014	182.20138	µg	0.4	400	0.0723684	0.1830518	183.05184	0.0716991	0.1813509	181.35091	0.99986748
0.004ug = DL	6/20/2018	12:51:06 PM	0.0018594	0.0047258	0.0047258	µg			0.0018475	0.0046955	0.0046955	0.0018713	0.0047561	0.0047561	0.99986748
0.080ug = QC STD 3	6/20/2018	12:52:48 PM	0.0317486	0.0806916	0.0806916	µg			0.031729	0.0806418	0.0806418	0.0317682	0.0807414	0.0807414	0.99986748
Reagent Blank	6/20/2018	12:54:41 PM	0.0002111	0.0005364	0.0005364	µg			0.0002168	0.0005511	0.0005511	0.0002053	0.0005218	0.0005218	0.99986748
Calib Blank	6/21/2018	10:45:40 AM	0.0002303			µg			0.0002167			0.0002438			
STD1 = .004ug	6/21/2018	10:47:22 AM	0.0014462			µg			0.001486			0.0014064			
STD2 = .04ug	6/21/2018	10:49:05 AM	0.0150542			µg			0.0153235			0.0147849			
STD3 = .08ug	6/21/2018	10:50:59 AM	0.0291811			µg			0.0295606			0.0288017			
STD4 = .16ug	6/21/2018	10:52:54 AM	0.0607169			µg			0.0616011			0.0598328			
STD5 = .2ug	6/21/2018	10:54:49 AM	0.0743148			µg			0.075114			0.0735157			
Reagent Blank	6/21/2018	10:56:41 AM	-6.60E-05	-0.0001765	-0.0001765	µg			-6.89E-05	-0.0001843	-0.0001843	-6.31E-05	-0.0001688	-0.0001688	
0.004ug = DL	6/21/2018	10:58:23 AM	0.0014443	0.0038629	0.0038629	µg			0.0014635	0.0039142	0.0039142	0.0014251	0.0038116	0.0038116	0.99979153
0.080ug = QC STD 3	6/21/2018	11:00:06 AM	0.0276693	0.0740037	0.0740037	µg			0.0280462	0.0750118	0.0750118	0.0272923	0.0729956	0.0729956	0.99979153
0.080ug = QC STD 2	6/21/2018	11:05:44 AM	0.0286836	0.0767167	0.0767167	µg			0.0288845	0.0772539	0.0772539	0.0284828	0.0761796	0.0761796	0.99979153
Reagent Blank	6/21/2018	11:07:37 AM	-6.74E-05	-0.0001802	-0.0001802	µg			-6.56E-05	-0.0001754	-0.0001754	-6.92E-05	-0.0001851	-0.0001851	0.99979153
31368-1 B	6/21/2018	11:20:26 AM	0.0034082	0.0092921	23.23029	µg	0.02	500	0.003399	0.0092675	23.168806	0.0034174	0.0093167	23.291775	0.99979153
31368-3 B	6/21/2018	11:22:10 AM	0.0030445	0.0083193	20.798197	µg	0.02	500	0.0029965	0.008191	20.477598	0.0030924	0.0084475	21.118797	0.99979153
31368-3 B SPK	6/21/2018	11:23:53 AM	0.0301869	0.0809139	202.2847	µg	0.02	500	0.0298943	0.0801313	200.32822	0.0304795	0.0816965	204.21119	0.99979153
0.004ug = DL	6/21/2018	11:27:40 AM	0.0013639	0.0036478	0.0036478	µg			0.0013775	0.0036842	0.0036842	0.0013502	0.0036113	0.0036113	0.99979153
0.080ug = QC STD 2	6/21/2018	11:33:08 AM	0.0282898	0.0756634	0.0756634	µg			0.0284427	0.0760724	0.0760724	0.0281369	0.0752543	0.0752543	0.99979153
Reagent Blank	6/21/2018	11:35:01 AM	-7.60E-05	-0.0002033	-0.0002033	µg			-7.84E-05	-0.0002097	-0.0002097	-7.36E-05	-0.0001968	-0.0001968	0.99979153



A Waters Company

June 21, 2018

Ben Hilgendorf
Montrose Environmental Services
1371 Brummel Ave.
Elk Grove Village, IL 60007

Enclosed is your final report for ERA's Stationary Source Audit Sample (SSAS) Program. Your final report includes an evaluation of all results submitted by your laboratory to ERA.

Data Evaluation Protocols: All analytes in ERA's SSAS Program have been evaluated comparing the reported result to the acceptance limits generated using the criteria contained in the TNI SSAS Table.

For any "Not Acceptable" results, please contact your state regulator for any corrective action requirements.

Thank you for your participation in ERA's SSAS Program. If you have any questions, please contact our Proficiency Testing Department at 1-800-372-0122.

Sincerely,

A handwritten signature in black ink, appearing to read "Matthew Seebeck", is written over a light gray circular stamp.

Matthew Seebeck
Quality Officer

cc: Project File Number 061318S



A Waters Company

Recipient Type	Report Recipient	Contact	Project ID
Agency	IL EPA Des Plaines (SSAS) 9511 Harrison Street Des Plaines, IL 60016 USA	Kevin Mattison kevin.mattison@illinois.gov Phone: 847-294-4019	
Facility	General Iron Industries 1909 N Clifton Ave Chicago, IL 60614 USA	John Pinion jpinion@rka-inc.com Phone: 630-393-9000 x 208	
Lab	Element One Inc 6319-D Carolina Beach Road Wilmington, NC 28412 USA	Paula Smith paula.smith@e1lab.com Phone: 910-793-0128	
Tester	Montrose Environmental Services 1371 Brummel Ave. Elk Grove Village, IL 60007 USA	Ben Hilgendorf bhilgendorf@montrose-env.com Phone: 630-860-4740	General Iron Industries



Project # : 061318S



GI0000453



A Waters Company

061318S Laboratory Exception Report

Paula Smith
Element One Inc
6319-D Carolina Beach Road
Wilmington, NC 28412
910-793-0128

EPA ID:
ERA Customer Number:

Not Reported
E533235

Evaluation Checks

There are no values reported with < where the assigned value was greater than 0.

Not Acceptable Evaluations

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
SSAP Metals on Filter Paper (cat# 1425, lot# 061318S) Study Dates: 06/13/18 - 06/21/18							
1030	Cadmium	µg/Filter	16.0	20.6	16.5 - 24.7	Not Acceptable	EPA Method 29 2000





Final Report Results For Laboratory Element One Inc

G10000455





SSAP Evaluation Report

Project Number: 061318S

ERA Customer Number: E533235

Laboratory Name: Element One Inc

Inorganic Results



061318S Evaluation Final Complete Report

Paula Smith
Element One Inc
6319-D Carolina Beach Road
Wilmington, NC 28412
910-793-0128

EPA ID:
ERA Customer Number:

Not Reported
E533235

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
------------------	---------	-------	----------------	----------------	-------------------	------------------------	--------------------	---------------	--------------

SSAP Metals in Impinger Solution (cat# 1426, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1005	Antimony	µg/mL	0.896	1.05	0.788 - 1.31	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1010	Arsenic	µg/mL	1.13	1.20	0.900 - 1.50	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1015	Barium	µg/mL	3.28	3.19	2.39 - 3.99	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1020	Beryllium	µg/mL	1.41	1.40	1.05 - 1.75	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1030	Cadmium	µg/mL	1.07	1.06	0.848 - 1.27	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1040	Chromium	µg/mL	4.05	3.99	3.19 - 4.79	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1050	Cobalt	µg/mL	2.02	1.99	1.49 - 2.49	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1055	Copper	µg/mL	3.74	3.83	2.87 - 4.79	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1075	Lead	µg/mL	2.96	2.94	2.20 - 3.68	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1090	Manganese	µg/mL	1.86	1.96	1.47 - 2.45	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1105	Nickel	µg/mL	2.65	2.74	2.19 - 3.29	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1140	Selenium	µg/mL	1.90	1.97	1.48 - 2.46	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1150	Silver	µg/mL	4.71	4.77	3.58 - 5.96	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1165	Thallium	µg/mL	3.02	3.06	2.30 - 3.82	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1190	Zinc	µg/mL	2.86	2.84	2.13 - 3.55	Acceptable	EPA Method 29 2000	6/19/2018	DMR





061318S Evaluation Final Complete Report

Paula Smith
Element One Inc
6319-D Carolina Beach Road
Wilmington, NC 28412
910-793-0128

EPA ID:
ERA Customer Number:

Not Reported
E533235

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
------------------	---------	-------	----------------	----------------	-------------------	------------------------	--------------------	---------------	--------------

SSAP Metals on Filter Paper (cat# 1425, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1005	Antimony	µg/Filter	40.7	42.5	31.9 - 53.1	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1010	Arsenic	µg/Filter	38.7	39.7	29.8 - 49.6	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1015	Barium	µg/Filter	39.7	41.8	31.4 - 52.2	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1020	Beryllium	µg/Filter	21.7	21.6	16.2 - 27.0	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1030	Cadmium	µg/Filter	16.0	20.6	16.5 - 24.7	Not Acceptable	EPA Method 29 2000	6/19/2018	DMR
1040	Chromium	µg/Filter	26.7	28.2	22.6 - 33.8	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1050	Cobalt	µg/Filter	23.1	22.1	16.6 - 27.6	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1055	Copper	µg/Filter	30.2	30.9	23.2 - 38.6	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1075	Lead	µg/Filter	35.9	36.9	29.5 - 44.3	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1090	Manganese	µg/Filter	41.6	42.9	34.3 - 51.5	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1105	Nickel	µg/Filter	38.6	38.3	30.6 - 46.0	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1140	Selenium	µg/Filter	38.7	40.7	30.5 - 50.9	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1150	Silver	µg/Filter	59.5	57.2	40.0 - 74.4	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1165	Thallium	µg/Filter	53.8	55.5	41.6 - 69.4	Acceptable	EPA Method 29 2000	6/19/2018	DMR
1190	Zinc	µg/Filter	45.9	45.2	33.9 - 56.5	Acceptable	EPA Method 29 2000	6/19/2018	DMR

SSAP Mercury on Filter Paper (cat# 1427, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1095	Mercury	µg/Filter	16.2	18.3	13.7 - 22.9	Acceptable	EPA Method 29 2000	6/20/2018	MMP
------	---------	-----------	------	------	-------------	------------	--------------------	-----------	-----

SSAP Mercury in Impinger Solution (cat# 1428, lot# 061318S) Study Dates: 06/13/18 - 06/21/18

1095	Mercury	ng/mL	13.3	15.1	11.3 - 18.9	Acceptable	EPA Method 29 2000	6/19/2018	MMP
------	---------	-------	------	------	-------------	------------	--------------------	-----------	-----



APPENDIX G CALIBRATION DATA

Montrose Air Quality Services, LLC
Meter Box Full Test Calibration

Date: 1/30/2018

Operator: j.burton

Meter Box ID M-39				Meter Box $\Delta H@$ 1.899				Meter Box Y_d 0.9987				Barometric Pressure (In. Hg.) 29.70			
Time	Orifice Data				Meter Box Data								Results		
θ (min)	K'	Vacuum	T_{amb}	V_{cr}	$V_{initial}$	V_{final}	V_d	ΔH	T_i	T_o	T_{avg}	V_{mead}	Q	Y_d	$\Delta H@$
5.0	0.7904	18.0	69	5.103	581.60	566.77	5.17	3.60	79	72	75.5	5.103	1.021	1.0000	1.942
5.0	0.7904	18.0	69	5.103	566.77	571.93	5.16	3.60	81	73	77.0	5.079	1.021	1.0048	1.955
5.0	0.7904	18.0	69	5.103	571.93	577.11	5.18	3.60	82	73	77.5	5.094	1.021	1.0018	1.941
5.0	0.5959	20.0	69	3.847	579.00	582.89	3.89	2.00	82	74	78.0	3.807	0.769	1.0107	1.914
5.0	0.5959	20.0	69	3.847	582.89	586.78	3.89	2.00	82	75	78.5	3.803	0.769	1.0116	1.916
5.0	0.5959	20.0	69	3.847	586.78	590.67	3.89	2.00	82	75	78.5	3.803	0.769	1.0116	1.916
5.0	0.4418	22.0	69	2.852	591.60	594.56	2.96	1.10	81	76	78.5	2.888	0.570	0.9878	1.820
5.0	0.4418	22.0	69	2.852	594.56	597.53	2.97	1.10	81	77	79.0	2.895	0.570	0.9854	1.810
5.0	0.4418	22.0	69	2.852	597.53	600.48	2.95	1.10	81	77	79.0	2.875	0.570	0.9921	1.834
5.0	0.3452	24.0	69	2.229	600.90	603.20	2.30	0.70	80	77	78.5	2.242	0.446	0.9943	1.918
5.0	0.3452	24.0	69	2.229	603.20	605.51	2.31	0.70	80	77	78.5	2.251	0.446	0.9900	1.902
5.0	0.3452	24.0	69	2.229	605.51	607.81	2.30	0.70	80	77	78.5	2.242	0.446	0.9943	1.918
5.0				0.000			0.00				#DIV/0!	#DIV/0!	0.000	#DIV/0!	#DIV/0!
5.0				0.000			0.00				#DIV/0!	#DIV/0!	0.000	#DIV/0!	#DIV/0!
5.0				0.000			0.00				#DIV/0!	#DIV/0!	0.000	#DIV/0!	#DIV/0!
													Average	0.9987	1.899

Nomenclature	
K'	Critical Orifice Coefficient
T_{amb}	Ambient Temperature ($^{\circ}F$)
V_{cr}	Volume Through Orifice (scf)
V_d	Gas Meter Volume (ft^3)
ΔH	Orifice Pressure Differential (In. H_2O)
T_i	Meter Inlet Temperature ($^{\circ}F$)
T_o	Meter Outlet Temperature ($^{\circ}F$)
T_{avg}	Average Meter Box Temperature ($^{\circ}F$)
V_{mead}	Volume Metered Standardized (scf)
Q	Flow Rate (scfm)
Y_d	Meter Correction Factor (dimensionless)
$\Delta H@$	ΔH yielding 0.75 scfm

Vacuum Gauge (In. Hg.)		Thermometers ($^{\circ}F$)				Equations
Standard	Vacuum Gauge	Standard	Ch. No. 1	Ch. No. 2	Ch. No. 3	
5	5.0	32	32	32	32	
10	10.0	50	50	51	50	
15	15.0	100	100	101	101	
20	20.0	150	151	151	151	
25	25.0	212	213	213	214	
		250	251	252	252	
		300	301	302	302	
		350	351	352	352	
		400	401	402	402	
		500	501	502	502	
		600	601	602	602	

Montrose Air Quality Services, LLC

Meter Post Calibration

Average Field Sample Rate (cfm)	1.600	Date	6/18/2018
Highest Field Vacuum (inches Hg)	11	Client	Iron Ind. Inc.
Critical Orifice ID	AA-63	Project No.	023AS-383040
Orifice Flow Rate (cfm)	0.790	Meter ID	M-39

	Run 1	Run 2	Run 3
Initial Volume (ft ³)	211.40	215.35	219.30
Final Volume (ft ³)	215.35	219.30	223.25
Volume Metered (ft ³)	3.95	3.95	3.95
DGM Inlet Temperature (°F)	83	84	85
DGM Outlet Temperature (°F)	78	78	79
Average DGM Temperature (°F)	80.5	81.0	82.0
Ambient Temperature (°F)	73	73	73
Elapsed Time (min.)	5	5	5
ΔH (inches H ₂ O)	2.00	2.00	2.00
Barometric Pressure (inches Hg)	29.14	29.14	29.14
Pump Vacuum (inches Hg)	21	21	21
K'	0.5909	0.5909	0.5909
Vcr (ft ³)	3.729	3.729	3.729
Vmstd (ft ³)	3.776	3.772	3.765
Post Test Yc	0.9877	0.9886	0.9905
Full Test Yd	0.9987	0.9987	0.9987
% Difference	1.10	1.01	0.82
Average % Difference			0.98

Montrose Air Quality Services, LLC
S-Type Pitot Tube Inspection Form

Date 3/9/18
Pitot ID AE5-6-7
Operator DD

	Measured	Allowed
Outside Tube Diameter - Dt (inches)	0.250	NA
Base To Opening Distance - Pa (inches)	0.356	NA
Base To Opening Distance - Pb (inches)	0.356	NA
Pa/Dt	1.42	1.05-1.50
Pb/Dt	1.42	1.05-1.50
Angle $\alpha 1(^{\circ})$	0.3	10
Angle $\alpha 2(^{\circ})$	0.7	10
Angle B1($^{\circ}$)	1.3	5
Angle B2($^{\circ}$)	0.7	5
Opening to Opening Distance Pa+Pb (inches)	0.712	NA
Angle Z ($^{\circ}$)	0.9	NA
z (inches)	0.0112	0.125
Angle W ($^{\circ}$)	0.1	NA
w (inches)	0.001	0.031

Note Any Damage, Nicks or Dents to the Pitot Tube

Is the Pitot Tube Part of an Assembly Yes
If Yes, Complete the Section Below

Pitot	Measured	Minimum
Distance From Nozzle (inches)	NA	0.75 in.
Pitot to Thermocouple Distance (inches)	2.25	2 in.
Pitot to Sample Probe Distance (inches)	6.25	3 in.

Does the Pitot Tube Meet the Above Requirements Yes
Is the Pitot Tube Free of Damage Yes

If Yes to Both, a Pitot Tube Coefficient of 0.84 is Assigned
If No to Either, then the Pitot Tube Must be Calibrated

MONTROSE AIR QUALITY SERVICES, LLC

Nozzle Calibration Datasheet

Client	<i>Iran Industries Inc</i>	Job No.	<i>451732</i>
Plant	<i>Chicago, IL</i>		

	Nozzle 1	Nozzle 2	Nozzle 3
Date	<i>6/13/18</i>		
Nozzle ID	<i>.17</i>		
Operator	<i>BH</i>		
Test Location	<i>Hammer Mill Shredder</i>		
Run Number (s)	<i>1, 2, 3, 4, 5</i>		
Diameter 1	<i>.170</i>		
Diameter 2	<i>.169</i>		
Diameter 3	<i>.171</i>		
Average	<i>.170</i>		

	Nozzle 4	Nozzle 5	Nozzle 6
Date			
Nozzle ID			
Operator			
Test Location			
Run Number (s)			
Diameter 1			
Diameter 2			
Diameter 3			
Average			

Notes:

Measurements must be made to the nearest 0.001 inches.

Three different diameters should be measured.

The difference between the high and low measurement must be less than 0.004 inches.

Signed

BH

Date

6/13/18

Airtech Environmental Services Inc.

Field Balance Daily Calibration Check

Project No.	451738
Project Name	Iron Industries
Balance ID	Scale 2

[illegible]

Notes:

At least one weight that is 500 grams or within 50 grams of the weight of a loaded impinger must be used for the daily calibration check.

The difference between the actual and measured value of the weight must be no more than 0.5 grams.

Signed: Billy Jk

Date: 6/13/18
6/14/18

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI74E15A2VT6	Reference Number:	54-124542331-1
Cylinder Number:	XC025171B	Cylinder Volume:	149.0 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12016	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Mar 08, 2016

Expiration Date: Mar 08, 2024

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	5.000 %	4.885 %	G1	+/- 1.0% NIST Traceable	03/08/2016
OXYGEN	21.00 %	20.95 %	G1	+/- 0.5% NIST Traceable	03/08/2016
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	97050816	SG9167530BAL	7.029 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2016
NTRM	12062016	CC367570	22.88 % OXYGEN/NITROGEN	+/- 0.2%	Apr 24, 2018

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Feb 16, 2016
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Feb 16, 2016

Triad Data Available Upon Request




Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI80E15A0138	Reference Number:	54-401086478-1
Cylinder Number:	CC167397	Cylinder Volume:	150.9 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12017	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Dec 26, 2017

Expiration Date: Dec 26, 2025

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	10.00 %	9.859 %	G1	+/- 0.9% NIST Traceable	12/26/2017
OXYGEN	10.00 %	9.971 %	G1	+/- 0.8% NIST Traceable	12/26/2017
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12081359	CC361050	11.002 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2018
NTRM	98051005	SG9181123BAL	12.05 % OXYGEN/NITROGEN	+/- 0.7%	Dec 14, 2023

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Dec 03, 2017
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Dec 03, 2017

Triad Data Available Upon Request




 Approved for Release

THIS IS THE LAST PAGE OF THIS DOCUMENT

If you have any questions, please contact one of the following individuals by email or phone.

Name: Mr. Matthew Libman
Title: District Manager
Region: Great Lakes Region
Email: mllibman@Montrose-env.com
Phone: (630) 860-4740

Name: Mr. Michael Hess
Title: Client Project Manager
Region: Great Lakes Region
Email: mhess@Montrose-env.com
Phone: (630) 860-4740