



Uranium and Fluoride in Fish from the Congaree River

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Introduction

Fish were collected from the Congaree River for targeted chemical analyses of tissue in response to community concerns with the Westinghouse Nuclear Fuels (WNF) facility located in Hopkins, South Carolina.

The WNF facility fabricates nuclear fuel assemblies that contain natural and low-enriched uranium oxide fuel for light water commercial nuclear power reactors. The fabrication process comprises chemical and mechanical phases. In the chemical phase the uranium complex of uranium hexafluoride (UF_6), produced by treatment of low-level U_{235} with hydrofluoric acid, is converted to uranium dioxide (UO_2) by the ammonium diuranate process. The UO_2 is then processed by being pressed into fuel pellets; heated to form a ceramic material; and, passed through a grinding operation. The ensuing fuel pellets are loaded into metal fuel rods that are then sealed and bundled into the final nuclear fuel assembly.

Specimens of bluegill (*Lepomis macrochirus*) and redbreast (*Lepomis auratus*) sunfish were collected and analyzed for uranium and fluoride. The target analytes were selected based on their presence in normal WNF operations. Although both analytes are present as production chemicals at the facility, uranium is considered to be closer to a signature analyte of the WNF facility than fluoride because fluoride is present in the aquatic environment from a variety of natural and anthropogenic sources. Ambient natural levels of uranium and fluoride (as fluorine) in the general Eastover area of the State soil are estimated to be 1.0 to 2.0 milligrams per kilogram (mg/Kg) (USGS 2014) and non-detect (<10 mg/Kg) to 47 mg/Kg (USGS 1984), respectively. Filet and whole fish samples were analyzed to evaluate the potential exposure upon human consumption from recreational fishing (filet) and as a sentinel monitor for general biological uptake (whole).

Description of Survey Area

The Congaree River, approximately 50 miles long, is formed by the confluence of the Saluda and Broad Rivers in Columbia, South Carolina. The Saluda River is the outflow from the Lake Murray hydroelectric station with its flow being controlled by the station's operations. The Broad River begins in North Carolina; it is also flow-controlled by several impoundments. The closest controlling impoundment before flowing to confluence with the Saluda River is Parr Shoals Reservoir.

Land use surrounding the Congaree River is highly urbanized at its origin in Columbia but transitions quickly to rural forested surroundings. A portion of the east side of the River bounded by the Congaree National Park. The Congaree River flows southeast from Columbia to its confluence with the Wateree River, forming the Santee River.

The Congaree River is classified as Freshwaters (SCDHEC 2012) for its entire length from formation to confluence with the Wateree River with the attendant quality standards (SCDHEC 2014). There are no promulgated State or Federal numeric water quality standards or criteria for uranium or fluoride. Neither analyte is considered a toxic or priority pollutant under the Federal Clean Water Act (USEPA 2020c). Although not applicable to the work reported herein, a maximum contaminant level of 4.0 milligrams per liter (mg/L) has been established as a National Primary Standard for drinking water along with a secondary MCL of 2.0 mg/L, also for drinking water (USEPA 2020b).

In 2019, the average streamflow of the Congaree River was 12,250 cubic feet per second (cfs) [7.9 billion gallons per day] with a lowest measured flow of 1,350 cfs and a highest measured flow of 55,500 cfs

(United States Geological Survey 2020). The Congaree River receives wastewater from three (3) major municipal wastewater treatment facilities (WWTFs) permitted under the National Pollutant Discharge Elimination System (NPDES). The City of Columbia WWTF (Columbia Metro) is permitted to discharge up to 60 million gallons per day; the City of Cayce WWTF is permitted to discharge up to 25 million gallons per day; the Gills Creek WWTF is permitted to discharge up to 16 million gallons per day. The NPDES-permitted maximum discharge volumes from these three (3) WWTFs comprised approximately 1.2% of the 2019 average daily flow in the Congaree River.

There are nine (9) additional NPDES permits along the river; three (3) water treatment plants/reservoirs and six (6) industrial operations.

Water Treatment NPDES:

- Columbia Canal Water Treatment Plant; no reported discharge since December 2016.
- City of West Columbia Water Treatment Plant; average discharge of 4,500 gallons per day.
- City of Cayce Raw Water Reservoir; no reported discharge since December 2016.

Industrial NPDES:

- Columbia Hydroelectric Project; no reported discharge since October 2015.
- Vulcan Construction Materials; average discharge of 4.5 million gallons per day.
- Martin Marietta/Cayce Quarry; no reported discharges.
- Eastman Chemical; average discharge of 50 – 100 million gallons per day, varied based on production.
- Westinghouse Nuclear Facility (WNF); average discharge of 100,000 gallons per day.
- Devro, Inc.; average discharge of 100,000 gallons per day.

The average flows from these additional NPDES facilities comprised approximately 0.6% – 1.3% of the 2019 average daily flow in the Congaree River.

Three (3) sampling locations were selected to represent separate sub-populations of the target fish species (Table 1; Figure 1). By selecting sampling locations with non-overlapping home ranges, the uranium and fluoride results could be more clearly interpreted and differentiated. The upstream (US, from WNF) location served as the background location. The midpoint location was at and slightly downstream from the WNF NPDES discharge diffuser (DC, at WNF). The third location was just upstream from the confluence of the Congaree and Wateree Rivers (DS, from WNF). Locations US and DS corresponded to routine monitoring stations C-007A and C-007, respectively, used by SCDHEC for long-term water quality monitoring.

Methods

Target Fish Species Selection

Twenty-seven fish were collected by SCDHEC from each location. Bluegill sunfish was the targeted species, while redbreast sunfish was accepted if bluegills were not recovered in the desired quantity. These two (2) species occupy the same trophic level and are of the same genus. Bluegill and redbreast sunfish were selected as the target species because they are an invertebrate-consuming (an insectivorous) fish species. Insectivores are indicated to bioaccumulate uranium at a higher level than fish species that are primarily piscivores or omnivores (Kraemer and Evans 2012).

Table 1 Fish Collection Locations in the Congaree River Used in Uranium and Fluoride Analyses.

Station	Description	Location
US (C-007A)	Upstream (US) from WNF NPDES diffuser:	Approximately a two (2)-mile section beginning at 33.949788 -81.029477, one (1) mile upstream and downstream from the Thomas Newman Landing.
DC (WNF)	at WNF NPDES diffuser: (DC for discharge)	Approximately a two (2)-mile section beginning at 33.840369 -80.949075 (the WNF diffuser), traveling downstream
DS- (C-007)	Downstream (DS) from WNF NPDES diffuser:	Current existing station at the US Hwy 601 bridge (C-007). Approximately one (1) mile upstream and downstream from bridge.

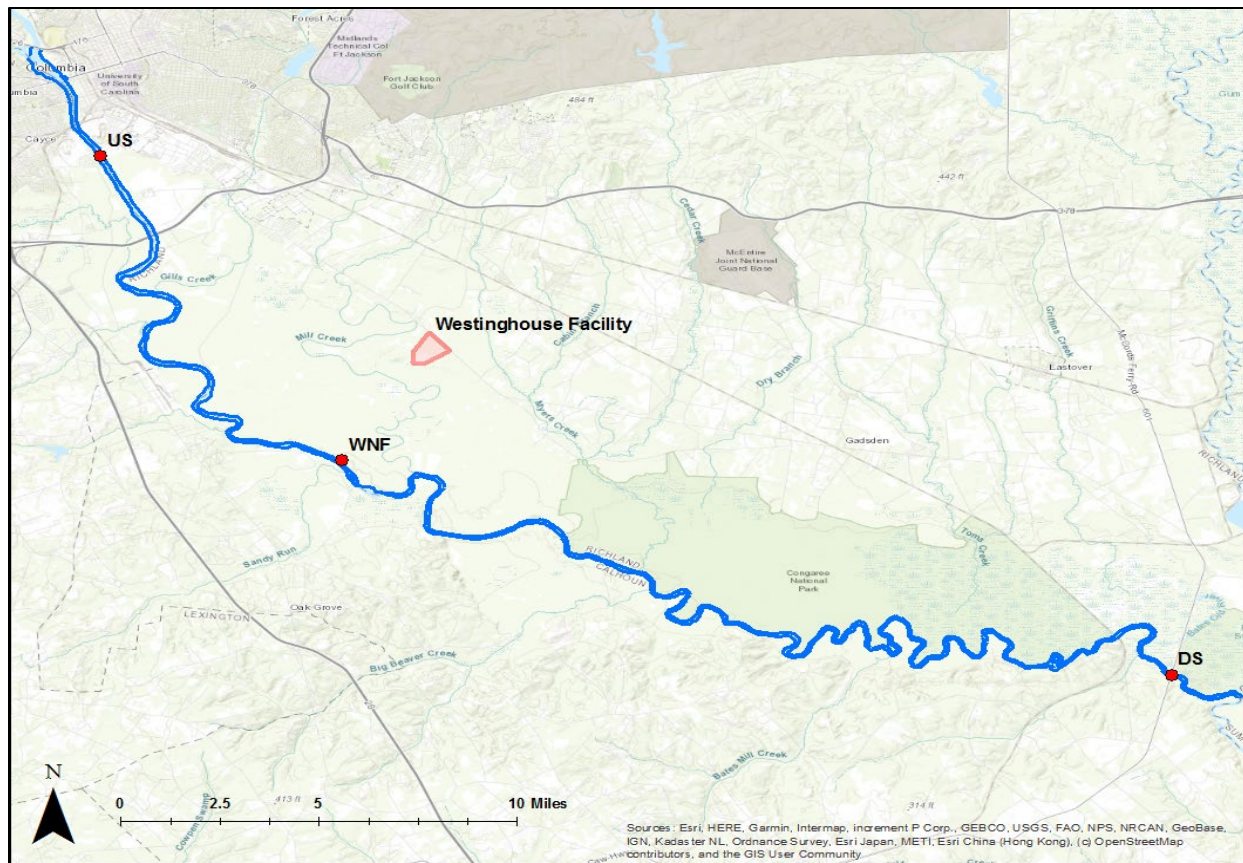


Figure 1 Fish Collection Locations in the Congaree River Used in Uranium and Fluoride Analyses.

Sample Collection and Preparation

Collection was performed via electroshocking and dip-netting following the SCDHEC Standard Operating Procedure for Fish and Shellfish Tissue Collection (SCDHEC 2001). Fish were placed and maintained on wet ice through daily work completion and transport to the SCDHEC Aquatic Science Programs Laboratory (ASPL).

At the ASPL, the specimens were weighed; measured for total length; and, the right-side portion scaled and then removed as a filet (hence, the *filet* sample). The portion of the whole fish remaining after removal of the filet was retained (hence, the *whole fish* sample). The whole fish and filets samples were wrapped in clean aluminum foil (dull side to the tissue) and placed in a freezer at -20° C or lower. These samples were transported on wet ice to Access Analytical in Columbia, S.C. for analytical testing

Chemical Analyses

The tissue samples were analyzed for total-form uranium and total-form fluoride. Samples were received by Access Analytical and the weights were recorded. Using a sharp knife, each sample was cut into 2.5-centimeter (cm) cubes to aid in grinding. Each sample was added to a Waring 500-watt bar blender and blended into a paste-like texture. Samples were then divided in half (split); one (1) set of split samples were shipped on ice by Access Analytical to GEL in Charleston, S.C. for uranium analyses. Samples were digested per USEPA SW-846 Method 3050B and then analyzed per USEPA SW-846 Method 6020B using inductively coupled plasma-mass spectrometry.

The second split set of the blended samples was retained and analyzed for fluoride by Access Analytical. Because there is no USEPA-approved method of preparation for fluoride analysis in fish tissue or solids, fluoride analysis was performed by first transferring each blended sample into a labeled 125 milliliter (ml) Erlenmeyer flask. Next, 100 ml of Ion Chromatograph eluent (sodium carbonate/sodium bicarbonate) was added to each flask. Samples were stirred on a stir plate for two (2) hours before settling the solids overnight. The supernatant was then analyzed by Ion Chromatography (IC).

Standard Weight

The standard weight of a fish is the ratio of the actual weight of a fish to what a quickly growing, healthy fish of the same length should weigh. When the weight of a given fish is compared to the standard weight of that fish species of the same length, an indication of the general health of the fish is obtained. If the ratio of the actual weight divided by the standard weight is greater than one (1) [unitless], then the fish is considered healthy. If the ratio is less than one (1), the fish is considered less than healthy. Standard weight data were supplied by the South Carolina Department of Natural Resources (Otho 1984).

Statistical Analyses

The length and weight data were evaluated for significant differences using the Kruskal-Wallis H test at a significance level of $p = 0.05$ (Wilcoxon and Wilcox 1964). Descriptive statistics of uranium and fluoride data were calculated for both filet and whole fish samples. Those data were also evaluated for significant differences by location and specimen type (*i.e.*, filet vs. whole) using the Kruskal-Wallis H test at a significance level of $p = 0.05$ (Wilcoxon and Wilcox 1964).

Box plots were constructed for length, weight, weight ratio and fluoride in tissue data. Box plots are figures used to visually represent the distribution of numerical data (Figure 2). The middle box of a box plot is known as the Interquartile Range (IQR) and goes from the 25th percentile to the 75th percentile of the data. The IQR represents the middle 50% of the data. The line found within the IQR box is the median,

or the mid-point of the data set. The minimum data point is shown at the end of the bottom whisker while the maximum data point is shown at the end of the top whisker. Points found outside of the whisker ends are called data outliers. Outliers are data points that are an abnormal distance from the other values.

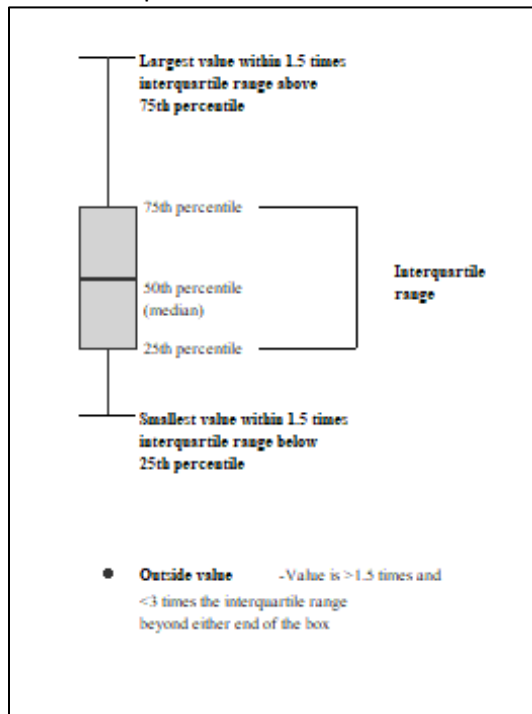


Figure 2 Box Plot Explanation (DeCicco, n.d).

Results

Chemical Data Quality Review

Access Analytical performed quality control at multiple steps in the fluoride analysis process. The balance was checked with American Society for Testing and Materials weights prior to use. The points were: 0.100 mg and 100 mg. A continuing check was performed on the balance using the 1.0 gram (g) check after every 20 samples were weighed. Samples run on IC were calibrated to 0.200 mg/L solution, continuing calibration verification, blanks, as well as matrix spikes and matrix spike duplicates. These matrix spike and spike duplicates were unsuccessful due to no standard method for preparing a tissue spike of fluoride. However, the continuing calibration verification passed which indicated no carryover of fluoride from one sample to another.

GEL Laboratory followed quality control requirements for USEPA SW-846 Method 6020B. This included Initial Calibration Verification (ICV) being performed immediately following each calibration and Continuing Calibration Verification (CCV) performed after at least every 10 samples. Initial Calibration Blank (ICB) was performed immediately following the ICV and Continuing Calibration Blanks (CCB) were run with each CCV. One of the Continuing Calibration Blanks run for uranium had a measurable quantity of uranium present. The uranium results all reported at or less than the minimum detection limit for the analysis, except for two (2) results. The two (2) uranium sample results that were reported as slightly greater than the detection limit were associated with this quality control blank. It was concluded that these two (2) detections whole fish were very likely laboratory-induced results.

The chemical data obtained from the fish tissue analyses were considered to have met appropriate quality requirements. Consequently, they were determined to be reliable to draw conclusions regarding the presence of uranium and fluoride in fish in the specified portion of the Congaree River, within the context of species analyzed and the sample collection period.

Fish Size

The length and weight data for the collected specimens are summarized in Tables 2 and 3, respectively.

Table 2 Analysis of Length Data of Fish from the Congaree River Used in Uranium and Fluoride Analyses.

US (C-007A) ^a		Species ^c	DC (WNF) ^a		Species ^c	DS (C-007) ^a		Species ^c
Collected 26-Aug-2019			Collected 7-Aug-2019			Collected 5-Aug-2019		
Length (mm) ^b	Rank		Length (mm) ^b	Rank		Length (mm) ^b	Rank	
166	8	BG	205	25	BG	212	26.5	BG
163	5.5		192	19.5		212	26.5	
164	7		183	15		204	23	
167	9		182	14		204	23	
163	5.5		169	10		199	21	
159	1		173	13		204	23	
161	3		171	11		192	20	
162	4	RB	172	12	RB	186	16	RB
160	2		189	17.5		189	18	
Rank Sum	45.0	--	Rank Sum	137.0	--	Rank Sum	196.0	--

a. US = upstream from Westinghouse Nuclear Fuels (WNF) NPDES discharge diffuser; DC = around WNF discharge diffuser; DS = downstream from WNF discharge diffuser

b. mm = millimeters

c. BG = bluegill sunfish (*Lepomis macrochirus*); RB = redbreast sunfish (*Lepomis auritas*)

Kruskal-Wallis H Test

Length

		DS (C-007)	DC (WNF)	US (C-007A)
		196.0	137.0	45.0
DS (C-007)	196.0	--	--	--
DC (WNF)	137.0	59.0	--	--
US (C-007A)	45.0	151.0	92.0	--

p=.05 (two-sided); k=3, n=9

Critical Value = 75; Table 3, Wilcoxon and Wilcox 1964

Red-bolded font and cell indicates significant difference at specified p level

Table 3 Analysis of Weight Data of Fish from the Congaree River Used in Uranium and Fluoride Analyses.

US (C-007A) ^a					Species ^d	DC (WNF) ^a					Species ^d	DS (C-007) ^a					Species ^d
Collected 26-Aug-2019						Collected 7-Aug-2019						Collected 5-Aug-2019					
Weight (g) ^b	Rank	Standard Weight (g) ^c	Weight Ratio	Rank		Weight (g) ^b	Rank	Standard Weight (g) ^c	Weight Ratio	Rank		Weight (g) ^b	Rank	Standard Weight (g) ^c	Weight Ratio	Rank	
119	15	76.7	1.6	22.5	BG	189	19.5	146.7	1.3	8.5	BG	212	26.5	162.6	1.3	8.5	BG
116	12.5	72.6	1.6	22.5		161	17	120.0	1.3	8.5		212	26.5	162.6	1.3	8.5	
111	9	73.9	1.5	17.5		116	12.5	103.5	1.1	1		204	24	144.5	1.4	13.5	
108	6	78.2	1.4	13.5		118	14	101.8	1.2	3.5		204	24	144.5	1.4	13.5	
106	4	72.6	1.5	17.5		101	1	81.1	1.2	3.5		199	22	133.9	1.5	17.5	
109	7.5	67.2	1.6	22.5		106	4	87.1	1.2	3.5		204	24	144.5	1.4	13.5	
112	10	69.9	1.6	22.5		109	7.5	84.1	1.3	8.5		192	21	120.0	1.6	22.5	
114	11	71.2	1.6	22.5	104	2	85.6	1.2	3.5	186	18	108.8	1.7	26.5			
106	4	68.5	1.5	17.5	149	16	114.3	1.3	8.5	189	20	114.3	1.7	26.5			
Rank Sum	79.0	--		178.5	--	Rank Sum	93.5	--	49.0	--	Rank Sum	205.5	--	150.5	--		

- a. US = upstream from Westinghouse Nuclear Fuels (WNF) NPDES discharge diffuser; DC = around WNF discharge diffuser; DS = downstream from WNF discharge diffuser
- b. g = grams
- c. from SCDNR (Otho 1984); in grams (g)
- d. BG = bluegill sunfish (*Lepomis macrochirus*); RB = redbreast sunfish (*Lepomis auritas*)

Kruskal-Wallis H Tests

Measured Weight

		DS (C-007)	DC (WNF)	US (C-007A)
		205.5	93.5	79.0
DS (C-007)	205.5	--	--	--
DC (WNF)	93.5	112	--	--
US (C-007A)	79.0	126.5	14.5	--

p=.05 (two-sided); k=3, n=9

Critical Value = 75; Table 3, Wilcoxon and Wilcox 1964

Standard Weight Ratio

		US (C-007A)	DS (C-007)	DC (WNF)
		178.5	150.5	49.0
US (C-007A)	178.5	--	--	--
DS (C-007)	150.5	28	--	--
DC (WNF)	49.0	129.5	101.5	--

p=.05 (two-sided); k=3, n=9

Critical Value = 75; Table 3, Wilcoxon and Wilcox 1964

Red-bolded font and cell indicates significant difference at specified p level

The size data from Tables 2 and 3 were compiled into box plots to depict visually the distributions of length and weight by location (Figure 2) and of standard weight ratio by location (Figure 3). The red boxes represent the length of the fish at each location, while the blue boxes represent the weight. The ends of the whiskers represent the minimum and maximum data values at each location.

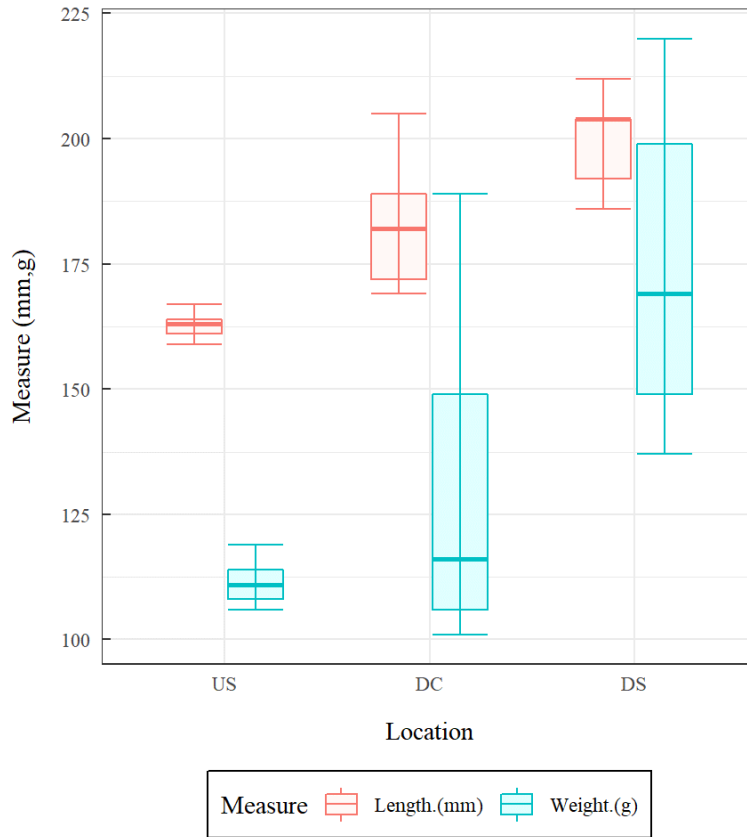


Figure 3 Box Plots of Length vs. Measured Weight of Fish from the Congaree River Used in Uranium and Fluoride

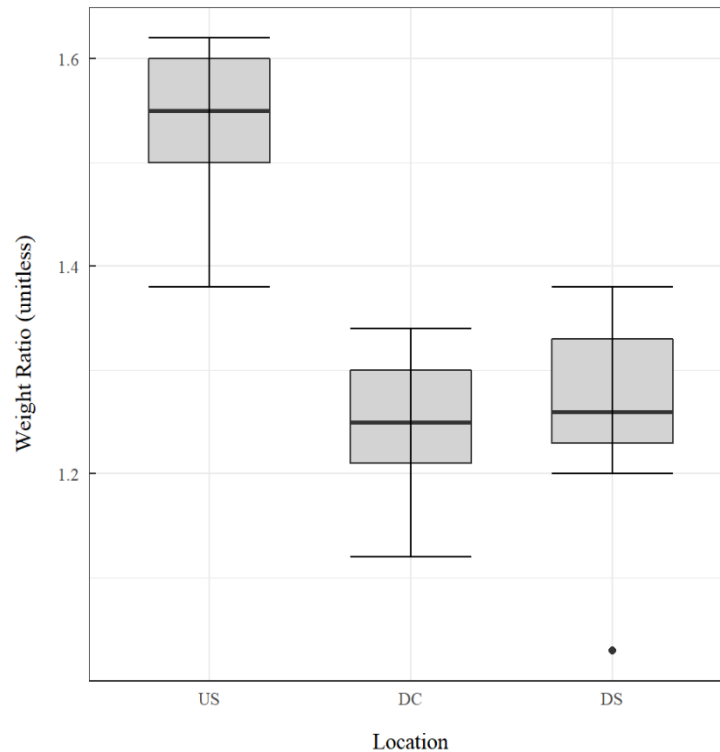


Figure 4 Box Plots of Standard Weight Ratio of Fish from the Congaree River Used in Uranium and Fluoride Analyses

The following observations were made regarding the size measurements:

- Gradual increases in lengths and weights in each successive downstream location.
- Healthy species growth at all three (3) locations.
- Significant difference in length ($p < 0.05$) between the US location (shorter) and the DC and DS locations.
- No significant difference in length ($p < 0.05$) between the DC and DS locations.
- Significant difference in measured weight ($p < 0.05$) between the DS location (heavier) and the US and DC locations.
- No significant difference in measured weight ($p < 0.05$) between the US and DC locations.
- Significant difference in standard weight ratio ($p < 0.05$) between the DC location (less) and the US and DS locations.
- No significant difference in standard weight ratio ($p < 0.05$) between the US and DS locations.

Overall, the size measurements indicated comparable-sized fish between the three (3) locations. While there were some statistically significant differences in lengths and weights between the locations, the actual differences were not large enough to result in confounding variables for data interpretation. The gradual trending increase in length and width with the downstream flow direction is not anomalous. It is likely that this is a natural ecological response to increasing preferential habitat for feeding and sheltering. Further, specimens from all three (3) locations returned standard weight ratios that indicated healthy organisms. It is worthy of note, however, that the standard weight ratio from the DC location (mean of 1.2) was significantly less than the other two (2) stations (1.5 at both US and DS).

Chemistry Results

Tissue of 27 whole fish and 27 filets from the three (3) noted locations along the Congaree River were analyzed for total-form uranium and total-form fluoride (Tables 4 and 5, respectively). The fluoride data were also summarized graphically in box plots (Figure 4). The fluoride results were evaluated further by analyzing the data by segregated and unsegregated results based off whole or filet samples (Tables 6 and 7). The following observations were made regarding the chemistry data.

Total Uranium

- All results were less than the detection limits except for two (2) result in a whole fish sample from stations DS and DC, with results of 0.019 mg/Kg and 0.017 mg/Kg, respectively. Based on the quality control data provided, it was concluded that the two (2) noted detections were laboratory-induced artifacts

Total Fluoride

- The greatest mean concentration (548 mg/Kg) was observed in whole fish from the DC location.
- The lowest mean concentration (373 mg/Kg) was observed in whole fish from the US location.
- Filet from the US location had a higher mean (296 mg/kg) than the whole fish (373 mg/kg) at locations DC and DS, the whole fish fluoride results were higher than the filet.
- Using the unsegregated specimens, a significant difference ($p < 0.05$) was observed between the US location (less) and DC location.
- Using the segregated specimens:
 - Whole fish -- a significant difference ($p < 0.05$) was observed between the US location (less) and DC location;
 - Filet -- no significant differences were observed between locations

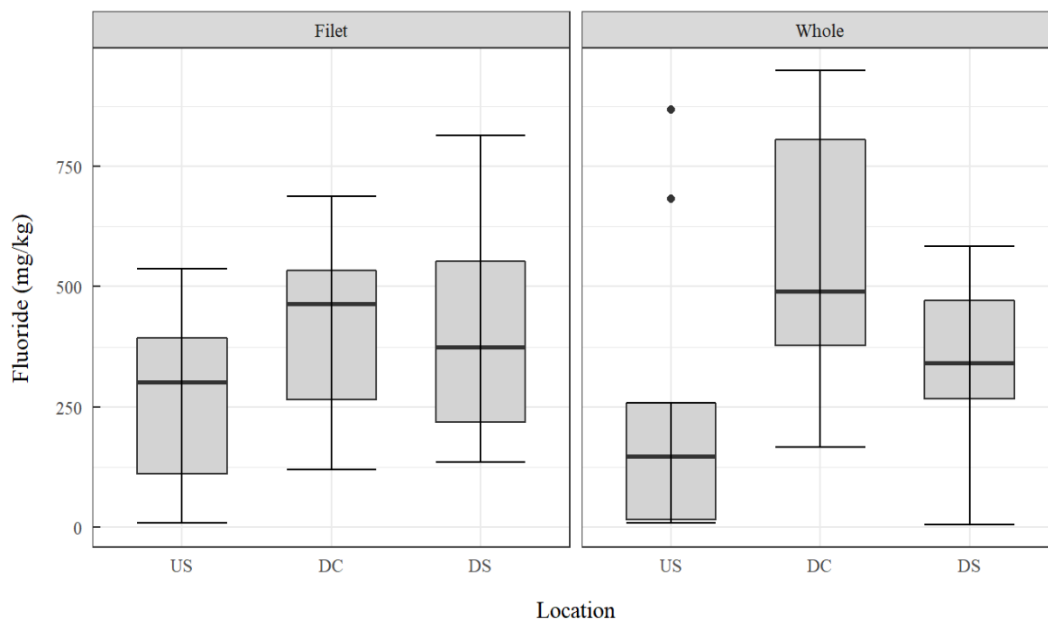


Figure 5 Box Plots of Fluoride Concentration in Fish from the Congaree River

Table 4 Uranium Concentrations in Fish from the Congaree River.

US (C-007A) ^a Collected 26-Aug-2019				
Whole (mg/Kg) ^b	Filet (mg/Kg) ^b	Length (mm) ^b	Weight (g) ^b	Species ^c
<0.0131	<0.0127	166	119	Bluegill
<0.0123	<0.0132	163	116	
<0.0126	<0.0126	164	111	
<0.0132	<0.0125	167	108	
<0.0132	<0.0131	163	106	
<0.0121	<0.012	159	109	
<0.0121	<0.0129	161	112	
<0.0122	<0.0129	162	114	Redbreast
<0.0131	<0.0124	160	106	
DC (WNF) ^a Collected 7-Aug-2019				
Whole (mg/Kg) ^b	Filet (mg/Kg) ^b	Length (mm) ^b	Weight (g) ^b	Species ^c
<0.0131	<0.0124	205	189	Bluegill
<0.0122	<0.0121	192	161	
<0.0126	<0.0125	183	116	
<0.0122	<0.0121	182	118	
<0.0127	<0.012	169	101	
<0.0129	<0.0131	173	106	
<0.0131	<0.0131	171	109	
0.017 ^d	<0.0127	172	104	
<0.0131	<0.0132	189	149	Redbreast
DS (C-007) ^a Collected 5-Aug-2019				
Whole (mg/Kg) ^b	Filet (mg/Kg) ^b	Length (mm) ^b	Weight (g) ^b	Species ^c
<0.0125	<0.0121	212	220	Bluegill
<0.013	<0.0128	212	204	
<0.0122	<0.0129	204	199	
<0.0127	<0.0125	204	178	
<0.0129	<0.0124	199	169	
0.019 ^d	<0.0127	204	149	
<0.0127	<0.0129	192	160	
<0.0127	<0.0132	186	144	
<0.0126	<0.013	189	137	Redbreast

a. US = upstream from Westinghouse Nuclear Fuels (WNF) NPDES discharge diffuser; DC = around WNF discharge diffuser; DS = downstream from WNF discharge diffuser

b. From Table 2; mg/Kg = milligrams per kilogram, wet weight; mm = millimeters; g = grams

c. bluegill sunfish (*Lepomis macrochirus*); redbreast sunfish (*Lepomis auritas*)

d. Results are assumed to be related to lab induced error. Samples were associated with a continuing calibration blank having a measurable amount of uranium

Table 5 Fluoride Concentration in Fish from the Congaree River.

	US (C-007A) ^a				Species ^d	DC (WNF) ^a				Species ^d	DS (C-007) ^a				Species ^d
	Collected 26-Aug-2019					Collected 7-Aug-2019					Collected 5-Aug-2019				
	Whole (mg/Kg) ^{b,c}	Filet (mg/Kg) ^{b,c}	Length (mm) ^c	Weight (g) ^c		Whole (mg/Kg) ^{b,c}	Filet (mg/Kg) ^{b,c}	Length (mm) ^c	Weight (g) ^c		Whole (mg/Kg) ^{b,c}	Filet (mg/Kg) ^{b,c}	Length (mm) ^c	Weight (g) ^c	
	868	536	166	119	BG	805	587	205	189	BG	342	148	212	220	BG
	<15.8	149	163	116		231	533	192	161		471	814	212	204	
	258	322	164	111		948	429	183	116		297	478	204	199	
	147	517	167	108		691	474	182	118		463	579	204	178	
	<15.5	302	163	106		841	238	169	101		<5.72	360	199	169	
	79.3	<9.5	159	109		490	266	173	106		267	135	204	149	
	683	112	161	112		381	688	171	109		479	553	192	160	
	205	37.6	162	114	RB	166	119	172	104	RB	584	218	186	144	RB
	<9.1	394	160	106		377	464	189	149		<12.0	374	189	137	
n ^{e,f}	9	9	9	9	--	9	9	9	9	--	9	9	9	9	--
Range	<9.1 - 683	<9.5 - 536	159 - 166	106 - 119		166 - 948	119 - 688	169 - 205	104 - 189		<5.72 - 584	135 - 814	186 - 204	137 - 220	
Mean	373	296	163	111		548	422	182	128		415	407	200	173	
SD ^{e,f}	322	185	3	4		283	182	12	31		115	224	9	29	
SE ^{e,f}	107	61.6	1	1		94.2	60.6	4	10		38.3	74.7	3	10	

a. US = upstream from Westinghouse Nuclear Fuels (WNF) NPDES discharge diffuser; DC = around WNF discharge diffuser; DS = downstream from WNF discharge diffuser
b. whole = sample remaining from removal of right filet
c. from Table 2; mg/Kg = milligrams per kilogram, wet weight; mm = millimeters; g = grams
d. BG = bluegill sunfish (*Lepomis macrochirus*); RB = redbreast sunfish (*Lepomis auritas*)
e. n = number of observations (sample size); SD = +/- 1 standard deviation; SE = +/- 1 standard error of the mean
f. n is unitless; all other descriptive statistics are in their respective reporting units

Table 6 Analysis of Fluoride Data from Unsegregated Whole and Filet Fish Samples from the Congaree River.

Fluoride in Fish -- Whole and Filet Combined								
US (C-007A)			DC (WNF)			DS (C-007)		
Tissue, mg/Kg ^a	Type ^b	Rank	Tissue, mg/Kg ^a	Type ^b	Rank	Tissue, mg/Kg ^a	Type ^b	Rank
536	F	42	587	F	46	148	F	13
868	W	53	805	W	50	342	W	26
149	F	14	533	F	41	814	F	51
<15.8	W	3.5	231	W	18	471	W	35
322	F	25	429	F	32	478	F	37
258	W	20	948	W	54	297	W	23
517	F	40	474	F	36	579	F	44
147	W	12	691	W	49	463	W	33
302	F	24	238	F	19	360	F	27
<15.5	W	3.5	841	W	52	< 5.72	W	3.5
<9.5	F	3.5	266	F	21	135	F	11
79.3	W	8	490	W	39	267	W	22
112	F	9	688	F	48	553	F	43
683	W	47	381	W	30	479	W	38
37.6	F	7	119	F	10	218	F	17
205	W	16	166	W	15	584	W	45
394	F	31	464	F	34	374	F	28
<9.1	W	3.5	377	W	29	< 12	W	3.5
Rank Sum		362	Rank Sum		623	Rank Sum		500

a. mg/kg = milligrams per kilogram, wet weight; from Table 2

b. F = filet; W = whole, less right filet

Kruskal-Wallis H Test

		DC (WNF)	DS (C-007)	US (C-007)
		623	500	362
DC (WNF)	623	--	--	--
DS (C-007)	500	123	--	--
US (C-007A)	362	261	138	--

p=.05 (two-sided); k=3, n=18 (where: k = treatments; n = observation/treatment)

Critical Value = 221; Table 3, Wilcoxon and Wilcox 1964

Red-bolded font and cell indicates significant difference at specified p level

Table 7 Analysis of Fluoride Data from Segregated Whole and Filet Fish Samples from the Congaree River.

Fluoride in Fish -- Whole					
US (C-007A)		DC (WNF)		DS (C-007)	
Tissue, mg/Kg ^a	Rank	Tissue, mg/Kg ^a	Rank	Tissue, mg/Kg ^a	Rank
868	26	805	24	342	14
<15.8	3	231	10	471	18
258	11	948	27	297	13
147	7	691	23	463	17
<15.5	3	841	25	< 5.72	3
79.3	6	490	20	267	12
683	22	381	16	479	19
205	9	166	8	584	21
<9.1	3	377	15	< 12.0	3
Rank Sum	90	Rank Sum	168	Rank Sum	120

a. mg/kg = milligrams per kilogram, wet weight; from Table 2

Fluoride in Fish -- Filet					
US (C-007A)		DC (WNF)		DS (C-007)	
Tissue, mg/Kg ^a	Rank	Tissue, mg/Kg ^a	Rank	Tissue, mg/Kg ^a	Rank
536	22	587	25	148	6
149	7	533	21	814	27
322	12	429	16	478	19
517	20	474	18	579	24
302	11	238	9	360	13
<9.5	1	266	10	135	5
112	3	688	26	553	23
37.6	2	119	4	218	8
394	15	464	17	374	14
Rank Sum	93	Rank Sum	146	Rank Sum	139

a. mg/kg = milligrams per kilogram, wet weight; from Table 2

Kruskal-Wallis H Tests

Whole

		DC (WNF)	DS (C-007)	C-007A (US)
		168	120	90
DC (WNF)	168	--	--	--
DS (C-007)	120	48	--	--
US (C-007A)	90	78	30	--

p=.05 (two-sided); k=3, n=9 (where: k = treatments; n = observation/treatment)

Critical Value = 75; Table 3, Wilcoxon and Wilcox 1964

Red-bolded font and cell indicates significant difference at specified p level

Filet

		DC (WNF)	DS (C-007)	US (C-007A)
		146	139	93
DC (WNF)	146	--	--	--
DS (C-007)	139	7	--	--
US (C-007A)	93	53	46	--

p=.05 (two-sided); k=3, n=9 (where: k = treatments; n = observation/treatment)

Critical Value = 75; Table 3, Wilcoxon and Wilcox 1964

No significant differences at specified p level

Fluoride-Associated Fish Consumption Risk

The principal sources of fluoride exposure to humans are water, beverages, food and fluoride-containing dental products (ATSDR 2003). Fluoride is present in water and food products because of its ubiquitous and natural occurrence in the environment in addition to its presence due to anthropogenic enrichment (*e.g.*, public water fluoridation, some industrial sector wastewaters, *etc.*). The principal media of focus for human exposure to fluoride have historically been drinking water and dental hygiene products.

Exposure to fluoride through food consumption has not been indicated to be of significant concern. At an appropriate dosage, fluoride is an effective prophylaxis against dental caries; hence, the widespread national practice of fluoridation of public water supplies. Conversely, ingestion of excess fluoride can lead to severe dental fluorosis, increased bone fractures and skeletal fluorosis. Dental fluorosis, usually of most concern in children, is considered to be a cosmetic, not toxic or adverse health effect (USEPA 2020a).

Skeletal fluorosis in adults (computed on typical adult weight of 70 Kg) has been reported to require daily consumption of 20 mg or more of fluoride for 20 years yielding a consequent upper bound intake rate of 0.28 mg fluoride/kg-day (USEPA 1985; USEPA 2020a). Since the development of this calculation and associated body weight exposure factor of 70 mg/Kg, best practice for the standard adult weight in risk evaluation has increased to 80 Kg, as typical. Accordingly, the noted upper bound intake rate was adjusted for this weight change to yield an upper bound intake rate of 0.25 mg fluoride/Kg-day.

While there is a National Primary Drinking Water Standard for fluoride, there are no residue or tolerance levels established for fluoride in foods. Consequently, the noted adjusted upper bound intake rate of 0.25 mg fluoride/kg-day was adopted as the metric to evaluate the potential concern for adverse health impact of skeletal fluorosis in adults upon human consumption of fish from the Congaree River, within the bounds of the dataset presented herein.

The standard formula for calculating analyte intake via fish consumption established under the USEPA Superfund Baseline Risk Assessment Program (USEPA 1989) was used, as delineated in Table 8, along with the basis for each parameter. Each location was evaluated individually; then all three (3) locations were combined to evaluate the integrated river reach. Consumption scenarios using the mean, the mean plus one (1) standard error of the mean, the 95% upper confidence limit on the mean and the maximum values were evaluated for each location; the mean, the 95% upper confidence limit on the mean and mean plus one (1) standard error were evaluated for the integrated river reach. One (1) meal per week, comprising an approximate six (6)-ounce (168 g) portion, was assumed for a 175-pound (approximate) [80 Kg] adult. Data from the filet dataset were used for this evaluation

As presented in Table 8, the various fish consumption scenarios did not exceed the adjusted upper bound intake rate of 0.25 mg/Kg-day. The scenario of note is at the DS location (C-007A). Consumption of fish for a year, with all specimens being at the maximum level detected, would yield near-equivalence to the adjusted upper bound intake rate. However, the likelihood of this actually occurring is considered to be low, given the data distribution of tissue concentrations over the reach of the river that was assessed.

Table 8 Fluoride Risk Evaluation for Consumption of Fish Filet (*Lepomis spp.*) from the Congaree River.

Intake (mg/kg-day)	=	$\frac{CF * IR * FI * EF * ED}{BW * AT}$
-----------------------	---	--

-- from USEPA (1989) Exhibit 6-17, where:

Parameter	Value	Value Basis
CF = Chemical Concentration in Fish (mg/Kg)	296	mean value from US (C-007A) location
	358	mean plus one (1) standard error of the mean from US (C-007A) location
	417	95% Upper Confidence Limit on the mean from US (C-007A) location
	536	maximum value from US (C-007A) location
	422	mean value from DC (WNF) location
	483	mean plus one (1) standard error of the mean from DC (WNF) location
	441	95% Upper Confidence Limit on the mean from DC (WNF) location
	587	maximum value from DC (WNF) location
	407	mean value from DS (C-007) location
	482	mean plus one (1) standard error of the mean from DS (C-007) location
	553	95% Upper Confidence Limit on the mean from DS (C-007) location
	814	maximum value from DS (C-007) location
	364	mean value from all locations combined
	404	mean plus one (1) standard error of the mean from all locations combined
442	95% Upper Confidence Limit on the mean for all locations combined	
IR = Ingestion Rate (Kg/meal)	0.168	2.1 g/Kg-day; Table 10: Age 21-50, 95th-percentile (USEPA 2011); equivalent to approximately 6-ounces per meal
FI = Fraction Ingested from Fish (unitless)	1	unity (100%) assumed
EF = Exposure Frequency (meals/year)	52	one (1) meal per week, assumed
ED = Exposure Duration (years)	30	standard stipulation for non-carcinogen (USEPA 1989)
BW = Body Weight (Kg)	80	USEPA 2011
AT = Averaging Time (days) [AT = ED * 365]	10,950	standard calculation for non-carcinogen (USEPA 19890)

Adjusted Upper Bound Target Intake (mg/kg-day)	Intake (mg/Kg-day)	CF (mg/Kg)	IR (Kg/meal)	FI (unitless)	EF (meals/year)	ED (years)	BW (Kg)	AT (days)	
0.25	US (C-007A) Location								
	0.09	=	296	0.168	1	52	30	80	10,950
	0.11	=	358						
	0.12	=	417						
	0.16	=	536						
	DC (WNF) Location								
	0.13	=	422	0.168	1	52	30	80	10,950
	0.14	=	483						
	0.13	=	441						
	0.18	=	587						
	DS (C-007) Location								
	0.12	=	407	0.168	1	52	30	80	10,950
	0.14	=	482						
	0.17	=	553						
	0.24	=	814						
	All Locations Combined								
0.11	=	364	0.168	1	52	30	80	10,950	
0.12	=	404							
0.13	=	442							

-USEPA 1985, 2020a

- adjusted intake = (20 mg/d)/(80 Kg) = 0.25 mg/Kg-d

Summary

This assessment was conducted to analyze tissue from bluegill (*L. macrochirus*) and redbreast (*L. auratus*) sunfish for the presence of total-form uranium and total-form fluoride at three (3) locations along the Congaree River in response to community concerns with the WNF facility. The target analytes were selected based on their presence in normal WNF operations. Although both analytes are present at the facility, uranium is considered to be closer to a signature analyte of the WNF facility than fluoride because fluoride is present in the aquatic environment from a variety of sources. The locations were selected to avoid overlapping home ranges of the fish, thereby removing a potential confounding variable of exposure history.

Filet and whole fish (*i.e.*, the remainder after removal of the right filet) tissue from 27 bluegill and redbreast sunfish were used to develop the dataset. These insectivorous species were selected due to their apparent preferential uptake of uranium relative to piscivorous and omnivorous species. A macroscopic assessment of the relative health of the species was performed by calculation of the measured weight : standard weight ratio.

The acquired data showed:

- The selected species were indicated to be healthy.
- Uranium was not detected in any filet samples.
 - The two (2) uranium detections reported in whole fish of 0.019 mg/Kg at DS and 0.017 mg/Kg at DC were indicated by quality control data to be laboratory-related artifacts.
- Fluoride was detected in almost all tissues from both filet and whole fish.
 - The fluoride level in whole fish from the US location was less (significant at $p < 0.05$) than either the DC or DS locations.
 - There was no significant difference ($p = 0.05$) in fluoride level in whole fish between the DC and DS locations.
 - There were no significant differences ($p = 0.05$) in fluoride levels in filets between any of the three (3) locations.
- Based on the whole fish dataset as an environmental monitoring sentinel:
 - Uranium was indicated to not be a contaminant of concern for ambient water quality.
 - An indication in ambient water quality change was observed for fluoride based on the difference between the US and DC/DS locations, likely due to the treated wastewaters entering and increased geogenic loadings to the River between the US and DC/DS locations.
- Based on the filet dataset as a public health monitoring sentinel:
 - Uranium was not indicated to be a contaminant of concern for fish consumption.
 - Fluoride was not indicated to be a contaminant of concern for fish consumption.

Overall, within the context of the point in time of sample collection, target species and analytical methods, no signal for uranium from the WNF facility was discerned. A slight, apparent signal for fluoride was observed from the WNF facility but it was not overall statistically significant from the other locations. The target species, as indicated by the noted limitations, were indicated to be healthy from an ecological viewpoint and safe for human consumption from a public health protection viewpoint.

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Appendix A: Data Package



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ANALYTICAL REPORT

CLIENT:

DHEC
BOW 2600 BULL STREET
COLUMBIA , SC 29201

PROJECT:

Fish Analysis

REPORT DATE:

09.26.19

REPORT APPROVED BY:

Bryant W. Boyd
Laboratory Manager

bryant@axs-inc.com

Any questions related to this report should be directed to Access Analytical, Inc. via phone at 803.781.4243 or via email at the address listed above.

- South Carolina DHEC state lab certification #: 32571001
- Florida – DOH national NELAP lab accreditation #: E871145



Access Analytical, Inc.
15 Thames Valley Rd. ~ Irmo, SC 29063
PHONE: 803.781.4243 ~ FAX: 803.781.4303 ~ WEB: www.axs-inc.com



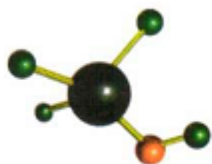
ACCESS
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Report of Analysis

Lab ID #: 21333-001
Project: Fish Analysis
Sample Name: 19-622-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	148	None	mg/kg	By SOP		9/18/2019 22:09	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0121	None	mg/kg	SW6020A	U	9/3/2019 13:19	#10120



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Report of Analysis

Lab ID #: 21333-002
Project: Fish Analysis
Sample Name: 19-622-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	342	None	mg/kg	By SOP		9/18/2019 22:32	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0125	None	mg/kg	SW6020A	U	9/3/2019 13:28	#10120



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Report of Analysis

Lab ID #: 21333-003
Project: Fish Analysis
Sample Name: 19-623-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	814	None	mg/kg	By SOP		9/18/2019 22:54	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0128	None	mg/kg	SW6020A	U	9/3/2019 13:30	#10120



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Report of Analysis

Lab ID #: 21333-004
Project: Fish Analysis
Sample Name: 19-623-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	471	None	mg/kg	By SOP		9/18/2019 23:17	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.013	None	mg/kg	SW6020A	U	9/3/2019 13:32	#10120



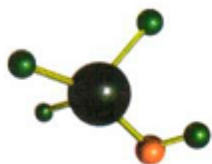
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Report of Analysis

Lab ID #: 21333-005
Project: Fish Analysis
Sample Name: 19-624-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	478	None	mg/kg	By SOP		9/18/2019 23:39	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0129	None	mg/kg	SW6020A	U	9/3/2019 13:33	#10120



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Report of Analysis

Lab ID #: 21333-006
Project: Fish Analysis
Sample Name: 19-624-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	297	None	mg/kg	By SOP		9/19/2019 0:02	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0122	None	mg/kg	SW6020A	U	9/3/2019 13:35	#10120



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Report of Analysis

Lab ID #: 21333-007

Project: Fish Analysis

Sample Name: 19-625-F

Client ID #:

Matrix: Soil

Collected: 8/5/2019 @ 0:00

Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	579	None	mg/kg	By SOP		9/19/2019 0:24	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0125	None	mg/kg	SW6020A	U	9/3/2019 13:36	#10120



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Report of Analysis

Lab ID #: 21333-008
Project: Fish Analysis
Sample Name: 19-625-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	463	None	mg/kg	By SOP		9/19/2019 0:47	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/3/2019 13:38	#10120



Report of Analysis

Lab ID #: 21333-009
Project: Fish Analysis
Sample Name: 19-626-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	360	None	mg/kg	By SOP		9/19/2019 1:09	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0124	None	mg/kg	SW6020A	U	9/3/2019 13:39	#10120



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Report of Analysis

Lab ID #: 21333-010
Project: Fish Analysis
Sample Name: 19-626-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	< 5.72	None	mg/kg	By SOP		9/20/2019 22:51	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0129	None	mg/kg	SW6020A	U	9/3/2019 13:44	#10120



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Report of Analysis

Lab ID #: 21333-011
Project: Fish Analysis
Sample Name: 19-627-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	135	None	mg/kg	By SOP	C	9/20/2019 2:39	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/3/2019 13:46	#10120



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Report of Analysis

Lab ID #: 21333-012
Project: Fish Analysis
Sample Name: 19-627-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	267	None	mg/kg	By SOP	C	9/20/2019 3:46	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.019	None	mg/kg	SW6020A	B	9/3/2019 13:47	#10120



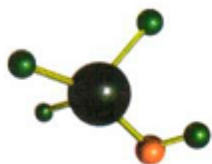
ACCESS
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Report of Analysis

Lab ID #: 21333-013
Project: Fish Analysis
Sample Name: 19-628-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	553	None	mg/kg	By SOP		9/20/2019 4:54	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0129	None	mg/kg	SW6020A	U	9/3/2019 13:49	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21333-014
Project: Fish Analysis
Sample Name: 19-628-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	479	None	mg/kg	By SOP		9/20/2019 5:17	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/3/2019 13:51	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21333-015

Project: Fish Analysis

Sample Name: 19-629-F

Client ID #:

Matrix: Soil

Collected: 8/5/2019 @ 0:00

Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	218	None	mg/kg	By SOP		9/20/2019 5:39	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0132	None	mg/kg	SW6020A	U	9/3/2019 13:52	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21333-016
Project: Fish Analysis
Sample Name: 19-629-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	584	None	mg/kg	By SOP		9/19/2019 17:44	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/3/2019 13:54	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21333-017
Project: Fish Analysis
Sample Name: 19-630-F
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	374	None	mg/kg	By SOP		9/19/2019 18:06	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.013	None	mg/kg	SW6020A	U	9/3/2019 13:55	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21333-018
Project: Fish Analysis
Sample Name: 19-630-W
Client ID #:

Matrix: Soil
Collected: 8/5/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	< 12	None	mg/kg	By SOP	C	9/20/2019 23:14	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0126	None	mg/kg	SW6020A	U	9/3/2019 13:57	#10120



Laboratory Endorsement / Definitions

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency, Standard Methods or other recognized agencies.

Common abbreviations that may be utilized in this report:

ND	Indicates the result was Not Detected at the specified reporting limit
"<"	Indicated the result as less than the indicated amount
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous to Count
SUB	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
DF	Dilution Factor
RL	Reporting Limit
MDL	Calculated minimum detection limit
PQL	Practical Quantitation Limit
RE	Re-analysis

Reporting flags that may be utilized in this report:

J	Indicates the result is between the MDL and PQL and considered to be an estimated result
MB	Indicates the analyte was detected in the associated Method Blank
H	Indicates the recommended holding time was exceeded
*	Indicates a non-compliant or not applicable QC recovery or RPD
A	BOD or CBOD GGA check value for this sample did not meet acceptance criteria.
B	BOD or CBOD blank depletion did not meet acceptance criteria.
C	Indicates the spike % recovery was not acceptable.
D	Indicates the duplicate % difference was not acceptable.
E	Toxicity is apparent in the sample.

Sample receipt at Access Analytical is documented through the attached chain of custody. In accordance with laboratory protocol, this report shall be reproduced only in full and with the written permission of Access Analytical, Inc.. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the attached report and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.



Sample Receipt

Were samples received on ice?	YES
Were samples received within required temperature limits?	YES
Are the number of samples the same as stated on the chain of custody?	YES
Are samples submitted with a correct and complete chain of custody?	YES
Are bottle caps tight and securely in place, coolers and samples intact?	YES
Are the correct sample containers provided?	YES
Were samples within the holding time for requested test(s)?	YES
Is the volume of sample submitted sufficient for the requested test(s)?	YES
Is there sufficient air space in bottle for bacteriological analysis?	n/a
Were samples received with applicable preservative?	YES

Result Comments

Sample 21333-001:

Uranium Data Qualifiers Per GEL

The "U" qualifier denotes the "Analyte was analyzed for, but not detected about the MDL, MDA, MDC or LOD."

The qualifier "B": "Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL"

See full report for details.



Access Lab Report #: <u>21333</u>		POH: _____		 ACCESS ANALYTICAL, INC. 15 Thames Valley Rd. Irmo, SC 29063 Phone: 803-781-4243 Web: www.axs-inc.com		Chain of Custody Record	
Sub Lab (if applicable): _____ / Sub Report #: _____		Bottle Types (see codes): _____					
Client: <u>SCDHEC - ASP</u>		Preservatives (see codes): _____		<p>Matrix Codes: 0 = None, 1 = HCL, 2 = HNO₃, 3 = H₂SO₄, 4 = NaOH, 5 = Na₂S₂O₈, 6 = Method 5035 set w/ NaHSO₄ & CH₃OH, 7 = NaOH/ZnOAc, 8 = H₂PO₄, 9 = cooled to 55°C, 10 = cooled to 510°C, 11 = Ascorbic Acid / HCL, 13 = EDTA</p> <p>Program Area Codes: GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section) NA = for non-regulatory samples</p> <p>Program Area Codes: CWA = Clean Water Act (for wastewaters), SDWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)</p> <p>Container Type: G = Glass, P = Plastic</p>			
Attn: <u>Ched Altman</u>		Bottle Types (see codes): _____					
Address: <u>2600 Bull St</u>		Requested Lab Analysis: _____					
City: <u>Charleston</u>		State: <u>SC</u> Zip Code: <u>29201</u>					
Phone: <u>803-898-4035</u>		Fax: <u>803-898-4200</u>					
Email: <u>Altman.KC@DHEC.sc.gov</u>		G-Grab / C-Comp: _____ Matrix (see code): _____					
Project ID: _____		Date Collected: _____ Time Collected: _____					
Sampled By: <u>Altman / Skaree</u>		Total # Containers: _____					
Lab ID: _____		Program Area (see code): _____					
Sample Name: _____		Total # Containers: _____					
001 19-622 F		8/5/19					
002 19-622 W							
003 19-623 F							
004 19-623 W							
005 19-624 F							
006 19-624 W							
007 19-625 F							
008 19-625 W							
009 19-626 F							
010 19-626 W							
<p>Auto Sampler Data (composite samples only): Date/Time On: _____ by whom: _____ Meter Reading Before: _____ Meter Reading After: _____ Difference: _____ Date/Time Off: _____ by whom: _____ Meter Reading Before: _____ Meter Reading After: _____ Difference: _____</p>							
Turnaround Time Requested: _____		Project Location: _____		Relinquished By: _____		Received By: _____	
Standard _____ Rush * _____		SC <input checked="" type="checkbox"/> NC _____		Ched Altman		Time (24hr): _____ Date: _____	
Date Required _____		Other (Specify): _____		Other _____		Samples Received on Ice: _____	
Rush data emailed/faxed by the end of business day on date required. Standard TAT is 7-10 business days.						Y N N/A Y N N/A Y N N/A	
Chain of Custody Page _____ of _____		Received in lab by: <u>Altman</u>		Date: <u>8-19-19</u>		Sample Temp. Upon Receipt in Lab: _____ (C) _____	
<p>White Copy: Lab original / Canary Copy / File Copy / Pink Copy: Client Copy</p> <p>NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.</p>							



Access Lab Report #: <u>21333</u>		Sub Lab (if applicable): _____ / Sub Report #: _____		PO#: _____		PRESERVATIVES (see codes):		BOTTLE TYPES (see codes):		REQUESTED LAB ANALYSIS		Notes / Comments							
Client: <u>SCOHCC - ASP</u>				Address: <u>2600 B-11 St</u>				State: <u>SC</u> Zip Code: <u>29201</u>		Matrix (see codes):		Total # Containers							
Attr: <u>Chad Alton</u>				City: <u>Greenville</u>				G-Grab C-Comp		Program Area (see codes):		Container per Test >>							
Phone: <u>803-898-4035</u>				Fax: <u>803-898-4200</u>				Date Collected: <u>8-5-A</u>		Time Collected:		Container per Test >>							
Email: <u>Alton@KC@dhec.state.sc.us</u>				Project ID: _____				Sampled By: _____		Date Collected:		Container per Test >>							
Sampled By: _____				Date Collected: _____				Time Collected: _____		Date Collected: _____		Container per Test >>							
Lab ID: _____				Sample Name: _____				Date Collected: _____		Time Collected: _____		Container per Test >>							
011 19-627 F				012 19-627 W				013 19-628 F		014 19-628 W		015 19-629 F		016 19-629 W		017 19-630 F		018 19-630 W	
Date/Time On: _____ by whom: _____				Date/Time Off: _____ by whom: _____				Meter Reading Before: _____ Meter Reading After: _____				Difference: _____							
Turnaround Time Requested: _____				Project Location: _____				Reinquished By: <u>Chad Alton</u>				Received By: _____							
Standard _____				Rush* _____				Project Location: SC				Date: _____							
*Tests Required _____				Project Location: NC				Project Location: Other (Specify): _____				Time (24hr): _____							
Rush data emailed/faxed by the end of business day on date required. Standard TAT is 7-10 business days.				Date Collected: _____				Date Collected: _____				Date Collected: _____							
Chain of Custody Page _____ of _____				Received in lab by: <u>ANASTE</u>				Date Collected: <u>8-14-19 1007</u>				Date Collected: _____							
Sample Temp. <u>Upon Receipt in Lab: (C)</u>				Date Collected: _____				Date Collected: _____				Date Collected: _____							



September 07, 2019

Ms. Angela Martin
ESP Associates, Inc.
3475 Lakemont Blvd
Fort Mill, South Carolina 29708

Re: Routine Analysis
Work Order: 488089

Dear Ms. Martin:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 20, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

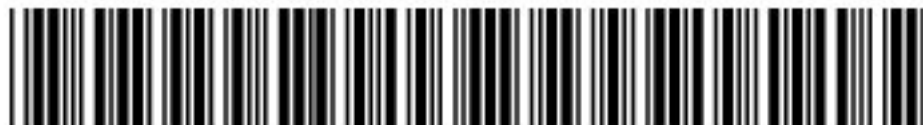
Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

Katelyn Gray for
Hope Taylor
Project Manager

Purchase Order: GELP18-1424
Enclosures



**Access Analytical
Routine Analysis
SDG: 488089**

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Case Narrative

**Receipt Narrative
for
Access Analytical
SDG: 488089**

September 07, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 20, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
488089001	21333-001
488089002	21333-002
488089003	21333-003
488089004	21333-004
488089005	21333-005
488089006	21333-006
488089007	21333-007
488089008	21333-008
488089009	21333-009
488089010	21333-010
488089011	21333-011
488089012	21333-012
488089013	21333-013
488089014	21333-014
488089015	21333-015
488089016	21333-016
488089017	21333-017
488089018	21333-018

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Metals.

Katelyn Gray

Katelyn Gray for
Hope Taylor
Project Manager

Chain of Custody and Supporting Documentation

Chain of Custody Record

Client: Access Analytical, Inc.
 Attn: Ashley Amick
 Address: 15 Thames Valley Rd.
 City: Irmo State: SC Zip Code: 29063
 Phone: 803-781-4243 Fax: _____
 Email: oelreports@axs-inc.com
 Project Name: Fish Tissue Analysis - Site I
 Sampled By (Signature): _____ Client

Lab ID	Sample Name	Date Collected	Time Collected	G-Grab (see codes)	Matrix (see codes)	Program Area (see codes)	Total # Containers	Preservatives (see codes)	Bottle Types (see codes)	Notes / Comments
21333-001		08.05.19		n/a	O	n/a	1	O	G	O = homogenized fish tissue
21333-002		08.05.19		n/a	O	n/a	1	G		
21333-003		08.05.19		n/a	O	n/a	1			
21333-004		08.05.19		n/a	O	n/a	1			
21333-005		08.05.19		n/a	O	n/a	1			
21333-006		08.05.19		n/a	O	n/a	1			
21333-007		08.05.19		n/a	O	n/a	1			
21333-008		08.05.19		n/a	O	n/a	1			
21333-009		08.05.19		n/a	O	n/a	1			
21333-010		08.05.19		n/a	O	n/a	1			

***Preservative Codes:**
 0 = None, 1 = HCL, 2 = HNO3, 3 = H2SO4, 4 = NaOH, 5 = Na2S2O8, 6 = Method 5035 set w/ NaHSO4 & CH3OH, 7 = NaOH/ZnOAC, 8 = H3PO4, 9 = cooled to ≤6°C, 10 = cooled to ≤10°C, 11 = Amm.Cl, 12 = Ascorbic Acid / HCL, 13 = EDA

***Matrix Codes:**
 GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section)

***Program Area Codes:**
 CWA = Clean Water Act (for wastewaters), SDWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)

***Container Type:** G = Glass, P = Plastic

***Preservation Codes / Bottle Types:**
 0 = None, 1 = HCL, 2 = HNO3, 3 = H2SO4, 4 = NaOH, 5 = Na2S2O8, 6 = Method 5035 set w/ NaHSO4 & CH3OH, 7 = NaOH/ZnOAC, 8 = H3PO4, 9 = cooled to ≤6°C, 10 = cooled to ≤10°C, 11 = Amm.Cl, 12 = Ascorbic Acid / HCL, 13 = EDA

Auto Sampler Data (composite samples only):
 Date/Time Set On: _____ by whom: _____
 Date/Time Off: _____ by whom: _____
 Meter Reading After: _____
 Meter Reading Before: _____
 Difference: _____ X _____ (factor): _____

Turnaround Time Requested:	Project Location:	Relinquished By:	Received By:	Date:	Time (24hr):	Samples Received on ice:
X	SC	<i>[Signature]</i>	<i>[Signature]</i>	8/19/19	1700	Y N N/A
	NC	<i>[Signature]</i>	<i>[Signature]</i>	8/20/19	8:50	Y N N/A
	Other (Specify):					Y N N/A

Received in lab by: _____
 Sample Temp: _____
 Receipt in Lab: _____ (°C) Ref: RT1 Ref: RT2

Chain of Custody Record

Access Analytical, Inc. - Irmo
 15 Thames Valley Rd. ~ Irmo, SC 29063
 Phone: 803-781-4243 / Fax: 803-781-4303 / www.axs-inc.com
 ACCESS ANALYTICAL, INC.
 SCDHEC Lab Certification # 32571

Access Lab Report #: _____
 Sub Lab (if applicable): GEL / Sub Report #: _____

Preservation Codes / Bottle Types:

***Preservative Codes:**
 0 = None, 1 = HCL, 2 = HNO3, 3 = H2SO4, 4 = NaOH, 5 = Na2S2O8, 6 = Method 5035 set w/ NaHSO4 & CH3OH, 7 = NaOH/ZnOAC, 8 = H3PO4, 9 = cooled to 56°C, 10 = cooled to 10°C, 11 = Amm.Cl, 12 = Ascorbic Acid / HCL, 13 = EDA

***Matrix Codes:**
 GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section)

***Program Area Codes:**
 CWA = Clean Water Act (for wastewaters), SDWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)

***Container Type:** G = Glass, P = Plastic

Preservatives (see codes):

0
 G

Bottle Types (see codes):

29063

SC

State:

Zip Code:

803-781-4243

Fax:

olelreports@axs-inc.com

Project Name: Fish Tissue Analysis - Site I

Client

Notes / Comments

O = homogenized fish tissue

Total Uranium in Tissue

! REQUESTED LAB ANALYSIS: !

Lab ID	Sample Name	Date Collected	Time Collected	G-Grab C-Comp	Matrix (see codes)	Program Area (see codes)	Total # Containers
21333-011		08.05.19		n/a	O	n/a	1
21333-012		08.05.19		n/a	O	n/a	1
21333-013		08.05.19		n/a	O	n/a	1
21333-014		08.05.19		n/a	O	n/a	1
21333-015		08.05.19		n/a	O	n/a	1
21333-016		08.05.19		n/a	O	n/a	1
21333-017		08.05.19		n/a	O	n/a	1
21333-018		08.05.19		n/a	O	n/a	1

Auto Sampler Data (composite samples only):

Date/Time Set On: _____ by whom: _____
 Date/Time Off: _____ by whom: _____
 Meter Reading After: _____
 Meter Reading Before: _____
 Difference: _____ X _____ (factor): _____

Standard	Turnaround Time Requested:	Project Location:	Relinquished By:	Received By:	Date:	Time (24hr):	Samples Received on Ice:
X	SC	X			8/19/19	1700	Y N N/A
	NC				8/20/19	8:50	Y N N/A
	Other (Specify):						Y N N/A
							Y N N/A

Chain of Custody Page 2 of 2

Received in lab by: _____
 Sample Temp: _____
 Receipt in Lab: _____ (°C) Ref: RT1 Ref: RT2

NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.

SAMPLE RECEIPT & REVIEW FORM

Client: ACAL SDG/AR/COC/Work Order: 488089 H-T
 Received By: IVE Date Received: 8/20/19

Carrier and Tracking Number: 5035 7507 9330
 Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other

Suspected Hazard Information: Yes No
 *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
 A) Shipped as a DOT Hazardous? Yes No
 Hazard Class Shipped: _____ UN#: _____
 If UN2910, Is the Radioactive Shipment Survey Compliant? Yes ___ No ___
 B) Did the client designate the samples are to be received as radioactive? Yes No
 COC notation or radioactive stickers on containers equal client designation.
 C) Did the RSO classify the samples as radioactive? Yes No
 Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr
 Classified as: Rad 1 Rad 2 Rad 3
 D) Did the client designate samples are hazardous? Yes No
 COC notation or hazard labels on containers equal client designation.
 E) Did the RSO identify possible hazards? Yes No
 If D or E is yes, select Hazards below.
 PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Client contacted and provided COC COC created upon receipt
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>ERI-18</u> TEMP: <u>4°C</u> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Preservation added Lot#:
				If Yes, are Encores or Soil Kits present for solids? Yes ___ No ___ NA ___ (If yes, take to VOA Freezer)
				Do liquid VOA vials contain acid preservation? Yes ___ No ___ NA ___ (If unknown, select No)
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No container count on COC Other (describe)
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PMI (or PMA) review: Initials WJ Date 8/21/19 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 07 September 2019

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122020-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-013
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122019-28
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
Access Analytical
SDG #: 488089

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3050B/6020

Analytical Procedure: GL-MA-E-014 REV# 33

Analytical Batch: 1909418

Preparation Method: SW846 3050B

Preparation Procedure: GL-MA-E-009 REV# 28

Preparation Batch: 1909416

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
488089001	21333-001
488089002	21333-002
488089003	21333-003
488089004	21333-004
488089005	21333-005
488089006	21333-006
488089007	21333-007
488089008	21333-008
488089009	21333-009
488089010	21333-010
488089011	21333-011
488089012	21333-012
488089013	21333-013
488089014	21333-014
488089015	21333-015
488089016	21333-016
488089017	21333-017
488089018	21333-018
1204362829	Method Blank (MB)ICP-MS
1204362830	Laboratory Control Sample (LCS)
1204362833	488089001(21333-001L) Serial Dilution (SD)
1204362831	488089001(21333-001D) Sample Duplicate (DUP)
1204362832	488089001(21333-001S) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Technical Information**Preparation/Analytical Method Verification**

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	488089									
	001	002	003	004	005	006	007	008	009	010
Uranium	2X	2X	2X	2X	2X	2X	2X	2X	2X	2X

Analyte	488089							
	011	012	013	014	015	016	017	018
Uranium	2X	2X	2X	2X	2X	2X	2X	2X

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

ACAL001 Access Analytical

Client SDG: 488089 GEL Work Order: 488089

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- B Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:



Name: **Jamie Johnson**

Date: **07 SEP 2019**

Title: **Group Leader**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089001

CLIENT ID: 21333-001

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0121	mg/kg	U		MS	0.0121	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089002

CLIENT ID: 21333-002

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0125	mg/kg	U		MS	0.0125	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089003

CLIENT ID: 21333-003

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0128	mg/kg	U		MS	0.0128	2	ICPMS14	190903-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089004

CLIENT ID: 21333-004

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.013	mg/kg	U		MS	0.013	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089005

CLIENT ID: 21333-005

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089006

CLIENT ID: 21333-006

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0122	mg/kg	U		MS	0.0122	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089007

CLIENT ID: 21333-007

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0125	mg/kg	U		MS	0.0125	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089008

CLIENT ID: 21333-008

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089009

CLIENT ID: 21333-009

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0124	mg/kg	U		MS	0.0124	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089010

CLIENT ID: 21333-010

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS14	190903-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089011

CLIENT ID: 21333-011

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089012

CLIENT ID: 21333-012

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.019	mg/kg	B		MS	0.0123	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089013

CLIENT ID: 21333-013

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089014

CLIENT ID: 21333-014

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089015

CLIENT ID: 21333-015

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0132	mg/kg	U		MS	0.0132	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089016

CLIENT ID: 21333-016

CONTRACT: ACAL00118

MATRIX: Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089017

CLIENT ID: 21333-017

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.013	mg/kg	U		MS	0.013	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488089

METHOD TYPE: SW846

SAMPLE ID: 488089018

CLIENT ID: 21333-018

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0126	mg/kg	U		MS	0.0126	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

Quality Control Summary

METALS
-2a-
Initial and Continuing Calibration Verification

SDG No: 488089

Contract: ACAL00118

Lab Code: GEL

Instrument ID: ICPMS14

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Acceptance Window (%R)</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
ICV01	Uranium	49.9	ug/L	50	ug/L	99.8	90.0 – 110.0	MS	03-SEP-19 13:00	190903-1
CCV01	Uranium	51.1	ug/L	50	ug/L	102.2	90.0 – 110.0	MS	03-SEP-19 13:08	190903-1
CCV02	Uranium	50.4	ug/L	50	ug/L	100.9	90.0 – 110.0	MS	03-SEP-19 13:12	190903-1
CCV03	Uranium	50.9	ug/L	50	ug/L	101.8	90.0 – 110.0	MS	03-SEP-19 13:25	190903-1
CCV04	Uranium	51.3	ug/L	50	ug/L	102.5	90.0 – 110.0	MS	03-SEP-19 13:41	190903-1
CCV05	Uranium	50.3	ug/L	50	ug/L	100.6	90.0 – 110.0	MS	03-SEP-19 13:59	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-2b-
CRDL Standard for ICP & ICPMS

SDG No: 488089

Contract: ACAL00118

Lab Code: GEL

Instrument ID: ICPMS14

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Advisory Limits (%R)</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
CRDL01	Uranium	.205	ug/L	.2	ug/L	102.5	70.0 – 130.0	MS	03-SEP-19 13:03	190903-1

***Analytical Methods:**

MS SW846 3050B/6020

Metals
-3a-
Initial and Continuing Calibration Blank Summary

SDG No.: 488089

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Analyte</u>	<u>Result ug/L</u>	<u>Acceptance</u>	<u>Conc Qual</u>	<u>MDL</u>	<u>RDL</u>	<u>Matrix</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run</u>
ICB01	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 13:01	190903-1
CCB01	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 13:09	190903-1
CCB02	Uranium	0.156	+/- .2	B	0.066	0.2	SOL	MS	03-SEP-19 13:14	190903-1
CCB03	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 13:27	190903-1
CCB04	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 13:43	190903-1
CCB05	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 14:00	190903-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 488089
Contract: ACAL00118
Matrix: Tissue

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1204362829	Uranium	0.0216	mg/kg	+/-0.0385	B	MS	0.0127	0.0385

*Analytical Methods:

MS SW846 3050B/6020

METALS
-4-
Interference Check Sample

SDG No: 488089

Contract: ACAL00118

Lab Code: GEL

Instrument: ICPMS14

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Acceptance Window (%R)</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
ICSA01	Uranium	0.019	ug/L					03-SEP-19 13:04	190903-1
ICSAB01	Uranium	21.5	ug/L	20	ug/L	108	80.0 - 120.0	03-SEP-19 13:06	190903-1

METALS

-5a-

Matrix Spike Summary

SDG NO. 488089 Client ID: 21333-001S

Contract: ACAL00118 Level: Low

Matrix: TISSUE % Solids:

Sample ID: 488089001 Spike ID: 1204362832

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Uranium	mg/kg	75-125	4.91		0.0121	U	4.84	101		MS

*Analytical Methods:

MS SW846 3050B/6020

Metals
-6-
Duplicate Sample Summary

SDG No.: 488089

Lab Code: GEL

Contract: ACAL00118

Client ID: 21333-001D

Matrix: TISSUE

Level: Low

Sample ID: 488089001

Duplicate ID: 1204362831

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Uranium	mg/kg		0.0121	U	0.0124	U			MS

*Analytical Methods:

MS SW846 3050B/6020

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 488089

Contract: ACAL00118

Aqueous LCS Source:

Solid LCS Source: Inorganic Ventures

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1204362830	Uranium	mg/kg	4.62	4.71		102	33.6-166	MS

*Analytical Methods:

MS SW846 3050B/6020

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 488089 Client ID: 21333-001L

Contract: ACAL00118

Matrix: SOLID Level: Low

Sample ID: 488089001 Serial Dilution ID: 1204362833

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Uranium	.066	U	.33	U				MS

*Analytical Methods:

MS SW846 3050B/6020

METALS
-13-
SAMPLE PREPARATION SUMMARY

SDG No: 488089

Method Type: MS

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Client ID</u>	<u>Sample Type</u>	<u>Matrix</u>	<u>Prep Date</u>	<u>Initial Sample Size</u>	<u>Final Sample Volume</u>	<u>Percent Solids</u>
Batch Number	1909416						
1204362829	MB for batch 1909416	MB	T	21-AUG-19	.519g	50mL	
1204362830	LCS for batch 1909416	LCS	T	21-AUG-19	.541g	50mL	
1204362832	21333-001S	MS	T	21-AUG-19	.517g	50mL	
1204362831	21333-001D	DUP	T	21-AUG-19	.531g	50mL	
488089001	21333-001	SAMPLE	T	21-AUG-19	.545g	50mL	
488089002	21333-002	SAMPLE	T	21-AUG-19	.53g	50mL	
488089003	21333-003	SAMPLE	T	21-AUG-19	.516g	50mL	
488089004	21333-004	SAMPLE	T	21-AUG-19	.509g	50mL	
488089005	21333-005	SAMPLE	T	21-AUG-19	.512g	50mL	
488089006	21333-006	SAMPLE	T	21-AUG-19	.542g	50mL	
488089007	21333-007	SAMPLE	T	21-AUG-19	.526g	50mL	
488089008	21333-008	SAMPLE	T	21-AUG-19	.521g	50mL	
488089009	21333-009	SAMPLE	T	21-AUG-19	.534g	50mL	
488089010	21333-010	SAMPLE	T	21-AUG-19	.511g	50mL	
488089011	21333-011	SAMPLE	T	21-AUG-19	.52g	50mL	
488089012	21333-012	SAMPLE	T	21-AUG-19	.536g	50mL	
488089013	21333-013	SAMPLE	T	21-AUG-19	.51g	50mL	
488089014	21333-014	SAMPLE	T	21-AUG-19	.519g	50mL	
488089015	21333-015	SAMPLE	T	21-AUG-19	.501g	50mL	

SW846

METALS
-13-
SAMPLE PREPARATION SUMMARY

SDG No: 488089

Method Type: MS

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Client ID</u>	<u>Sample Type</u>	<u>Matrix</u>	<u>Prep Date</u>	<u>Initial Sample Size</u>	<u>Final Sample Volume</u>	<u>Percent Solids</u>
488089016	21333-016	SAMPLE	T	21-AUG-19	.518g	50mL	
488089017	21333-017	SAMPLE	T	21-AUG-19	.508g	50mL	
488089018	21333-018	SAMPLE	T	21-AUG-19	.522g	50mL	

Metals
-14-
Analysis Run Log

Contract: ACAL00118**Lab Code :** GEL**Inst Name:** ICPMS14**Start Date:** 03-SEP-19**End Date:** 03-SEP-19**Client Sdg:** 488089**Instrument Type:** MS**Data File:** 190903-1

Samp ID	D/F	Run Time	U
S0.0	1	12:55:15	X
S10	1	12:56:51	X
S100	1	12:58:26	X
ICV01	1	13:00:02	X
ICB01	1	13:01:38	X
CRDL01	1	13:03:14	X
ICSA01	1	13:04:49	X
ICSAB01	1	13:06:25	X
CCV01	1	13:08:01	X
CCB01	1	13:09:37	X
LR01	1	13:11:14	X
CCV02	1	13:12:50	X
CCB02	1	13:14:26	X
1204362829	2	13:16:03	X
1204362830	2	13:17:38	X
488089001	2	13:19:14	X
1204362831	2	13:20:49	X
1204362832	2	13:22:25	X
1204362833	10	13:24:00	X
CCV03	1	13:25:37	X
CCB03	1	13:27:13	X
488089002	2	13:28:50	X
488089003	2	13:30:26	X
488089004	2	13:32:01	X
488089005	2	13:33:37	X
488089006	2	13:35:13	X
488089007	2	13:36:48	X
488089008	2	13:38:24	X
488089009	2	13:39:59	X
CCV04	1	13:41:36	X
CCB04	1	13:43:12	X
488089010	2	13:44:48	X
488089011	2	13:46:24	X
488089012	2	13:47:59	X
488089013	2	13:49:35	X
488089014	2	13:51:11	X
488089015	2	13:52:46	X
488089016	2	13:54:22	X
488089017	2	13:55:57	X
488089018	2	13:57:33	X
CCV05	1	13:59:10	X

Metals
-14-
Analysis Run Log

Contract: ACAL00118

Lab Code : GEL

Inst Name: ICPMS14

Start Date: 03-SEP-19

End Date: 03-SEP-19

Client Sdg: 488089

Instrument Type:MS

Data File: 190903-1

Samp ID	D/F	Run Time	U
CCB05	1	14:00:46	X

Standards

METALS
-10-
Instrument Detection Limits

SDG NO. 488089

Contract: ACAL00118

Lab Code: GEL

MDL

Effective Date: 01-SEP-16

Instrument(s):

ICPMS14

Verified on:

30-AUG-19

	<u>Analyte</u>	<u>Wavelength (nm)</u>	<u>MDL ug/L</u>	<u>RDL ug/L</u>
ICP/MS				
SOLID	Uranium		0.066	0.2

METALS
-12-
Linear Ranges

SDG NO. 488089

Contract: ACAL00118

Lab Code: GEL

Instrument ID ICPMS14

<u>Analyte</u>	<u>Integration Time (msec)</u>	<u>LDR</u>	<u>Units</u>	<u>Effective Date</u>
Uranium	1000	5000	ug/L	01-AUG-17

Raw Data

ICPMS #14 Daily Performance

Sample ID: Sample

Sample Date/Time: Tuesday, September 03, 2019 08:51:08

Sample Description:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\Daily 2.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190902\Sample.078

Mass Calibration File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\MassCal\Default1.tun

Dual Detector Mode: Pulse

Acquisition Date/Time&Time Zone: Tuesday, September 03, 2019 08:51:08 Eastern Daylight Time

Number of Replicates: 5

Summary

Analyte	Mass	Meas. Intens.	Mean	Net Intens.	Mean	Net Intens.	SD	Net Intens.	RSD
Be	9.0	53320.9		53320.909		1750.032		3.3	
Mg	24.0	217072.6		217072.629		7872.405		3.6	
Co	58.9	116708.5		116708.533		3246.919		2.8	
Rh	102.9	148094.5		148094.535		3917.968		2.6	
In	114.9	215608.3		215608.274		6097.498		2.8	
Pb	208.0	226874.5		226874.473		6031.552		2.7	
[> Ba	137.9	161307.9		161307.927		4457.908		2.8	
[Ba++	69.0	4315.4		0.027		0.000		1.0	
[> Ce	139.9	191103.5		191103.521		5031.377		2.6	
[CeO	155.9	4598.0		0.024		0.002		9.5	
Bkgd	220.0	0.1		0.050		0.112		223.6	

Current Conditions

C Val	Description
1.11	Nebulizer Gas Flow STD/KED [NEB]
1.20	Auxiliary Gas Flow
18.00	Plasma Gas Flow
-11.00	Deflector Voltage
1600.00	ICP RF Power
-1609.00	Analog Stage Voltage
1000.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset STD [QRO]
-14.00	Cell Rod Offset STD [CRO]
11.00	Discriminator Threshold
-4.00	Cell Entrance/Exit Voltage STD
0.00	RPa
0.45	RPq
1.11	DRC Mode NEB
-8.50	DRC Mode QRO
-3.00	DRC Mode CRO
-13.00	DRC Mode Cell Entrance/Exit Voltage
0.10	Cell Gas A
375.00	Axial Field Voltage
-15.00	KED Mode CRO
-12.00	KED Mode QRO
-7.00	KED Mode Cell Entrance Voltage
-23.00	KED Mode Cell Exit Voltage
3.00	KED Cell Gas A
0.00	KED RPa
0.25	KED RPq
475.00	KED Mode Axial Field Voltage

Current Autolens Data

Sample ID: Sample

Report Date/Time: Tuesday, September 03, 2019 08:55:12

Page 1
Page 52 of 112 SDG: 488089

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9.012	41	-16.5	2292.2
Mg	23.985	41	-15.5	17522.7
In	114.904	41	-10.0	35656.4
Ce	139.905	41	-8.5	32587.1
Pb	207.977	41	-7.5	32519.0
U	238.050	41	-7.0	54977.6

ICPMS #14 Instrument Tuning Report

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res DAC	Meas. Pk. Width
Be	9.0	9.0	1630	2068	0.700
Mg	24.0	24.0	4604	2068	0.721
Mg	25.0	25.0	4805	2068	0.729
Mg	26.0	26.0	5004	2068	0.707
Co	58.9	58.9	11575	2068	0.757
Rh	102.9	102.9	20354	2069	0.833
In	114.9	114.9	22748	2080	0.747
Ce	139.9	139.9	27742	2080	0.782
Pb	206.0	206.0	40954	2085	0.847
Pb	207.0	207.0	41129	2080	0.811
Pb	208.0	208.0	41359	2085	0.816
U	238.1	238.0	47351	2090	0.767

ICPMS #14 - Summary Report

Sample ID: Cal Blank
Sample Date/Time: Tuesday, September 03, 2019 12:55:15
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\Cal Blank.058

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		602742.582	
[U	238		ug/L		23.333	

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175									
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: Standard 1

Sample Date/Time: Tuesday, September 03, 2019 12:56:51

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\Standard 1.059

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		578423.016	578423.016
[U	238	10.0000	ug/L	0.703	187790.929	0.325

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175									
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: Standard 2

Sample Date/Time: Tuesday, September 03, 2019 12:58:26

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\Standard 2.060

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		624551.186	624551.186
[U	238	99.9858	ug/L	1.536	1999261.570	3.201

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175									
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, September 03, 2019 13:00:02
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 1.061

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		596591.089	596591.089
[U	238	49.9057	ug/L	0.724	953095.462	1.598

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			98.98			
[U	238		99.811					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 2
Sample Date/Time: Tuesday, September 03, 2019 13:01:38
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 2.062

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		551011.758	551011.758
[U	238	0.0162	ug/L	15.012	306.670	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.42				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 3
Sample Date/Time: Tuesday, September 03, 2019 13:03:14
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 3.063

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		560115.448	560115.448
[U	238	0.2052	ug/L	2.022	3700.479	0.007

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			92.93			
[U	238		102.594					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, September 03, 2019 13:04:49
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 4.064

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		461098.082	461098.082
[U	238	0.0190	ug/L	12.641	298.670	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC Std	% Recovery	Int Std	% Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175			76.50				
[U	238							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits	Message
Lu 175 Int Std for Q	Lu	175		

QC Action

QC Action Line: Continue

ICPMS #14 - Summary Report

Sample ID: QC Std 5
Sample Date/Time: Tuesday, September 03, 2019 13:06:25
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 5.065

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		491381.937	491381.937
[U	238	21.5194	ug/L	0.274	338498.179	0.689

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					81.52				
[U	238			107.597							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 13:08:01
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.066

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		550708.164	550708.164
[U	238	51.1147	ug/L	1.574	901007.651	1.636

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.37				
[U	238			102.229							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 13:09:37
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.067

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		552491.076	552491.076
[U	238	0.0125	ug/L	9.122	242.002	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.66				
[U	238						

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 03, 2019 13:11:14

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 10.068

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		505001.069	505001.069
[U	238	5210.7613	ug/L	0.805	84230947.051	166.799

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			83.78			
[U	238		104.215					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 11

Sample Date/Time: Tuesday, September 03, 2019 13:12:50

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 11.069

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		639188.531	639188.531
[U	238	50.4367	ug/L	0.964	1031859.414	1.615

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	DDuplicate	Rel. % Difference
[>	Lu	175			106.05			
[U	238		100.873					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 12

Sample Date/Time: Tuesday, September 03, 2019 13:14:26

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 12.070

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		588554.038	588554.038
[U	238	0.1555	ug/L	4.808	2949.638	0.005

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					97.65				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

Sample ID: QC Std 12

Report Date/Time: Tuesday, September 03, 2019 13:14:33

Page 1

ICPMS #14 - Summary Report

Sample ID: 1204362829
Sample Date/Time: Tuesday, September 03, 2019 13:16:03
Sample Type: Sample
Sample Description: QC A 6020 MB
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362829.071

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		566967.542	566967.542
[U	238	0.1122	ug/L	2.172	2058.148	0.004

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		94.06				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362830
Sample Date/Time: Tuesday, September 03, 2019 13:17:38
Sample Type: Sample
Sample Description: QC A 6020 LCS
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362830.072

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		581241.880	581241.880
[U	238	25.4989	ug/L	0.153	474453.108	0.816

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		96.43				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089001
Sample Date/Time: Tuesday, September 03, 2019 13:19:14
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089001.073

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		562779.476	562779.476
[U	238	0.0398	ug/L	10.501	738.686	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		93.37				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362831

Sample Date/Time: Tuesday, September 03, 2019 13:20:49

Sample Type: Sample

Sample Description: QC A 6020 DUP

Number of Replicates: 3

Batch ID: 1909418|2|prb

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362831.074

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		573099.295	573099.295
[U	238	0.0227	ug/L	10.989	438.673	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		95.08				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

Sample ID: 1204362831

Report Date/Time: Tuesday, September 03, 2019 13:20:56

ICPMS #14 - Summary Report

Sample ID: 1204362832
Sample Date/Time: Tuesday, September 03, 2019 13:22:25
Sample Type: Sample
Sample Description: QC A 6020 MS
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362832.075

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		560528.820	560528.820
[U	238	25.3687	ug/L	1.407	455134.077	0.812

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		93.00				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362833
Sample Date/Time: Tuesday, September 03, 2019 13:24:00
Sample Type: Sample
Sample Description: QC A 6020 SDILT
Number of Replicates: 3
Batch ID: 1909418|10|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362833.076

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		559310.619	559310.619
[U	238	0.0148	ug/L	13.299	286.670	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		92.79				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 13:25:37
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.077

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		556492.592	556492.592
[U	238	50.8758	ug/L	0.765	906271.974	1.629

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			92.33			
[U	238	101.752					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 13:27:13
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.078

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		559889.179	559889.179
[U	238	0.0166	ug/L	8.368	320.004	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					92.89				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089002
Sample Date/Time: Tuesday, September 03, 2019 13:28:50
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089002.079

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		549281.584	549281.584
[U	238	0.0212	ug/L	3.615	393.339	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		91.13				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089003
Sample Date/Time: Tuesday, September 03, 2019 13:30:26
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089003.080

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		558734.202	558734.202
[U	238	0.0083	ug/L	19.910	170.001	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		92.70				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089004
Sample Date/Time: Tuesday, September 03, 2019 13:32:01
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089004.081

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		537867.523	537867.523
[U	238	0.0150	ug/L	1.144	279.336	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		89.24				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089005
Sample Date/Time: Tuesday, September 03, 2019 13:33:37
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089005.082

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		558056.060	558056.060
[U	238	0.0070	ug/L	9.452	147.334	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					92.59				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089006
Sample Date/Time: Tuesday, September 03, 2019 13:35:13
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089006.083

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		551773.282	551773.282
[U	238	0.0219	ug/L	4.430	408.673	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.54				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089007
Sample Date/Time: Tuesday, September 03, 2019 13:36:48
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089007.084

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		542819.694	542819.694
[U	238	0.0240	ug/L	7.300	438.673	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		90.06				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089008
Sample Date/Time: Tuesday, September 03, 2019 13:38:24
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089008.085

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		555230.221	555230.221
[U	238	0.0047	ug/L	4.843	105.334	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		92.12				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089009
Sample Date/Time: Tuesday, September 03, 2019 13:39:59
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089009.086

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		551965.495	551965.495
[U	238	0.0035	ug/L	41.535	82.667	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.58				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 13:41:36
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.087

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		533937.014	533937.014
[U	238	51.2495	ug/L	1.128	875845.167	1.641

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					88.58				
[U	238			102.499							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 13:43:12
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.088

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		597282.825	597282.825
[U	238	0.0115	ug/L	11.598	244.002	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					99.09				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089010
Sample Date/Time: Tuesday, September 03, 2019 13:44:48
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089010.089

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		546268.400	546268.400
[U	238	0.0496	ug/L	3.435	888.028	0.002

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					90.63				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089011
Sample Date/Time: Tuesday, September 03, 2019 13:46:24
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089011.090

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		562683.879	562683.879
[U	238	0.0072	ug/L	17.266	151.334	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		93.35				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089012
Sample Date/Time: Tuesday, September 03, 2019 13:47:59
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089012.091

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		520767.603	520767.603
[U	238	0.1016	ug/L	4.798	1714.103	0.003

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		86.40				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089013
Sample Date/Time: Tuesday, September 03, 2019 13:49:35
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089013.092

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		552769.467	552769.467
[U	238	0.0038	ug/L	13.124	89.334	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.71				
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits	Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089014
Sample Date/Time: Tuesday, September 03, 2019 13:51:11
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089014.093

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		534677.521	534677.521
[U	238	0.0100	ug/L	5.771	191.335	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		88.71				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089015
Sample Date/Time: Tuesday, September 03, 2019 13:52:46
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089015.094

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		552331.664	552331.664
[U	238	0.0043	ug/L	12.005	98.000	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.64				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089016
Sample Date/Time: Tuesday, September 03, 2019 13:54:22
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089016.095

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		548360.756	548360.756
[U	238	0.0499	ug/L	5.984	897.362	0.002

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		90.98				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089017
Sample Date/Time: Tuesday, September 03, 2019 13:55:57
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089017.096

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		553686.201	553686.201
[U	238	0.0044	ug/L	5.956	100.000	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.86				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488089018
Sample Date/Time: Tuesday, September 03, 2019 13:57:33
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909418|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488089018.097

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		546889.571	546889.571
[U	238	0.0091	ug/L	14.890	180.001	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		90.73				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 13:59:10
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.098

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		596117.606	596117.606
[U	238	50.3052	ug/L	1.000	959818.560	1.610

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					98.90				
[	U	238		100.610							

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 14:00:46
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.099

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		596796.944	596796.944
[U	238	0.0111	ug/L	3.308	235.335	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					99.01				
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

Miscellaneous

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: 1909416	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Prep: Hannah Hatherly Shanta Mack	LCS	1204362830	ICP-MS spiking solution A	UI190703-A	.25	mL
Method: SW846 3050B	LCS	1204362830	ICP-MS spiking solution B	UI190703-B	.25	mL
Lab SOP: GL-MA-E-009 REV# 28	MS	1204362832	ICP-MS spiking solution A	UI190703-A	.25	mL
Instrument: BAL-591	MS	1204362832	ICP-MS spiking solution B	UI190703-B	.25	mL

Sample ID	Initial Prep Date	Matrix	Initial Weight (g)	Final Volume (mL)	Hot Block Stop Date (date)	Prep Factor (mL/g)
1204362829 MB	21-AUG-2019 01:57:33	Tissue	0.519	50	08/21/19 10:20	96.33911
1204362830 LCS	21-AUG-2019 01:57:33	Tissue	0.541	50	08/21/19 10:20	92.42144
488089001	21-AUG-2019 01:57:33	Tissue	0.545	50	08/21/19 10:20	91.74312
1204362833 SDILT (488089001)	21-AUG-2019 01:57:33	Tissue	0.545	50	08/21/19 10:20	91.74312
1204362831 DUP (488089001)	21-AUG-2019 01:57:33	Tissue	0.531	50	08/21/19 10:20	94.16196
1204362832 MS (488089001)	21-AUG-2019 01:57:33	Tissue	0.517	50	08/21/19 10:20	96.71118
488089002	21-AUG-2019 01:57:33	Tissue	0.53	50	08/21/19 10:20	94.33962
488089003	21-AUG-2019 01:57:33	Tissue	0.516	50	08/21/19 10:20	96.89922
488089004	21-AUG-2019 01:57:33	Tissue	0.509	50	08/21/19 10:20	98.23183
488089005	21-AUG-2019 01:57:33	Tissue	0.512	50	08/21/19 10:20	97.65625
488089006	21-AUG-2019 01:57:33	Tissue	0.542	50	08/21/19 10:20	92.25092
488089007	21-AUG-2019 01:57:33	Tissue	0.526	50	08/21/19 10:20	95.05703
488089008	21-AUG-2019 01:57:33	Tissue	0.521	50	08/21/19 10:20	95.96929
488089009	21-AUG-2019 01:57:33	Tissue	0.534	50	08/21/19 10:20	93.63296
488089010	21-AUG-2019 01:57:33	Tissue	0.511	50	08/21/19 10:20	97.84736
488089011	21-AUG-2019 01:57:33	Tissue	0.52	50	08/21/19 10:20	96.15385
488089012	21-AUG-2019 01:57:33	Tissue	0.536	50	08/21/19 10:20	93.28358
488089013	21-AUG-2019 01:57:33	Tissue	0.51	50	08/21/19 10:20	98.03922
488089014	21-AUG-2019 01:57:33	Tissue	0.519	50	08/21/19 10:20	96.33911
488089015	21-AUG-2019 01:57:33	Tissue	0.501	50	08/21/19 10:20	99.8004
488089016	21-AUG-2019 01:57:33	Tissue	0.518	50	08/21/19 10:20	96.5251
488089017	21-AUG-2019 01:57:33	Tissue	0.508	50	08/21/19 10:20	98.4252
488089018	21-AUG-2019 01:57:33	Tissue	0.522	50	08/21/19 10:20	95.78544

Reagent/Solvent Lot ID	Description	Amount	Comments:
190719	Concentrated Nitric Acid	5 mL	Block Temperature (90-100C): 95 C Temperature within limits (Y/N?): Y Thermometer ID: 118754 Hot Block ID: 14 Prep Date: 21-AUG-2019 05:20 METALMAN Shanta Mack Digestion tube lot #: 1902243
2940245	Hydrogen Peroxide 30%, from Bioassay (LIMS ID 2936517)	1.5 mL	
I-BC190213	Teflon chips for MB/LCS metals Solids	.5 g	

Standard Logbook

Serial ID: UI190307-07 **Open/Reference Date:** 07-MAR-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master B **Received:** 07-MAR-19 **Catalog Number :** 160054-02-03
Type: Source Material **Expires:** 07-MAR-20 **Lot Number :** 10066767-8
Employee: Paul Boyd **Solvent :** 2% HNO3 100 cm2
Supplier: 02SI
Description: ICPMS ICV/CCV Soln B - 20ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	20 mg/L	Barium	20 mg/L
Beryllium	20 mg/L	Boron	40 mg/L
Cadmium	20 mg/L	Chromium	20 mg/L
Cobalt	20 mg/L	Copper	20 mg/L
Lead	20 mg/L	Lithium	20 mg/L
Manganese	20 mg/L	Nickel	20 mg/L
Selenium	20 mg/L	Strontium	20 mg/L
Thallium	20 mg/L	Thorium	20 mg/L
Uranium	20 mg/L	Vanadium	20 mg/L
Zinc	20 mg/L		

Serial ID: UI190307-09 **Open/Reference Date:** 07-MAR-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master A **Received:** 07-MAR-19 **Catalog Number :** 160055-01-03
Type: Source Material **Expires:** 07-MAR-20 **Lot Number :** 10066767-9
Employee: Paul Boyd **Solvent :** 2% HNO3 100 cm2
Supplier: 02SI
Description: ICPMS ICV/CCV SOLN A - 2000ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	2020 mg/L	Calcium	2000 mg/L
Iron	2000 mg/L	Magnesium	2000 mg/L
Phosphorous	2000 mg/L	Potassium	2000 mg/L
Sodium	2000 mg/L		

Serial ID: UI190415-09 **Open/Reference Date:** 15-APR-19 **Amount :** 250 mL
Name: ICP-MS CRDL Master #1 **Received:** 15-APR-19 **Catalog Number :** 090014-MC-02
Type: Source Material **Expires:** 15-APR-20 **Lot Number :** 10091735-1
Employee: Paul Boyd **Solvent :** +/- 0.5% IN 2% HNO3
Supplier: 02SI
Description: ICPMS CRDL Master Soln #1
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	50 mg/L	Arsenic	5 mg/L
Barium	4 mg/L	Beryllium	.5 mg/L
Boron	15 mg/L	Cadmium	1 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Calcium	200 mg/L	Chromium	30 mg/L
Cobalt	1 mg/L	Copper	2 mg/L
Iron	100 mg/L	Lead	2 mg/L
Lithium	10 mg/L	Magnesium	30 mg/L
Manganese	5 mg/L	Nickel	2 mg/L
Phosphorous	50 mg/L	Potassium	300 mg/L
Selenium	5 mg/L	Sodium	250 mg/L
Strontium	10 mg/L	Thallium	2 mg/L
Thorium	2 mg/L	Uranium	.2 mg/L
Vanadium	20 mg/L	Zinc	20 mg/L

Serial ID: UI190415-10 **Open/Reference Date:** 15-APR-19 **Amount :** 250 mL
Name: ICP-MS CRDL Master #2 **Received:** 15-APR-19 **Catalog Number :** 160044-11-02
Type: Source Material **Expires:** 15-APR-20 **Lot Number :** 10091735-2
Employee: Paul Boyd **Solvent :** +/- 0.5% IN 2% HNO3
Supplier: O2SI
Description: ICPMS CRDL Soln #2
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	3 mg/L	Molybdenum	1 mg/L
Silver	1 mg/L	Tin	5 mg/L
Titanium	10 mg/L	Tungsten	5 mg/L
Zirconium	2 mg/L		

Serial ID: UI190424-60 **Open/Reference Date:** 24-APR-19 **Amount :** 100 mL
Name: ICPMS High Range Standard **Received:** 24-APR-19 **Catalog Number :** 160212-02-01-A
Type: Source Material **Expires:** 24-APR-20 **Lot Number :** 10066129-12
Employee: Paul Boyd **Solvent :** 2%HNO3
Supplier: O2SI
Description: Linear Range Standard A
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	5000 mg/L	Arsenic	100 mg/L
Barium	250 mg/L	Beryllium	100 mg/L
Cadmium	100 mg/L	Calcium	5000 mg/L
Chromium	100 mg/L	Cobalt	100 mg/L
Copper	100 mg/L	Iron	5000 mg/L
Lead	500 mg/L	Lithium	100 mg/L
Magnesium	5000 mg/L	Manganese	100 mg/L
Nickel	100 mg/L	Phosphorous	2500 mg/L
Potassium	5000 mg/L	Selenium	50 mg/L
Sodium	5000 mg/L	Strontium	100 mg/L
Thallium	50 mg/L	Thorium	250 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Uranium	500 mg/L	Vanadium	100 mg/L
Zinc	250 mg/L		

Serial ID: UI190424-61 **Open/Reference Date:** 24-APR-19 **Amount :** 100 mL
Name: ICPMS High Range Standar **Received:** 24-APR-19 **Catalog Number :** 160212-02-01-B
Type: Source Material **Expires:** 24-APR-20 **Lot Number :** 10066129-13
Employee: Paul Boyd **Solvent :** 2% in 2%HNO3 + Tr HF
Supplier: O2SI
Description: Linear Range Standard B
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	25 mg/L	Molybdenum	100 mg/L
Silver	25 mg/L	Tin	100 mg/L
Tungsten	100 mg/L	Zirconium	50 mg/L

Serial ID: UI190605-08 **Open/Reference Date:** 05-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master C **Received:** 05-JUN-19 **Catalog Number :** ZGEL-107-500
Type: Source Material **Expires:** 30-MAY-20 **Lot Number :** 5-093AB
Employee: Paul Boyd **Solvent :** 2% HNO3/Tr. Tart Acid/ Tr. HF 100
Supplier: Spex
Description: ICPMS ICV/CCV Soln C - 20ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	20 mg/L	Molybdenum	20 mg/L
Silver	20 mg/L	Tin	20 mg/L
Titanium	20 mg/L	Tungsten	20 mg/L
Zirconium	20 mg/L		

Serial ID: UI190621-12 **Open/Reference Date:** 21-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICSAB Master B **Received:** 21-JUN-19 **Catalog Number :** 160033-02-02
Type: Source Material **Expires:** 21-JUN-20 **Lot Number :** 10069799-7
Employee: Paul Boyd **Solvent :** +/- 2.0% in 2% HNO3
Supplier: O2SI
Description: ICPMS ICSAB Master B
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	2 mg/L	Barium	2 mg/L
Beryllium	2 mg/L	Boron	2 mg/L
Cadmium	2 mg/L	Chromium	2 mg/L
Cobalt	2 mg/L	Copper	2 mg/L
Lead	2 mg/L	Lithium	2 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Manganese	2 mg/L	Nickel	2 mg/L
Selenium	2 mg/L	Strontium	2 mg/L
Thallium	2 mg/L	Thorium	2 mg/L
Uranium	2 mg/L	Vanadium	2 mg/L
Zinc	2 mg/L		

Serial ID: UI190621-13 **Open/Reference Date:** 21-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICSAB Master C **Received:** 21-JUN-19 **Catalog Number :** 160033-03-02
Type: Source Material **Expires:** 21-JUN-20 **Lot Number :** 10069799-8
Employee: Paul Boyd **Solvent :** +/- 2.0% in 2% HNO3 + tr HF
Supplier: 02SI
Description: ICPMS ICSAB Master C
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	2 mg/L	Silver	2 mg/L
Tin	2 mg/L	Tungsten	2 mg/L
Zirconium	2 mg/L		

Serial ID: UI190703-A **Open/Reference Date:** 24-JUL-19 **Catalog Number :** GEL-12A
Name: ICP-MS SPIKE A **Received:** 03-JUL-19 **Lot Number :** N2-MEB673694
Type: Source Material **Expires:** 03-JUL-20
Employee: Shanta Mack
Supplier: Inorganic Ventures
Description: ICP-MS spiking solution A
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	10 mg/L	Hafnium	10 mg/L
Molybdenum	10 mg/L	Tantalum	10 mg/L
Tin	10 mg/L	Titanium	10 mg/L
Tungsten	10 mg/L	Zirconium	10 mg/L

Serial ID: UI190703-B **Open/Reference Date:** 24-JUL-19 **Catalog Number :** GEL-12B
Name: ICP-MS SPIKE B **Received:** 03-JUL-19 **Lot Number :** N2-MEB673693
Type: Source Material **Expires:** 03-JUL-20
Employee: Hannah Hatherly
Supplier: Inorganic Ventures
Description: ICP-MS spiking solution B
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	400 mg/L	Arsenic	10 mg/L
Barium	10 mg/L	Beryllium	10 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Bismuth	10 mg/L	Boron	20 mg/L
Cadmium	10 mg/L	Calcium	400 mg/L
Cesium	10 mg/L	Chromium	10 mg/L
Cobalt	10 mg/L	Copper	10 mg/L
Iron	400 mg/L	Lead	10 mg/L
Lithium	10 mg/L	Magnesium	400 mg/L
Manganese	10 mg/L	Nickel	10 mg/L
Phosphorous	400 mg/L	Potassium	400 mg/L
Rhenium	10 mg/L	Rhodium	10 mg/L
Selenium	10 mg/L	Silver	10 mg/L
Sodium	400 mg/L	Strontium	10 mg/L
Thallium	10 mg/L	Thorium	10 mg/L
Uranium	10 mg/L	Uranium-235	.072 mg/L
Uranium-238	9.928 mg/L	Vanadium	10 mg/L
Zinc	10 mg/L		

Serial ID: UI190807-03 **Open/Reference Date:** 07-AUG-19 **Catalog Number :** 060074-05-01
Name: ICPMS Tungsten - 10mg/L **Received:** 07-AUG-19 **Lot Number :** 10070573-9
Type: Source Material **Expires:** 07-AUG-20 **Solvent :** 2% HNO3 + Tr HF
Employee: Paul Boyd
Supplier: O2SI
Description: ICPMS Tungsten standard SPIKE - 10mg/L
Comments: None

Analyte	Concentration	Analyte	Concentration
Tungsten	10 mg/L		

Serial ID: UI190820-11 **Open/Reference Date:** 20-AUG-19 **Amount :** 1000 mL
Name: ICP-MS ICSA Master A Nex **Received:** 20-AUG-19 **Catalog Number :** 60013-01-01LNexion
Type: Source Material **Expires:** 20-AUG-20 **Lot Number :** 10065549-12
Employee: Paul Boyd **Solvent :** 5% HNO3 + Tr HF
Supplier: O2SI
Description: ICP-MS ICSA Master A NEXION
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	1000 mg/L	Calcium	1000 mg/L
Carbon	2000 mg/L	Chloride	10000 mg/L
Iron	1000 mg/L	Magnesium	1000 mg/L
Molybdenum	20 mg/L	Phosphorous	1000 mg/L
Potassium	1000 mg/L	Sodium	1000 mg/L
Sulfur	1000 mg/L	Titanium	20 mg/L

Standard Logbook

Serial ID: UMS190824-01 **Open/Reference Date:** 24-AUG-19 **Amount :** 250 mL
Name: ICPMSCalSPIKEB **Received:** 24-AUG-19 **Catalog Number :** ZGEL-100-250
Type: Source Material **Expires:** 24-AUG-20 **Lot Number :** 6-188AB
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution B
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	10 mg/L	Barium	10 mg/L
Beryllium	10 mg/L	Boron	20 mg/L
Cadmium	10 mg/L	Chromium	10 mg/L
Cobalt	10 mg/L	Copper	10 mg/L
Lead	10 mg/L	Lithium	10 mg/L
Manganese	10 mg/L	Nickel	10 mg/L
Selenium	10 mg/L	Silver	10 mg/L
Strontium	10 mg/L	Thallium	10 mg/L
Thorium	10 mg/L	Uranium	10 mg/L
Vanadium	10 mg/L	Zinc	10 mg/L

Serial ID: UMS190824-02 **Open/Reference Date:** 24-AUG-19 **Catalog Number :** ZGEL-102-250
Name: ICPMSCalSPIKEA **Received:** 24-AUG-19 **Lot Number :** 6-189AB
Type: Source Material **Expires:** 24-AUG-20
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution A
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	1000 mg/L	Calcium	1000 mg/L
Iron	1000 mg/L	Magnesium	1000 mg/L
Phosphorous	1000 mg/L	Potassium	1000 mg/L
Sodium	1000 mg/L		

Serial ID: UMS190824-03 **Open/Reference Date:** 24-AUG-19 **Amount :** 250 ml
Name: ICPMSCalSPIKEC **Received:** 24-AUG-19 **Catalog Number :** ZGEL-101-250
Type: Source Material **Expires:** 24-AUG-20 **Lot Number :** 6-190AB
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution C
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	10 mg/L	Molybdenum	10 mg/L
Tin	10 mg/L	Titanium	10 mg/L
Zirconium	10 mg/L		

Standard Logbook

Serial ID: WMS190903-04 **Open/Reference Date:** 03-SEP-19 **Amount :** 50 mL
Name: ICPMS Cal Standard 100 **Received:** 03-SEP-19 **Balance Id :** 4025216
Type: Working **Expires:** 04-SEP-19 **Pipet Id :** 3541598
Employee: Paul Boyd **Solvent :** 2%HNO3/1%HCl -2975813
Supplier: GEL
Description: ICPMS Calibration Standard (100 ppb)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190807-03	Tungsten	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Arsenic	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Barium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Beryllium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Boron	20 mg/L	5 mL	500 mL	200 ug/l
UMS190824-01	Cadmium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Chromium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Cobalt	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Copper	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Lead	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Lithium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Manganese	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Nickel	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Selenium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Silver	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Strontium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Thallium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Thorium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Uranium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Vanadium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Zinc	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-02	Aluminum	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Calcium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Iron	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Magnesium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Phosphorous	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Potassium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Sodium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-03	Antimony	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Molybdenum	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Tin	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Titanium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Zirconium	10 mg/L	5 mL	500 mL	100 ug/l

Standard Logbook

Serial ID: WMS190903-04A **Open/Reference Date:** 03-SEP-19 **Balance Id :** 4025216
Name: ICPMS Cal Standard 10 **Received:** 03-SEP-19 **Pipet Id :** 3541598
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS Calibration Standard (10 ppb)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
WMS190903-04	Aluminum	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Antimony	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Arsenic	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Barium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Beryllium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Boron	200 ug/l	50 mL	500 mL	20 ug/l
WMS190903-04	Cadmium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Calcium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Chromium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Cobalt	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Copper	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Iron	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Lead	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Lithium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Magnesium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Manganese	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Molybdenum	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Nickel	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Phosphorous	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Potassium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Selenium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Silver	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Sodium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Strontium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Thallium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Thorium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Tin	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Titanium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Tungsten	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Uranium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Vanadium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Zinc	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Zirconium	100 ug/l	50 mL	500 mL	10 ug/l

Standard Logbook

Serial ID: WMS190903-05 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICV **Received:** 03-SEP-19 **Pipet Id :** 3541598
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS ICV
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190307-07	Arsenic	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Barium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Beryllium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Boron	40 mg/L	2.5 mL	1000 mL	100 ug/L
UI190307-07	Cadmium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Chromium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Cobalt	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Copper	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Lead	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Lithium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Manganese	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Nickel	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Selenium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Strontium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Thallium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Thorium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Uranium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Vanadium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Zinc	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-09	Aluminum	2020 mg/L	2.5 mL	1000 mL	5050 ug/L
UI190307-09	Calcium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Iron	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Magnesium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Phosphorous	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Potassium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Sodium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190605-08	Antimony	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Molybdenum	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Silver	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Tin	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Titanium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Tungsten	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Zirconium	20 mg/L	2.5 mL	1000 mL	50 ug/L

Standard Logbook

Serial ID: WMS190903-06 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS CRDL **Received:** 03-SEP-19 **Pipet Id :** 3820544
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl - 2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS CRDL
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190415-09	Aluminum	50 mg/L	.5 mL	500 mL	30 ug/L
UI190415-09	Arsenic	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Barium	4 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Beryllium	.5 mg/L	.5 mL	500 mL	.5 ug/L
UI190415-09	Boron	15 mg/L	.5 mL	500 mL	15 ug/L
UI190415-09	Cadmium	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Calcium	200 mg/L	.5 mL	500 mL	200 ug/L
UI190415-09	Chromium	30 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Cobalt	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Copper	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Iron	100 mg/L	.5 mL	500 mL	100 ug/L
UI190415-09	Lead	2 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Lithium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Magnesium	30 mg/L	.5 mL	500 mL	15 ug/L
UI190415-09	Manganese	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Nickel	2 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Phosphorous	50 mg/L	.5 mL	500 mL	50 ug/L
UI190415-09	Potassium	300 mg/L	.5 mL	500 mL	300 ug/L
UI190415-09	Selenium	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Sodium	250 mg/L	.5 mL	500 mL	250 ug/L
UI190415-09	Strontium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Thallium	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Thorium	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Uranium	.2 mg/L	.5 mL	500 mL	.2 ug/L
UI190415-09	Vanadium	20 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Zinc	20 mg/L	.5 mL	500 mL	10 ug/L
UI190415-10	Antimony	3 mg/L	.5 mL	500 mL	3 ug/L
UI190415-10	Molybdenum	1 mg/L	.5 mL	500 mL	.5 ug/L
UI190415-10	Silver	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-10	Tin	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-10	Titanium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-10	Tungsten	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-10	Zirconium	2 mg/L	.5 mL	500 mL	2 ug/L

Standard Logbook

Serial ID: WMS190903-20 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICSA **Received:** 03-SEP-19 **Lot Number :** 1064482
Type: Working **Expires:** 04-SEP-19 **Pipet Id :** 3541598
Employee: Paul Boyd **Solvent :** 2%HNO3/1%HCl -2975813
Supplier: GEL
Description: ICPMS ICSA NexION
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190820-11	Aluminum	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Calcium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Carbon	2000 mg/L	25 mL	250 mL	200000 ug/L
UI190820-11	Chloride	10000 mg/L	25 mL	250 mL	1000000 ug/L
UI190820-11	Iron	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Magnesium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Molybdenum	20 mg/L	25 mL	250 mL	2000 ug/L
UI190820-11	Phosphorous	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Potassium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sodium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sulfur	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Titanium	20 mg/L	25 mL	250 mL	2000 ug/L

Serial ID: WMS190903-21 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICSAB **Received:** 03-SEP-19 **Pipet Id :** 1758088
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS ICSAB NexION
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190621-12	Arsenic	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Barium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Beryllium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Boron	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Cadmium	2 mg/L	2.5 mL	250 mL	20.2 ug/L
UI190621-12	Chromium	2 mg/L	2.5 mL	250 mL	22.2 ug/L
UI190621-12	Cobalt	2 mg/L	2.5 mL	250 mL	20.4 ug/L
UI190621-12	Copper	2 mg/L	2.5 mL	250 mL	23.4 ug/L
UI190621-12	Lead	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Lithium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Manganese	2 mg/L	2.5 mL	250 mL	22.7 ug/L
UI190621-12	Nickel	2 mg/L	2.5 mL	250 mL	22.4 ug/L
UI190621-12	Selenium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Strontium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Thallium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Thorium	2 mg/L	2.5 mL	250 mL	20 ug/L

Standard Logbook

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190621-12	Uranium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Vanadium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Zinc	2 mg/L	2.5 mL	250 mL	27 ug/L
UI190621-13	Antimony	2 mg/L	2.5 mL	250 mL	20.5 ug/L
UI190621-13	Silver	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Tin	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Tungsten	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Zirconium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190820-11	Aluminum	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Calcium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Carbon	2000 mg/L	25 mL	250 mL	200000 ug/L
UI190820-11	Chloride	10000 mg/L	25 mL	250 mL	1000000 ug/L
UI190820-11	Iron	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Magnesium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Molybdenum	20 mg/L	25 mL	250 mL	2000 ug/L
UI190820-11	Phosphorous	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Potassium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sodium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sulfur	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Titanium	20 mg/L	25 mL	250 mL	2000 ug/L

Serial ID: WMS190903-70 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS LINEAR RANGE ST **Received:** 03-SEP-19 **Pipet Id :** 2878988
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: 02SI
Description: ICPMS LINEAR RANGE STANDARD
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190424-60	Aluminum	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Arsenic	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Barium	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-60	Beryllium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Cadmium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Calcium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Chromium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Cobalt	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Copper	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Iron	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Lead	500 mg/L	2.5 mL	250 mL	5000 ug/L
UI190424-60	Lithium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Magnesium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Manganese	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Nickel	100 mg/L	2.5 mL	250 mL	1000 ug/L

Standard Logbook

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190424-60	Phosphorous	2500 mg/L	2.5 mL	250 mL	25000 ug/L
UI190424-60	Potassium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Selenium	50 mg/L	2.5 mL	250 mL	500 ug/L
UI190424-60	Sodium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Strontium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Thallium	50 mg/L	2.5 mL	250 mL	500 ug/L
UI190424-60	Thorium	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-60	Uranium	500 mg/L	2.5 mL	250 mL	5000 ug/L
UI190424-60	Vanadium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Zinc	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-61	Antimony	25 mg/L	2.5 mL	250 mL	250 ug/L
UI190424-61	Molybdenum	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Silver	25 mg/L	2.5 mL	250 mL	250 ug/L
UI190424-61	Tin	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Tungsten	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Zirconium	50 mg/L	2.5 mL	250 mL	500 ug/L

Serial ID: 190719 **Open/Reference Date:** 29-JUL-19 **Lot Number :** 2019021419
Name: I-HNO3 **Received:** 19-JUL-19
Type: Reagent/Solvent **Expires:** 19-JUL-21
Employee: Shanta Mack
Supplier: VWR - BDH Chemicals
Description: Concentrated Nitric Acid
Comments: None

Serial ID: 190815 **Open/Reference Date:** 23-AUG-19 **Lot Number :** 2019041788
Name: I-HNO3 **Received:** 15-AUG-19
Type: Reagent/Solvent **Expires:** 15-AUG-21
Employee: Hannah Hatherly
Supplier: VWR - BDH Chemicals
Description: Concentrated Nitric Acid
Comments: None

Serial ID: 2940245 **Open/Reference Date:** 07-JUN-19 **Lot Number :** 0000217579 mL
Name: B-H2O2 **Received:** 07-JUN-19
Type: Reagent/Solvent **Expires:** 13-JUN-20
Employee: Edmund Frampton
Supplier: J.T. BAKER
Description: Hydrogen Peroxide 30%, from Bioassay (LIMS ID 2936517)
Comments: None

Standard Logbook

Serial ID: 2962424 **Open/Reference Date:** 26-AUG-19 **Lot Number :** 2019021499
Name: I-HCL **Received:** 31-JUL-19
Type: Reagent/Solvent **Expires:** 31-JUL-21
Employee: Edmund Frampton
Supplier: VWR
Description: HYDROCHLORIC ACID
Comments: None

Serial ID: 2975813 **Open/Reference Date:** 02-SEP-19 **Solvent :** Type I Water
Name: B-2%HNO3/1%HCl-ICPMS **Received:** 02-SEP-19
Type: Reagent/Solvent **Expires:** 16-SEP-19
Employee: Paul Boyd
Supplier: GEL
Description: 2%HNO3/1%HCl Solution (Type I Water)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
190815	I-HNO3	68.0-70.0%	160 mL	8 l	N/A
2962424	I-HCL	36.5-38.0	80 mL	8 l	N/A

Serial ID: I-BC190213 **Open/Reference Date:** 29-JUL-19 **Lot Number :** 24462227
Name: I-Boiling chips **Received:** 13-FEB-19
Type: Reagent/Solvent **Expires:** 13-FEB-21
Employee: Edmund Frampton
Supplier: Chemware
Description: Teflon chips for MB/LCS metals Solids
Comments: None



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ANALYTICAL REPORT

CLIENT:

DHEC
BOW 2600 BULL STREET
COLUMBIA , SC 29201

PROJECT:

Fish Analysis

REPORT DATE:

09.26.19

REPORT APPROVED BY:

Bryant W. Boyd
Laboratory Manager

bryant@axs-inc.com

Any questions related to this report should be directed to Access Analytical, Inc. via phone at 803.781.4243 or via email at the address listed above.

- South Carolina DHEC state lab certification #: 32571001
- Florida – DOH national NELAP lab accreditation #: E871145



Access Analytical, Inc.
15 Thames Valley Rd. ~ Irmo, SC 29063
PHONE: 803.781.4243 ~ FAX: 803.781.4303 ~ WEB: www.axs-inc.com



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Report of Analysis

Lab ID #: 21334-001
Project: Fish Analysis
Sample Name: 19-631-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	587	None	mg/kg	By SOP		9/20/2019 18:52	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0124	None	mg/kg	SW6020A	U	9/3/2019 14:05	#10120



ACCESS
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Report of Analysis

Lab ID #: 21334-002
Project: Fish Analysis
Sample Name: 19-631-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	805	None	mg/kg	By SOP		9/20/2019 19:14	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/3/2019 14:15	#10120



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Report of Analysis

Lab ID #: 21334-003

Project: Fish Analysis

Sample Name: 19-632-F

Client ID #:

Matrix: Soil

Collected: 8/7/2019 @ 0:00

Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	533	None	mg/kg	By SOP		9/20/2019 19:37	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0121	None	mg/kg	SW6020A	U	9/3/2019 14:16	#10120



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Report of Analysis

Lab ID #: 21334-004
Project: Fish Analysis
Sample Name: 19-632-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	231	None	mg/kg	By SOP		9/20/2019 19:59	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0122	None	mg/kg	SW6020A	U	9/3/2019 14:18	#10120



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Report of Analysis

Lab ID #: 21334-005

Project: Fish Analysis

Sample Name: 19-633-F

Client ID #:

Matrix: Soil

Collected: 8/7/2019 @ 0:00

Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	429	None	mg/kg	By SOP		9/20/2019 20:22	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0125	None	mg/kg	SW6020A	U	9/3/2019 14:19	#10120



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Report of Analysis

Lab ID #: 21334-006
Project: Fish Analysis
Sample Name: 19-633-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	948	None	mg/kg	By SOP		9/20/2019 20:45	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0126	None	mg/kg	SW6020A	U	9/3/2019 14:21	#10120

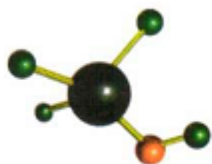


Report of Analysis

Lab ID #: 21334-007
Project: Fish Analysis
Sample Name: 19-634-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	474	None	mg/kg	By SOP	C	9/20/2019 21:07	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0121	None	mg/kg	SW6020A	U	9/3/2019 14:23	#10120



ACCESS
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Report of Analysis

Lab ID #: 21334-008
Project: Fish Analysis
Sample Name: 19-634-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	691	None	mg/kg	By SOP		9/20/2019 10:33	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0122	None	mg/kg	SW6020A	U	9/3/2019 14:24	#10120



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Report of Analysis

Lab ID #: 21334-009
Project: Fish Analysis
Sample Name: 19-635-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	238	None	mg/kg	By SOP		9/20/2019 0:07	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.012	None	mg/kg	SW6020A	U	9/3/2019 14:26	#10120



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Report of Analysis

Lab ID #: 21334-010
Project: Fish Analysis
Sample Name: 19-635-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	841	None	mg/kg	By SOP		9/20/2019 0:29	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/3/2019 14:31	#10120



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Report of Analysis

Lab ID #: 21334-011
Project: Fish Analysis
Sample Name: 19-636-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	266	None	mg/kg	By SOP		9/20/2019 3:06	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/3/2019 14:32	#10120



Report of Analysis

Lab ID #: 21334-012
Project: Fish Analysis
Sample Name: 19-636-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	490	None	mg/kg	By SOP		9/20/2019 3:29	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0129	None	mg/kg	SW6020A	U	9/3/2019 14:34	#10120



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Report of Analysis

Lab ID #: 21334-013
Project: Fish Analysis
Sample Name: 19-637-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	688	None	mg/kg	By SOP		9/20/2019 18:21	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/3/2019 14:35	#10120



Report of Analysis

Lab ID #: 21334-014
Project: Fish Analysis
Sample Name: 19-637-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	381	None	mg/kg	By SOP		9/20/2019 18:43	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/3/2019 14:37	#10120



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Report of Analysis

Lab ID #: 21334-015
Project: Fish Analysis
Sample Name: 19-638-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	119	None	mg/kg	By SOP		9/20/2019 19:06	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/3/2019 14:39	#10120



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Report of Analysis

Lab ID #: 21334-016
Project: Fish Analysis
Sample Name: 19-638-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	166	None	mg/kg	By SOP		9/20/2019 19:29	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.017	None	mg/kg	SW6020A	B	9/3/2019 14:40	#10120



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Report of Analysis

Lab ID #: 21334-017
Project: Fish Analysis
Sample Name: 19-639-F
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	464	None	mg/kg	By SOP	C	9/20/2019 19:51	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0132	None	mg/kg	SW6020A	U	9/3/2019 14:42	#10120



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Report of Analysis

Lab ID #: 21334-018
Project: Fish Analysis
Sample Name: 19-639-W
Client ID #:

Matrix: Soil
Collected: 8/7/2019 @ 0:00
Date Received: 8/14/2019 @ 10:07

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	377	None	mg/kg	By SOP		9/20/2019 20:14	CC
Sample Preparation	Complete	None	None	By SOP		8/16/2019 10:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/3/2019 14:43	#10120



Laboratory Endorsement / Definitions

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency, Standard Methods or other recognized agencies.

Common abbreviations that may be utilized in this report:

ND	Indicates the result was Not Detected at the specified reporting limit
"<"	Indicated the result as less than the indicated amount
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous to Count
SUB	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
DF	Dilution Factor
RL	Reporting Limit
MDL	Calculated minimum detection limit
PQL	Practical Quantitation Limit
RE	Re-analysis

Reporting flags that may be utilized in this report:

J	Indicates the result is between the MDL and PQL and considered to be an estimated result
MB	Indicates the analyte was detected in the associated Method Blank
H	Indicates the recommended holding time was exceeded
*	Indicates a non-compliant or not applicable QC recovery or RPD
A	BOD or CBOD GGA check value for this sample did not meet acceptance criteria.
B	BOD or CBOD blank depletion did not meet acceptance criteria.
C	Indicates the spike % recovery was not acceptable.
D	Indicates the duplicate % difference was not acceptable.
E	Toxicity is apparent in the sample.

Sample receipt at Access Analytical is documented through the attached chain of custody. In accordance with laboratory protocol, this report shall be reproduced only in full and with the written permission of Access Analytical, Inc.. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the attached report and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.



Sample Receipt

Were samples received on ice?	YES
Were samples received within required temperature limits?	YES
Are the number of samples the same as stated on the chain of custody?	YES
Are samples submitted with a correct and complete chain of custody?	YES
Are bottle caps tight and securely in place, coolers and samples intact?	YES
Are the correct sample containers provided?	YES
Were samples within the holding time for requested test(s)?	YES
Is the volume of sample submitted sufficient for the requested test(s)?	YES
Is there sufficient air space in bottle for bacteriological analysis?	n/a
Were samples received with applicable preservative?	YES

Result Comments

Sample 21334-001:

Uranium Data Qualifiers Per GEL

The "U" qualifier denotes the "Analyte was analyzed for, but not detected about the MDL, MDA, MDC or LOD."

The qualifier "B": "Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL"

See full report for details.



Access Lab Report #: 21334 / Sub Report #: _____

Sub Lab (if applicable): _____

Client: SCPHEG - ASP

Attn: Chad Altman

Address: 2600 Bull St

City: Blumbie State: SC Zip Code: 29201

Phone: 803-898-9035 Fax: 898-4200

Email: Altman.KC@DHEC.SC.SG

Project ID: _____

Sampled By: Altman/Shever

PO#: _____

15 Thames Valley Rd.
Irmo, SC 29063
Phone: 803-781-4243
Web: www.axs-inc.com

ACCESS ANALYTICAL, INC.

Chain of Custody Record

Preservative Codes/ Bottle Type:

*Preservative Codes:
0 = None, 1 = HCL, 2 = HNO₃, 3 = H₂SO₄, 4 = NaOH, 5 = Na₂O, 6 = Method 5035 set w/ NaHSO₄ & CH₃OH, 7 = NaOH/ZnOAC, 8 = H₂PO₄, 9 = cooled to 55°C, 10 = cooled to 510°C, 11 = AmmCl₂, 12 = Ascorbic Acid/ HCL, 13 = EDTA

*Matrix Codes:
GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section)
NA = for non-regulatory samples

*Program Area Codes:
CWA = Clean Water Act (for wastewaters), SDWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)

*Container Type: G = Glass, P = Plastic

Requested Lab Analysis

Lab ID	Sample Name	Date Collected	Time Collected	Matrix (see codes)	Grab/ C-Comp	Program Area (see codes)	Total # Containers	Notes / Comments
001	19-631 F	8-7-19						
002	19-631 W							
003	19-632 F							
004	19-632 W							
005	19-633 F							
006	19-633 W							
007	19-634 F							
008	19-634 W							
009	19-635 F							
010	19-635 W							

Auto Sampler Data (composite samples only):
Date/Time On: _____ by whom: _____ Meter Reading Before: _____ Difference: _____
Date/Time Off: _____ by whom: _____ Meter Reading After: _____

Turnaround Time Requested: _____

Project Location: SC NC Other (Specify): _____

Relinquished By: [Signature]

Received By: _____

Time (24hr): _____ Date: _____

Samples Received on Ice: Y N N/A

Y N N/A

Y N N/A

Y N N/A

8-14-19 1007

Received in lab by: Conartz

Sample Temp. Upon Receipt in Lab: _____ of _____

White Copy: Lab original / Canary Copy: File Copy / Pink Copy: Client Copy

NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.



Access Lab Report #: 21334 / Sub Report #: _____		PO#: _____		Chain of Custody Record												
Sub Lab (if applicable): _____		15 Thames Valley Rd. Irmo, SC 29063 Phone: 803-781-4243 Web: www.axs-inc.com		ACCESS ANALYTICAL, INC.												
Client: SCOHG - ASP		Preservatives (see codes):		Presentation Codes / Bottle Types:												
Attn: Chad Altman		Bottle Types (see codes):		*Preservative Codes: 0 = None, 1 = HCL, 2 = HNO ₃ , 3 = H ₂ SO ₄ , 4 = NaOH, 5 = Na ₂ O, 6 = Method 5035 set w/ NaHSO ₄ & CH ₃ OH, 7 = NaOH/znOAc, 8 = H ₂ PO ₄ , 9 = cooled to 56°C, 10 = cooled to 510°C, 11 = Amm.Cl, 12 = Acetic Acid / HCL, 13 = EDA												
Address: 2600 B-11 St		State: SC		*Matrix Codes: GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section)												
City: Columbia		Zip Code: 29201		NA = for non-regulatory samples												
Phone: 803-898-4035		Fax: 803-898-4200		Program Area Codes: C = Chemicals (for wastewater), SDWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)												
Email: Altman.C@DHG.C.S.C.		Project ID: _____		*Container Type: G = Glass, P = Plastic												
Sampled By: Altman/Shear		Requested Lab Analysis: Fluoride		Notes / Comments												
Lab ID	Sample Name	Date Collected	Time Collected	G-Grab C-Comp	Matrix (see code)	Program Area (see code)	Total # Containers	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >	4 Containers per Test >
011	19-636 F	8-7-19														
012	19-636 W															
013	19-637 F															
014	19-637 W															
015	19-638 F															
016	19-638 W															
017	19-639 F															
018	19-639 W															

Auto Sampler Data (composite samples only):
 Date/Time On: _____ by whom: _____ Meter Reading Before: _____ Meter Reading After: _____ Difference: _____
 Date/Time Off: _____ by whom: _____ X _____ (factor): _____

Turnaround Time Requested:	Project Location:	Relinquished By:	Received By:	Date:	Time (24hr):	Samples Received on Ice:
Standard	SC					Y N N/A
*Date Required	NC					Y N N/A
Rush data emailed/faxed by the end of business day on date required. Standard TAT is 7-10 business days.	Other (Specify):					Y N N/A
Chain of Custody Page _____ of _____		Received in lab by: <i>Altman</i>		8-14-19 1007		Y N N/A
						Y N N/A

Sample Temp. Upon Receipt in Lab: _____
 Samples are frozen

White Copy: Lab original / Canary Copy / File Copy / Pink Copy / Client Copy
 NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.



September 07, 2019

Ms. Angela Martin
ESP Associates, Inc.
3475 Lakemont Blvd
Fort Mill, South Carolina 29708

Re: Routine Analysis
Work Order: 488091

Dear Ms. Martin:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 20, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

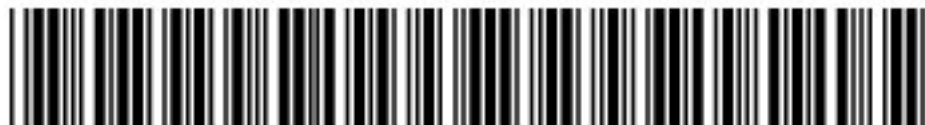
Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

Katelyn Gray for
Hope Taylor
Project Manager

Purchase Order: GELP18-1214
Enclosures



**Access Analytical
Routine Analysis
SDG: 488091**

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Case Narrative

**Receipt Narrative
for
Access Analytical
SDG: 488091**

September 07, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 20, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
488091001	21334-001
488091002	21334-002
488091003	21334-003
488091004	21334-004
488091005	21334-005
488091006	21334-006
488091007	21334-007
488091008	21334-008
488091009	21334-009
488091010	21334-010
488091011	21334-011
488091012	21334-012
488091013	21334-013
488091014	21334-014
488091015	21334-015
488091016	21334-016
488091017	21334-017
488091018	21334-018

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Metals.

Katelyn Gray

Katelyn Gray for
Hope Taylor
Project Manager

Chain of Custody and Supporting Documentation

Access Lab Report #: 486091
 Sub Lab (if applicable): CEL / Sub Report #:

Access Analytical, Inc. -- Irmo
 15 Thames Valley Rd. ~ Irmo, SC 29063
 Phone: 803-781-4243 / Fax: 803-781-4303 / www.axs-inc.com
 ACCESS ANALYTICAL, INC.
 SCDHEC Lab Certification # 32571

Chain of Custody Record

Client: Access Analytical, Inc.
 Analyst: Ashley Amick
 Address: 15 Thames Valley Rd.
 City: Irmo
 Phone: 803-781-4243
 Fax: 803-781-4243
 Email: olelreports@axs-inc.com

Project Name: Fish Tissue Analysis - Site II
 Client: **Client**

Lab ID	Sample Name	Date Collected	Time Collected	Gr/Grab C/Comp	Matrix (see codes)	Program Area (see codes)	Total # Containers	Preservatives (see codes)	Bottle Types (see codes)	Notes / Comments
21334-001		08.07.19		n/a	O	n/a	1	0	G	Total Uranium in Tissue O = homogenized fish tissue
21334-002		08.07.19		n/a	O	n/a	1	G		
21334-003		08.07.19		n/a	O	n/a	1			
21334-004		08.07.19		n/a	O	n/a	1			
21334-005		08.07.19		n/a	O	n/a	1			
21334-006		08.07.19		n/a	O	n/a	1			
21334-007		08.07.19		n/a	O	n/a	1			
21334-008		08.07.19		n/a	O	n/a	1			
21334-009		08.07.19		n/a	O	n/a	1			
21334-010		08.07.19		n/a	O	n/a	1			

Auto Sampler Data (composite samples only):
 Date/Time Set On: _____ by whom: _____
 Date/Time Off: _____ by whom: _____
 Meter Reading After: _____
 Meter Reading Before: _____
 Difference: _____ X _____ (factor): _____

Standard	Turnaround Time Requested:	Project Location:	Relinquished By:	Received By:	Date:	Time (24hr):	Samples Received on ice:
X		SC	<i>[Signature]</i>	<i>[Signature]</i>	8/19/19	17:00	Y N N/A
		NC	<i>[Signature]</i>	<i>[Signature]</i>	8/20/19	8:50	Y N N/A
		Other (Specify):					Y N N/A

Chain of Custody Page 1 of 2
 Rush data emailed/faxed by end of business day on date required. Standard TAT is 7-10 business days.
 Received in lab by: _____
 Sample Temp. _____
 Receipt in Lab: _____ (°C)
 Ref: RT1 Ref: RT2

White Copy: Lab original / Canary Copy: Client Copy
 NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.

Access Lab Report #: _____
 Pub Lab (if applicable): GET / Sub Report #: _____
 Access Analytical, Inc. - Irmo, SC 29063
 15 Thames Valley Rd. - Irmo, SC 29063
 Phone: 803-781-4243 / Fax: 803-781-4303 / www.axs-inc.com
 ACCESS ANALYTICAL, INC. SCDHECLab Certification # 32571

Client: Access Analytical, Inc.
 Address: Ashley Amick
 15 Thames Valley Rd.
 City: Irmo State: SC Zip Code: 29063
 Phone: 803-781-4243 Fax: _____
 Email: o1elreports@axs-inc.com
 Project Name: Fish Tissue Analysis - Site II
 Sampled By (Signature): _____

Lab ID	Sample Name	Date Collected	Time Collected	G-Grab (C-Comp)	Matrix (see codes)	Program Area (see codes)	Total # Containers	Notes / Comments
21334-011		08.07.19		n/a	O	n/a	1	O = homogenized fish tissue
21334-012		08.07.19		n/a	O	n/a	1	
21334-013		08.07.19		n/a	O	n/a	1	
21334-014		08.07.19		n/a	O	n/a	1	
21334-015		08.07.19		n/a	O	n/a	1	
21334-016		08.07.19		n/a	O	n/a	1	
21334-017		08.07.19		n/a	O	n/a	1	
21334-018		08.07.19		n/a	O	n/a	1	

Auto Sampler Data (composite samples only): _____
 Date/Time Set On: _____ by whom: _____
 Date/Time Off: _____ by whom: _____
 Meter Reading After: _____
 Meter Reading Before: _____
 Difference: _____ X _____ (factor): _____

Turnaround Time Requested:	X	Project Location:	SC	Relinquished By:	<i>[Signature]</i>	Received By:	<i>[Signature]</i>	Time (24hr):	17:00	Samples Received on Ice:	Y N N/A
Standard			NC		<i>[Signature]</i>			Date:	8/19/19		Y N N/A
Rush *			Other					Date:	8/20/19		Y N N/A
*Date Required								Sample Temp.			Y N N/A

Rush data emailed/axed by end of business day on date required. Standard TAT is 7-10 business days.

Chain of Custody Page 2 of 2

White Copy: Lab original / Canary Copy: Client Copy

NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.

SAMPLE RECEIPT & REVIEW FORM

Client: ACAL SDG/AR/COC/Work Order: 488091
 Received By: TVE Date Received: 8/20/19

Carrier and Tracking Number: 5035 7507 9330
 Circle Applicable: FedEx Express FedEx Ground UPS Field Services Courier Other

Suspected Hazard Information: Yes No
 *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

A) Shipped as a DOT Hazardous?
 Hazard Class Shipped: _____ UN#: _____
 (If UN2910, Is the Radioactive Shipment Survey Compliant? Yes ___ No ___)

B) Did the client designate the samples are to be received as radioactive?
 COC notation or radioactive stickers on containers equal client designation.

C) Did the RSO classify the samples as radioactive?
 Maximum Net Counts Observed* (Observed Counts - Area Background Counts): Φ CPM / mR/Hr
 Classified as: Rad 1 Rad 2 Rad 3

D) Did the client designate samples are hazardous?
 COC notation or hazard labels on containers equal client designation.

E) Did the RSO identify possible hazards?
 If D or E is yes, select Hazards below.
 PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Client contacted and provided COC COC created upon receipt
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: Wet ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR1-18</u> TEMP: <u>4°C</u> Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected:
7 Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Preservation added, Lot#:
				If Yes, are Encores or Soil Kits present for solids? Yes ___ No ___ NA ___ (If yes, take to VOA Freezer)
				Do liquid VOA vials contain acid preservation? Yes ___ No ___ NA ___ (If unknown, select No)
Are liquid VOA vials free of headspace? Yes ___ No ___ NA ___				Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No container count on COC Other (describe)
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials kg Date 8/21/19 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 07 September 2019

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122020-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-013
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122019-28
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
Access Analytical
SDG #: 488091

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3050B/6020

Analytical Procedure: GL-MA-E-014 REV# 33

Analytical Batch: 1909458

Preparation Method: SW846 3050B

Preparation Procedure: GL-MA-E-009 REV# 28

Preparation Batch: 1909457

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
488091001	21334-001
488091002	21334-002
488091003	21334-003
488091004	21334-004
488091005	21334-005
488091006	21334-006
488091007	21334-007
488091008	21334-008
488091009	21334-009
488091010	21334-010
488091011	21334-011
488091012	21334-012
488091013	21334-013
488091014	21334-014
488091015	21334-015
488091016	21334-016
488091017	21334-017
488091018	21334-018
1204362939	Method Blank (MB)ICP-MS
1204362940	Laboratory Control Sample (LCS)
1204362943	488091001(21334-001L) Serial Dilution (SD)
1204362941	488091001(21334-001D) Sample Duplicate (DUP)
1204362942	488091001(21334-001S) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	488091									
	001	002	003	004	005	006	007	008	009	010
Uranium	2X	2X	2X	2X	2X	2X	2X	2X	2X	2X

Analyte	488091							
	011	012	013	014	015	016	017	018
Uranium	2X	2X	2X	2X	2X	2X	2X	2X

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

ACAL001 Access Analytical

Client SDG: 488091 GEL Work Order: 488091

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- B Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:



Name: **Jamie Johnson**

Date: **07 SEP 2019**

Title: **Group Leader**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091001

CLIENT ID: 21334-001

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0124	mg/kg	U		MS	0.0124	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091002

CLIENT ID: 21334-002

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091003

CLIENT ID: 21334-003

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0121	mg/kg	U		MS	0.0121	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091004

CLIENT ID: 21334-004

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0122	mg/kg	U		MS	0.0122	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091005

CLIENT ID: 21334-005

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0125	mg/kg	U		MS	0.0125	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091006

CLIENT ID: 21334-006

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0126	mg/kg	U		MS	0.0126	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091007

CLIENT ID: 21334-007

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0121	mg/kg	U		MS	0.0121	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091008

CLIENT ID: 21334-008

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0122	mg/kg	U		MS	0.0122	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091009

CLIENT ID: 21334-009

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.012	mg/kg	U		MS	0.012	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091010

CLIENT ID: 21334-010

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091011

CLIENT ID: 21334-011

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091012

CLIENT ID: 21334-012

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091013

CLIENT ID: 21334-013

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091014

CLIENT ID: 21334-014

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091015

CLIENT ID: 21334-015

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091016

CLIENT ID: 21334-016

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.017	mg/kg	B		MS	0.0127	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091017

CLIENT ID: 21334-017

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0132	mg/kg	U		MS	0.0132	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 488091

METHOD TYPE: SW846

SAMPLE ID: 488091018

CLIENT ID: 21334-018

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 20-AUG-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS14	190903-1

*Analytical Methods:

MS SW846 3050B/6020

Quality Control Summary

METALS
-2a-
Initial and Continuing Calibration Verification

SDG No: 488091

Contract: ACAL00118

Lab Code: GEL

Instrument ID: ICPMS14

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Acceptance Window (%R)</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
ICV01	Uranium	49.9	ug/L	50	ug/L	99.8	90.0 – 110.0	MS	03-SEP-19 13:00	190903-1
CCV01	Uranium	51.1	ug/L	50	ug/L	102.2	90.0 – 110.0	MS	03-SEP-19 13:08	190903-1
CCV02	Uranium	50.4	ug/L	50	ug/L	100.9	90.0 – 110.0	MS	03-SEP-19 13:12	190903-1
CCV03	Uranium	50.3	ug/L	50	ug/L	100.6	90.0 – 110.0	MS	03-SEP-19 13:59	190903-1
CCV04	Uranium	49.7	ug/L	50	ug/L	99.3	90.0 – 110.0	MS	03-SEP-19 14:11	190903-1
CCV05	Uranium	50.6	ug/L	50	ug/L	101.1	90.0 – 110.0	MS	03-SEP-19 14:27	190903-1
CCV06	Uranium	50.8	ug/L	50	ug/L	101.5	90.0 – 110.0	MS	03-SEP-19 14:45	190903-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-2b-
CRDL Standard for ICP & ICPMS

SDG No: 488091

Contract: ACAL00118

Lab Code: GEL

Instrument ID: ICPMS14

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Advisory Limits (%R)</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
CRDL01	Uranium	.205	ug/L	.2	ug/L	102.5	70.0 – 130.0	MS	03-SEP-19 13:03	190903-1

*Analytical Methods:

MS SW846 3050B/6020

Metals
-3a-
Initial and Continuing Calibration Blank Summary

SDG No.: 488091

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Analyte</u>	<u>Result ug/L</u>	<u>Acceptance</u>	<u>Conc Qual</u>	<u>MDL</u>	<u>RDL</u>	<u>Matrix</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run</u>
ICB01	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 13:01	190903-1
CCB01	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 13:09	190903-1
CCB02	Uranium	0.156	+/- .2	B	0.066	0.2	SOL	MS	03-SEP-19 13:14	190903-1
CCB03	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 14:00	190903-1
CCB04	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 14:13	190903-1
CCB05	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 14:29	190903-1
CCB06	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	03-SEP-19 14:47	190903-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 488091
Contract: ACAL00118
Matrix: Tissue

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1204362939	Uranium	0.0127	mg/kg	+/-0.0385	U	MS	0.0127	0.0385

*Analytical Methods:

MS SW846 3050B/6020

METALS
-4-
Interference Check Sample

SDG No: 488091

Contract: ACAL00118

Lab Code: GEL

Instrument: ICPMS14

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Acceptance Window (%R)</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
ICSA01	Uranium	0.019	ug/L					03-SEP-19 13:04	190903-1
ICSAB01	Uranium	21.5	ug/L	20	ug/L	108	80.0 - 120.0	03-SEP-19 13:06	190903-1

METALS

-5a-

Matrix Spike Summary

SDG NO. 488091 Client ID: 21334-001S

Contract: ACAL00118 Level: Low

Matrix: TISSUE % Solids:

Sample ID: 488091001 Spike ID: 1204362942

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Uranium	mg/kg	75-125	4.33		0.0124	U	4.71	91.9		MS

*Analytical Methods:

MS SW846 3050B/6020

Metals
-6-
Duplicate Sample Summary

SDG No.: 488091

Lab Code: GEL

Contract: ACAL00118

Client ID: 21334-001D

Matrix: TISSUE

Level: Low

Sample ID: 488091001

Duplicate ID: 1204362941

Percent Solids for Dup: N/A

Analyte	Units	Acceptance Limit	Sample Result	C	Duplicate Result	C	RPD	Qual	M*
Uranium	mg/kg		0.0124	U	0.0125	U			MS

*Analytical Methods:
MS SW846 3050B/6020

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 488091

Contract: ACAL00118

Aqueous LCS Source:

Solid LCS Source: Inorganic Ventures

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1204362940	Uranium	mg/kg	4.78	4.74		99.2	33.6-166	MS

*Analytical Methods:

MS SW846 3050B/6020

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 488091 Client ID: 21334-001L

Contract: ACAL00118

Matrix: SOLID Level: Low

Sample ID: 488091001 Serial Dilution ID: 1204362943

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Uranium	.066	U	.33	U				MS

*Analytical Methods:

MS SW846 3050B/6020

METALS
-13-
SAMPLE PREPARATION SUMMARY

SDG No: 488091

Method Type: MS

Contract:

ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Client ID</u>	<u>Sample Type</u>	<u>Matrix</u>	<u>Prep Date</u>	<u>Initial Sample Size</u>	<u>Final Sample Volume</u>	<u>Percent Solids</u>
Batch Number 1909457							
1204362939	MB for batch 1909457	MB	T	21-AUG-19	.519g	50mL	
1204362940	LCS for batch 1909457	LCS	T	21-AUG-19	.523g	50mL	
1204362942	21334-001S	MS	T	21-AUG-19	.531g	50mL	
1204362941	21334-001D	DUP	T	21-AUG-19	.526g	50mL	
488091001	21334-001	SAMPLE	T	21-AUG-19	.533g	50mL	
488091002	21334-002	SAMPLE	T	21-AUG-19	.505g	50mL	
488091003	21334-003	SAMPLE	T	21-AUG-19	.544g	50mL	
488091004	21334-004	SAMPLE	T	21-AUG-19	.541g	50mL	
488091005	21334-005	SAMPLE	T	21-AUG-19	.528g	50mL	
488091006	21334-006	SAMPLE	T	21-AUG-19	.525g	50mL	
488091007	21334-007	SAMPLE	T	21-AUG-19	.545g	50mL	
488091008	21334-008	SAMPLE	T	21-AUG-19	.543g	50mL	
488091009	21334-009	SAMPLE	T	21-AUG-19	.549g	50mL	
488091010	21334-010	SAMPLE	T	21-AUG-19	.519g	50mL	
488091011	21334-011	SAMPLE	T	21-AUG-19	.502g	50mL	
488091012	21334-012	SAMPLE	T	21-AUG-19	.512g	50mL	
488091013	21334-013	SAMPLE	T	21-AUG-19	.504g	50mL	
488091014	21334-014	SAMPLE	T	21-AUG-19	.504g	50mL	
488091015	21334-015	SAMPLE	T	21-AUG-19	.52g	50mL	

SW846

METALS
-13-
SAMPLE PREPARATION SUMMARY

SDG No: 488091

Method Type: MS

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Client ID</u>	<u>Sample Type</u>	<u>Matrix</u>	<u>Prep Date</u>	<u>Initial Sample Size</u>	<u>Final Sample Volume</u>	<u>Percent Solids</u>
488091016	21334-016	SAMPLE	T	21-AUG-19	.519g	50mL	
488091017	21334-017	SAMPLE	T	21-AUG-19	.5g	50mL	
488091018	21334-018	SAMPLE	T	21-AUG-19	.503g	50mL	

**Metals
-14-
Analysis Run Log**

Contract: ACAL00118

Lab Code : GEL

Inst Name: ICPMS14

Start Date: 03-SEP-19

Client Sdg: 488091

Instrument Type:MS

Data File: 190903-1

End Date: 03-SEP-19

Samp ID	D/F	Run Time	U
S0.0	1	12:55:15	X
S10	1	12:56:51	X
S100	1	12:58:26	X
ICV01	1	13:00:02	X
ICB01	1	13:01:38	X
CRDL01	1	13:03:14	X
ICSA01	1	13:04:49	X
ICSAB01	1	13:06:25	X
CCV01	1	13:08:01	X
CCB01	1	13:09:37	X
LR01	1	13:11:14	X
CCV02	1	13:12:50	X
CCB02	1	13:14:26	X
//////	2	13:16:03	
//////	2	13:17:38	
//////	2	13:19:14	
//////	2	13:20:49	
//////	2	13:22:25	
//////	10	13:24:00	
CCV	1	13:25:37	X
CCB	1	13:27:13	X
//////	2	13:28:50	
//////	2	13:30:26	
//////	2	13:32:01	
//////	2	13:33:37	
//////	2	13:35:13	
//////	2	13:36:48	
//////	2	13:38:24	
//////	2	13:39:59	
CCV	1	13:41:36	X
CCB	1	13:43:12	X
//////	2	13:44:48	
//////	2	13:46:24	
//////	2	13:47:59	
//////	2	13:49:35	
//////	2	13:51:11	
//////	2	13:52:46	
//////	2	13:54:22	
//////	2	13:55:57	
//////	2	13:57:33	
CCV03	1	13:59:10	X

Metals
-14-
Analysis Run Log

Contract: ACAL00118**Lab Code :** GEL**Inst Name:** ICPMS14**Start Date:** 03-SEP-19**End Date:** 03-SEP-19**Client Sdg:** 488091**Instrument Type:** MS**Data File:** 190903-1

Samp ID	D/F	Run Time	U
CCB03	1	14:00:46	X
1204362939	2	14:02:23	X
1204362940	2	14:03:59	X
488091001	2	14:05:35	X
1204362941	2	14:07:10	X
1204362942	2	14:08:46	X
1204362943	10	14:10:21	X
CCV04	1	14:11:58	X
CCB04	1	14:13:34	X
488091002	2	14:15:11	X
488091003	2	14:16:46	X
488091004	2	14:18:22	X
488091005	2	14:19:57	X
488091006	2	14:21:33	X
488091007	2	14:23:09	X
488091008	2	14:24:44	X
488091009	2	14:26:19	X
CCV05	1	14:27:56	X
CCB05	1	14:29:32	X
488091010	2	14:31:09	X
488091011	2	14:32:44	X
488091012	2	14:34:20	X
488091013	2	14:35:55	X
488091014	2	14:37:31	X
488091015	2	14:39:07	X
488091016	2	14:40:42	X
488091017	2	14:42:18	X
488091018	2	14:43:53	X
CCV06	1	14:45:30	X
CCB06	1	14:47:06	X

Standards

METALS
-10-
Instrument Detection Limits

SDG NO. 488091

Contract: ACAL00118

Lab Code: GEL

MDL

Effective Date: 01-SEP-16

Instrument(s):

ICPMS14

Verified on:

30-AUG-19

	<u>Analyte</u>	<u>Wavelength (nm)</u>	<u>MDL ug/L</u>	<u>RDL ug/L</u>
ICP/MS				
SOLID	Uranium		0.066	0.2

METALS
-12-
Linear Ranges

SDG NO. 488091

Contract: ACAL00118

Lab Code: GEL

Instrument ID ICPMS14

<u>Analyte</u>	<u>Integration Time (msec)</u>	<u>LDR</u>	<u>Units</u>	<u>Effective Date</u>
Uranium	1000	5000	ug/L	01-AUG-17

Raw Data

ICPMS #14 Daily Performance

Sample ID: Sample

Sample Date/Time: Tuesday, September 03, 2019 08:51:08

Sample Description:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\Daily 2.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190902\Sample.078

Mass Calibration File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\MassCal\Default1.tun

Dual Detector Mode: Pulse

Acquisition Date/Time&Time Zone: Tuesday, September 03, 2019 08:51:08 Eastern Daylight Time

Number of Replicates: 5

Summary

Analyte	Mass	Meas. Intens.	Mean	Net Intens.	Mean	Net Intens.	SD	Net Intens.	RSD
Be	9.0	53320.9		53320.909		1750.032		3.3	
Mg	24.0	217072.6		217072.629		7872.405		3.6	
Co	58.9	116708.5		116708.533		3246.919		2.8	
Rh	102.9	148094.5		148094.535		3917.968		2.6	
In	114.9	215608.3		215608.274		6097.498		2.8	
Pb	208.0	226874.5		226874.473		6031.552		2.7	
[> Ba	137.9	161307.9		161307.927		4457.908		2.8	
[Ba++	69.0	4315.4		0.027		0.000		1.0	
[> Ce	139.9	191103.5		191103.521		5031.377		2.6	
[CeO	155.9	4598.0		0.024		0.002		9.5	
Bkgd	220.0	0.1		0.050		0.112		223.6	

Current Conditions

C Val	Description
1.11	Nebulizer Gas Flow STD/KED [NEB]
1.20	Auxiliary Gas Flow
18.00	Plasma Gas Flow
-11.00	Deflector Voltage
1600.00	ICP RF Power
-1609.00	Analog Stage Voltage
1000.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset STD [QRO]
-14.00	Cell Rod Offset STD [CRO]
11.00	Discriminator Threshold
-4.00	Cell Entrance/Exit Voltage STD
0.00	RPa
0.45	RPq
1.11	DRC Mode NEB
-8.50	DRC Mode QRO
-3.00	DRC Mode CRO
-13.00	DRC Mode Cell Entrance/Exit Voltage
0.10	Cell Gas A
375.00	Axial Field Voltage
-15.00	KED Mode CRO
-12.00	KED Mode QRO
-7.00	KED Mode Cell Entrance Voltage
-23.00	KED Mode Cell Exit Voltage
3.00	KED Cell Gas A
0.00	KED RPa
0.25	KED RPq
475.00	KED Mode Axial Field Voltage

Current Autolens Data

Sample ID: Sample

Report Date/Time: Tuesday, September 03, 2019 08:55:12

Page 1
Page 52 of 114 SDG: 488091

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9.012	41	-16.5	2292.2
Mg	23.985	41	-15.5	17522.7
In	114.904	41	-10.0	35656.4
Ce	139.905	41	-8.5	32587.1
Pb	207.977	41	-7.5	32519.0
U	238.050	41	-7.0	54977.6

ICPMS #14 Instrument Tuning Report

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res DAC	Meas. Pk. Width
Be	9.0	9.0	1630	2068	0.700
Mg	24.0	24.0	4604	2068	0.721
Mg	25.0	25.0	4805	2068	0.729
Mg	26.0	26.0	5004	2068	0.707
Co	58.9	58.9	11575	2068	0.757
Rh	102.9	102.9	20354	2069	0.833
In	114.9	114.9	22748	2080	0.747
Ce	139.9	139.9	27742	2080	0.782
Pb	206.0	206.0	40954	2085	0.847
Pb	207.0	207.0	41129	2080	0.811
Pb	208.0	208.0	41359	2085	0.816
U	238.1	238.0	47351	2090	0.767

ICPMS #14 - Summary Report

Sample ID: Cal Blank
Sample Date/Time: Tuesday, September 03, 2019 12:55:15
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\Cal Blank.058

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		602742.582	
[U	238		ug/L		23.333	

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175									
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: Standard 1

Sample Date/Time: Tuesday, September 03, 2019 12:56:51

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\Standard 1.059

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		578423.016	578423.016
[U	238	10.0000	ug/L	0.703	187790.929	0.325

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175									
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

Sample ID: Standard 1

Report Date/Time: Tuesday, September 03, 2019 12:56:57

Page 1

ICPMS #14 - Summary Report

Sample ID: Standard 2

Sample Date/Time: Tuesday, September 03, 2019 12:58:26

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\Standard 2.060

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		624551.186	624551.186
[U	238	99.9858	ug/L	1.536	1999261.570	3.201

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175									
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits	Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 1
Sample Date/Time: Tuesday, September 03, 2019 13:00:02
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 1.061

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		596591.089	596591.089
[U	238	49.9057	ug/L	0.724	953095.462	1.598

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			98.98			
[	U	238	99.811					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 2
Sample Date/Time: Tuesday, September 03, 2019 13:01:38
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 2.062

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		551011.758	551011.758
[U	238	0.0162	ug/L	15.012	306.670	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.42				
[U	238						

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 3
Sample Date/Time: Tuesday, September 03, 2019 13:03:14
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 3.063

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		560115.448	560115.448
[U	238	0.2052	ug/L	2.022	3700.479	0.007

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					92.93				
[U	238			102.594							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 4
Sample Date/Time: Tuesday, September 03, 2019 13:04:49
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 4.064

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		461098.082	461098.082
[U	238	0.0190	ug/L	12.641	298.670	0.001

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC Std	% Recovery	Int Std	% Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175			76.50				
[U	238							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits	Message
Lu 175 Int Std for Q	Lu	175		

QC Action

QC Action Line: Continue

ICPMS #14 - Summary Report

Sample ID: QC Std 5
Sample Date/Time: Tuesday, September 03, 2019 13:06:25
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 5.065

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		491381.937	491381.937
[U	238	21.5194	ug/L	0.274	338498.179	0.689

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					81.52				
[U	238			107.597							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits	Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 13:08:01
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.066

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		550708.164	550708.164
[U	238	51.1147	ug/L	1.574	901007.651	1.636

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			91.37			
[U	238		102.229					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 13:09:37
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.067

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		552491.076	552491.076
[U	238	0.0125	ug/L	9.122	242.002	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.66				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 10

Sample Date/Time: Tuesday, September 03, 2019 13:11:14

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 10.068

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		505001.069	505001.069
[U	238	5210.7613	ug/L	0.805	84230947.051	166.799

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			83.78			
[U	238		104.215					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 11

Sample Date/Time: Tuesday, September 03, 2019 13:12:50

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 11.069

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		639188.531	639188.531
[U	238	50.4367	ug/L	0.964	1031859.414	1.615

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			106.05			
[U	238		100.873					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 12

Sample Date/Time: Tuesday, September 03, 2019 13:14:26

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 12.070

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		588554.038	588554.038
[U	238	0.1555	ug/L	4.808	2949.638	0.005

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		97.65				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

Sample ID: QC Std 12

Report Date/Time: Tuesday, September 03, 2019 13:14:33

Page 1

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 13:59:10
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.098

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		596117.606	596117.606
[U	238	50.3052	ug/L	1.000	959818.560	1.610

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					98.90				
[U	238			100.610							

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 14:00:46
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.099

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		596796.944	596796.944
[U	238	0.0111	ug/L	3.308	235.335	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		99.01				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362939
Sample Date/Time: Tuesday, September 03, 2019 14:02:23
Sample Type: Sample
Sample Description: QC A 6020 MB
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362939.100

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		541093.226	541093.226
[U	238	0.0064	ug/L	13.150	132.667	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175			89.77			
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362940
Sample Date/Time: Tuesday, September 03, 2019 14:03:59
Sample Type: Sample
Sample Description: QC A 6020 LCS
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362940.101

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		545591.380	545591.380
[U	238	24.8097	ug/L	0.408	433322.595	0.794

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					90.52				
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091001
Sample Date/Time: Tuesday, September 03, 2019 14:05:35
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091001.102

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		550781.567	550781.567
[U	238	0.0064	ug/L	12.182	134.667	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.38				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362941
Sample Date/Time: Tuesday, September 03, 2019 14:07:10
Sample Type: Sample
Sample Description: QC A 6020 DUP
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362941.103

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		555458.684	555458.684
[U	238	0.0031	ug/L	1.017	76.667	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

InteAnalyte	MassQC	Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[> Lu	175		92.16				
[U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362942
Sample Date/Time: Tuesday, September 03, 2019 14:08:46
Sample Type: Sample
Sample Description: QC A 6020 MS
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362942.104

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		555870.585	555870.585
[U	238	22.9758	ug/L	0.666	408818.876	0.735

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		92.22				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 1204362943
Sample Date/Time: Tuesday, September 03, 2019 14:10:21
Sample Type: Sample
Sample Description: QC A 6020 SDILT
Number of Replicates: 3
Batch ID: 1909458|10|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\1204362943.105

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		597198.596	597198.596
[U	238	0.0046	ug/L	16.263	111.334	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		99.08				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 14:11:58
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.106

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		613720.649	613720.649
[U	238	49.6705	ug/L	0.677	975804.312	1.590

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			101.82			
[U	238		99.341					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7

Sample Date/Time: Tuesday, September 03, 2019 14:13:34

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.107

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		530204.988	530204.988
[U	238	0.0119	ug/L	9.508	223.335	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		87.97				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091002
Sample Date/Time: Tuesday, September 03, 2019 14:15:11
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091002.108

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		555131.639	555131.639
[U	238	0.0206	ug/L	6.880	387.339	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		92.10				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091003
Sample Date/Time: Tuesday, September 03, 2019 14:16:46
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091003.109

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		558147.925	558147.925
[U	238	0.0077	ug/L	11.657	158.668	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		92.60				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091004
Sample Date/Time: Tuesday, September 03, 2019 14:18:22
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091004.110

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		542941.387	542941.387
[U	238	0.0227	ug/L	4.030	414.673	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175				90.08					
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091005
Sample Date/Time: Tuesday, September 03, 2019 14:19:57
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091005.111

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		550845.794	550845.794
[U	238	0.0039	ug/L	13.172	89.334	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.39				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091006
Sample Date/Time: Tuesday, September 03, 2019 14:21:33
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091006.112

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		546754.583	546754.583
[U	238	0.0119	ug/L	12.804	228.669	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		90.71				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091007
Sample Date/Time: Tuesday, September 03, 2019 14:23:09
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091007.113

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		550713.736	550713.736
[U	238	0.0034	ug/L	20.351	82.000	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.37				
[U	238						

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091008
Sample Date/Time: Tuesday, September 03, 2019 14:24:44
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091008.114

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		529592.962	529592.962
[U	238	0.0191	ug/L	7.379	344.004	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		87.86				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091009
Sample Date/Time: Tuesday, September 03, 2019 14:26:19
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091009.115

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		544631.444	544631.444
[U	238	0.0032	ug/L	6.445	76.667	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		90.36				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 14:27:56
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.116

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		534886.250	534886.250
[U	238	50.5594	ug/L	0.941	865598.822	1.618

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			88.74			
[U	238		101.119					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 14:29:32
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.117

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		561821.192	561821.192
[U	238	0.0103	ug/L	12.824	207.335	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		93.21				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091010
Sample Date/Time: Tuesday, September 03, 2019 14:31:09
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091010.118

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		544957.435	544957.435
[U	238	0.0197	ug/L	6.327	364.671	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					90.41				
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091011
Sample Date/Time: Tuesday, September 03, 2019 14:32:44
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091011.119

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		550960.886	550960.886
[U	238	0.0054	ug/L	4.046	116.000	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.41				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091012
Sample Date/Time: Tuesday, September 03, 2019 14:34:20
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091012.120

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		545557.822	545557.822
[U	238	0.0127	ug/L	4.960	242.002	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					90.51				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091013
Sample Date/Time: Tuesday, September 03, 2019 14:35:55
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091013.121

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		552604.716	552604.716
[U	238	0.0041	ug/L	13.640	94.000	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		91.68				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091014
Sample Date/Time: Tuesday, September 03, 2019 14:37:31
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091014.122

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		534459.156	534459.156
[U	238	0.0271	ug/L	7.912	484.675	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					88.67				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091015
Sample Date/Time: Tuesday, September 03, 2019 14:39:07
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091015.123

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		543997.728	543997.728
[U	238	0.0039	ug/L	8.784	88.667	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					90.25				
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091016

Sample Date/Time: Tuesday, September 03, 2019 14:40:42

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1909458|2|prb

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091016.124

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		531809.900	531809.900
[U	238	0.0878	ug/L	4.299	1515.414	0.003

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Lu	175Linear Thru Zero	
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		88.23				
[U	238						

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091017
Sample Date/Time: Tuesday, September 03, 2019 14:42:18
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091017.125

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		547693.945	547693.945
[U	238	0.0033	ug/L	14.023	78.667	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					90.87				
[U	238									

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
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QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: 488091018
Sample Date/Time: Tuesday, September 03, 2019 14:43:53
Sample Type: Sample
Sample Description: ACAL 6020
Number of Replicates: 3
Batch ID: 1909458|2|prb
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\488091018.126

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		543167.733	543167.733
[U	238	0.0171	ug/L	4.193	318.670	0.001

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175		90.12				
[	U	238						

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 6
Sample Date/Time: Tuesday, September 03, 2019 14:45:30
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 6.127

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		543329.971	543329.971
[U	238	50.7630	ug/L	2.768	882754.312	1.625

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution %	DDuplicate	Rel. % Difference
[>	Lu	175			90.14			
[U	238		101.526					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #14 - Summary Report

Sample ID: QC Std 7
Sample Date/Time: Tuesday, September 03, 2019 14:47:06
Sample Type: Sample
Sample Description:
Number of Replicates: 3
Batch ID:
Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\U only.mth
Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190903\QC Std 7.128

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
[> Lu	175		ug/L		551697.189	551697.189
[U	238	0.0106	ug/L	9.533	208.668	0.000

Calibration

Analyte	Mass	Curve Type	Correlation Coefficient
Lu	175	Linear Thru Zero	
U	238	Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std	% Recovery	Int Std	% Recovery	Spike	% Reco	Dilution	% DDuplicate	Rel. % Difference
[>	Lu	175					91.53				
[	U	238									

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

Miscellaneous

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID: 1909457	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst: Prep: Hannah Hatherly Shanta Mack	LCS	1204362940	ICP-MS spiking solution A	UI190703-A	.25	mL
Method: SW846 3050B	LCS	1204362940	ICP-MS spiking solution B	UI190703-B	.25	mL
Lab SOP: GL-MA-E-009 REV# 28	MS	1204362942	ICP-MS spiking solution A	UI190703-A	.25	mL
Instrument: BAL-591	MS	1204362942	ICP-MS spiking solution B	UI190703-B	.25	mL

Sample ID	Initial Prep Date	Matrix	Initial Weight (g)	Final Volume (mL)	Hot Block Stop Date (date)	Prep Factor (mL/g)
1204362939 MB	21-AUG-2019 01:57:33	Tissue	0.519	50	08/21/19 10:21	96.33911
1204362940 LCS	21-AUG-2019 01:57:33	Tissue	0.523	50	08/21/19 10:21	95.60229
488091001	21-AUG-2019 01:57:33	Tissue	0.533	50	08/21/19 10:21	93.80863
1204362943 SDILT (488091001)	21-AUG-2019 01:57:33	Tissue	0.533	50	08/21/19 10:21	93.80863
1204362941 DUP (488091001)	21-AUG-2019 01:57:33	Tissue	0.526	50	08/21/19 10:21	95.05703
1204362942 MS (488091001)	21-AUG-2019 01:57:33	Tissue	0.531	50	08/21/19 10:21	94.16196
488091002	21-AUG-2019 01:57:33	Tissue	0.505	50	08/21/19 10:21	99.0099
488091003	21-AUG-2019 01:57:33	Tissue	0.544	50	08/21/19 10:21	91.91176
488091004	21-AUG-2019 01:57:33	Tissue	0.541	50	08/21/19 10:21	92.42144
488091005	21-AUG-2019 01:57:33	Tissue	0.528	50	08/21/19 10:21	94.69697
488091006	21-AUG-2019 01:57:33	Tissue	0.525	50	08/21/19 10:21	95.2381
488091007	21-AUG-2019 01:57:33	Tissue	0.545	50	08/21/19 10:21	91.74312
488091008	21-AUG-2019 01:57:33	Tissue	0.543	50	08/21/19 10:21	92.08103
488091009	21-AUG-2019 01:57:33	Tissue	0.549	50	08/21/19 10:21	91.07468
488091010	21-AUG-2019 01:57:33	Tissue	0.519	50	08/21/19 10:21	96.33911
488091011	21-AUG-2019 01:57:33	Tissue	0.502	50	08/21/19 10:21	99.60159
488091012	21-AUG-2019 01:57:33	Tissue	0.512	50	08/21/19 10:21	97.65625
488091013	21-AUG-2019 01:57:33	Tissue	0.504	50	08/21/19 10:21	99.20635
488091014	21-AUG-2019 01:57:33	Tissue	0.504	50	08/21/19 10:21	99.20635
488091015	21-AUG-2019 01:57:33	Tissue	0.52	50	08/21/19 10:21	96.15385
488091016	21-AUG-2019 01:57:33	Tissue	0.519	50	08/21/19 10:21	96.33911
488091017	21-AUG-2019 01:57:33	Tissue	0.5	50	08/21/19 10:21	100
488091018	21-AUG-2019 01:57:33	Tissue	0.503	50	08/21/19 10:21	99.40358

Reagent/Solvent Lot ID	Description	Amount	Comments:
190719	Concentrated Nitric Acid	5 mL	Block Temperature (90-100C): 93 C Temperature within limits (Y/N)?: Y Thermometer ID: 118631 Hot Block ID: 2 Prep Date: 21-AUG-2019 05:21 METALMAN Shanta Mack Digestion tube lot #: 1902243
2940245	Hydrogen Peroxide 30%, from Bioassay (LIMS ID 2936517)	1.5 mL	
I-BC190213	Teflon chips for MB/LCS metals Solids	.5 g	

Standard Logbook

Serial ID: UI190307-07 **Open/Reference Date:** 07-MAR-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master B **Received:** 07-MAR-19 **Catalog Number :** 160054-02-03
Type: Source Material **Expires:** 07-MAR-20 **Lot Number :** 10066767-8
Employee: Paul Boyd **Solvent :** 2% HNO3 100 cm2
Supplier: 02SI
Description: ICPMS ICV/CCV Soln B - 20ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	20 mg/L	Barium	20 mg/L
Beryllium	20 mg/L	Boron	40 mg/L
Cadmium	20 mg/L	Chromium	20 mg/L
Cobalt	20 mg/L	Copper	20 mg/L
Lead	20 mg/L	Lithium	20 mg/L
Manganese	20 mg/L	Nickel	20 mg/L
Selenium	20 mg/L	Strontium	20 mg/L
Thallium	20 mg/L	Thorium	20 mg/L
Uranium	20 mg/L	Vanadium	20 mg/L
Zinc	20 mg/L		

Serial ID: UI190307-09 **Open/Reference Date:** 07-MAR-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master A **Received:** 07-MAR-19 **Catalog Number :** 160055-01-03
Type: Source Material **Expires:** 07-MAR-20 **Lot Number :** 10066767-9
Employee: Paul Boyd **Solvent :** 2% HNO3 100 cm2
Supplier: 02SI
Description: ICPMS ICV/CCV SOLN A - 2000ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	2020 mg/L	Calcium	2000 mg/L
Iron	2000 mg/L	Magnesium	2000 mg/L
Phosphorous	2000 mg/L	Potassium	2000 mg/L
Sodium	2000 mg/L		

Serial ID: UI190415-09 **Open/Reference Date:** 15-APR-19 **Amount :** 250 mL
Name: ICP-MS CRDL Master #1 **Received:** 15-APR-19 **Catalog Number :** 090014-MC-02
Type: Source Material **Expires:** 15-APR-20 **Lot Number :** 10091735-1
Employee: Paul Boyd **Solvent :** +/- 0.5% IN 2% HNO3
Supplier: 02SI
Description: ICPMS CRDL Master Soln #1
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	50 mg/L	Arsenic	5 mg/L
Barium	4 mg/L	Beryllium	.5 mg/L
Boron	15 mg/L	Cadmium	1 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Calcium	200 mg/L	Chromium	30 mg/L
Cobalt	1 mg/L	Copper	2 mg/L
Iron	100 mg/L	Lead	2 mg/L
Lithium	10 mg/L	Magnesium	30 mg/L
Manganese	5 mg/L	Nickel	2 mg/L
Phosphorous	50 mg/L	Potassium	300 mg/L
Selenium	5 mg/L	Sodium	250 mg/L
Strontium	10 mg/L	Thallium	2 mg/L
Thorium	2 mg/L	Uranium	.2 mg/L
Vanadium	20 mg/L	Zinc	20 mg/L

Serial ID: UI190415-10 **Open/Reference Date:** 15-APR-19 **Amount :** 250 mL
Name: ICP-MS CRDL Master #2 **Received:** 15-APR-19 **Catalog Number :** 160044-11-02
Type: Source Material **Expires:** 15-APR-20 **Lot Number :** 10091735-2
Employee: Paul Boyd **Solvent :** +/- 0.5% IN 2% HNO3
Supplier: O2SI
Description: ICPMS CRDL Soln #2
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	3 mg/L	Molybdenum	1 mg/L
Silver	1 mg/L	Tin	5 mg/L
Titanium	10 mg/L	Tungsten	5 mg/L
Zirconium	2 mg/L		

Serial ID: UI190424-60 **Open/Reference Date:** 24-APR-19 **Amount :** 100 mL
Name: ICPMS High Range Standard **Received:** 24-APR-19 **Catalog Number :** 160212-02-01-A
Type: Source Material **Expires:** 24-APR-20 **Lot Number :** 10066129-12
Employee: Paul Boyd **Solvent :** 2%HNO3
Supplier: O2SI
Description: Linear Range Standard A
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	5000 mg/L	Arsenic	100 mg/L
Barium	250 mg/L	Beryllium	100 mg/L
Cadmium	100 mg/L	Calcium	5000 mg/L
Chromium	100 mg/L	Cobalt	100 mg/L
Copper	100 mg/L	Iron	5000 mg/L
Lead	500 mg/L	Lithium	100 mg/L
Magnesium	5000 mg/L	Manganese	100 mg/L
Nickel	100 mg/L	Phosphorous	2500 mg/L
Potassium	5000 mg/L	Selenium	50 mg/L
Sodium	5000 mg/L	Strontium	100 mg/L
Thallium	50 mg/L	Thorium	250 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Uranium	500 mg/L	Vanadium	100 mg/L
Zinc	250 mg/L		

Serial ID: UI190424-61 **Open/Reference Date:** 24-APR-19 **Amount :** 100 mL
Name: ICPMS High Range Standard **Received:** 24-APR-19 **Catalog Number :** 160212-02-01-B
Type: Source Material **Expires:** 24-APR-20 **Lot Number :** 10066129-13
Employee: Paul Boyd **Solvent :** 2% in 2%HNO3 + Tr HF
Supplier: O2SI
Description: Linear Range Standard B
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	25 mg/L	Molybdenum	100 mg/L
Silver	25 mg/L	Tin	100 mg/L
Tungsten	100 mg/L	Zirconium	50 mg/L

Serial ID: UI190605-08 **Open/Reference Date:** 05-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master C **Received:** 05-JUN-19 **Catalog Number :** ZGEL-107-500
Type: Source Material **Expires:** 30-MAY-20 **Lot Number :** 5-093AB
Employee: Paul Boyd **Solvent :** 2% HNO3/Tr. Tart Acid/ Tr. HF 100
Supplier: Spex
Description: ICPMS ICV/CCV Soln C - 20ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	20 mg/L	Molybdenum	20 mg/L
Silver	20 mg/L	Tin	20 mg/L
Titanium	20 mg/L	Tungsten	20 mg/L
Zirconium	20 mg/L		

Serial ID: UI190621-12 **Open/Reference Date:** 21-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICSAB Master B **Received:** 21-JUN-19 **Catalog Number :** 160033-02-02
Type: Source Material **Expires:** 21-JUN-20 **Lot Number :** 10069799-7
Employee: Paul Boyd **Solvent :** +/- 2.0% in 2% HNO3
Supplier: O2SI
Description: ICPMS ICSAB Master B
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	2 mg/L	Barium	2 mg/L
Beryllium	2 mg/L	Boron	2 mg/L
Cadmium	2 mg/L	Chromium	2 mg/L
Cobalt	2 mg/L	Copper	2 mg/L
Lead	2 mg/L	Lithium	2 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Manganese	2 mg/L	Nickel	2 mg/L
Selenium	2 mg/L	Strontium	2 mg/L
Thallium	2 mg/L	Thorium	2 mg/L
Uranium	2 mg/L	Vanadium	2 mg/L
Zinc	2 mg/L		

Serial ID: UI190621-13 **Open/Reference Date:** 21-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICSAB Master C **Received:** 21-JUN-19 **Catalog Number :** 160033-03-02
Type: Source Material **Expires:** 21-JUN-20 **Lot Number :** 10069799-8
Employee: Paul Boyd **Solvent :** +/- 2.0% in 2% HNO3 + tr HF
Supplier: 02SI
Description: ICPMS ICSAB Master C
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	2 mg/L	Silver	2 mg/L
Tin	2 mg/L	Tungsten	2 mg/L
Zirconium	2 mg/L		

Serial ID: UI190703-A **Open/Reference Date:** 24-JUL-19 **Catalog Number :** GEL-12A
Name: ICP-MS SPIKE A **Received:** 03-JUL-19 **Lot Number :** N2-MEB673694
Type: Source Material **Expires:** 03-JUL-20
Employee: Shanta Mack
Supplier: Inorganic Ventures
Description: ICP-MS spiking solution A
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	10 mg/L	Hafnium	10 mg/L
Molybdenum	10 mg/L	Tantalum	10 mg/L
Tin	10 mg/L	Titanium	10 mg/L
Tungsten	10 mg/L	Zirconium	10 mg/L

Serial ID: UI190703-B **Open/Reference Date:** 24-JUL-19 **Catalog Number :** GEL-12B
Name: ICP-MS SPIKE B **Received:** 03-JUL-19 **Lot Number :** N2-MEB673693
Type: Source Material **Expires:** 03-JUL-20
Employee: Hannah Hatherly
Supplier: Inorganic Ventures
Description: ICP-MS spiking solution B
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	400 mg/L	Arsenic	10 mg/L
Barium	10 mg/L	Beryllium	10 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Bismuth	10 mg/L	Boron	20 mg/L
Cadmium	10 mg/L	Calcium	400 mg/L
Cesium	10 mg/L	Chromium	10 mg/L
Cobalt	10 mg/L	Copper	10 mg/L
Iron	400 mg/L	Lead	10 mg/L
Lithium	10 mg/L	Magnesium	400 mg/L
Manganese	10 mg/L	Nickel	10 mg/L
Phosphorous	400 mg/L	Potassium	400 mg/L
Rhenium	10 mg/L	Rhodium	10 mg/L
Selenium	10 mg/L	Silver	10 mg/L
Sodium	400 mg/L	Strontium	10 mg/L
Thallium	10 mg/L	Thorium	10 mg/L
Uranium	10 mg/L	Uranium-235	.072 mg/L
Uranium-238	9.928 mg/L	Vanadium	10 mg/L
Zinc	10 mg/L		

Serial ID: UI190807-03 **Open/Reference Date:** 07-AUG-19 **Catalog Number :** 060074-05-01
Name: ICPMS Tungsten - 10mg/L **Received:** 07-AUG-19 **Lot Number :** 10070573-9
Type: Source Material **Expires:** 07-AUG-20 **Solvent :** 2% HNO3 + Tr HF
Employee: Paul Boyd
Supplier: O2SI
Description: ICPMS Tungsten standard SPIKE - 10mg/L
Comments: None

Analyte	Concentration	Analyte	Concentration
Tungsten	10 mg/L		

Serial ID: UI190820-11 **Open/Reference Date:** 20-AUG-19 **Amount :** 1000 mL
Name: ICP-MS ICSA Master A Nex **Received:** 20-AUG-19 **Catalog Number :** 60013-01-01LNexion
Type: Source Material **Expires:** 20-AUG-20 **Lot Number :** 10065549-12
Employee: Paul Boyd **Solvent :** 5% HNO3 + Tr HF
Supplier: O2SI
Description: ICP-MS ICSA Master A NEXION
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	1000 mg/L	Calcium	1000 mg/L
Carbon	2000 mg/L	Chloride	10000 mg/L
Iron	1000 mg/L	Magnesium	1000 mg/L
Molybdenum	20 mg/L	Phosphorous	1000 mg/L
Potassium	1000 mg/L	Sodium	1000 mg/L
Sulfur	1000 mg/L	Titanium	20 mg/L

Standard Logbook

Serial ID: UMS190824-01 **Open/Reference Date:** 24-AUG-19 **Amount :** 250 mL
Name: ICPMSCaSPIKEB **Received:** 24-AUG-19 **Catalog Number :** ZGEL-100-250
Type: Source Material **Expires:** 24-AUG-20 **Lot Number :** 6-188AB
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution B
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	10 mg/L	Barium	10 mg/L
Beryllium	10 mg/L	Boron	20 mg/L
Cadmium	10 mg/L	Chromium	10 mg/L
Cobalt	10 mg/L	Copper	10 mg/L
Lead	10 mg/L	Lithium	10 mg/L
Manganese	10 mg/L	Nickel	10 mg/L
Selenium	10 mg/L	Silver	10 mg/L
Strontium	10 mg/L	Thallium	10 mg/L
Thorium	10 mg/L	Uranium	10 mg/L
Vanadium	10 mg/L	Zinc	10 mg/L

Serial ID: UMS190824-02 **Open/Reference Date:** 24-AUG-19 **Catalog Number :** ZGEL-102-250
Name: ICPMSCaSPIKEA **Received:** 24-AUG-19 **Lot Number :** 6-189AB
Type: Source Material **Expires:** 24-AUG-20
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution A
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	1000 mg/L	Calcium	1000 mg/L
Iron	1000 mg/L	Magnesium	1000 mg/L
Phosphorous	1000 mg/L	Potassium	1000 mg/L
Sodium	1000 mg/L		

Serial ID: UMS190824-03 **Open/Reference Date:** 24-AUG-19 **Amount :** 250 ml
Name: ICPMSCaSPIKEC **Received:** 24-AUG-19 **Catalog Number :** ZGEL-101-250
Type: Source Material **Expires:** 24-AUG-20 **Lot Number :** 6-190AB
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution C
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	10 mg/L	Molybdenum	10 mg/L
Tin	10 mg/L	Titanium	10 mg/L
Zirconium	10 mg/L		

Standard Logbook

Serial ID: WMS190903-04 **Open/Reference Date:** 03-SEP-19 **Amount :** 50 mL
Name: ICPMS Cal Standard 100 **Received:** 03-SEP-19 **Balance Id :** 4025216
Type: Working **Expires:** 04-SEP-19 **Pipet Id :** 3541598
Employee: Paul Boyd **Solvent :** 2%HNO3/1%HCl -2975813
Supplier: GEL
Description: ICPMS Calibration Standard (100 ppb)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190807-03	Tungsten	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Arsenic	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Barium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Beryllium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Boron	20 mg/L	5 mL	500 mL	200 ug/l
UMS190824-01	Cadmium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Chromium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Cobalt	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Copper	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Lead	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Lithium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Manganese	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Nickel	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Selenium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Silver	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Strontium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Thallium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Thorium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Uranium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Vanadium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Zinc	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-02	Aluminum	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Calcium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Iron	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Magnesium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Phosphorous	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Potassium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Sodium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-03	Antimony	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Molybdenum	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Tin	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Titanium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Zirconium	10 mg/L	5 mL	500 mL	100 ug/l

Standard Logbook

Serial ID: WMS190903-04A **Open/Reference Date:** 03-SEP-19 **Balance Id :** 4025216
Name: ICPMS Cal Standard 10 **Received:** 03-SEP-19 **Pipet Id :** 3541598
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS Calibration Standard (10 ppb)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
WMS190903-04	Aluminum	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Antimony	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Arsenic	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Barium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Beryllium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Boron	200 ug/l	50 mL	500 mL	20 ug/l
WMS190903-04	Cadmium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Calcium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Chromium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Cobalt	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Copper	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Iron	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Lead	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Lithium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Magnesium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Manganese	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Molybdenum	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Nickel	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Phosphorous	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Potassium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Selenium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Silver	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Sodium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190903-04	Strontium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Thallium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Thorium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Tin	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Titanium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Tungsten	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Uranium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Vanadium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Zinc	100 ug/l	50 mL	500 mL	10 ug/l
WMS190903-04	Zirconium	100 ug/l	50 mL	500 mL	10 ug/l

Standard Logbook

Serial ID: WMS190903-05 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICV **Received:** 03-SEP-19 **Pipet Id :** 3541598
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS ICV
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190307-07	Arsenic	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Barium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Beryllium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Boron	40 mg/L	2.5 mL	1000 mL	100 ug/L
UI190307-07	Cadmium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Chromium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Cobalt	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Copper	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Lead	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Lithium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Manganese	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Nickel	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Selenium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Strontium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Thallium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Thorium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Uranium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Vanadium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Zinc	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-09	Aluminum	2020 mg/L	2.5 mL	1000 mL	5050 ug/L
UI190307-09	Calcium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Iron	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Magnesium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Phosphorous	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Potassium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Sodium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190605-08	Antimony	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Molybdenum	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Silver	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Tin	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Titanium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Tungsten	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Zirconium	20 mg/L	2.5 mL	1000 mL	50 ug/L

Standard Logbook

Serial ID: WMS190903-06 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS CRDL **Received:** 03-SEP-19 **Pipet Id :** 3820544
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl - 2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS CRDL
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190415-09	Aluminum	50 mg/L	.5 mL	500 mL	30 ug/L
UI190415-09	Arsenic	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Barium	4 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Beryllium	.5 mg/L	.5 mL	500 mL	.5 ug/L
UI190415-09	Boron	15 mg/L	.5 mL	500 mL	15 ug/L
UI190415-09	Cadmium	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Calcium	200 mg/L	.5 mL	500 mL	200 ug/L
UI190415-09	Chromium	30 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Cobalt	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Copper	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Iron	100 mg/L	.5 mL	500 mL	100 ug/L
UI190415-09	Lead	2 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Lithium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Magnesium	30 mg/L	.5 mL	500 mL	15 ug/L
UI190415-09	Manganese	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Nickel	2 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Phosphorous	50 mg/L	.5 mL	500 mL	50 ug/L
UI190415-09	Potassium	300 mg/L	.5 mL	500 mL	300 ug/L
UI190415-09	Selenium	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Sodium	250 mg/L	.5 mL	500 mL	250 ug/L
UI190415-09	Strontium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Thallium	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Thorium	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Uranium	.2 mg/L	.5 mL	500 mL	.2 ug/L
UI190415-09	Vanadium	20 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Zinc	20 mg/L	.5 mL	500 mL	10 ug/L
UI190415-10	Antimony	3 mg/L	.5 mL	500 mL	3 ug/L
UI190415-10	Molybdenum	1 mg/L	.5 mL	500 mL	.5 ug/L
UI190415-10	Silver	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-10	Tin	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-10	Titanium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-10	Tungsten	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-10	Zirconium	2 mg/L	.5 mL	500 mL	2 ug/L

Standard Logbook

Serial ID: WMS190903-20 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICSA **Received:** 03-SEP-19 **Lot Number :** 1064482
Type: Working **Expires:** 04-SEP-19 **Pipet Id :** 3541598
Employee: Paul Boyd **Solvent :** 2%HNO3/1%HCl -2975813
Supplier: GEL
Description: ICPMS ICSA NexION
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190820-11	Aluminum	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Calcium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Carbon	2000 mg/L	25 mL	250 mL	200000 ug/L
UI190820-11	Chloride	10000 mg/L	25 mL	250 mL	1000000 ug/L
UI190820-11	Iron	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Magnesium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Molybdenum	20 mg/L	25 mL	250 mL	2000 ug/L
UI190820-11	Phosphorous	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Potassium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sodium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sulfur	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Titanium	20 mg/L	25 mL	250 mL	2000 ug/L

Serial ID: WMS190903-21 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICSAB **Received:** 03-SEP-19 **Pipet Id :** 1758088
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS ICSAB NexION
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190621-12	Arsenic	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Barium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Beryllium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Boron	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Cadmium	2 mg/L	2.5 mL	250 mL	20.2 ug/L
UI190621-12	Chromium	2 mg/L	2.5 mL	250 mL	22.2 ug/L
UI190621-12	Cobalt	2 mg/L	2.5 mL	250 mL	20.4 ug/L
UI190621-12	Copper	2 mg/L	2.5 mL	250 mL	23.4 ug/L
UI190621-12	Lead	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Lithium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Manganese	2 mg/L	2.5 mL	250 mL	22.7 ug/L
UI190621-12	Nickel	2 mg/L	2.5 mL	250 mL	22.4 ug/L
UI190621-12	Selenium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Strontium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Thallium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Thorium	2 mg/L	2.5 mL	250 mL	20 ug/L

Standard Logbook

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190621-12	Uranium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Vanadium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Zinc	2 mg/L	2.5 mL	250 mL	27 ug/L
UI190621-13	Antimony	2 mg/L	2.5 mL	250 mL	20.5 ug/L
UI190621-13	Silver	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Tin	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Tungsten	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Zirconium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190820-11	Aluminum	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Calcium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Carbon	2000 mg/L	25 mL	250 mL	200000 ug/L
UI190820-11	Chloride	10000 mg/L	25 mL	250 mL	1000000 ug/L
UI190820-11	Iron	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Magnesium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Molybdenum	20 mg/L	25 mL	250 mL	2000 ug/L
UI190820-11	Phosphorous	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Potassium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sodium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sulfur	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Titanium	20 mg/L	25 mL	250 mL	2000 ug/L

Serial ID: WMS190903-70 **Open/Reference Date:** 03-SEP-19 **Balance Id :** BAL216
Name: ICPMS LINEAR RANGE ST **Received:** 03-SEP-19 **Pipet Id :** 2878988
Type: Working **Expires:** 04-SEP-19 **Solvent :** 2%HNO3/1%HCl -2975813
Employee: Paul Boyd
Supplier: 02SI
Description: ICPMS LINEAR RANGE STANDARD
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190424-60	Aluminum	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Arsenic	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Barium	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-60	Beryllium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Cadmium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Calcium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Chromium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Cobalt	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Copper	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Iron	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Lead	500 mg/L	2.5 mL	250 mL	5000 ug/L
UI190424-60	Lithium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Magnesium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Manganese	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Nickel	100 mg/L	2.5 mL	250 mL	1000 ug/L

Standard Logbook

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190424-60	Phosphorous	2500 mg/L	2.5 mL	250 mL	25000 ug/L
UI190424-60	Potassium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Selenium	50 mg/L	2.5 mL	250 mL	500 ug/L
UI190424-60	Sodium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Strontium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Thallium	50 mg/L	2.5 mL	250 mL	500 ug/L
UI190424-60	Thorium	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-60	Uranium	500 mg/L	2.5 mL	250 mL	5000 ug/L
UI190424-60	Vanadium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Zinc	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-61	Antimony	25 mg/L	2.5 mL	250 mL	250 ug/L
UI190424-61	Molybdenum	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Silver	25 mg/L	2.5 mL	250 mL	250 ug/L
UI190424-61	Tin	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Tungsten	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Zirconium	50 mg/L	2.5 mL	250 mL	500 ug/L

Serial ID: 190719 **Open/Reference Date:** 29-JUL-19 **Lot Number :** 2019021419
Name: I-HNO3 **Received:** 19-JUL-19
Type: Reagent/Solvent **Expires:** 19-JUL-21
Employee: Shanta Mack
Supplier: VWR - BDH Chemicals
Description: Concentrated Nitric Acid
Comments: None

Serial ID: 190815 **Open/Reference Date:** 23-AUG-19 **Lot Number :** 2019041788
Name: I-HNO3 **Received:** 15-AUG-19
Type: Reagent/Solvent **Expires:** 15-AUG-21
Employee: Hannah Hatherly
Supplier: VWR - BDH Chemicals
Description: Concentrated Nitric Acid
Comments: None

Serial ID: 2940245 **Open/Reference Date:** 07-JUN-19 **Lot Number :** 0000217579 mL
Name: B-H2O2 **Received:** 07-JUN-19
Type: Reagent/Solvent **Expires:** 13-JUN-20
Employee: Edmund Frampton
Supplier: J.T. BAKER
Description: Hydrogen Peroxide 30%, from Bioassay (LIMS ID 2936517)
Comments: None

Standard Logbook

Serial ID: 2962424 **Open/Reference Date:** 26-AUG-19 **Lot Number :** 2019021499
Name: I-HCL **Received:** 31-JUL-19
Type: Reagent/Solvent **Expires:** 31-JUL-21
Employee: Edmund Frampton
Supplier: VWR
Description: HYDROCHLORIC ACID
Comments: None

Serial ID: 2975813 **Open/Reference Date:** 02-SEP-19 **Solvent :** Type I Water
Name: B-2%HNO3/1%HCl-ICPMS **Received:** 02-SEP-19
Type: Reagent/Solvent **Expires:** 16-SEP-19
Employee: Paul Boyd
Supplier: GEL
Description: 2%HNO3/1%HCl Solution (Type I Water)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
190815	I-HNO3	68.0-70.0%	160 mL	8 l	N/A
2962424	I-HCL	36.5-38.0	80 mL	8 l	N/A

Serial ID: I-BC190213 **Open/Reference Date:** 29-JUL-19 **Lot Number :** 24462227
Name: I-Boiling chips **Received:** 13-FEB-19
Type: Reagent/Solvent **Expires:** 13-FEB-21
Employee: Edmund Frampton
Supplier: Chemware
Description: Teflon chips for MB/LCS metals Solids
Comments: None



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ANALYTICAL REPORT

CLIENT:

DHEC
BOW 2600 BULL STREET
COLUMBIA , SC 29201

PROJECT:

Fish Analysis

REPORT DATE:

10.01.19

REPORT APPROVED BY:

Bryant W. Boyd
Laboratory Manager

bryant@axs-inc.com

Any questions related to this report should be directed to Access Analytical, Inc. via phone at 803.781.4243 or via email at the address listed above.

- South Carolina DHEC state lab certification #: 32571001
- Florida – DOH national NELAP lab accreditation #: E871145



Access Analytical, Inc.
15 Thames Valley Rd. ~ Irmo, SC 29063
PHONE: 803.781.4243 ~ FAX: 803.781.4303 ~ WEB: www.axs-inc.com



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Report of Analysis

Lab ID #: 21688-001
Project: Fish Analysis
Sample Name: 19-662-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	536	None	mg/kg	By SOP		9/20/2019 20:36	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0127	None	mg/kg	SW6020A	U	9/23/2019 19:44	#10120



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Report of Analysis

Lab ID #: 21688-002
Project: Fish Analysis
Sample Name: 19-662-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	868	None	mg/kg	By SOP		9/20/2019 20:59	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/23/2019 19:58	#10120



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Report of Analysis

Lab ID #: 21688-003
Project: Fish Analysis
Sample Name: 19-663-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	149	None	mg/kg	By SOP		9/20/2019 21:21	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0132	None	mg/kg	SW6020A	U	9/23/2019 20:01	#10120



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Report of Analysis

Lab ID #: 21688-004
Project: Fish Analysis
Sample Name: 19-663-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	<15.8	None	mg/kg	By SOP		9/27/2019 2:53	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0123	None	mg/kg	SW6020A	U	9/23/2019 20:11	#10120



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Report of Analysis

Lab ID #: 21688-005
Project: Fish Analysis
Sample Name: 19-664-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	322	None	mg/kg	By SOP		9/27/2019 3:15	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0126	None	mg/kg	SW6020A	U	9/23/2019 20:15	#10120



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Report of Analysis

Lab ID #: 21688-006
Project: Fish Analysis
Sample Name: 16-664-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	258	None	mg/kg	By SOP		9/27/2019 3:38	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0126	None	mg/kg	SW6020A	U	9/23/2019 20:18	#10120



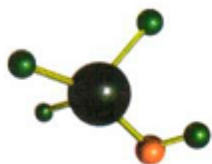
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Report of Analysis

Lab ID #: 21688-007
Project: Fish Analysis
Sample Name: 19-665-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	517	None	mg/kg	By SOP		9/27/2019 4:01	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0125	None	mg/kg	SW6020A	U	9/23/2019 20:21	#10120



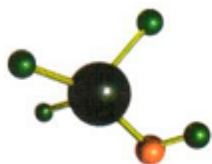
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Report of Analysis

Lab ID #: 21688-008
Project: Fish Analysis
Sample Name: 19-665-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	147	None	mg/kg	By SOP		9/26/2019 13:45	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0132	None	mg/kg	SW6020A	U	9/23/2019 20:25	#10120



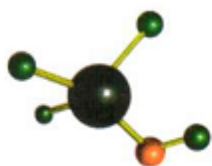
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Report of Analysis

Lab ID #: 21688-009
Project: Fish Analysis
Sample Name: 16-666-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	302	None	mg/kg	By SOP		9/27/2019 8:21	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/23/2019 20:28	#10120



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Report of Analysis

Lab ID #: 21688-010
Project: Fish Analysis
Sample Name: 19-666-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	<15.5	None	mg/kg	By SOP		9/27/2019 21:06	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0132	None	mg/kg	SW6020A	U	9/23/2019 20:32	#10120



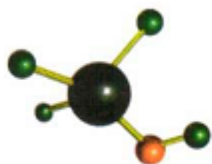
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Report of Analysis

Lab ID #: 21688-011
Project: Fish Analysis
Sample Name: 19-667-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	<9.5	None	mg/kg	By SOP		9/27/2019 22:14	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.012	None	mg/kg	SW6020A	U	9/23/2019 20:35	#10120



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Report of Analysis

Lab ID #: 21688-012
Project: Fish Analysis
Sample Name: 19-667-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	79.3	None	mg/kg	By SOP	C	9/27/2019 13:36	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0121	None	mg/kg	SW6020A	U	9/23/2019 20:45	#10120



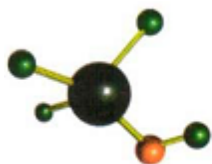
ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21688-013
Project: Fish Analysis
Sample Name: 16-668-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	112	None	mg/kg	By SOP		9/27/2019 13:59	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0129	None	mg/kg	SW6020A	U	9/23/2019 20:48	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21688-014
Project: Fish Analysis
Sample Name: 19-668-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	683	None	mg/kg	By SOP		9/27/2019 14:21	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0121	None	mg/kg	SW6020A	U	9/23/2019 20:52	#10120

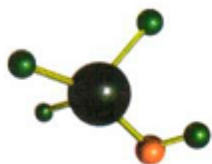


Report of Analysis

Lab ID #: 21688-015
Project: Fish Analysis
Sample Name: 19-669-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	37.6	None	mg/kg	By SOP		9/27/2019 14:44	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0129	None	mg/kg	SW6020A	U	9/23/2019 20:55	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21688-016
Project: Fish Analysis
Sample Name: 19-669-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	205	None	mg/kg	By SOP	C	9/26/2019 20:08	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0122	None	mg/kg	SW6020A	U	9/23/2019 20:59	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21688-017
Project: Fish Analysis
Sample Name: 19-670-F
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	394	None	mg/kg	By SOP		9/27/2019 15:29	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0124	None	mg/kg	SW6020A	U	9/23/2019 21:02	#10120



ACCESS
ANALYTICAL, INC.

Report of Analysis

Lab ID #: 21688-018
Project: Fish Analysis
Sample Name: 19-670-W
Client ID #:

Matrix: Soil
Collected: 8/26/2019 @ 0:00
Date Received: 9/3/2019 @ 8:57

Parameter	Result	Reporting Limit	Units	Method Reference	Data Flag	Date/Time of Analysis	Analyst
Fluoride Analysis - Solid	<9.1	None	mg/kg	By SOP		9/27/2019 15:51	CC
Sample Preparation	Complete	None	None	By SOP		9/6/2019 12:00	AA
Uranium in Solids	0.0131	None	mg/kg	SW6020A	U	9/23/2019 21:05	#10120



Laboratory Endorsement / Definitions

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency, Standard Methods or other recognized agencies.

Common abbreviations that may be utilized in this report:

ND	Indicates the result was Not Detected at the specified reporting limit
"<"	Indicated the result as less than the indicated amount
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous to Count
SUB	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
DF	Dilution Factor
RL	Reporting Limit
MDL	Calculated minimum detection limit
PQL	Practical Quantitation Limit
RE	Re-analysis

Reporting flags that may be utilized in this report:

J	Indicates the result is between the MDL and PQL and considered to be an estimated result
MB	Indicates the analyte was detected in the associated Method Blank
H	Indicates the recommended holding time was exceeded
*	Indicates a non-compliant or not applicable QC recovery or RPD
A	BOD or CBOD GGA check value for this sample did not meet acceptance criteria.
B	BOD or CBOD blank depletion did not meet acceptance criteria.
C	Indicates the spike % recovery was not acceptable.
D	Indicates the duplicate % difference was not acceptable.
E	Toxicity is apparent in the sample.

Sample receipt at Access Analytical is documented through the attached chain of custody. In accordance with laboratory protocol, this report shall be reproduced only in full and with the written permission of Access Analytical, Inc.. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the attached report and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.



Sample Receipt

Were samples received on ice?	YES
Were samples received within required temperature limits?	YES
Are the number of samples the same as stated on the chain of custody?	YES
Are samples submitted with a correct and complete chain of custody?	YES
Are bottle caps tight and securely in place, coolers and samples intact?	YES
Are the correct sample containers provided?	YES
Were samples within the holding time for requested test(s)?	YES
Is the volume of sample submitted sufficient for the requested test(s)?	YES
Is there sufficient air space in bottle for bacteriological analysis?	n/a
Were samples received with applicable preservative?	YES

Result Comments

Sample 21688-001:

Uranium Data Qualifiers Per GEL

The "U" qualifier denotes the "Analyte was analyzed for, but not detected about the MDL, MDA, MDC or LOD."

The qualifier "B": "Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL"

See full report for details.



September 24, 2019

Ms. Angela Martin
ESP Associates, Inc.
3475 Lakemont Blvd
Fort Mill, South Carolina 29708

Re: Routine Analysis
Work Order: 489537

Dear Ms. Martin:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 10, 2019. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

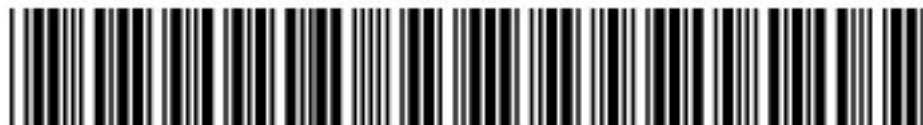
Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4778.

Sincerely,

Katelyn Gray for
Hope Taylor
Project Manager

Purchase Order: GELP18-1424
Enclosures



**Access Analytical
Routine Analysis
SDG: 489537**

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Case Narrative

**Receipt Narrative
for
Access Analytical
SDG: 489537**

September 24, 2019

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on September 10, 2019 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
489537001	19-662F
489537002	19-662W
489537003	19-663F
489537004	19-663W
489537005	19-664F
489537006	19-664W
489537007	19-665F
489537008	19-665W
489537009	19-666F
489537010	19-666W
489537011	19-667F
489537012	19-667W
489537013	19-668F
489537014	19-668W
489537015	19-669F
489537016	19-669W
489537017	19-670F
489537018	19-670W

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Metals.

Katelyn Gray

Katelyn Gray for
Hope Taylor
Project Manager

Chain of Custody and Supporting Documentation

Client: Access Analytical, Inc.
 Person: Ashley Arnick
 Address: 15 Thames Valley Rd.
 City: Irmo State: SC Zip Code: 29063
 Phone: 803-781-4243 Fax:
 Email: oelreports@axs-inc.com

Fish Tissue Analysis
 Client

Lab ID	Sample Name	Date Collected	Time Collected	G=Grab C=Comp	Matrix (see codes)	Program Area (see codes)	Total # Containers	Preservatives (see codes):	Preservation Codes / Bottle Types:	Notes / Comments
19-662F		08.26.19		Grab	O	n/a	1	0		21688-001
19-662W		08.26.19		Grab	O	n/a	1	G		21688-002
19-663F		08.26.19		Grab	O	n/a	1			21688-003
19-663W		08.26.19		Grab	O	n/a	1			21688-004
19-664F		08.26.19		Grab	O	n/a	1			21688-005
19-664W		08.26.19		Grab	O	n/a	1			21688-006
19-665F		08.26.19		Grab	O	n/a	1			21688-007
19-665W		08.26.19		Grab	O	n/a	1			21688-008
19-666F		08.26.19		Grab	O	n/a	1			21688-009
19-666W		08.26.19		Grab	O	n/a	1			21688-010

Auto Sampler Data (composite samples only):
 Date/Time Set On: _____ by whom: _____
 Meter Reading After: _____
 Date/Time Off: _____ by whom: _____
 Meter Reading Before: _____
 Difference: _____ X _____ (factor): _____

Standard	Turnaround Time Requested:	Project Location:	Relinquished By:	Received By:	Date:	Time (24hr):	Samples Received on Ice:
X		SC	<i>[Signature]</i>	<i>[Signature]</i>	9/9/19	1700	Y N N/A
Rush *		NC	<i>[Signature]</i>	<i>[Signature]</i>	9/10/19	10:15	Y N N/A
*Date Required		Other (Specify):					Y N N/A

Chain of Custody Page 1 of 2
 Received in lab by: _____
 Sample Temp. _____
 Receipt in Lab: _____ (°C) Ref: RT1 Ref: RT2

White Copy: Lab original / Canary Copy: Client Copy
 NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.



Access Analytical, Inc. - Irmo
 15 Thames Valley Rd. - Irmo, SC 29063
 Phone: 803-781-4243 / Fax: 803-781-4303 / www.axs-inc.com
 ACCESS ANALYTICAL, INC. SCDHEC Lab Certification # 32571

Chain of Custody Record

Access Lab Report #: 21688
 Sub Lab (if applicable): GEL / Sub Report #: 0

Client: Access Analytical, Inc.
Person: Ashley Amick
Address: 15 Thames Valley Rd.
City: Irmo
State: SC
Zip Code: 29063
Phone: 803-781-4243
Fax:
Email: oielreports@axs-inc.com
Project Name: Fish Tissue Analysis
Sampled By (Signature):

Preservatives (see codes): 0
Bottle Types (see codes): G

Preservation Codes / Bottle Types:
 *Preservative Codes:
 0 = None, 1 = HCL, 2 = HNO3, 3 = H2SO4, 4 = NaOH, 5 = Na2O2, 6 = Method 5035 set w/ NaHSO4 & CH3OH, 7 = NaOH/ZnOAC, 8 = H3PO4, 9 = cooled to 56 C, 10 = cooled to 10 C, 11 = Amm.Cl, 12 = Ascorbic Acid / HCL, 13 = EDA
 *Matrix Codes:
 GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section)
 *Program Area Codes:
 CWA = Clean Water Act (for wastewaters), SDWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)
 *Container Type: G = Glass, P = Plastic

Lab ID	Sample Name	Date Collected	Time Collected	G-Grab (C-Comp)	Matrix (see codes)	Program Area (see codes)	Total # Containers	# Containers per Test >>	Notes / Comments
19-667F		08.26.19		Grab	O	n/a	1	1	21688-011
19-667W		08.26.19		Grab	O	n/a	1	1	21688-012
19-668F		08.26.19		Grab	O	n/a	1	1	21688-013
19-668W		08.26.19		Grab	O	n/a	1	1	21688-014
19-669F		08.26.19		Grab	O	n/a	1	1	21688-015
19-669W		08.26.19		Grab	O	n/a	1	1	21688-016
19-670F		08.26.19		Grab	O	n/a	1	1	21688-017
19-670W		08.26.19		Grab	O	n/a	1	1	21688-018

Auto Sampler Data (composite samples only):
 Date/Time Set On: _____ by whom: _____
 Date/Time Off: _____ by whom: _____
 Difference: _____ X _____ (factor): _____

Turnaround Time Requested:	Project Location:	Relinquished By:	Received By:	Date:	Time (24hr):	Samples Received on Ice:
X	SC	<i>[Signature]</i>	<i>[Signature]</i>	9/9/19	1700	Y N N/A
	NC	<i>[Signature]</i>	<i>[Signature]</i>	9/10/19	10:15	Y N N/A
	Other (Specify):					Y N N/A

Chain of Custody Page 2 of 2
 Received in lab by: _____
 Sample Temp: _____
 Receipt in Lab: _____ (°C) Ref: RT1 Ref: RT2
 White Copy: Lab original / Canary Copy: Client Copy
 NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.



Laboratories LLC

41

SAMPLE RECEIPT & REVIEW FORM

Client: ACAL SDG/AR/COC/Work Order: 489537

Received By: JJA Date Received: 9/11/19

Carrier and Tracking Number: FedEx Express 5035 7508 0105

Suspected Hazard Information: *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.

A) Shipped as a DOT Hazardous? Hazard Class Shipped: UN#: If UN2910, is the Radioactive Shipment Survey Compliant? Yes No

B) Did the client designate the samples to be received as radioactive? COC notation or radioactive stickers on containers equal client designation.

C) Did the RSO classify the samples as radioactive? Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3

D) Did the client designate samples as hazardous? COC notation or hazard labels on containers equal client designation.

E) Did the RSO identify possible hazards? If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria: Yes NA No

1 Shipping containers received intact and sealed? Comments/Qualifiers (Required for Non-Conforming Items): Circle Applicable: Seals broken Damaged container Leaking container Other (describe)

2 Chain of custody documents included with shipment? Circle Applicable: Client contacted and provided COC COC created upon receipt

3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?* Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius TEMP: 2°

4 Daily check performed and passed on IR temperature gun? Temperature Device Serial #: 184-16 Secondary Temperature Device Serial # (If Applicable):

5 Sample containers intact and sealed? Circle Applicable: Seals broken Damaged container Leaking container Other (describe)

6 Samples requiring chemical preservation at proper pH? Sample ID's and Containers Affected:

7 Do any samples require Volatile Analysis? If Preservation added, Lot#: If Yes, are Encores or Soil Kits present for solids? Yes No NA (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes No NA (If unknown, select No) Are liquid VOA vials free of headspace? Yes No NA Sample ID's and containers affected:

8 Samples received within holding time? ID's and tests affected:

9 Sample ID's on COC match ID's on bottles? ID's and containers affected:

10 Date & time on COC match date & time on bottles? Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)

11 Number of containers received match number indicated on COC? Circle Applicable: No container count on COC Other (describe)

12 Are sample containers identifiable as GEL provided?

13 COC form is properly signed in relinquished/received sections? Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials [Signature] Date 9/11/19 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 24 September 2019

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122020-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-013
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-19-15
Utah NELAP	SC000122019-28
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
Access Analytical
SDG #: 489537

Product: Determination of Metals by ICP-MS

Analytical Method: SW846 3050B/6020

Analytical Procedure: GL-MA-E-014 REV# 33

Analytical Batch: 1914842

Preparation Method: SW846 3050B

Preparation Procedure: GL-MA-E-009 REV# 28

Preparation Batch: 1914841

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
489537001	19-662F
489537002	19-662W
489537003	19-663F
489537004	19-663W
489537005	19-664F
489537006	19-664W
489537007	19-665F
489537008	19-665W
489537009	19-666F
489537010	19-666W
489537011	19-667F
489537012	19-667W
489537013	19-668F
489537014	19-668W
489537015	19-669F
489537016	19-669W
489537017	19-670F
489537018	19-670W
1204376391	Method Blank (MB)ICP-MS
1204376392	Laboratory Control Sample (LCS)
1204376395	489537001(19-662FL) Serial Dilution (SD)
1204376393	489537001(19-662FD) Sample Duplicate (DUP)
1204376394	489537001(19-662FS) Matrix Spike (MS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Calibration Information

ICSA/ICSAB Statement

For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Technical Information

Preparation/Analytical Method Verification

Method SW-846 3050B is not a total digestion technique for most samples. It is a very strong acid digestion that will dissolve almost all elements that could become environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. The ICPMS solid samples in this SDG were diluted the standard two times.

Analyte	489537									
	001	002	003	004	005	006	007	008	009	010
Uranium	2X	2X	2X	2X	2X	2X	2X	2X	2X	2X

Analyte	489537							
	011	012	013	014	015	016	017	018
Uranium	2X	2X	2X	2X	2X	2X	2X	2X

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

ACAL001 Access Analytical

Client SDG: 489537 GEL Work Order: 489537

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- B Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:



Name: **Jamie Johnson**

Date: **24 SEP 2019**

Title: **Group Leader**

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537001

CLIENT ID: 19-662F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0127	mg/kg	U		MS	0.0127	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537002

CLIENT ID: 19-662W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537003

CLIENT ID: 19-663F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0132	mg/kg	U		MS	0.0132	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537004

CLIENT ID: 19-663W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537005

CLIENT ID: 19-664F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0126	mg/kg	U		MS	0.0126	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537006

CLIENT ID: 19-664W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0126	mg/kg	U	MS		0.0126	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537007

CLIENT ID: 19-665F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0125	mg/kg	U		MS	0.0125	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537008

CLIENT ID: 19-665W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0132	mg/kg	U		MS	0.0132	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537009

CLIENT ID: 19-666F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537010

CLIENT ID: 19-666W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0132	mg/kg	U		MS	0.0132	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537011

CLIENT ID: 19-667F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.012	mg/kg	U		MS	0.012	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537012

CLIENT ID: 19-667W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0121	mg/kg	U		MS	0.0121	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537013

CLIENT ID: 19-668F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537014

CLIENT ID: 19-668W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0121	mg/kg	U		MS	0.0121	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537015

CLIENT ID: 19-669F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0129	mg/kg	U		MS	0.0129	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537016

CLIENT ID: 19-669W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0122	mg/kg	U		MS	0.0122	2	ICPMS12	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537017

CLIENT ID: 19-670F

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0124	mg/kg	U		MS	0.0124	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 489537

METHOD TYPE: SW846

SAMPLE ID: 489537018

CLIENT ID: 19-670W

CONTRACT: ACAL00118

MATRIX:Tissue

DATE RECEIVED 10-SEP-19

LEVEL: Low

<u>CAS No</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>C</u>	<u>Qual</u>	<u>M*</u>	<u>MDL</u>	<u>DF</u>	<u>Inst ID</u>	<u>Analytical Run</u>
7440-61-1	Uranium	0.0131	mg/kg	U		MS	0.0131	2	ICPMS12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

Quality Control Summary

METALS
-2a-
Initial and Continuing Calibration Verification

SDG No: 489537

Contract: ACAL00118

Lab Code: GEL

Instrument ID: ICPMS12

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Acceptance Window (%R)</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
ICV01	Uranium	47.1	ug/L	50	ug/L	94.3	90.0 – 110.0	MS	23-SEP-19 17:59	190923-1
CCV01	Uranium	47.1	ug/L	50	ug/L	94.2	90.0 – 110.0	MS	23-SEP-19 18:16	190923-1
CCV02	Uranium	47.8	ug/L	50	ug/L	95.7	90.0 – 110.0	MS	23-SEP-19 18:26	190923-1
CCV03	Uranium	48.2	ug/L	50	ug/L	96.3	90.0 – 110.0	MS	23-SEP-19 19:31	190923-1
CCV04	Uranium	48.2	ug/L	50	ug/L	96.3	90.0 – 110.0	MS	23-SEP-19 20:04	190923-1
CCV05	Uranium	48.9	ug/L	50	ug/L	97.8	90.0 – 110.0	MS	23-SEP-19 20:38	190923-1
CCV06	Uranium	47.9	ug/L	50	ug/L	95.7	90.0 – 110.0	MS	23-SEP-19 21:09	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

METALS
 -2b-
 CRDL Standard for ICP & ICPMS

SDG No: 489537

Contract: ACAL00118

Lab Code: GEL

Instrument ID: ICPMS12

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Advisory Limits (%R)</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
CRDL01	Uranium	.195	ug/L	.2	ug/L	97.5	70.0 – 130.0	MS	23-SEP-19 18:06	190923-1

***Analytical Methods:**

MS SW846 3050B/6020

Metals
-3a-
Initial and Continuing Calibration Blank Summary

SDG No.: 489537

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Analyte</u>	<u>Result ug/L</u>	<u>Acceptance</u>	<u>Conc Qual</u>	<u>MDL</u>	<u>RDL</u>	<u>Matrix</u>	<u>M*</u>	<u>Analysis Date/Time</u>	<u>Run</u>
ICB01	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	23-SEP-19 18:03	190923-1
CCB01	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	23-SEP-19 18:20	190923-1
CCB02	Uranium	0.081	+/- .2	B	0.066	0.2	SOL	MS	23-SEP-19 18:30	190923-1
CCB03	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	23-SEP-19 19:34	190923-1
CCB04	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	23-SEP-19 20:08	190923-1
CCB05	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	23-SEP-19 20:42	190923-1
CCB06	Uranium	0.066	+/- .2	U	0.066	0.2	SOL	MS	23-SEP-19 21:12	190923-1

*Analytical Methods:

MS SW846 3050B/6020

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 489537
Contract: ACAL00118
Matrix: Tissue

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Acceptance Window</u>	<u>Conc Qual</u>	<u>M*</u>	<u>MDL</u>	<u>RDL</u>
1204376391	Uranium	0.0129	mg/kg	+/-0.0391	U	MS	0.0129	0.0391

*Analytical Methods:

MS SW846 3050B/6020

METALS
-4-
Interference Check Sample

SDG No: 489537

Contract: ACAL00118

Lab Code: GEL

Instrument: ICPMS12

<u>Sample ID</u>	<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>True Value</u>	<u>Units</u>	<u>% Recovery</u>	<u>Acceptance Window (%R)</u>	<u>Analysis Date/Time</u>	<u>Run Number</u>
ICSA01	Uranium	0.019	ug/L					23-SEP-19 18:09	190923-1
ICSAB01	Uranium	20.6	ug/L	20	ug/L	103	80.0 - 120.0	23-SEP-19 18:13	190923-1

METALS

-5a-

Matrix Spike Summary

SDG NO. 489537 Client ID: 19-662FS

Contract: ACAL00118 Level: Low

Matrix: TISSUE % Solids:

Sample ID: 489537001 Spike ID: 1204376394

<u>Analyte</u>	<u>Units</u>	<u>Acceptance Limit</u>	<u>Spiked Result</u>	<u>C</u>	<u>Sample Result</u>	<u>C</u>	<u>Spike Added</u>	<u>% Recovery</u>	<u>Qual</u>	<u>M*</u>
Uranium	mg/kg	75-125	4.24		0.0127	U	4.84	87.5		MS

*Analytical Methods:

MS SW846 3050B/6020

METALS

-7-

Laboratory Control Sample Summary

SDG NO. 489537

Contract: ACAL00118

Aqueous LCS Source:

Solid LCS Source: Inorganic Ventures

<u>Sample ID</u>	<u>Analyte</u>	<u>Units</u>	<u>True Value</u>	<u>Result</u>	<u>C</u>	<u>% Recovery</u>	<u>Acceptance Limit</u>	<u>M*</u>
1204376392	Uranium	mg/kg	4.92	4.81		97.8	33.6-166	MS

*Analytical Methods:

MS SW846 3050B/6020

METALS

-9-

Serial Dilution Sample Summary

SDG NO. 489537 Client ID: 19-662FL

Contract: ACAL00118

Matrix: SOLID Level: Low

Sample ID: 489537001 Serial Dilution ID: 1204376395

<u>Analyte</u>	<u>Initial Value</u> ug/L	<u>C</u>	<u>Serial Value</u> ug/L	<u>C</u>	<u>% Difference</u>	<u>Qual</u>	<u>Acceptance Limit</u>	<u>M*</u>
Uranium	.066	U	.33	U				MS

*Analytical Methods:

MS SW846 3050B/6020

METALS
-13-
SAMPLE PREPARATION SUMMARY

SDG No: 489537

Method Type: MS

Contract:

ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Client ID</u>	<u>Sample Type</u>	<u>Matrix</u>	<u>Prep Date</u>	<u>Initial Sample Size</u>	<u>Final Sample Volume</u>	<u>Percent Solids</u>
Batch Number	1914841						
1204376391	MB for batch 1914841	MB	T	13-SEP-19	.511g	50mL	
1204376392	LCS for batch 1914841	LCS	T	13-SEP-19	.508g	50mL	
1204376394	19-662FS	MS	T	13-SEP-19	.516g	50mL	
1204376393	19-662FD	DUP	T	13-SEP-19	.517g	50mL	
489537001	19-662F	SAMPLE	T	13-SEP-19	.518g	50mL	
489537002	19-662W	SAMPLE	T	13-SEP-19	.503g	50mL	
489537003	19-663F	SAMPLE	T	13-SEP-19	.501g	50mL	
489537004	19-663W	SAMPLE	T	13-SEP-19	.512g	50mL	
489537005	19-664F	SAMPLE	T	13-SEP-19	.524g	50mL	
489537006	19-664W	SAMPLE	T	13-SEP-19	.525g	50mL	
489537007	19-665F	SAMPLE	T	13-SEP-19	.529g	50mL	
489537008	19-665W	SAMPLE	T	13-SEP-19	.5g	50mL	
489537009	19-666F	SAMPLE	T	13-SEP-19	.504g	50mL	
489537010	19-666W	SAMPLE	T	13-SEP-19	.501g	50mL	
489537011	19-667F	SAMPLE	T	13-SEP-19	.55g	50mL	
489537012	19-667W	SAMPLE	T	13-SEP-19	.544g	50mL	
489537013	19-668F	SAMPLE	T	13-SEP-19	.512g	50mL	
489537014	19-668W	SAMPLE	T	13-SEP-19	.544g	50mL	
489537015	19-669F	SAMPLE	T	13-SEP-19	.51g	50mL	

SW846

METALS
-13-
SAMPLE PREPARATION SUMMARY

SDG No: 489537

Method Type: MS

Contract: ACAL00118

Lab Code: GEL

<u>Sample ID</u>	<u>Client ID</u>	<u>Sample Type</u>	<u>Matrix</u>	<u>Prep Date</u>	<u>Initial Sample Size</u>	<u>Final Sample Volume</u>	<u>Percent Solids</u>
489537016	19-669W	SAMPLE	T	13-SEP-19	.539g	50mL	
489537017	19-670F	SAMPLE	T	13-SEP-19	.531g	50mL	
489537018	19-670W	SAMPLE	T	13-SEP-19	.505g	50mL	

**Metals
-14-
Analysis Run Log**

Contract: ACAL00118

Lab Code : GEL

Inst Name: ICPMS12

Start Date: 23-SEP-19

End Date: 23-SEP-19

Client Sdg: 489537

Instrument Type:MS

Data File: 190923-1

Samp ID	D/F	Run Time	U
S0.0	1	17:49:42	X
S10	1	17:53:05	X
S100	1	17:56:27	X
ICV01	1	17:59:50	X
ICB01	1	18:03:14	X
CRDL01	1	18:06:35	X
ICSA01	1	18:09:58	X
ICSAB01	1	18:13:21	X
CCV01	1	18:16:45	X
CCB01	1	18:20:07	X
LR01	1	18:23:30	X
CCV02	1	18:26:54	X
CCB02	1	18:30:16	X
ZZZZZ	1	18:33:40	
ZZZZZ	1	18:37:01	
ZZZZZ	1	18:40:24	
ZZZZZ	1	18:43:47	
ZZZZZ	1	18:47:09	
ZZZZZ	5	18:50:30	
ZZZZZ	1	18:53:53	
ZZZZZ	1	18:57:15	
CCV	1	19:00:39	X
CCB	1	19:04:02	X
ZZZZZ	1	19:07:27	
ZZZZZ	1	19:10:50	
ZZZZZ	1	19:14:12	
ZZZZZ	1	19:17:35	
ZZZZZ	1	19:20:58	
ZZZZZ	1	19:24:20	
ZZZZZ	1	19:27:43	
CCV03	1	19:31:07	X
CCB03	1	19:34:30	X
1204376391	2	19:37:54	X
1204376392	2	19:41:17	X
489537001	2	19:44:40	X
1204376393	2	19:48:03	X
1204376394	2	19:51:26	X
1204376395	10	19:54:48	X
489537002	2	19:58:12	X
489537003	2	20:01:34	X
CCV04	1	20:04:57	X

Metals
-14-
Analysis Run Log

Contract: ACAL00118**Lab Code :** GEL**Inst Name:** ICPMS12**Start Date:** 23-SEP-19**End Date:** 23-SEP-19**Client Sdg:** 489537**Instrument Type:** MS**Data File:** 190923-1

Samp ID	D/F	Run Time	U
CCB04	1	20:08:21	X
489537004	2	20:11:44	X
489537005	2	20:15:07	X
489537006	2	20:18:29	X
489537007	2	20:21:51	X
489537008	2	20:25:14	X
489537009	2	20:28:37	X
489537010	2	20:32:00	X
489537011	2	20:35:22	X
CCV05	1	20:38:46	X
CCB05	1	20:42:09	X
489537012	2	20:45:33	X
489537013	2	20:48:55	X
489537014	2	20:52:18	X
489537015	2	20:55:41	X
489537016	2	20:59:04	X
489537017	2	21:02:27	X
489537018	2	21:05:50	X
CCV06	1	21:09:15	X
CCB06	1	21:12:38	X

Standards

METALS
-10-
Instrument Detection Limits

SDG NO. 489537

Contract: ACAL00118

Lab Code: GEL

MDL

Effective Date: 01-SEP-16

Instrument(s):

ICPMS12

Verified on:

20-SEP-19

		<u>Wavelength</u> <u>(nm)</u>	<u>MDL</u> <u>ug/L</u>	<u>RDL</u> <u>ug/L</u>
ICP/MS	<u>Analyte</u>			
SOLID	Uranium		0.066	0.2

METALS
-12-
Linear Ranges

SDG NO. 489537

Contract: ACAL00118

Lab Code: GEL

Instrument ID ICPMS12

<u>Analyte</u>	<u>Integration Time (msec)</u>	<u>LDR</u>	<u>Units</u>	<u>Effective Date</u>
Uranium	1000	5000	ug/L	01-AUG-17

Raw Data

ICPMS #12 Daily Performance

Sample ID: Sample

Sample Date/Time: Monday, September 23, 2019 11:06:30

Sample Description:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\Daily 2.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\DEFAULT1\Sample.1232

Mass Calibration File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\MassCal\default2.tun

Dual Detector Mode: Pulse

Acquisition Date/Time&Time Zone: Monday, September 23, 2019 11:06:30 Eastern Daylight Time

Number of Replicates: 5

Summary

Analyte	Mass	Meas. Intens.	Mean	Net Intens.	Mean	Net Intens.	SD	Net Intens.	RSD
Be	9.0	24970.5		24970.505		163.246		0.7	
Mg	24.0	296590.4		296590.381		1995.261		0.7	
Co	58.9	79992.0		79992.034		348.606		0.4	
Rh	102.9	68226.3		68226.291		1472.273		2.2	
In	114.9	182232.9		182232.869		990.210		0.5	
Pb	208.0	144515.8		144515.796		460.729		0.3	
[> Ba	137.9	235300.8		235300.780		863.829		0.4	
[Ba++	69.0	2095.9		0.009		0.000		1.5	
[> Ce	139.9	297710.8		297710.785		763.892		0.3	
[CeO	155.9	4204.0		0.014		0.000		2.2	
Bkgd	220.0	0.0		0.000		0.000			

Current Conditions

C Val	Description
0.93	Nebulizer Gas Flow STD/KED [NEB]
1.20	Auxiliary Gas Flow
18.00	Plasma Gas Flow
-12.00	Deflector Voltage
1600.00	ICP RF Power
-1550.00	Analog Stage Voltage
1000.00	Pulse Stage Voltage
0.00	Quadrupole Rod Offset STD [QRO]
-16.00	Cell Rod Offset STD [CRO]
8.00	Discriminator Threshold
-8.00	Cell Entrance/Exit Voltage STD
0.00	RPa
0.45	RPq
0.94	DRC Mode NEB
-9.00	DRC Mode QRO
-2.00	DRC Mode CRO
-7.00	DRC Mode Cell Entrance/Exit Voltage
0.60	Cell Gas A
200.00	Axial Field Voltage
-16.00	KED Mode CRO
-12.50	KED Mode QRO
-5.00	KED Mode Cell Entrance Voltage
-31.00	KED Mode Cell Exit Voltage
3.00	KED Cell Gas A
0.00	KED RPa
0.25	KED RPq
475.00	KED Mode Axial Field Voltage

Current Autolens Data

Sample ID: Sample

Report Date/Time: Monday, September 23, 2019 11:10:33

Page 1
Page 52 of 202 SDG: 489537

Analyte	Mass	Num of Pts	DAC Value	Maximum Intensity
Be	9.012	41	-17.5	3422.4
Mg	23.985	41	-14.5	20789.1
In	114.904	41	-10.0	21702.5
Ce	139.905	41	-9.0	28626.7
Pb	207.977	41	-6.0	16331.3
U	238.050	41	-6.5	30458.4

ICPMS #12 Instrument Tuning Report

Analyte	Exact Mass	Meas. Mass	Mass DAC	Res DAC	Meas. Pk. Width
Be	9.0	9.0	1638	2065	0.680
Mg	24.0	24.0	4623	2065	0.677
Mg	25.0	25.0	4819	2067	0.678
Mg	26.0	26.0	5014	2067	0.669
Co	58.9	58.9	11595	2067	0.679
Rh	102.9	102.9	20379	2067	0.682
In	114.9	114.9	22778	2069	0.690
Ce	139.9	139.9	27780	2071	0.683
Pb	206.0	206.0	40993	2071	0.751
Pb	207.0	207.0	41174	2071	0.699
Pb	208.0	208.0	41394	2071	0.712
U	238.1	238.0	47391	2067	0.751

ICPMS #12 - Summary Report

Sample ID: Cal Blank

Sample Date/Time: Monday, September 23, 2019 17:49:42

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\Cal Blank.039

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7		ug/L		35.333	
Be	9		ug/L		5.000	
B	11		ug/L		582.012	
Na	23		ug/L		7233.165	
Mg	24		ug/L		130.667	
Al	27		ug/L		272.003	
P	31		ug/L		220.002	
K	39		ug/L		14440.638	
Ca	44		ug/L		151.334	
>Sc	45		ug/L		430778.319	
Ti	47		ug/L		8.000	
V	51		ug/L		6709.577	
Cr	52		ug/L		231.335	
Cr	53		ug/L		2420.872	
Mn	55		ug/L		57.333	
Fe	57		ug/L		58.667	
Co	59		ug/L		30.667	
Ni	60		ug/L		37.333	
Cu	63		ug/L		60.000	
Cu	65		ug/L		29.333	
Zn	66		ug/L		414.673	
Zn	67		ug/L		72.000	
Zn	68		ug/L		261.336	
>Ge	74		ug/L		229980.805	
As	75		ug/L		211.113	
Se	77		ug/L		92.667	
Se	78		ug/L		60.322	
Se	82		ug/L		24.000	
Kr	83		ug/L		11.333	
Sr	88		ug/L		62.000	
Zr	90		ug/L		218.002	
Mo	98		ug/L		19.488	
Ag	107		ug/L		10.000	
Cd	111		ug/L		11.333	
Cd	114		ug/L		11.316	
>In	115		ug/L		256774.761	
Sn	120		ug/L		529.284	
Sb	121		ug/L		45.333	
Sb	123		ug/L		31.413	
Ba	135		ug/L		8.000	
Ba	137		ug/L		22.667	
>Lu	175		ug/L		830805.805	
Tl	205		ug/L		162.668	
Pb	208		ug/L		357.335	
Th	232		ug/L		1537.418	
U	238		ug/L		119.000	

Sample ID: Cal Blank

Report Date/Time: Monday, September 23, 2019 17:51:32

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Simple Linear	
Be	9Simple Linear	
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Simple Linear	
P	31Simple Linear	
K	39Simple Linear	
Ca	44Linear Thru Zero	0.9999
Sc	45Linear Thru Zero	
Ti	47Simple Linear	
V	51Simple Linear	
Cr	52Simple Linear	
Cr	53Simple Linear	
Mn	55Simple Linear	
Fe	57Simple Linear	
Co	59Simple Linear	
Ni	60Simple Linear	
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Simple Linear	
Se	77Simple Linear	
Se	78Simple Linear	
Se	82Simple Linear	
Kr	83Simple Linear	
Sr	88Linear Thru Zero	1.0000
Zr	90Simple Linear	
Mo	98Simple Linear	
Ag	107Simple Linear	
Cd	111Simple Linear	
Cd	114Simple Linear	
In	115Linear Thru Zero	
Sn	120Simple Linear	
Sb	121Simple Linear	
Sb	123Simple Linear	
Ba	135Simple Linear	
Ba	137Simple Linear	
Lu	175Simple Linear	
Tl	205Simple Linear	
Pb	208Simple Linear	
Th	232Simple Linear	
U	238Simple Linear	

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li		7				
|	Be		9				
|	B		11				
|	Na		23				
|	Mg		24				
|	Al		27				
|	P		31				
|	K		39				
|	Ca		44				
>	Sc		45				
|	Ti		47				
|	V		51				
|	Cr		52				
|	Cr		53				
|	Mn		55				
|	Fe		57				
|	Co		59				
|	Ni		60				
|	Cu		63				
|	Cu		65				
[	Zn		66				
|	Zn		67				
|	Zn		68				
>	Ge		74				
|	As		75				
|	Se		77				
|	Se		78				
|	Se		82				
|	Kr		83				
[	Sr		88				
|	Zr		90				
|	Mo		98				
|	Ag		107				
|	Cd		111				
|	Cd		114				
>	In		115				
|	Sn		120				
|	Sb		121				
[	Sb		123				
|	Ba		135				
|	Ba		137				
>	Lu		175				
|	Tl		205				
|	Pb		208				
|	Th		232				
[	U		238				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: Standard 1

Sample Date/Time: Monday, September 23, 2019 17:53:05

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\Standard 1.040

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	10.000	ug/L	2.898	7200.482	0.017
Be	9	10.000	ug/L	0.623	2647.579	0.006
B	11	20.000	ug/L	5.812	3213.028	0.006
Na	23	1000.000	ug/L	1.329	677759.596	1.561
Mg	24	1000.000	ug/L	2.365	331893.927	0.772
Al	27	1000.000	ug/L	2.096	262101.834	0.609
P	31	1000.000	ug/L	2.294	22133.805	0.051
K	39	1000.000	ug/L	1.980	304838.752	0.676
Ca	44	1000.000	ug/L	4.772	15059.945	0.035
>Sc	45		ug/L		429613.883	429613.883
Ti	47	10.000	ug/L	7.045	726.685	0.002
V	51	10.000	ug/L	3.244	25162.148	0.043
Cr	52	10.000	ug/L	1.921	22353.478	0.051
Cr	53		ug/L		5266.971	0.007
Mn	55	10.000	ug/L	1.573	13182.080	0.031
Fe	57	1000.000	ug/L	3.886	44706.573	0.104
Co	59	10.000	ug/L	1.288	35017.539	0.081
Ni	60	10.000	ug/L	6.680	9860.745	0.023
Cu	63		ug/L		25868.071	0.060
Cu	65	10.000	ug/L	2.321	12084.444	0.028
Zn	66	10.000	ug/L	4.604	3629.795	0.014
Zn	67		ug/L		577.345	0.002
Zn	68		ug/L		2726.261	0.011
>Ge	74		ug/L		229023.982	229023.982
As	75	10.000	ug/L	0.656	2090.375	0.008
Se	77		ug/L		163.334	0.000
Se	78	10.000	ug/L	5.611	309.044	0.001
Se	82		ug/L		125.334	0.000
Kr	83		ug/L		9.600	-0.000
Sr	88	10.000	ug/L	2.146	16705.096	0.067
Zr	90	10.000	ug/L	2.018	19956.599	0.079
Mo	98	10.000	ug/L	0.888	12701.371	0.051
Ag	107	10.000	ug/L	0.961	31303.596	0.125
Cd	111	10.000	ug/L	3.993	4964.196	0.020
Cd	114		ug/L		13082.065	0.052
>In	115		ug/L		249582.076	249582.076
Sn	120	10.000	ug/L	2.220	22635.198	0.089
Sb	121	10.000	ug/L	1.267	15326.886	0.061
Sb	123		ug/L		12602.971	0.050
Ba	135		ug/L		4590.739	0.006
Ba	137	10.000	ug/L	1.886	8265.724	0.010
>Lu	175		ug/L		823199.541	823199.541
Tl	205	10.000	ug/L	2.004	140441.056	0.170
Pb	208	10.000	ug/L	0.834	179951.262	0.218
Th	232	10.000	ug/L	0.460	201599.212	0.243
U	238	10.000	ug/L	1.116	227092.543	0.276

Sample ID: Standard 1

Report Date/Time: Monday, September 23, 2019 17:54:55

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li		7				
|	Be		9				
|	B		11				
|	Na		23				
|	Mg		24				
|	Al		27				
|	P		31				
|	K		39				
|	Ca		44				
>	Sc		45				
|	Ti		47				
|	V		51				
|	Cr		52				
|	Cr		53				
|	Mn		55				
|	Fe		57				
|	Co		59				
|	Ni		60				
|	Cu		63				
|	Cu		65				
|	Zn		66				
|	Zn		67				
|	Zn		68				
>	Ge		74				
|	As		75				
|	Se		77				
|	Se		78				
|	Se		82				
|	Kr		83				
|	Sr		88				
|	Zr		90				
|	Mo		98				
|	Ag		107				
|	Cd		111				
|	Cd		114				
>	In		115				
|	Sn		120				
|	Sb		121				
|	Sb		123				
|	Ba		135				
|	Ba		137				
>	Lu		175				
|	Tl		205				
|	Pb		208				
|	Th		232				
|	U		238				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: Standard 2

Sample Date/Time: Monday, September 23, 2019 17:56:27

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\Standard 2.041

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	99.981	ug/L	1.185	70287.164	0.164
Be	9	99.957	ug/L	0.436	25293.374	0.059
B	11	200.023	ug/L	4.137	27187.872	0.062
Na	23	10000.895	ug/L	0.450	6767077.801	15.751
Mg	24	10003.224	ug/L	0.859	3425832.898	7.982
Al	27	10002.755	ug/L	0.401	2690751.141	6.269
P	31	9998.983	ug/L	0.802	216926.159	0.505
K	39	10000.977	ug/L	1.057	2945024.911	6.828
Ca	44	9990.318	ug/L	2.709	135819.605	0.316
>Sc	45		ug/L		429180.925	429180.925
Ti	47	99.976	ug/L	1.374	7014.388	0.016
V	51	99.972	ug/L	0.961	186174.905	0.418
Cr	52	99.993	ug/L	2.665	219640.570	0.511
Cr	53		ug/L		27753.620	0.059
Mn	55	99.954	ug/L	2.534	125315.369	0.292
Fe	57	9999.625	ug/L	1.694	444387.077	1.035
Co	59	99.980	ug/L	0.900	342684.289	0.798
Ni	60	99.955	ug/L	2.447	93940.577	0.219
Cu	63		ug/L		245559.116	0.572
Cu	65	99.965	ug/L	2.952	116372.204	0.271
Zn	66	99.975	ug/L	1.243	31174.646	0.137
Zn	67		ug/L		4944.189	0.022
Zn	68		ug/L		22251.321	0.098
>Ge	74		ug/L		224580.886	224580.886
As	75	99.970	ug/L	0.501	18095.231	0.080
Se	77		ug/L		759.354	0.003
Se	78	99.971	ug/L	1.082	2429.203	0.011
Se	82		ug/L		1228.053	0.005
Kr	83		ug/L		11.067	-0.000
Sr	88	100.025	ug/L	1.600	168976.155	0.684
Zr	90	99.989	ug/L	1.000	193447.192	0.782
Mo	98	100.019	ug/L	2.196	127976.607	0.518
Ag	107	99.957	ug/L	0.088	296709.208	1.201
Cd	111	99.995	ug/L	1.109	48791.180	0.198
Cd	114		ug/L		127430.855	0.516
>In	115		ug/L		246984.276	246984.276
Sn	120	99.991	ug/L	1.409	217501.267	0.879
Sb	121	99.981	ug/L	0.615	148478.398	0.601
Sb	123		ug/L		123249.579	0.499
Ba	135		ug/L		44980.709	0.054
Ba	137	99.985	ug/L	2.712	81908.164	0.099
>Lu	175		ug/L		830305.916	830305.916
Tl	205	99.962	ug/L	1.625	1362509.545	1.641
Pb	208	99.965	ug/L	1.820	1749854.657	2.107
Th	232	100.052	ug/L	4.938	2131869.977	2.565
U	238	100.046	ug/L	1.479	2400945.712	2.892

Sample ID: Standard 2

Report Date/Time: Monday, September 23, 2019 17:58:17

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li		7				
|	Be		9				
|	B		11				
|	Na		23				
|	Mg		24				
|	Al		27				
|	P		31				
|	K		39				
|	Ca		44				
>	Sc		45				
|	Ti		47				
|	V		51				
|	Cr		52				
|	Cr		53				
|	Mn		55				
|	Fe		57				
|	Co		59				
|	Ni		60				
|	Cu		63				
|	Cu		65				
|	Zn		66				
|	Zn		67				
|	Zn		68				
>	Ge		74				
|	As		75				
|	Se		77				
|	Se		78				
|	Se		82				
|	Kr		83				
|	Sr		88				
|	Zr		90				
|	Mo		98				
|	Ag		107				
|	Cd		111				
|	Cd		114				
>	In		115				
|	Sn		120				
|	Sb		121				
|	Sb		123				
|	Ba		135				
|	Ba		137				
>	Lu		175				
|	Tl		205				
|	Pb		208				
|	Th		232				
|	U		238				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 1

Sample Date/Time: Monday, September 23, 2019 17:59:50

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 1.042

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	50.688	ug/L	2.464	35920.463	0.083
Be	9	51.322	ug/L	3.974	13081.990	0.030
B	11	101.892	ug/L	6.903	14233.101	0.032
Na	23	5022.375	ug/L	3.321	3427016.865	7.910
Mg	24	4721.124	ug/L	3.747	1628480.330	3.767
Al	27	4790.152	ug/L	2.504	1298073.797	3.002
P	31	4978.074	ug/L	1.942	108900.211	0.251
K	39	4730.018	ug/L	2.478	1410679.164	3.229
Ca	44	4717.663	ug/L	4.323	64678.872	0.149
>Sc	45		ug/L		432388.857	432388.857
Ti	47	48.923	ug/L	4.082	3461.753	0.008
V	51	50.385	ug/L	3.167	97843.999	0.211
Cr	52	49.611	ug/L	2.625	109898.475	0.254
Cr	53		ug/L		15228.123	0.030
Mn	55	50.119	ug/L	3.439	63335.520	0.146
Fe	57	4906.787	ug/L	5.039	219652.827	0.508
Co	59	50.258	ug/L	1.635	173544.438	0.401
Ni	60	50.192	ug/L	2.244	47540.982	0.110
Cu	63		ug/L		127376.428	0.294
Cu	65	52.762	ug/L	2.811	61902.568	0.143
Zn	66	50.624	ug/L	2.480	16137.112	0.069
Zn	67		ug/L		2632.243	0.011
Zn	68		ug/L		11475.941	0.049
>Ge	74		ug/L		226715.552	226715.552
As	75	50.623	ug/L	2.820	9351.950	0.040
Se	77		ug/L		442.007	0.002
Se	78	49.474	ug/L	3.542	1243.454	0.005
Se	82		ug/L		664.015	0.003
Kr	83		ug/L		10.933	-0.000
Sr	88	49.448	ug/L	0.228	84402.615	0.338
Zr	90	47.894	ug/L	2.986	93680.997	0.375
Mo	98	49.200	ug/L	2.744	63584.202	0.255
Ag	107	49.611	ug/L	2.361	148706.779	0.596
Cd	111	49.439	ug/L	0.371	24368.768	0.098
Cd	114		ug/L		64883.701	0.260
>In	115		ug/L		249426.264	249426.264
Sn	120	50.400	ug/L	0.755	110973.262	0.443
Sb	121	49.625	ug/L	1.353	74442.805	0.298
Sb	123		ug/L		61670.514	0.247
Ba	135		ug/L		22696.019	0.028
Ba	137	50.416	ug/L	0.468	41062.263	0.050
>Lu	175		ug/L		825069.328	825069.328
Tl	205	49.211	ug/L	0.785	666699.181	0.808
Pb	208	49.293	ug/L	0.401	857729.843	1.039
Th	232	49.900	ug/L	2.010	1056802.693	1.279
U	238	47.128	ug/L	0.527	1124054.315	1.362

Sample ID: QC Std 1

Report Date/Time: Monday, September 23, 2019 18:01:41

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % DD	Duplicate Rel. % Difference
[	Li	7	101.376				
|	Be	9	102.644				
|	B	11	101.892				
|	Na	23	100.447				
|	Mg	24	94.422				
|	Al	27	94.854				
|	P	31	99.561				
|	K	39	94.600				
|	Ca	44	94.353				
>	Sc	45		100.37			
|	Ti	47	97.846				
|	V	51	100.771				
|	Cr	52	99.223				
|	Cr	53					
|	Mn	55	100.237				
|	Fe	57	98.136				
|	Co	59	100.516				
|	Ni	60	100.383				
|	Cu	63					
|	Cu	65	105.524				
[	Zn	66	101.248				
|	Zn	67					
|	Zn	68					
>	Ge	74		98.58			
|	As	75	101.245				
|	Se	77					
|	Se	78	98.949				
|	Se	82					
[	Kr	83					
[	Sr	88	98.896				
|	Zr	90	95.788				
|	Mo	98	98.401				
|	Ag	107	99.221				
|	Cd	111	98.877				
|	Cd	114					
>	In	115		97.14			
|	Sn	120	100.799				
|	Sb	121	99.251				
[	Sb	123					
[	Ba	135					
|	Ba	137	100.832				
>	Lu	175		99.31			
|	Tl	205	98.422				
|	Pb	208	98.586				
|	Th	232	99.800				
[	U	238	94.256				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 2

Sample Date/Time: Monday, September 23, 2019 18:03:14

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 2.043

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.004	ug/L	84.495	32.000	-0.000
Be	9	0.012	ug/L	59.450	8.000	0.000
B	11	2.117	ug/L	6.527	854.026	0.001
Na	23	-1.182	ug/L	14.355	6351.412	-0.002
Mg	24	0.196	ug/L	24.346	195.335	0.000
Al	27	0.252	ug/L	15.073	336.004	0.000
P	31	1.626	ug/L	72.222	252.002	0.000
K	39	2.559	ug/L	52.347	15007.218	0.002
Ca	44	1.046	ug/L	285.745	164.001	0.000
>Sc	45		ug/L		425471.081	425471.081
Ti	47	-0.008	ug/L	189.784	7.333	-0.000
V	51	-0.221	ug/L	20.890	6232.026	-0.001
Cr	52	-0.005	ug/L	129.759	218.002	-0.000
Cr	53		ug/L		2146.828	-0.001
Mn	55	-0.005	ug/L	303.244	50.000	-0.000
Fe	57	0.758	ug/L	34.727	91.334	0.000
Co	59	0.002	ug/L	187.986	36.667	0.000
Ni	60	0.023	ug/L	28.659	58.000	0.000
Cu	63		ug/L		57.333	-0.000
Cu	65	0.003	ug/L	425.720	32.667	0.000
Zn	66	0.103	ug/L	111.410	442.674	0.000
Zn	67		ug/L		68.667	-0.000
Zn	68		ug/L		277.336	0.000
>Ge	74		ug/L		227526.771	227526.771
As	75	-0.002	ug/L	1460.041	208.446	-0.000
Se	77		ug/L		89.334	-0.000
Se	78	0.347	ug/L	30.853	67.991	0.000
Se	82		ug/L		19.333	-0.000
Kr	83		ug/L		9.067	-0.000
Sr	88	-0.007	ug/L	32.475	48.000	-0.000
Zr	90	0.134	ug/L	21.801	472.675	0.001
Mo	98	0.035	ug/L	45.903	63.790	0.000
Ag	107	0.000	ug/L	1189.932	10.000	0.000
Cd	111	-0.010	ug/L	40.746	6.000	-0.000
Cd	114		ug/L		10.915	-0.000
>In	115		ug/L		248639.311	248639.311
Sn	120	-0.046	ug/L	14.406	412.579	-0.000
Sb	121	0.014	ug/L	61.958	65.333	0.000
Sb	123		ug/L		47.744	0.000
Ba	135		ug/L		10.667	0.000
Ba	137	-0.008	ug/L	61.112	15.333	-0.000
>Lu	175		ug/L		810622.646	810622.646
Tl	205	0.036	ug/L	14.859	642.015	0.001
Pb	208	0.002	ug/L	129.640	377.335	0.000
Th	232	0.150	ug/L	15.638	4624.088	0.004
U	238	0.007	ug/L	25.682	279.003	0.000

Sample ID: QC Std 2

Report Date/Time: Monday, September 23, 2019 18:05:04

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		98.77			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		98.93			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		96.83			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		97.57			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 3

Sample Date/Time: Monday, September 23, 2019 18:06:35

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 3.044

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	10.320	ug/L	1.680	7371.902	0.017
Be	9	0.520	ug/L	2.821	138.001	0.000
B	11	15.174	ug/L	3.197	2628.909	0.005
Na	23	242.161	ug/L	1.698	172883.295	0.381
Mg	24	29.096	ug/L	0.870	10212.316	0.023
Al	27	52.387	ug/L	2.469	14530.055	0.033
P	31	49.695	ug/L	5.092	1311.394	0.003
K	39	292.820	ug/L	2.648	101358.437	0.200
Ca	44	235.044	ug/L	6.610	3381.735	0.007
>Sc	45		ug/L		434191.176	434191.176
Ti	47	9.863	ug/L	1.799	707.351	0.002
V	51	20.528	ug/L	1.440	44047.139	0.086
Cr	52	10.016	ug/L	1.191	22471.662	0.051
Cr	53		ug/L		4862.162	0.006
Mn	55	5.238	ug/L	1.808	6699.571	0.015
Fe	57	103.409	ug/L	1.111	4708.109	0.011
Co	59	1.021	ug/L	3.308	3571.780	0.008
Ni	60	2.147	ug/L	2.652	2078.818	0.005
Cu	63		ug/L		5370.343	0.012
Cu	65	2.211	ug/L	2.906	2633.576	0.006
Zn	66	22.200	ug/L	4.372	7585.349	0.030
Zn	67		ug/L		1190.716	0.005
Zn	68		ug/L		5396.353	0.022
>Ge	74		ug/L		235376.928	235376.928
As	75	5.164	ug/L	2.486	1184.716	0.004
Se	77		ug/L		117.334	0.000
Se	78	5.438	ug/L	5.994	196.852	0.001
Se	82		ug/L		85.334	0.000
Kr	83		ug/L		11.467	-0.000
Sr	88	9.907	ug/L	4.096	17550.782	0.068
Zr	90	9.420	ug/L	2.558	19249.630	0.074
Mo	98	0.965	ug/L	1.334	1310.964	0.005
Ag	107	0.997	ug/L	2.072	3103.670	0.012
Cd	111	0.969	ug/L	5.683	505.342	0.002
Cd	114		ug/L		1340.563	0.005
>In	115		ug/L		258240.026	258240.026
Sn	120	4.931	ug/L	3.282	11718.096	0.043
Sb	121	2.662	ug/L	2.255	4177.277	0.016
Sb	123		ug/L		3450.664	0.013
Ba	135		ug/L		1874.790	0.002
Ba	137	3.996	ug/L	0.606	3325.720	0.004
>Lu	175		ug/L		837791.267	837791.267
Tl	205	1.988	ug/L	2.123	27502.451	0.033
Pb	208	2.064	ug/L	1.229	36817.924	0.044
Th	232	2.027	ug/L	2.292	45066.316	0.052
U	238	0.195	ug/L	2.325	4849.156	0.006

Sample ID: QC Std 3

Report Date/Time: Monday, September 23, 2019 18:08:26

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	103.197				
|	Be	9	103.901				
|	B	11	101.162				
|	Na	23	96.865				
|	Mg	24	96.985				
|	Al	27	104.774				
|	P	31	99.390				
|	K	39	97.607				
|	Ca	44	117.522				
>	Sc	45		100.79			
|	Ti	47	98.625				
|	V	51	102.642				
|	Cr	52	100.160				
|	Cr	53					
|	Mn	55	104.762				
|	Fe	57	103.409				
|	Co	59	102.118				
|	Ni	60	107.369				
|	Cu	63					
|	Cu	65	110.564				
[	Zn	66	111.001				
|	Zn	67					
|	Zn	68					
>	Ge	74		102.35			
|	As	75	103.289				
|	Se	77					
|	Se	78	108.769				
|	Se	82					
[	Kr	83					
[	Sr	88	99.066				
|	Zr	90	94.200				
|	Mo	98	96.522				
|	Ag	107	99.698				
|	Cd	111	96.901				
|	Cd	114					
>	In	115		100.57			
|	Sn	120	98.628				
|	Sb	121	88.738				
[	Sb	123					
[	Ba	135					
|	Ba	137	99.890				
>	Lu	175		100.84			
|	Tl	205	99.397				
|	Pb	208	103.203				
|	Th	232	101.328				
[	U	238	97.652				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 4

Sample Date/Time: Monday, September 23, 2019 18:09:58

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 4.045

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.021	ug/L	26.224	46.000	0.000
Be	9	0.022	ug/L	12.078	9.667	0.000
B	11	0.354	ug/L	61.831	574.012	0.000
Na	23	104196.550	ug/L	1.906	64495382.136	164.103
Mg	24	98948.437	ug/L	1.288	31027456.245	78.956
Al	27	100454.111	ug/L	2.602	24743850.030	62.958
P	31	100955.591	ug/L	2.394	2003762.619	5.098
K	39	101013.134	ug/L	1.576	27116147.185	68.964
Ca	44	96135.927	ug/L	2.707	1195463.620	3.042
>Sc	45		ug/L		392986.850	392986.850
Ti	47	2025.513	ug/L	0.568	129992.779	0.331
V	51	-0.338	ug/L	33.566	5563.750	-0.001
Cr	52	0.700	ug/L	5.456	1618.092	0.004
Cr	53		ug/L		2201.503	-0.000
Mn	55	6.993	ug/L	2.953	8077.617	0.020
Fe	57	101902.439	ug/L	1.640	4146395.105	10.551
Co	59	0.240	ug/L	7.587	780.021	0.002
Ni	60	0.284	ug/L	11.254	278.669	0.001
Cu	63		ug/L		264.002	0.001
Cu	65	0.147	ug/L	26.873	184.001	0.000
Zn	66	1.504	ug/L	13.275	758.687	0.002
Zn	67		ug/L		117.334	0.000
Zn	68		ug/L		433.340	0.001
>Ge	74		ug/L		196286.302	196286.302
As	75	0.421	ug/L	22.844	246.002	0.000
Se	77		ug/L		114.000	0.000
Se	78	0.744	ug/L	4.890	66.899	0.000
Se	82		ug/L		19.333	-0.000
Kr	83		ug/L		14.267	0.000
Sr	88	3.069	ug/L	2.002	4684.102	0.021
Zr	90	1.485	ug/L	11.172	2751.600	0.012
Mo	98	2179.452	ug/L	1.011	2491253.866	11.291
Ag	107	0.021	ug/L	25.884	63.333	0.000
Cd	111	0.678	ug/L	3.411	305.337	0.001
Cd	114		ug/L		584.473	0.003
>In	115		ug/L		220654.649	220654.649
Sn	120	-0.038	ug/L	41.652	380.604	-0.000
Sb	121	0.071	ug/L	3.249	133.334	0.000
Sb	123		ug/L		110.662	0.000
Ba	135		ug/L		134.667	0.000
Ba	137	0.311	ug/L	2.053	236.669	0.000
>Lu	175		ug/L		707826.511	707826.511
Tl	205	0.017	ug/L	9.941	331.337	0.000
Pb	208	0.130	ug/L	1.988	2250.070	0.003
Th	232	0.832	ug/L	23.829	16401.702	0.021
U	238	0.019	ug/L	6.174	491.675	0.001

Sample ID: QC Std 4

Report Date/Time: Monday, September 23, 2019 18:11:48

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23	104.197				
|	Mg	24	98.948				
|	Al	27	100.454				
|	P	31	100.956				
|	K	39	101.013				
|	Ca	44	96.136				
>	Sc	45		91.23			
|	Ti	47	101.276				
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55	123.232				
|	Fe	57	101.902				
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		85.35			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88	102.286				
|	Zr	90					
|	Mo	98	108.973				
|	Ag	107					
|	Cd	111	68.858				
|	Cd	114					
>	In	115		85.93			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		85.20			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 5

Sample Date/Time: Monday, September 23, 2019 18:13:21

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 5.046

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	21.698	ug/L	1.064	13922.114	0.036
Be	9	19.548	ug/L	0.816	4510.045	0.012
B	11	19.817	ug/L	5.932	2929.634	0.006
Na	23	105068.748	ug/L	1.820	64702951.934	165.476
Mg	24	100947.320	ug/L	1.117	31494418.342	80.551
Al	27	102573.262	ug/L	2.431	25133242.723	64.286
P	31	99267.031	ug/L	0.235	1960200.872	5.013
K	39	104274.968	ug/L	2.540	27845720.654	71.191
Ca	44	97630.872	ug/L	0.331	1208035.270	3.089
>Sc	45		ug/L		391005.963	391005.963
Ti	47	2035.761	ug/L	1.409	129986.748	0.332
V	51	20.510	ug/L	1.773	39632.903	0.086
Cr	52	20.694	ug/L	0.480	41585.774	0.106
Cr	53		ug/L		6568.178	0.011
Mn	55	26.782	ug/L	3.368	30630.826	0.078
Fe	57	100949.656	ug/L	1.675	4086965.398	10.453
Co	59	19.984	ug/L	1.244	62424.767	0.160
Ni	60	19.428	ug/L	1.610	16665.719	0.043
Cu	63		ug/L		41980.940	0.107
Cu	65	18.373	ug/L	2.285	19509.314	0.050
Zn	66	18.972	ug/L	2.362	5430.366	0.026
Zn	67		ug/L		836.025	0.004
Zn	68		ug/L		3807.841	0.018
>Ge	74		ug/L		195314.490	195314.490
As	75	20.528	ug/L	1.895	3373.732	0.016
Se	77		ug/L		234.669	0.001
Se	78	20.090	ug/L	1.461	465.452	0.002
Se	82		ug/L		222.668	0.001
Kr	83		ug/L		13.867	0.000
Sr	88	23.563	ug/L	2.037	35262.137	0.161
Zr	90	20.340	ug/L	0.581	34964.737	0.159
Mo	98	2212.774	ug/L	1.414	2505188.245	11.464
Ag	107	18.382	ug/L	2.613	48292.214	0.221
Cd	111	18.975	ug/L	0.842	8200.353	0.037
Cd	114		ug/L		21886.808	0.100
>In	115		ug/L		218535.485	218535.485
Sn	120	20.370	ug/L	1.119	39565.974	0.179
Sb	121	18.898	ug/L	1.683	24862.286	0.114
Sb	123		ug/L		20470.571	0.094
Ba	135		ug/L		8237.708	0.012
Ba	137	21.543	ug/L	3.405	15071.950	0.021
>Lu	175		ug/L		708323.970	708323.970
Tl	205	19.687	ug/L	0.872	229080.535	0.323
Pb	208	20.098	ug/L	1.130	300408.600	0.424
Th	232	21.669	ug/L	0.836	394730.561	0.555
U	238	20.627	ug/L	0.578	422417.787	0.596

Sample ID: QC Std 5

Report Date/Time: Monday, September 23, 2019 18:15:11

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	108.491				
|	Be	9	97.741				
|	B	11	99.085				
|	Na	23	105.069				
|	Mg	24	100.947				
|	Al	27	102.573				
|	P	31	99.267				
|	K	39	104.275				
|	Ca	44	97.631				
>	Sc	45		90.77			
|	Ti	47	101.788				
|	V	51	102.548				
|	Cr	52	103.471				
|	Cr	53					
|	Mn	55	104.311				
|	Fe	57	100.950				
|	Co	59	99.919				
|	Ni	60	97.139				
|	Cu	63					
|	Cu	65	91.867				
[	Zn	66	94.858				
|	Zn	67					
|	Zn	68					
>	Ge	74		84.93			
|	As	75	102.639				
|	Se	77					
|	Se	78	100.450				
|	Se	82					
[	Kr	83					
[	Sr	88	102.448				
|	Zr	90	101.698				
|	Mo	98	110.639				
|	Ag	107	91.909				
|	Cd	111	90.423				
|	Cd	114					
>	In	115		85.11			
|	Sn	120	101.852				
|	Sb	121	94.491				
[	Sb	123					
[	Ba	135					
|	Ba	137	107.717				
>	Lu	175		85.26			
|	Tl	205	98.437				
|	Pb	208	100.492				
|	Th	232	108.346				
[	U	238	103.135				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 6

Sample Date/Time: Monday, September 23, 2019 18:16:45

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 6.047

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	51.411	ug/L	2.073	36648.305	0.084
Be	9	51.546	ug/L	1.903	13219.448	0.030
B	11	97.307	ug/L	1.745	13705.238	0.030
Na	23	5174.466	ug/L	2.001	3551430.581	8.149
Mg	24	4809.039	ug/L	0.558	1669058.977	3.837
Al	27	4908.300	ug/L	3.312	1338125.988	3.076
P	31	4986.450	ug/L	1.879	109727.833	0.252
K	39	4847.882	ug/L	2.907	1454045.808	3.310
Ca	44	4883.694	ug/L	1.791	67357.105	0.155
>Sc	45		ug/L		434924.859	434924.859
Ti	47	50.061	ug/L	1.152	3563.778	0.008
V	51	51.241	ug/L	1.024	99996.097	0.214
Cr	52	50.753	ug/L	1.460	113113.492	0.260
Cr	53		ug/L		13876.739	0.026
Mn	55	50.659	ug/L	3.179	64404.309	0.148
Fe	57	5024.107	ug/L	4.851	226264.469	0.520
Co	59	51.086	ug/L	2.772	177478.423	0.408
Ni	60	53.262	ug/L	1.468	50749.322	0.117
Cu	63		ug/L		128891.524	0.296
Cu	65	53.300	ug/L	1.816	62898.845	0.145
Zn	66	48.735	ug/L	3.926	16050.352	0.067
Zn	67		ug/L		2738.263	0.011
Zn	68		ug/L		11872.932	0.050
>Ge	74		ug/L		234018.942	234018.942
As	75	50.045	ug/L	1.076	9546.077	0.040
Se	77		ug/L		416.673	0.001
Se	78	50.186	ug/L	2.945	1301.072	0.005
Se	82		ug/L		690.017	0.003
Kr	83		ug/L		10.533	-0.000
Sr	88	48.884	ug/L	0.478	85945.089	0.334
Zr	90	47.995	ug/L	1.511	96697.524	0.376
Mo	98	49.981	ug/L	0.749	66543.382	0.259
Ag	107	49.672	ug/L	1.809	153367.593	0.597
Cd	111	48.962	ug/L	4.106	24854.285	0.097
Cd	114		ug/L		66622.265	0.259
>In	115		ug/L		256917.473	256917.473
Sn	120	49.797	ug/L	2.018	112940.708	0.438
Sb	121	49.412	ug/L	1.121	76350.156	0.297
Sb	123		ug/L		62554.324	0.243
Ba	135		ug/L		23268.936	0.028
Ba	137	50.067	ug/L	1.308	41597.143	0.049
>Lu	175		ug/L		841651.678	841651.678
Tl	205	49.352	ug/L	0.757	682034.149	0.810
Pb	208	49.690	ug/L	1.127	881985.857	1.048
Th	232	49.649	ug/L	2.551	1072579.463	1.273
U	238	47.116	ug/L	0.969	1146343.054	1.362

Sample ID: QC Std 6

Report Date/Time: Monday, September 23, 2019 18:18:35

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	102.822				
|	Be	9	103.092				
|	B	11	97.307				
|	Na	23	103.489				
|	Mg	24	96.181				
|	Al	27	97.194				
|	P	31	99.729				
|	K	39	96.958				
|	Ca	44	97.674				
>	Sc	45		100.96			
|	Ti	47	100.123				
|	V	51	102.483				
|	Cr	52	101.506				
|	Cr	53					
|	Mn	55	101.317				
|	Fe	57	100.482				
|	Co	59	102.171				
|	Ni	60	106.524				
|	Cu	63					
|	Cu	65	106.601				
[	Zn	66	97.470				
|	Zn	67					
|	Zn	68					
>	Ge	74		101.76			
|	As	75	100.089				
|	Se	77					
|	Se	78	100.372				
|	Se	82					
[	Kr	83					
[	Sr	88	97.769				
|	Zr	90	95.989				
|	Mo	98	99.962				
|	Ag	107	99.344				
|	Cd	111	97.924				
|	Cd	114					
>	In	115		100.06			
|	Sn	120	99.594				
|	Sb	121	98.824				
[	Sb	123					
[	Ba	135					
|	Ba	137	100.135				
>	Lu	175		101.31			
|	Tl	205	98.704				
|	Pb	208	99.380				
|	Th	232	99.298				
[	U	238	94.232				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 7

Sample Date/Time: Monday, September 23, 2019 18:20:07

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 7.048

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.005	ug/L	638.340	38.667	0.000
Be	9	0.001	ug/L	529.779	5.333	0.000
B	11	0.313	ug/L	119.431	630.014	0.000
Na	23	3.876	ug/L	12.856	9952.132	0.006
Mg	24	4.263	ug/L	0.432	1611.424	0.003
Al	27	4.137	ug/L	12.621	1401.402	0.003
P	31	5.902	ug/L	24.384	351.338	0.000
K	39	9.611	ug/L	5.704	17433.302	0.007
Ca	44	4.159	ug/L	25.813	210.002	0.000
>Sc	45		ug/L		434925.315	434925.315
Ti	47	0.196	ug/L	14.451	22.000	0.000
V	51	-0.165	ug/L	38.655	6474.134	-0.001
Cr	52	0.002	ug/L	145.769	238.669	0.000
Cr	53		ug/L		2125.492	-0.001
Mn	55	-0.007	ug/L	22.144	48.667	-0.000
Fe	57	6.462	ug/L	9.847	350.671	0.001
Co	59	0.003	ug/L	43.422	42.667	0.000
Ni	60	0.003	ug/L	125.169	40.667	0.000
Cu	63		ug/L		67.333	0.000
Cu	65	0.001	ug/L	520.242	31.333	0.000
Zn	66	-0.102	ug/L	30.398	389.339	-0.000
Zn	67		ug/L		62.000	-0.000
Zn	68		ug/L		281.336	0.000
>Ge	74		ug/L		234044.036	234044.036
As	75	0.028	ug/L	138.487	220.002	0.000
Se	77		ug/L		82.667	-0.000
Se	78	-0.195	ug/L	136.811	56.576	-0.000
Se	82		ug/L		12.667	-0.000
Kr	83		ug/L		11.733	0.000
Sr	88	-0.006	ug/L	64.121	50.667	-0.000
Zr	90	0.087	ug/L	37.536	391.339	0.001
Mo	98	0.302	ug/L	17.027	418.609	0.002
Ag	107	0.001	ug/L	171.154	14.000	0.000
Cd	111	-0.014	ug/L	48.198	4.000	-0.000
Cd	114		ug/L		14.484	0.000
>In	115		ug/L		255198.331	255198.331
Sn	120	-0.065	ug/L	12.048	380.646	-0.001
Sb	121	0.013	ug/L	9.371	64.667	0.000
Sb	123		ug/L		61.748	0.000
Ba	135		ug/L		12.667	0.000
Ba	137	-0.006	ug/L	96.025	17.333	-0.000
>Lu	175		ug/L		828166.974	828166.974
Tl	205	0.037	ug/L	15.951	670.016	0.001
Pb	208	0.001	ug/L	372.330	366.668	0.000
Th	232	0.057	ug/L	20.193	2753.600	0.001
U	238	0.006	ug/L	23.587	251.336	0.000

Sample ID: QC Std 7

Report Date/Time: Monday, September 23, 2019 18:21:57

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		100.96			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.77			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		99.39			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		99.68			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 10

Sample Date/Time: Monday, September 23, 2019 18:23:30

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 10.049

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	1029.716	ug/L	2.188	695245.991	1.686
Be	9	985.008	ug/L	2.347	239428.172	0.581
B	11	-0.541	ug/L	53.544	488.008	-0.000
Na	23	51147.601	ug/L	3.176	33223288.143	80.554
Mg	24	48448.510	ug/L	1.553	15941968.904	38.660
Al	27	48739.432	ug/L	3.617	12594652.884	30.546
P	31	24457.272	ug/L	0.362	509517.518	1.235
K	39	49188.471	ug/L	2.671	13860893.205	33.582
Ca	44	49023.239	ug/L	1.561	639777.361	1.551
>Sc	45		ug/L		412386.107	412386.107
Ti	47	12.380	ug/L	5.413	841.358	0.002
V	51	1003.586	ug/L	2.036	1737529.011	4.198
Cr	52	1036.123	ug/L	2.003	2185033.406	5.298
Cr	53		ug/L		216609.995	0.520
Mn	55	972.768	ug/L	1.899	1171420.929	2.841
Fe	57	54748.514	ug/L	1.512	2337623.571	5.669
Co	59	1012.599	ug/L	1.624	3334440.887	8.086
Ni	60	931.596	ug/L	0.319	841116.989	2.040
Cu	63		ug/L		2335260.874	5.663
Cu	65	930.208	ug/L	1.269	1040384.868	2.523
Zn	66	2345.837	ug/L	0.557	663670.673	3.215
Zn	67		ug/L		103864.980	0.503
Zn	68		ug/L		470366.613	2.279
>Ge	74		ug/L		206307.813	206307.813
As	75	1006.417	ug/L	1.039	165623.719	0.802
Se	77		ug/L		3267.707	0.015
Se	78	493.742	ug/L	0.284	10807.600	0.052
Se	82		ug/L		5566.418	0.027
Kr	83		ug/L		11.600	0.000
Sr	88	1006.897	ug/L	1.535	1568516.689	6.886
Zr	90	511.068	ug/L	0.694	911188.205	3.999
Mo	98	1035.680	ug/L	1.825	1222200.374	5.365
Ag	107	240.858	ug/L	2.671	659315.385	2.895
Cd	111	959.644	ug/L	0.814	431835.185	1.896
Cd	114		ug/L		1149234.655	5.045
>In	115		ug/L		227823.493	227823.493
Sn	120	1077.328	ug/L	2.285	2156755.172	9.467
Sb	121	222.575	ug/L	0.877	304822.623	1.338
Sb	123		ug/L		249438.660	1.095
Ba	135		ug/L		425257.609	0.562
Ba	137	1026.673	ug/L	1.419	766554.478	1.013
>Lu	175		ug/L		756720.825	756720.825
Tl	205	515.017	ug/L	0.482	6398067.939	8.455
Pb	208	5051.053	ug/L	0.668	80579849.101	106.485
Th	232	2693.256	ug/L	0.787	52243097.024	69.037
U	238	5109.305	ug/L	0.110	111758951.553	147.688

Sample ID: QC Std 10

Report Date/Time: Monday, September 23, 2019 18:25:21

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	102.972				
|	Be	9	98.501				
|	B	11					
|	Na	23	102.295				
|	Mg	24	96.897				
|	Al	27	97.479				
|	P	31	97.829				
|	K	39	98.377				
|	Ca	44	98.046				
>	Sc	45		95.73			
|	Ti	47					
|	V	51	100.359				
|	Cr	52	103.612				
|	Cr	53					
|	Mn	55	97.277				
|	Fe	57	109.497				
|	Co	59	101.260				
|	Ni	60	93.160				
|	Cu	63					
|	Cu	65	93.021				
[	Zn	66	93.833				
|	Zn	67					
|	Zn	68					
>	Ge	74		89.71			
|	As	75	100.642				
|	Se	77					
|	Se	78	98.748				
|	Se	82					
[	Kr	83					
[	Sr	88	100.690				
|	Zr	90	102.214				
|	Mo	98	103.568				
|	Ag	107	96.343				
|	Cd	111	95.964				
|	Cd	114					
>	In	115		88.73			
|	Sn	120	107.733				
|	Sb	121	89.030				
[	Sb	123					
[	Ba	135					
|	Ba	137	102.667				
>	Lu	175		91.08			
|	Tl	205	103.003				
|	Pb	208	101.021				
|	Th	232	107.730				
[	U	238	102.186				

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
QC Std 10	Sb	121	LRS is out of limits (+/- 10%)

QC Action

QC Action Line: Continue

ICPMS #12 - Summary Report

Sample ID: QC Std 11

Sample Date/Time: Monday, September 23, 2019 18:26:54

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 11.050

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	51.470	ug/L	2.944	37141.562	0.084
Be	9	51.386	ug/L	2.043	13343.563	0.030
B	11	100.239	ug/L	0.732	14279.133	0.031
Na	23	5123.047	ug/L	1.310	3561137.965	8.068
Mg	24	4763.665	ug/L	1.041	1674106.427	3.801
Al	27	4787.243	ug/L	2.753	1321833.776	3.000
P	31	4887.879	ug/L	2.030	108914.293	0.247
K	39	4770.933	ug/L	2.039	1449104.851	3.257
Ca	44	4924.669	ug/L	1.259	68781.877	0.156
>Sc	45		ug/L		440423.743	440423.743
Ti	47	49.992	ug/L	1.833	3603.121	0.008
V	51	50.355	ug/L	1.516	99626.919	0.211
Cr	52	50.704	ug/L	2.011	114415.758	0.259
Cr	53		ug/L		13805.336	0.026
Mn	55	49.419	ug/L	1.815	63611.324	0.144
Fe	57	4943.449	ug/L	1.640	225466.695	0.512
Co	59	51.088	ug/L	2.466	179677.651	0.408
Ni	60	51.076	ug/L	1.221	49288.239	0.112
Cu	63		ug/L		131074.584	0.297
Cu	65	52.506	ug/L	1.586	62742.146	0.142
Zn	66	50.000	ug/L	2.593	16474.162	0.069
Zn	67		ug/L		2695.588	0.011
Zn	68		ug/L		11814.218	0.049
>Ge	74		ug/L		234284.620	234284.620
As	75	49.924	ug/L	0.745	9534.514	0.040
Se	77		ug/L		461.341	0.002
Se	78	51.009	ug/L	0.698	1323.098	0.005
Se	82		ug/L		652.015	0.003
Kr	83		ug/L		9.733	-0.000
Sr	88	49.738	ug/L	1.521	86334.811	0.340
Zr	90	50.403	ug/L	3.792	100238.029	0.394
Mo	98	50.726	ug/L	0.290	66676.229	0.263
Ag	107	50.992	ug/L	0.303	155449.189	0.613
Cd	111	49.843	ug/L	0.649	24983.160	0.098
Cd	114		ug/L		66726.116	0.263
>In	115		ug/L		253646.499	253646.499
Sn	120	51.392	ug/L	1.668	115064.900	0.452
Sb	121	50.598	ug/L	0.993	77185.288	0.304
Sb	123		ug/L		63442.729	0.250
Ba	135		ug/L		23194.826	0.028
Ba	137	50.249	ug/L	1.340	41619.206	0.050
>Lu	175		ug/L		839056.239	839056.239
Tl	205	49.057	ug/L	1.183	675860.560	0.805
Pb	208	50.032	ug/L	0.105	885356.448	1.055
Th	232	51.238	ug/L	0.861	1103572.481	1.313
U	238	47.830	ug/L	0.361	1160180.216	1.383

Sample ID: QC Std 11

Report Date/Time: Monday, September 23, 2019 18:28:44

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	102.941				
|	Be	9	102.771				
|	B	11	100.239				
|	Na	23	102.461				
|	Mg	24	95.273				
|	Al	27	94.797				
|	P	31	97.758				
|	K	39	95.419				
|	Ca	44	98.493				
>	Sc	45		102.24			
|	Ti	47	99.984				
|	V	51	100.709				
|	Cr	52	101.408				
|	Cr	53					
|	Mn	55	98.837				
|	Fe	57	98.869				
|	Co	59	102.177				
|	Ni	60	102.152				
|	Cu	63					
|	Cu	65	105.013				
[	Zn	66	99.999				
|	Zn	67					
|	Zn	68					
>	Ge	74		101.87			
|	As	75	99.848				
|	Se	77					
|	Se	78	102.018				
|	Se	82					
[	Kr	83					
[	Sr	88	99.477				
|	Zr	90	100.805				
|	Mo	98	101.451				
|	Ag	107	101.983				
|	Cd	111	99.685				
|	Cd	114					
>	In	115		98.78			
|	Sn	120	102.783				
|	Sb	121	101.195				
[	Sb	123					
[	Ba	135					
|	Ba	137	100.498				
>	Lu	175		100.99			
|	Tl	205	98.114				
|	Pb	208	100.064				
|	Th	232	102.476				
[	U	238	95.660				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 12

Sample Date/Time: Monday, September 23, 2019 18:30:16

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 12.051

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.055	ug/L	16.252	76.000	0.000
Be	9	0.033	ug/L	32.681	13.667	0.000
B	11	0.172	ug/L	100.764	618.013	0.000
Na	23	-0.960	ug/L	38.996	6720.248	-0.002
Mg	24	0.596	ug/L	2.818	342.671	0.000
Al	27	0.489	ug/L	4.453	412.673	0.000
P	31	1.529	ug/L	16.874	258.669	0.000
K	39	6.070	ug/L	8.246	16570.939	0.004
Ca	44	-0.404	ug/L	610.247	148.667	-0.000
>Sc	45		ug/L		439989.449	439989.449
Ti	47	0.035	ug/L	167.445	10.667	0.000
V	51	-0.445	ug/L	12.937	6032.607	-0.002
Cr	52	0.047	ug/L	32.422	342.671	0.000
Cr	53		ug/L		1970.136	-0.001
Mn	55	0.008	ug/L	90.542	68.667	0.000
Fe	57	1.781	ug/L	27.783	141.334	0.000
Co	59	0.016	ug/L	22.406	87.334	0.000
Ni	60	0.029	ug/L	32.404	66.000	0.000
Cu	63		ug/L		104.000	0.000
Cu	65	0.022	ug/L	50.298	56.000	0.000
Zn	66	0.100	ug/L	56.360	455.341	0.000
Zn	67		ug/L		76.000	0.000
Zn	68		ug/L		280.003	0.000
>Ge	74		ug/L		234683.652	234683.652
As	75	-0.103	ug/L	122.537	196.001	-0.000
Se	77		ug/L		79.334	-0.000
Se	78	-0.129	ug/L	133.784	58.387	-0.000
Se	82		ug/L		24.000	-0.000
Kr	83		ug/L		9.200	-0.000
Sr	88	0.005	ug/L	55.855	70.000	0.000
Zr	90	0.163	ug/L	12.844	540.677	0.001
Mo	98	0.144	ug/L	18.048	208.604	0.001
Ag	107	0.001	ug/L	219.020	13.333	0.000
Cd	111	-0.008	ug/L	80.536	7.333	-0.000
Cd	114		ug/L		22.288	0.000
>In	115		ug/L		254111.346	254111.346
Sn	120	0.004	ug/L	294.010	532.600	0.000
Sb	121	0.146	ug/L	6.613	267.336	0.001
Sb	123		ug/L		215.246	0.001
Ba	135		ug/L		18.667	0.000
Ba	137	0.006	ug/L	176.632	27.333	0.000
>Lu	175		ug/L		831786.163	831786.163
Tl	205	0.051	ug/L	12.978	862.026	0.001
Pb	208	0.044	ug/L	10.605	1132.684	0.001
Th	232	0.390	ug/L	9.581	9845.406	0.010
U	238	0.081	ug/L	10.445	2060.483	0.002

Sample ID: QC Std 12

Report Date/Time: Monday, September 23, 2019 18:32:06

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		102.14			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		102.04			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		98.96			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		100.12			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 8
 Sample Date/Time: Monday, September 23, 2019 19:31:07
 Sample Type: Sample
 Sample Description:
 Number of Replicates: 3
 Batch ID:
 Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth
 Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 8.069

Concentration Results Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	50.188	ug/L	1.800	35000.179	0.082
Be	9	51.317	ug/L	2.121	12874.801	0.030
B	11	95.059	ug/L	2.364	13110.682	0.029
Na	23	4950.736	ug/L	2.685	3324050.511	7.797
Mg	24	4702.024	ug/L	0.915	1596377.121	3.752
Al	27	4827.908	ug/L	1.973	1287543.439	3.026
P	31	4918.577	ug/L	1.425	105887.686	0.248
K	39	4745.890	ug/L	1.280	1392962.480	3.240
Ca	44	4833.058	ug/L	2.315	65205.156	0.153
>Sc	45		ug/L		425468.310	425468.310
Ti	47	48.594	ug/L	2.404	3383.734	0.008
V	51	51.673	ug/L	2.581	98578.338	0.216
Cr	52	49.015	ug/L	2.323	106852.840	0.251
Cr	53		ug/L		14486.034	0.028
Mn	55	49.939	ug/L	3.038	62092.016	0.146
Fe	57	4954.431	ug/L	1.595	218335.737	0.513
Co	59	50.482	ug/L	0.784	171553.389	0.403
Ni	60	50.290	ug/L	1.527	46883.503	0.110
Cu	63		ug/L		124471.420	0.292
Cu	65	51.749	ug/L	1.738	59738.649	0.140
Zn	66	49.556	ug/L	0.792	15568.479	0.068
Zn	67		ug/L		2655.580	0.012
Zn	68		ug/L		11122.996	0.049
>Ge	74		ug/L		223313.790	223313.790
As	75	50.688	ug/L	2.666	9222.755	0.040
Se	77		ug/L		487.342	0.002
Se	78	50.636	ug/L	2.822	1252.021	0.005
Se	82		ug/L		597.346	0.003
Kr	83		ug/L		9.867	-0.000
Sr	88	49.359	ug/L	2.291	82795.271	0.338
Zr	90	48.326	ug/L	2.072	92896.422	0.378
Mo	98	50.121	ug/L	2.797	63663.004	0.260
Ag	107	50.304	ug/L	1.074	148217.686	0.605
Cd	111	50.383	ug/L	2.750	24404.165	0.100
Cd	114		ug/L		64240.747	0.262
>In	115		ug/L		245149.547	245149.547
Sn	120	51.082	ug/L	2.357	110531.322	0.449
Sb	121	51.117	ug/L	1.594	75360.928	0.307
Sb	123		ug/L		61932.958	0.253
Ba	135		ug/L		22487.685	0.027
Ba	137	50.143	ug/L	1.742	40608.325	0.049
>Lu	175		ug/L		820315.303	820315.303
Tl	205	49.749	ug/L	1.319	670059.734	0.817
Pb	208	50.248	ug/L	0.752	869286.187	1.059
Th	232	49.774	ug/L	1.798	1048013.753	1.276
U	238	48.171	ug/L	1.085	1142256.410	1.392

Sample ID: QC Std 8
 Report Date/Time: Monday, September 23, 2019 19:32:57

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	100.375				
|	Be	9	102.634				
|	B	11	95.059				
|	Na	23	99.015				
|	Mg	24	94.040				
|	Al	27	95.602				
|	P	31	98.372				
|	K	39	94.918				
|	Ca	44	96.661				
>	Sc	45		98.77			
|	Ti	47	97.188				
|	V	51	103.346				
|	Cr	52	98.031				
|	Cr	53					
|	Mn	55	99.879				
|	Fe	57	99.089				
|	Co	59	100.963				
|	Ni	60	100.579				
|	Cu	63					
|	Cu	65	103.498				
[	Zn	66	99.112				
|	Zn	67					
|	Zn	68					
>	Ge	74		97.10			
|	As	75	101.377				
|	Se	77					
|	Se	78	101.273				
|	Se	82					
[	Kr	83					
[	Sr	88	98.718				
|	Zr	90	96.652				
|	Mo	98	100.241				
|	Ag	107	100.609				
|	Cd	111	100.765				
|	Cd	114					
>	In	115		95.47			
|	Sn	120	102.164				
|	Sb	121	102.233				
[	Sb	123					
[	Ba	135					
|	Ba	137	100.285				
>	Lu	175		98.74			
|	Tl	205	99.498				
|	Pb	208	100.496				
|	Th	232	99.549				
[	U	238	96.342				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 9

Sample Date/Time: Monday, September 23, 2019 19:34:30

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 9.070

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.020	ug/L	35.438	20.667	-0.000
Be	9	0.008	ug/L	211.117	7.000	0.000
B	11	-0.698	ug/L	84.057	482.675	-0.000
Na	23	-3.199	ug/L	2.231	5003.543	-0.005
Mg	24	0.350	ug/L	11.298	248.002	0.000
Al	27	0.152	ug/L	13.170	309.337	0.000
P	31	1.307	ug/L	138.765	245.335	0.000
K	39	9.154	ug/L	12.656	16932.033	0.006
Ca	44	1.661	ug/L	95.390	172.001	0.000
>Sc	45		ug/L		425699.856	425699.856
Ti	47	0.001	ug/L	3914.617	8.000	0.000
V	51	0.424	ug/L	19.102	7385.909	0.002
Cr	52	0.014	ug/L	112.918	259.336	0.000
Cr	53		ug/L		2508.220	0.000
Mn	55	-0.003	ug/L	435.481	52.667	-0.000
Fe	57	0.320	ug/L	105.571	72.000	0.000
Co	59	0.001	ug/L	825.947	32.000	0.000
Ni	60	0.012	ug/L	106.272	48.000	0.000
Cu	63		ug/L		58.667	-0.000
Cu	65	-0.001	ug/L	758.086	27.333	-0.000
Zn	66	0.139	ug/L	96.562	443.340	0.000
Zn	67		ug/L		75.334	0.000
Zn	68		ug/L		324.004	0.000
>Ge	74		ug/L		222341.562	222341.562
As	75	0.187	ug/L	54.304	237.335	0.000
Se	77		ug/L		103.334	0.000
Se	78	0.212	ug/L	46.023	63.279	0.000
Se	82		ug/L		18.000	-0.000
Kr	83		ug/L		10.533	-0.000
Sr	88	0.008	ug/L	85.008	73.334	0.000
Zr	90	0.104	ug/L	27.355	410.006	0.001
Mo	98	0.023	ug/L	12.838	48.164	0.000
Ag	107	0.001	ug/L	76.601	14.000	0.000
Cd	111	-0.015	ug/L	40.505	3.333	-0.000
Cd	114		ug/L		8.866	-0.000
>In	115		ug/L		246534.582	246534.582
Sn	120	-0.074	ug/L	11.176	347.287	-0.001
Sb	121	0.004	ug/L	81.659	49.333	0.000
Sb	123		ug/L		42.163	0.000
Ba	135		ug/L		10.000	0.000
Ba	137	0.001	ug/L	1635.958	22.667	0.000
>Lu	175		ug/L		809137.445	809137.445
Tl	205	0.033	ug/L	22.069	602.013	0.001
Pb	208	0.000	ug/L	347.049	355.335	0.000
Th	232	0.152	ug/L	14.661	4657.430	0.004
U	238	0.005	ug/L	32.926	242.335	0.000

Sample ID: QC Std 9

Report Date/Time: Monday, September 23, 2019 19:36:20

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Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		98.82			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		96.68			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		96.01			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		97.39			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 1204376391

Sample Date/Time: Monday, September 23, 2019 19:37:54

Sample Type: Sample

Sample Description: ACAL 6020 MB

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\1204376391.071

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.033	ug/L	25.706	62.667	0.000
Be	9	0.010	ug/L	134.470	8.000	0.000
B	11	-1.663	ug/L	13.889	383.339	-0.001
Na	23	-2.071	ug/L	15.025	6208.016	-0.003
Mg	24	2.096	ug/L	5.478	906.695	0.002
Al	27	1.584	ug/L	7.771	745.353	0.001
P	31	15.035	ug/L	13.287	582.679	0.001
K	39	8.786	ug/L	13.266	18134.840	0.006
Ca	44	23.930	ug/L	12.548	508.676	0.001
>Sc	45		ug/L		458867.439	458867.439
Ti	47	0.180	ug/L	39.022	22.000	0.000
V	51	-0.148	ug/L	10.089	6862.314	-0.001
Cr	52	0.122	ug/L	8.749	532.677	0.001
Cr	53		ug/L		2231.508	-0.001
Mn	55	0.084	ug/L	12.453	173.334	0.000
Fe	57	4.128	ug/L	12.772	258.669	0.000
Co	59	0.004	ug/L	56.984	47.333	0.000
Ni	60	0.083	ug/L	10.134	123.334	0.000
Cu	63		ug/L		480.008	0.001
Cu	65	0.144	ug/L	10.748	210.668	0.000
Zn	66	1.771	ug/L	5.998	988.034	0.002
Zn	67		ug/L		147.334	0.000
Zn	68		ug/L		695.350	0.002
>Ge	74		ug/L		233530.807	233530.807
As	75	0.041	ug/L	288.905	222.002	0.000
Se	77		ug/L		90.667	-0.000
Se	78	0.082	ug/L	339.924	63.312	0.000
Se	82		ug/L		23.333	-0.000
Kr	83		ug/L		9.467	-0.000
Sr	88	0.037	ug/L	19.638	131.334	0.000
Zr	90	0.437	ug/L	17.797	1131.379	0.003
Mo	98	0.061	ug/L	12.372	104.082	0.000
Ag	107	0.000	ug/L	1325.564	10.667	0.000
Cd	111	-0.008	ug/L	128.929	7.333	-0.000
Cd	114		ug/L		-30.296	-0.000
>In	115		ug/L		264704.877	264704.877
Sn	120	3.976	ug/L	1.515	9793.280	0.035
Sb	121	-0.007	ug/L	19.436	36.000	-0.000
Sb	123		ug/L		26.578	-0.000
Ba	135		ug/L		99.334	0.000
Ba	137	0.146	ug/L	5.191	148.001	0.000
>Lu	175		ug/L		865661.715	865661.715
Tl	205	0.008	ug/L	18.305	276.669	0.000
Pb	208	0.027	ug/L	8.857	857.343	0.001
Th	232	0.108	ug/L	11.987	4002.563	0.003
U	238	0.005	ug/L	10.345	252.002	0.000

Sample ID: 1204376391

Report Date/Time: Monday, September 23, 2019 19:39:44

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Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.52			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.54			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		103.09			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		104.20			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 1204376392

Sample Date/Time: Monday, September 23, 2019 19:41:17

Sample Type: Sample

Sample Description: ACAL 6020 LCS

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\1204376392.072

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	25.505	ug/L	0.810	19152.163	0.042
Be	9	22.938	ug/L	1.653	6194.343	0.014
B	11	45.469	ug/L	1.134	7069.749	0.014
Na	23	960.423	ug/L	2.817	699985.050	1.513
Mg	24	953.599	ug/L	0.897	348438.162	0.761
Al	27	943.146	ug/L	2.257	270836.313	0.591
P	31	890.486	ug/L	2.719	20818.501	0.045
K	39	960.742	ug/L	2.205	315562.302	0.656
Ca	44	1094.957	ug/L	1.995	16018.977	0.035
>Sc	45		ug/L		457750.374	457750.374
Ti	47	25.414	ug/L	2.428	1908.127	0.004
V	51	25.587	ug/L	2.132	56129.436	0.107
Cr	52	26.094	ug/L	2.314	61319.348	0.133
Cr	53		ug/L		8703.317	0.013
Mn	55	26.698	ug/L	1.152	35752.026	0.078
Fe	57	1024.758	ug/L	0.585	48633.315	0.106
Co	59	26.194	ug/L	1.918	95778.725	0.209
Ni	60	26.175	ug/L	2.671	26270.143	0.057
Cu	63		ug/L		69473.242	0.152
Cu	65	26.995	ug/L	1.009	33547.351	0.073
Zn	66	25.074	ug/L	2.027	8469.177	0.034
Zn	67		ug/L		1407.403	0.006
Zn	68		ug/L		6274.045	0.026
>Ge	74		ug/L		234183.365	234183.365
As	75	22.678	ug/L	0.204	4446.692	0.018
Se	77		ug/L		238.002	0.001
Se	78	20.982	ug/L	5.394	580.261	0.002
Se	82		ug/L		262.669	0.001
Kr	83		ug/L		9.333	-0.000
Sr	88	25.899	ug/L	2.228	46491.537	0.177
Zr	90	25.879	ug/L	2.132	53307.956	0.202
Mo	98	26.372	ug/L	0.752	35841.067	0.137
Ag	107	26.122	ug/L	1.315	82318.530	0.314
Cd	111	23.845	ug/L	0.757	12361.347	0.047
Cd	114		ug/L		32559.089	0.124
>In	115		ug/L		262190.116	262190.116
Sn	120	31.897	ug/L	0.767	74025.883	0.280
Sb	121	24.033	ug/L	0.986	37922.947	0.144
Sb	123		ug/L		31459.686	0.120
Ba	135		ug/L		12841.103	0.015
Ba	137	27.063	ug/L	1.470	23213.513	0.027
>Lu	175		ug/L		868514.421	868514.421
Tl	205	24.958	ug/L	1.872	356031.246	0.410
Pb	208	25.975	ug/L	1.169	475945.358	0.548
Th	232	24.370	ug/L	1.314	544146.618	0.625
U	238	24.439	ug/L	0.532	613663.820	0.706

Sample ID: 1204376392

Report Date/Time: Monday, September 23, 2019 19:43:07

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Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.26			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.83			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		102.11			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		104.54			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537001

Sample Date/Time: Monday, September 23, 2019 19:44:40

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537001.073

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.004	ug/L	140.752	34.667	-0.000
Be	9	0.010	ug/L	132.708	8.000	0.000
B	11	-1.061	ug/L	41.797	472.008	-0.000
Na	23	1820.723	ug/L	1.254	1331985.908	2.868
Mg	24	1287.216	ug/L	2.671	474505.086	1.027
Al	27	6.883	ug/L	4.718	2284.183	0.004
P	31	8360.972	ug/L	2.228	195200.080	0.422
K	39	19421.523	ug/L	1.367	6139179.206	13.260
Ca	44	603.086	ug/L	1.772	8974.151	0.019
>Sc	45		ug/L		461844.287	461844.287
Ti	47	1.910	ug/L	11.894	152.667	0.000
V	51	0.509	ug/L	24.384	8179.010	0.002
Cr	52	0.193	ug/L	2.603	704.684	0.001
Cr	53		ug/L		2683.586	0.000
Mn	55	1.357	ug/L	2.998	1891.459	0.004
Fe	57	11.630	ug/L	10.102	618.680	0.001
Co	59	0.019	ug/L	30.384	104.000	0.000
Ni	60	0.093	ug/L	16.154	134.001	0.000
Cu	63		ug/L		2969.642	0.006
Cu	65	1.114	ug/L	3.478	1426.738	0.003
Zn	66	55.146	ug/L	1.534	18017.355	0.076
Zn	67		ug/L		2613.573	0.011
Zn	68		ug/L		12181.858	0.051
>Ge	74		ug/L		232857.201	232857.201
As	75	0.115	ug/L	23.198	235.113	0.000
Se	77		ug/L		98.667	0.000
Se	78	1.031	ug/L	53.854	86.383	0.000
Se	82		ug/L		33.333	0.000
Kr	83		ug/L		9.333	-0.000
Sr	88	0.631	ug/L	1.448	1182.049	0.004
Zr	90	0.352	ug/L	20.754	934.031	0.003
Mo	98	0.126	ug/L	9.680	188.531	0.001
Ag	107	0.002	ug/L	34.312	16.667	0.000
Cd	111	-0.007	ug/L	100.640	8.000	-0.000
Cd	114		ug/L		-4.181	-0.000
>In	115		ug/L		259479.711	259479.711
Sn	120	2.060	ug/L	2.395	5231.574	0.018
Sb	121	0.002	ug/L	449.893	48.667	0.000
Sb	123		ug/L		34.163	0.000
Ba	135		ug/L		1110.710	0.001
Ba	137	2.305	ug/L	6.500	1984.805	0.002
>Lu	175		ug/L		862667.051	862667.051
Tl	205	0.044	ug/L	3.460	793.355	0.001
Pb	208	0.041	ug/L	6.565	1117.351	0.001
Th	232	0.142	ug/L	20.010	4724.790	0.004
U	238	0.008	ug/L	21.895	315.337	0.000

Sample ID: 489537001

Report Date/Time: Monday, September 23, 2019 19:46:30

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Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		107.21			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.25			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		101.05			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.83			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 1204376393

Sample Date/Time: Monday, September 23, 2019 19:48:03

Sample Type: Sample

Sample Description: ACAL 6020 DUP

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\1204376393.074

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.006	ug/L	35.808	34.000	-0.000
Be	9	0.004	ug/L	285.305	6.667	0.000
B	11	-1.556	ug/L	7.867	407.339	-0.000
Na	23	1783.176	ug/L	2.264	1325067.944	2.808
Mg	24	1298.411	ug/L	1.045	486116.802	1.036
Al	27	8.352	ug/L	2.474	2751.598	0.005
P	31	8462.856	ug/L	0.124	200706.909	0.427
K	39	19317.780	ug/L	4.922	6200128.603	13.189
Ca	44	572.300	ug/L	5.425	8655.958	0.018
>Sc	45		ug/L		469086.802	469086.802
Ti	47	1.818	ug/L	18.373	148.001	0.000
V	51	0.464	ug/L	24.235	8214.361	0.002
Cr	52	0.163	ug/L	20.823	642.015	0.001
Cr	53		ug/L		2756.266	0.000
Mn	55	1.374	ug/L	3.111	1944.132	0.004
Fe	57	10.258	ug/L	4.097	562.011	0.001
Co	59	0.015	ug/L	11.182	90.000	0.000
Ni	60	0.097	ug/L	28.400	140.667	0.000
Cu	63		ug/L		6075.292	0.013
Cu	65	2.297	ug/L	2.187	2953.639	0.006
Zn	66	44.888	ug/L	3.276	14767.635	0.062
Zn	67		ug/L		2296.185	0.010
Zn	68		ug/L		10441.150	0.044
>Ge	74		ug/L		233199.987	233199.987
As	75	0.111	ug/L	77.318	234.669	0.000
Se	77		ug/L		100.000	0.000
Se	78	1.163	ug/L	8.280	89.805	0.000
Se	82		ug/L		30.667	0.000
Kr	83		ug/L		10.800	-0.000
Sr	88	0.758	ug/L	3.036	1429.405	0.005
Zr	90	0.148	ug/L	11.289	530.010	0.001
Mo	98	0.119	ug/L	7.256	182.750	0.001
Ag	107	-0.000	ug/L	1509.524	10.000	-0.000
Cd	111	-0.007	ug/L	111.300	8.000	-0.000
Cd	114		ug/L		-15.290	-0.000
>In	115		ug/L		263618.858	263618.858
Sn	120	2.286	ug/L	0.459	5839.100	0.020
Sb	121	-0.004	ug/L	77.480	40.667	-0.000
Sb	123		ug/L		30.410	-0.000
Ba	135		ug/L		496.675	0.001
Ba	137	1.051	ug/L	2.278	928.697	0.001
>Lu	175		ug/L		872483.285	872483.285
Tl	205	0.025	ug/L	6.129	534.677	0.000
Pb	208	0.052	ug/L	2.014	1322.691	0.001
Th	232	0.046	ug/L	14.050	2648.913	0.001
U	238	0.003	ug/L	26.294	189.001	0.000

Sample ID: 1204376393

Report Date/Time: Monday, September 23, 2019 19:49:53

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		108.89			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.40			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		102.67			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		105.02			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 1204376394

Sample Date/Time: Monday, September 23, 2019 19:51:26

Sample Type: Sample

Sample Description: ACAL 6020 MS

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\1204376394.075

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	23.902	ug/L	1.212	18146.856	0.039
Be	9	20.198	ug/L	1.375	5514.398	0.012
B	11	41.138	ug/L	4.173	6523.490	0.013
Na	23	2571.871	ug/L	2.395	1881616.442	4.051
Mg	24	2107.496	ug/L	1.635	778164.751	1.682
Al	27	834.542	ug/L	1.839	242291.914	0.523
P	31	9230.336	ug/L	0.547	215915.100	0.466
K	39	19772.243	ug/L	1.941	6261114.026	13.499
Ca	44	1448.614	ug/L	1.278	21370.641	0.046
>Sc	45		ug/L		462702.217	462702.217
Ti	47	23.832	ug/L	3.541	1808.781	0.004
V	51	23.617	ug/L	1.128	52914.486	0.099
Cr	52	22.573	ug/L	1.615	53654.583	0.115
Cr	53		ug/L		8112.303	0.012
Mn	55	24.388	ug/L	1.516	33011.431	0.071
Fe	57	894.741	ug/L	2.172	42922.389	0.093
Co	59	22.890	ug/L	3.226	84611.351	0.183
Ni	60	22.563	ug/L	1.482	22893.663	0.049
Cu	63		ug/L		63872.471	0.138
Cu	65	23.660	ug/L	1.252	29721.555	0.064
Zn	66	60.906	ug/L	1.194	19946.584	0.083
Zn	67		ug/L		3147.013	0.013
Zn	68		ug/L		14431.289	0.061
>Ge	74		ug/L		233903.686	233903.686
As	75	20.853	ug/L	2.209	4101.478	0.017
Se	77		ug/L		220.668	0.001
Se	78	21.040	ug/L	1.107	580.883	0.002
Se	82		ug/L		282.003	0.001
Kr	83		ug/L		10.800	-0.000
Sr	88	23.447	ug/L	2.056	41970.914	0.160
Zr	90	9.253	ug/L	1.316	19145.488	0.072
Mo	98	23.769	ug/L	2.853	32203.398	0.123
Ag	107	23.433	ug/L	1.398	73616.543	0.282
Cd	111	20.480	ug/L	1.689	10584.587	0.040
Cd	114		ug/L		29361.993	0.112
>In	115		ug/L		261370.909	261370.909
Sn	120	20.980	ug/L	1.658	48725.626	0.184
Sb	121	21.618	ug/L	2.251	34008.444	0.130
Sb	123		ug/L		27690.647	0.106
Ba	135		ug/L		12189.199	0.014
Ba	137	25.295	ug/L	1.504	21570.273	0.025
>Lu	175		ug/L		863406.801	863406.801
Tl	205	23.200	ug/L	0.905	329000.794	0.381
Pb	208	22.956	ug/L	0.298	418217.430	0.484
Th	232	21.365	ug/L	1.341	474423.367	0.548
U	238	21.871	ug/L	0.689	545939.152	0.632

Sample ID: 1204376394

Report Date/Time: Monday, September 23, 2019 19:53:16

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		107.41			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.71			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		101.79			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.92			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 1204376395

Sample Date/Time: Monday, September 23, 2019 19:54:48

Sample Type: Sample

Sample Description: ACAL 6020 SDILT

Number of Replicates: 3

Batch ID: 1914842|10|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\1204376395.076

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.010	ug/L	54.399	30.000	-0.000
Be	9	0.014	ug/L	46.289	9.000	0.000
B	11	-2.027	ug/L	19.698	326.670	-0.001
Na	23	364.071	ug/L	2.385	266767.128	0.573
Mg	24	265.190	ug/L	1.668	95784.740	0.212
Al	27	2.850	ug/L	4.551	1092.708	0.002
P	31	1828.659	ug/L	2.842	41964.222	0.092
K	39	3794.528	ug/L	2.352	1186191.150	2.591
Ca	44	137.367	ug/L	8.584	2124.159	0.004
>Sc	45		ug/L		452046.435	452046.435
Ti	47	0.393	ug/L	52.836	37.333	0.000
V	51	0.441	ug/L	14.246	7874.170	0.002
Cr	52	0.040	ug/L	9.908	335.337	0.000
Cr	53		ug/L		2610.905	0.000
Mn	55	0.345	ug/L	9.966	514.676	0.001
Fe	57	3.468	ug/L	10.412	224.002	0.000
Co	59	0.006	ug/L	47.552	54.667	0.000
Ni	60	0.026	ug/L	55.308	65.333	0.000
Cu	63		ug/L		1813.449	0.004
Cu	65	0.654	ug/L	15.268	831.358	0.002
Zn	66	10.304	ug/L	1.808	3693.144	0.014
Zn	67		ug/L		582.012	0.002
Zn	68		ug/L		2490.217	0.010
>Ge	74		ug/L		231919.756	231919.756
As	75	0.108	ug/L	53.569	232.891	0.000
Se	77		ug/L		90.000	-0.000
Se	78	0.588	ug/L	13.689	75.243	0.000
Se	82		ug/L		28.000	0.000
Kr	83		ug/L		7.333	-0.000
Sr	88	0.184	ug/L	9.626	385.339	0.001
Zr	90	-0.027	ug/L	37.895	163.334	-0.000
Mo	98	0.033	ug/L	27.448	63.050	0.000
Ag	107	0.001	ug/L	104.243	12.000	0.000
Cd	111	-0.007	ug/L	258.345	8.000	-0.000
Cd	114		ug/L		9.965	-0.000
>In	115		ug/L		257330.903	257330.903
Sn	120	0.343	ug/L	2.723	1306.642	0.003
Sb	121	-0.007	ug/L	28.694	34.000	-0.000
Sb	123		ug/L		33.827	0.000
Ba	135		ug/L		1080.708	0.001
Ba	137	2.336	ug/L	3.914	1964.802	0.002
>Lu	175		ug/L		842697.277	842697.277
Tl	205	0.013	ug/L	17.863	339.337	0.000
Pb	208	0.027	ug/L	3.078	837.343	0.001
Th	232	0.099	ug/L	14.925	3689.146	0.003
U	238	0.003	ug/L	34.553	201.335	0.000

Sample ID: 1204376395

Report Date/Time: Monday, September 23, 2019 19:56:39

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		104.94			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.84			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		100.22			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		101.43			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537002

Sample Date/Time: Monday, September 23, 2019 19:58:12

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537002.077

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.064	ug/L	12.870	85.334	0.000
Be	9	0.016	ug/L	57.663	9.667	0.000
B	11	-1.810	ug/L	3.196	360.005	-0.001
Na	23	4335.066	ug/L	1.925	3118823.702	6.827
Mg	24	1668.894	ug/L	0.977	606972.254	1.332
Al	27	28.264	ug/L	1.811	8359.779	0.018
P	31	31134.792	ug/L	2.979	716659.904	1.572
K	39	12374.718	ug/L	2.025	3865174.073	8.449
Ca	44	55128.043	ug/L	2.653	795060.328	1.744
>Sc	45		ug/L		455688.398	455688.398
Ti	47	8.183	ug/L	5.888	617.347	0.001
V	51	-0.553	ug/L	8.276	6043.945	-0.002
Cr	52	0.192	ug/L	10.563	692.684	0.001
Cr	53		ug/L		1586.755	-0.002
Mn	55	90.778	ug/L	0.244	120861.779	0.265
Fe	57	124.288	ug/L	2.760	5926.563	0.013
Co	59	0.095	ug/L	5.416	379.338	0.001
Ni	60	0.204	ug/L	13.905	242.669	0.000
Cu	63		ug/L		8309.083	0.018
Cu	65	3.214	ug/L	1.422	4003.228	0.009
Zn	66	113.045	ug/L	0.589	35373.082	0.155
Zn	67		ug/L		5248.298	0.023
Zn	68		ug/L		24299.988	0.107
>Ge	74		ug/L		225683.499	225683.499
As	75	0.036	ug/L	114.029	213.779	0.000
Se	77		ug/L		97.334	0.000
Se	78	1.619	ug/L	4.749	97.749	0.000
Se	82		ug/L		46.667	0.000
Kr	83		ug/L		8.267	-0.000
Sr	88	145.028	ug/L	2.520	253623.905	0.992
Zr	90	0.046	ug/L	34.035	308.670	0.000
Mo	98	1.249	ug/L	4.653	1674.701	0.006
Ag	107	0.001	ug/L	70.099	13.333	0.000
Cd	111	0.036	ug/L	21.446	29.333	0.000
Cd	114		ug/L		61.232	0.000
>In	115		ug/L		255712.713	255712.713
Sn	120	2.561	ug/L	1.657	6280.646	0.023
Sb	121	-0.006	ug/L	98.673	35.333	-0.000
Sb	123		ug/L		40.662	0.000
Ba	135		ug/L		6405.436	0.007
Ba	137	13.475	ug/L	2.840	11409.223	0.013
>Lu	175		ug/L		856430.953	856430.953
Tl	205	0.023	ug/L	14.425	493.342	0.000
Pb	208	0.226	ug/L	2.710	4442.932	0.005
Th	232	0.070	ug/L	18.246	3111.674	0.002
U	238	0.036	ug/L	6.547	1005.702	0.001

Sample ID: 489537002

Report Date/Time: Monday, September 23, 2019 20:00:02

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		105.78			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		98.13			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		99.59			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		103.08			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
P 31 Upper, S, EEEP		31	Sample is out of limits (over linear range)
Ca 44 Upper, S, EECa		44	Sample is out of limits (over linear range)

QC Action

QC Action Line: Continue

ICPMS #12 - Summary Report

Sample ID: 489537003

Sample Date/Time: Monday, September 23, 2019 20:01:34

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537003.078

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.001	ug/L	980.142	38.000	0.000
Be	9	0.006	ug/L	206.192	7.000	0.000
B	11	-2.331	ug/L	3.269	288.003	-0.001
Na	23	2168.032	ug/L	1.845	1572658.926	3.415
Mg	24	1290.495	ug/L	1.218	472125.063	1.030
Al	27	6.401	ug/L	2.092	2128.159	0.004
P	31	7738.899	ug/L	0.704	179350.155	0.391
K	39	18042.904	ug/L	1.205	5661521.105	12.318
Ca	44	469.974	ug/L	3.110	6977.038	0.015
>Sc	45		ug/L		458343.367	458343.367
Ti	47	1.766	ug/L	4.628	140.667	0.000
V	51	-0.268	ug/L	22.687	6625.536	-0.001
Cr	52	0.100	ug/L	1.138	481.341	0.001
Cr	53		ug/L		2074.151	-0.001
Mn	55	1.280	ug/L	3.573	1774.110	0.004
Fe	57	8.056	ug/L	10.038	444.674	0.001
Co	59	0.014	ug/L	5.968	82.667	0.000
Ni	60	0.059	ug/L	11.436	98.667	0.000
Cu	63		ug/L		1791.446	0.004
Cu	65	0.668	ug/L	3.994	862.026	0.002
Zn	66	28.786	ug/L	4.080	9560.534	0.039
Zn	67		ug/L		1398.735	0.006
Zn	68		ug/L		6602.859	0.027
>Ge	74		ug/L		231758.856	231758.856
As	75	-0.005	ug/L	1934.482	211.779	-0.000
Se	77		ug/L		100.667	0.000
Se	78	1.108	ug/L	30.246	87.866	0.000
Se	82		ug/L		39.333	0.000
Kr	83		ug/L		8.800	-0.000
Sr	88	0.930	ug/L	1.482	1710.769	0.006
Zr	90	0.031	ug/L	11.036	282.003	0.000
Mo	98	0.078	ug/L	18.680	124.676	0.000
Ag	107	-0.000	ug/L	302.388	9.333	-0.000
Cd	111	-0.008	ug/L	75.613	7.333	-0.000
Cd	114		ug/L		3.531	-0.000
>In	115		ug/L		259161.020	259161.020
Sn	120	3.299	ug/L	0.687	8046.882	0.029
Sb	121	-0.009	ug/L	49.949	32.000	-0.000
Sb	123		ug/L		26.830	-0.000
Ba	135		ug/L		724.685	0.001
Ba	137	1.510	ug/L	5.068	1310.727	0.001
>Lu	175		ug/L		864058.911	864058.911
Tl	205	0.023	ug/L	10.287	492.008	0.000
Pb	208	0.026	ug/L	12.290	843.343	0.001
Th	232	0.024	ug/L	21.449	2141.494	0.001
U	238	0.002	ug/L	30.337	175.668	0.000

Sample ID: 489537003

Report Date/Time: Monday, September 23, 2019 20:03:24

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.40			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.77			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		100.93			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		104.00			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 8

Sample Date/Time: Monday, September 23, 2019 20:04:57

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 8.079

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	49.037	ug/L	2.198	34923.991	0.080
Be	9	48.672	ug/L	0.956	12471.775	0.029
B	11	95.112	ug/L	1.932	13397.614	0.029
Na	23	4988.242	ug/L	1.261	3420788.920	7.856
Mg	24	4637.827	ug/L	2.207	1608009.446	3.701
Al	27	4623.962	ug/L	1.222	1259568.228	2.898
P	31	4808.358	ug/L	1.622	105719.088	0.243
K	39	4671.541	ug/L	1.128	1400381.548	3.189
Ca	44	4657.585	ug/L	1.602	64195.299	0.147
>Sc	45		ug/L		434520.878	434520.878
Ti	47	49.172	ug/L	2.720	3497.095	0.008
V	51	49.270	ug/L	3.963	96304.368	0.206
Cr	52	48.887	ug/L	1.490	108855.883	0.250
Cr	53		ug/L		13350.905	0.025
Mn	55	49.728	ug/L	2.030	63151.960	0.145
Fe	57	4951.548	ug/L	1.961	222816.370	0.513
Co	59	50.086	ug/L	0.995	173828.605	0.400
Ni	60	49.619	ug/L	4.525	47232.036	0.109
Cu	63		ug/L		125991.298	0.290
Cu	65	51.556	ug/L	3.203	60779.739	0.140
Zn	66	49.549	ug/L	1.543	15678.599	0.068
Zn	67		ug/L		2644.245	0.011
Zn	68		ug/L		11307.808	0.049
>Ge	74		ug/L		224930.380	224930.380
As	75	50.192	ug/L	1.673	9201.407	0.040
Se	77		ug/L		442.007	0.002
Se	78	51.378	ug/L	0.269	1279.030	0.005
Se	82		ug/L		698.684	0.003
Kr	83		ug/L		7.467	-0.000
Sr	88	49.854	ug/L	2.239	84325.551	0.341
Zr	90	48.347	ug/L	0.687	93717.743	0.378
Mo	98	49.867	ug/L	3.066	63870.322	0.258
Ag	107	50.329	ug/L	2.549	149513.277	0.605
Cd	111	50.085	ug/L	3.696	24462.943	0.099
Cd	114		ug/L		65394.286	0.265
>In	115		ug/L		247180.313	247180.313
Sn	120	51.005	ug/L	1.710	111290.480	0.448
Sb	121	49.984	ug/L	1.032	74308.100	0.300
Sb	123		ug/L		61212.958	0.248
Ba	135		ug/L		22762.121	0.027
Ba	137	50.358	ug/L	3.041	41194.673	0.050
>Lu	175		ug/L		828705.267	828705.267
Tl	205	49.069	ug/L	1.207	667729.580	0.806
Pb	208	50.306	ug/L	0.949	879215.752	1.061
Th	232	50.127	ug/L	0.802	1066342.564	1.285
U	238	48.151	ug/L	0.763	1153525.669	1.392

Sample ID: QC Std 8

Report Date/Time: Monday, September 23, 2019 20:06:47

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	98.073				
|	Be	9	97.344				
|	B	11	95.112				
|	Na	23	99.765				
|	Mg	24	92.757				
|	Al	27	91.564				
|	P	31	96.167				
|	K	39	93.431				
|	Ca	44	93.152				
>	Sc	45		100.87			
|	Ti	47	98.344				
|	V	51	98.539				
|	Cr	52	97.775				
|	Cr	53					
|	Mn	55	99.456				
|	Fe	57	99.031				
|	Co	59	100.173				
|	Ni	60	99.238				
|	Cu	63					
|	Cu	65	103.112				
[	Zn	66	99.098				
|	Zn	67					
|	Zn	68					
>	Ge	74		97.80			
|	As	75	100.384				
|	Se	77					
|	Se	78	102.756				
|	Se	82					
[	Kr	83					
[	Sr	88	99.707				
|	Zr	90	96.694				
|	Mo	98	99.734				
|	Ag	107	100.658				
|	Cd	111	100.170				
|	Cd	114					
>	In	115		96.26			
|	Sn	120	102.010				
|	Sb	121	99.969				
[	Sb	123					
[	Ba	135					
|	Ba	137	100.716				
>	Lu	175		99.75			
|	Tl	205	98.138				
|	Pb	208	100.611				
|	Th	232	100.254				
[	U	238	96.302				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 9

Sample Date/Time: Monday, September 23, 2019 20:08:21

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 9.080

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.015	ug/L	70.227	24.667	-0.000
Be	9	0.013	ug/L	122.267	8.333	0.000
B	11	-1.334	ug/L	25.290	406.673	-0.000
Na	23	-3.829	ug/L	3.548	4668.096	-0.006
Mg	24	0.142	ug/L	6.543	180.668	0.000
Al	27	0.264	ug/L	73.907	345.338	0.000
P	31	2.249	ug/L	70.659	270.669	0.000
K	39	8.373	ug/L	11.155	17019.466	0.006
Ca	44	0.404	ug/L	603.904	158.001	0.000
>Sc	45		ug/L		433768.429	433768.429
Ti	47	-0.057	ug/L	49.387	4.000	-0.000
V	51	-0.428	ug/L	41.254	5979.921	-0.002
Cr	52	-0.003	ug/L	279.188	226.002	-0.000
Cr	53		ug/L		2051.481	-0.001
Mn	55	0.010	ug/L	131.582	70.000	0.000
Fe	57	0.689	ug/L	64.998	90.000	0.000
Co	59	0.003	ug/L	143.726	40.667	0.000
Ni	60	0.003	ug/L	95.424	40.667	0.000
Cu	63		ug/L		52.667	-0.000
Cu	65	-0.002	ug/L	159.690	26.667	-0.000
Zn	66	0.152	ug/L	120.176	463.341	0.000
Zn	67		ug/L		78.667	0.000
Zn	68		ug/L		286.670	0.000
>Ge	74		ug/L		230448.255	230448.255
As	75	0.106	ug/L	79.513	230.891	0.000
Se	77		ug/L		89.334	-0.000
Se	78	0.027	ug/L	424.345	61.082	0.000
Se	82		ug/L		62.000	0.000
Kr	83		ug/L		8.267	-0.000
Sr	88	-0.008	ug/L	103.351	47.333	-0.000
Zr	90	0.146	ug/L	27.199	501.342	0.001
Mo	98	0.022	ug/L	23.591	47.562	0.000
Ag	107	0.001	ug/L	84.241	13.333	0.000
Cd	111	-0.001	ug/L	1085.621	10.667	-0.000
Cd	114		ug/L		13.878	0.000
>In	115		ug/L		251132.526	251132.526
Sn	120	-0.079	ug/L	13.204	343.962	-0.001
Sb	121	-0.010	ug/L	38.153	28.667	-0.000
Sb	123		ug/L		30.914	0.000
Ba	135		ug/L		14.000	0.000
Ba	137	-0.005	ug/L	59.851	18.667	-0.000
>Lu	175		ug/L		825678.221	825678.221
Tl	205	0.031	ug/L	24.243	580.679	0.001
Pb	208	0.000	ug/L	447.656	359.335	0.000
Th	232	0.160	ug/L	15.941	4916.853	0.004
U	238	0.005	ug/L	23.188	245.669	0.000

Sample ID: QC Std 9

Report Date/Time: Monday, September 23, 2019 20:10:11

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		100.69			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.20			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		97.80			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		99.38			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537004

Sample Date/Time: Monday, September 23, 2019 20:11:44

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537004.081

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.036	ug/L	75.479	64.000	0.000
Be	9	0.006	ug/L	254.898	7.000	0.000
B	11	-1.673	ug/L	6.979	380.672	-0.001
Na	23	4200.300	ug/L	2.218	3031862.765	6.615
Mg	24	1400.578	ug/L	4.716	510840.258	1.118
Al	27	36.272	ug/L	7.473	10673.327	0.023
P	31	20938.862	ug/L	2.735	483532.539	1.057
K	39	13248.619	ug/L	3.414	4149800.733	9.045
Ca	44	33596.934	ug/L	2.145	486120.206	1.063
>Sc	45		ug/L		457254.255	457254.255
Ti	47	5.491	ug/L	8.347	418.006	0.001
V	51	-0.752	ug/L	13.335	5681.797	-0.003
Cr	52	0.132	ug/L	9.829	554.677	0.001
Cr	53		ug/L		1643.428	-0.002
Mn	55	90.956	ug/L	2.650	121488.552	0.266
Fe	57	81.598	ug/L	2.129	3924.539	0.008
Co	59	0.110	ug/L	9.887	434.673	0.001
Ni	60	0.160	ug/L	6.143	200.001	0.000
Cu	63		ug/L		12678.294	0.028
Cu	65	4.856	ug/L	2.752	6051.282	0.013
Zn	66	104.986	ug/L	1.330	32957.311	0.144
Zn	67		ug/L		5015.548	0.022
Zn	68		ug/L		23375.117	0.102
>Ge	74		ug/L		226228.720	226228.720
As	75	-0.039	ug/L	164.490	200.668	-0.000
Se	77		ug/L		96.667	0.000
Se	78	1.408	ug/L	19.705	92.904	0.000
Se	82		ug/L		42.000	0.000
Kr	83		ug/L		9.733	-0.000
Sr	88	112.325	ug/L	1.291	196798.273	0.768
Zr	90	0.494	ug/L	8.849	1209.385	0.004
Mo	98	0.571	ug/L	3.579	777.510	0.003
Ag	107	0.003	ug/L	51.350	20.000	0.000
Cd	111	0.059	ug/L	11.707	41.333	0.000
Cd	114		ug/L		73.788	0.000
>In	115		ug/L		256161.151	256161.151
Sn	120	2.645	ug/L	6.795	6478.069	0.023
Sb	121	-0.002	ug/L	336.675	42.667	-0.000
Sb	123		ug/L		34.662	0.000
Ba	135		ug/L		6307.392	0.007
Ba	137	13.362	ug/L	1.849	11375.195	0.013
>Lu	175		ug/L		861058.996	861058.996
Tl	205	0.031	ug/L	3.142	607.346	0.001
Pb	208	0.583	ug/L	1.755	10959.628	0.012
Th	232	0.119	ug/L	10.663	4227.294	0.003
U	238	0.024	ug/L	4.182	732.019	0.001

Sample ID: 489537004

Report Date/Time: Monday, September 23, 2019 20:13:34

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.15			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		98.37			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		99.76			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.64			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537005

Sample Date/Time: Monday, September 23, 2019 20:15:07

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537005.082

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.051	ug/L	3.461	76.667	0.000
Be	9	0.014	ug/L	52.203	9.333	0.000
B	11	-1.848	ug/L	2.109	361.338	-0.001
Na	23	2211.669	ug/L	2.679	1625310.867	3.483
Mg	24	1410.370	ug/L	1.780	522743.148	1.125
Al	27	3.835	ug/L	1.472	1409.403	0.002
P	31	8374.365	ug/L	0.970	196605.695	0.423
K	39	18969.210	ug/L	1.643	6029186.890	12.951
Ca	44	515.759	ug/L	4.313	7740.765	0.016
>Sc	45		ug/L		464362.161	464362.161
Ti	47	1.900	ug/L	3.797	152.667	0.000
V	51	-0.381	ug/L	45.666	6491.477	-0.002
Cr	52	0.432	ug/L	6.931	1275.390	0.002
Cr	53		ug/L		2169.498	-0.001
Mn	55	1.379	ug/L	4.367	1931.464	0.004
Fe	57	15.392	ug/L	5.107	803.356	0.002
Co	59	0.038	ug/L	6.274	173.334	0.000
Ni	60	0.096	ug/L	18.177	137.334	0.000
Cu	63		ug/L		2117.490	0.004
Cu	65	0.766	ug/L	6.199	996.035	0.002
Zn	66	42.620	ug/L	3.237	13925.455	0.058
Zn	67		ug/L		2031.478	0.008
Zn	68		ug/L		9473.140	0.040
>Ge	74		ug/L		231272.010	231272.010
As	75	0.014	ug/L	639.439	214.891	0.000
Se	77		ug/L		106.000	0.000
Se	78	1.695	ug/L	25.255	102.051	0.000
Se	82		ug/L		48.000	0.000
Kr	83		ug/L		11.467	0.000
Sr	88	1.005	ug/L	2.225	1836.785	0.007
Zr	90	0.186	ug/L	13.646	595.346	0.001
Mo	98	0.202	ug/L	1.333	289.866	0.001
Ag	107	0.002	ug/L	31.038	17.333	0.000
Cd	111	-0.009	ug/L	23.977	6.667	-0.000
Cd	114		ug/L		-3.943	-0.000
>In	115		ug/L		258187.779	258187.779
Sn	120	3.142	ug/L	1.103	7660.669	0.028
Sb	121	0.009	ug/L	41.398	59.333	0.000
Sb	123		ug/L		38.163	0.000
Ba	135		ug/L		302.670	0.000
Ba	137	0.580	ug/L	8.149	514.676	0.001
>Lu	175		ug/L		858895.303	858895.303
Tl	205	0.042	ug/L	4.430	754.687	0.001
Pb	208	0.038	ug/L	2.423	1055.349	0.001
Th	232	0.031	ug/L	20.396	2266.847	0.001
U	238	0.013	ug/L	7.353	440.673	0.000

Sample ID: 489537005

Report Date/Time: Monday, September 23, 2019 20:16:57

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		107.80			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.56			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		100.55			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.38			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537006

Sample Date/Time: Monday, September 23, 2019 20:18:29

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537006.083

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.007	ug/L	301.823	42.000	0.000
Be	9	0.007	ug/L	144.884	7.000	0.000
B	11	-2.336	ug/L	5.912	280.669	-0.001
Na	23	4084.749	ug/L	4.018	2887738.905	6.433
Mg	24	1714.187	ug/L	2.328	612589.547	1.368
Al	27	21.678	ug/L	0.927	6366.085	0.014
P	31	25899.201	ug/L	1.880	585806.993	1.308
K	39	14971.403	ug/L	1.775	4591577.286	10.221
Ca	44	54867.129	ug/L	1.399	777494.252	1.736
>Sc	45		ug/L		447777.270	447777.270
Ti	47	5.767	ug/L	9.537	430.007	0.001
V	51	-0.597	ug/L	9.421	5856.534	-0.002
Cr	52	0.143	ug/L	18.580	567.345	0.001
Cr	53		ug/L		1557.418	-0.002
Mn	55	94.249	ug/L	2.403	123288.489	0.275
Fe	57	76.256	ug/L	2.815	3596.453	0.008
Co	59	0.123	ug/L	4.324	472.008	0.001
Ni	60	0.133	ug/L	15.913	169.334	0.000
Cu	63		ug/L		4553.393	0.010
Cu	65	1.733	ug/L	3.686	2134.826	0.005
Zn	66	91.925	ug/L	1.320	28489.717	0.126
Zn	67		ug/L		4286.643	0.019
Zn	68		ug/L		19459.247	0.086
>Ge	74		ug/L		222948.278	222948.278
As	75	0.145	ug/L	52.145	230.446	0.000
Se	77		ug/L		108.000	0.000
Se	78	1.692	ug/L	17.494	98.326	0.000
Se	82		ug/L		50.000	0.000
Kr	83		ug/L		11.200	0.000
Sr	88	172.784	ug/L	0.725	300032.380	1.182
Zr	90	0.116	ug/L	11.373	445.340	0.001
Mo	98	0.815	ug/L	3.329	1090.571	0.004
Ag	107	0.000	ug/L	5362.736	10.000	0.000
Cd	111	0.023	ug/L	67.253	22.667	0.000
Cd	114		ug/L		46.591	0.000
>In	115		ug/L		253884.903	253884.903
Sn	120	2.197	ug/L	2.509	5423.662	0.019
Sb	121	-0.009	ug/L	58.190	30.667	-0.000
Sb	123		ug/L		35.664	0.000
Ba	135		ug/L		14590.782	0.017
Ba	137	31.348	ug/L	3.258	26291.512	0.031
>Lu	175		ug/L		849526.832	849526.832
Tl	205	0.031	ug/L	3.237	604.013	0.001
Pb	208	0.368	ug/L	2.830	6948.666	0.008
Th	232	0.010	ug/L	57.757	1786.779	0.000
U	238	0.018	ug/L	2.613	552.677	0.001

Sample ID: 489537006

Report Date/Time: Monday, September 23, 2019 20:20:20

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		103.95			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		96.94			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		98.87			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		102.25			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
P 31 Upper, S, EEEP		31	Sample is out of limits (over linear range)
Ca 44 Upper, S, EECa		44	Sample is out of limits (over linear range)

QC Action

QC Action Line: Continue

ICPMS #12 - Summary Report

Sample ID: 489537007

Sample Date/Time: Monday, September 23, 2019 20:21:51

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537007.084

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.016	ug/L	109.085	25.333	-0.000
Be	9	-0.002	ug/L	233.506	4.667	-0.000
B	11	-2.184	ug/L	5.500	308.670	-0.001
Na	23	1576.504	ug/L	0.585	1144701.553	2.483
Mg	24	1583.326	ug/L	1.535	578673.739	1.263
Al	27	5.228	ug/L	1.858	1789.445	0.003
P	31	9548.256	ug/L	1.915	221019.512	0.482
K	39	21978.218	ug/L	1.144	6886801.527	15.005
Ca	44	744.070	ug/L	3.362	10942.860	0.024
>Sc	45		ug/L		457934.984	457934.984
Ti	47	1.927	ug/L	11.184	152.667	0.000
V	51	-0.521	ug/L	22.143	6134.651	-0.002
Cr	52	0.187	ug/L	12.072	683.350	0.001
Cr	53		ug/L		2108.156	-0.001
Mn	55	2.273	ug/L	0.662	3101.003	0.007
Fe	57	11.126	ug/L	6.913	590.012	0.001
Co	59	0.018	ug/L	24.594	99.334	0.000
Ni	60	0.117	ug/L	34.313	157.334	0.000
Cu	63		ug/L		1968.802	0.004
Cu	65	0.729	ug/L	4.469	936.697	0.002
Zn	66	41.393	ug/L	0.667	13545.753	0.057
Zn	67		ug/L		2084.152	0.009
Zn	68		ug/L		9551.859	0.040
>Ge	74		ug/L		231420.742	231420.742
As	75	0.089	ug/L	36.805	228.891	0.000
Se	77		ug/L		96.000	0.000
Se	78	2.170	ug/L	15.871	113.688	0.000
Se	82		ug/L		49.333	0.000
Kr	83		ug/L		10.267	-0.000
Sr	88	0.847	ug/L	1.737	1559.418	0.006
Zr	90	0.051	ug/L	24.503	322.670	0.000
Mo	98	0.113	ug/L	22.351	171.270	0.001
Ag	107	-0.001	ug/L	42.285	7.333	-0.000
Cd	111	-0.003	ug/L	516.477	10.000	-0.000
Cd	114		ug/L		-29.846	-0.000
>In	115		ug/L		258316.358	258316.358
Sn	120	3.479	ug/L	3.621	8428.394	0.031
Sb	121	-0.001	ug/L	312.173	43.333	-0.000
Sb	123		ug/L		35.744	0.000
Ba	135		ug/L		2118.157	0.002
Ba	137	4.400	ug/L	3.570	3747.825	0.004
>Lu	175		ug/L		857946.197	857946.197
Tl	205	0.030	ug/L	3.947	588.679	0.000
Pb	208	0.042	ug/L	19.925	1130.017	0.001
Th	232	-0.008	ug/L	10.055	1415.403	-0.000
U	238	0.001	ug/L	162.579	139.667	0.000

Sample ID: 489537007

Report Date/Time: Monday, September 23, 2019 20:23:42

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.30			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.63			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		100.60			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.27			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537008

Sample Date/Time: Monday, September 23, 2019 20:25:14

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537008.085

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.066	ug/L	33.761	84.667	0.000
Be	9	0.011	ug/L	93.421	8.000	0.000
B	11	-1.816	ug/L	3.647	351.338	-0.001
Na	23	3753.384	ug/L	1.705	2642506.060	5.911
Mg	24	1614.607	ug/L	1.744	574417.500	1.288
Al	27	90.784	ug/L	1.480	25645.671	0.057
P	31	24044.322	ug/L	0.395	541486.614	1.214
K	39	15114.763	ug/L	0.930	4614861.865	10.319
Ca	44	38703.589	ug/L	0.904	546063.556	1.225
>Sc	45		ug/L		445782.379	445782.379
Ti	47	7.151	ug/L	6.807	528.676	0.001
V	51	0.540	ug/L	24.972	7949.545	0.002
Cr	52	0.243	ug/L	7.754	794.022	0.001
Cr	53		ug/L		1710.103	-0.002
Mn	55	151.346	ug/L	2.119	197061.357	0.442
Fe	57	281.991	ug/L	2.141	13075.315	0.029
Co	59	0.311	ug/L	10.221	1139.379	0.002
Ni	60	0.198	ug/L	8.813	232.002	0.000
Cu	63		ug/L		7864.167	0.017
Cu	65	3.059	ug/L	3.816	3729.154	0.008
Zn	66	99.505	ug/L	1.311	31006.951	0.136
Zn	67		ug/L		4697.439	0.021
Zn	68		ug/L		21986.247	0.097
>Ge	74		ug/L		224405.476	224405.476
As	75	0.325	ug/L	21.209	264.002	0.000
Se	77		ug/L		109.334	0.000
Se	78	2.856	ug/L	2.865	126.533	0.000
Se	82		ug/L		52.667	0.000
Kr	83		ug/L		8.800	-0.000
Sr	88	77.294	ug/L	2.074	134353.549	0.529
Zr	90	0.070	ug/L	29.135	356.004	0.001
Mo	98	0.929	ug/L	1.860	1242.730	0.005
Ag	107	0.003	ug/L	124.775	20.000	0.000
Cd	111	0.347	ug/L	4.466	185.335	0.001
Cd	114		ug/L		434.724	0.002
>In	115		ug/L		254109.314	254109.314
Sn	120	2.797	ug/L	4.161	6767.535	0.025
Sb	121	0.015	ug/L	27.674	67.333	0.000
Sb	123		ug/L		54.662	0.000
Ba	135		ug/L		9876.080	0.012
Ba	137	21.521	ug/L	1.966	18108.805	0.021
>Lu	175		ug/L		851840.713	851840.713
Tl	205	0.036	ug/L	2.097	670.016	0.001
Pb	208	0.582	ug/L	2.704	10816.944	0.012
Th	232	-0.008	ug/L	30.342	1396.068	-0.000
U	238	0.031	ug/L	3.461	873.693	0.001

Sample ID: 489537008

Report Date/Time: Monday, September 23, 2019 20:27:05

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		103.48			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		97.58			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		98.96			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		102.53			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537009

Sample Date/Time: Monday, September 23, 2019 20:28:37

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537009.086

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.016	ug/L	43.832	26.000	-0.000
Be	9	-0.007	ug/L	126.525	3.333	-0.000
B	11	-2.773	ug/L	3.274	226.002	-0.001
Na	23	1733.096	ug/L	0.948	1262037.133	2.730
Mg	24	1331.444	ug/L	0.544	488394.846	1.062
Al	27	1.797	ug/L	19.239	807.356	0.001
P	31	7855.571	ug/L	0.664	182532.766	0.397
K	39	18831.073	ug/L	3.095	5922893.207	12.856
Ca	44	481.172	ug/L	1.085	7158.460	0.015
>Sc	45		ug/L		459561.114	459561.114
Ti	47	1.806	ug/L	12.327	144.001	0.000
V	51	-0.451	ug/L	22.188	6290.052	-0.002
Cr	52	0.111	ug/L	6.734	508.009	0.001
Cr	53		ug/L		2084.152	-0.001
Mn	55	0.996	ug/L	2.332	1397.402	0.003
Fe	57	7.872	ug/L	10.202	437.340	0.001
Co	59	0.017	ug/L	23.940	94.667	0.000
Ni	60	0.070	ug/L	35.343	110.000	0.000
Cu	63		ug/L		2404.869	0.005
Cu	65	0.864	ug/L	3.158	1108.710	0.002
Zn	66	34.007	ug/L	3.500	11325.826	0.047
Zn	67		ug/L		1673.432	0.007
Zn	68		ug/L		7934.203	0.033
>Ge	74		ug/L		233930.483	233930.483
As	75	0.007	ug/L	529.785	216.002	0.000
Se	77		ug/L		80.000	-0.000
Se	78	1.109	ug/L	28.731	88.787	0.000
Se	82		ug/L		39.333	0.000
Kr	83		ug/L		9.200	-0.000
Sr	88	0.696	ug/L	6.999	1307.393	0.005
Zr	90	-0.003	ug/L	518.590	216.002	-0.000
Mo	98	0.075	ug/L	18.006	120.676	0.000
Ag	107	-0.001	ug/L	105.700	7.333	-0.000
Cd	111	-0.002	ug/L	524.860	10.667	-0.000
Cd	114		ug/L		-17.535	-0.000
>In	115		ug/L		261189.188	261189.188
Sn	120	3.278	ug/L	1.944	8061.540	0.029
Sb	121	-0.009	ug/L	79.096	31.333	-0.000
Sb	123		ug/L		28.662	-0.000
Ba	135		ug/L		66.667	0.000
Ba	137	0.104	ug/L	9.433	112.000	0.000
>Lu	175		ug/L		862094.207	862094.207
Tl	205	0.025	ug/L	5.705	529.343	0.000
Pb	208	0.028	ug/L	5.973	885.344	0.001
Th	232	-0.022	ug/L	4.579	1106.043	-0.001
U	238	-0.000	ug/L	100.770	116.000	-0.000

Sample ID: 489537009

Report Date/Time: Monday, September 23, 2019 20:30:27

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.68			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.72			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		101.72			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.77			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537010

Sample Date/Time: Monday, September 23, 2019 20:32:00

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537010.087

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.080	ug/L	24.089	95.334	0.000
Be	9	0.012	ug/L	113.483	8.333	0.000
B	11	-2.801	ug/L	5.700	216.668	-0.001
Na	23	4332.700	ug/L	0.755	3068494.496	6.824
Mg	24	1505.551	ug/L	0.462	539012.615	1.201
Al	27	72.160	ug/L	1.030	20570.803	0.045
P	31	23788.791	ug/L	0.816	539055.341	1.201
K	39	11999.412	ug/L	0.957	3689765.179	8.192
Ca	44	41988.892	ug/L	0.791	596140.410	1.329
>Sc	45		ug/L		448568.683	448568.683
Ti	47	9.555	ug/L	10.240	708.018	0.002
V	51	-0.191	ug/L	64.546	6627.538	-0.001
Cr	52	0.165	ug/L	12.045	619.347	0.001
Cr	53		ug/L		1655.429	-0.002
Mn	55	53.782	ug/L	1.233	70511.622	0.157
Fe	57	119.902	ug/L	1.062	5630.443	0.012
Co	59	0.097	ug/L	3.752	379.338	0.001
Ni	60	0.174	ug/L	19.437	210.002	0.000
Cu	63		ug/L		30871.999	0.069
Cu	65	11.901	ug/L	0.224	14510.032	0.032
Zn	66	85.626	ug/L	1.259	26838.524	0.117
Zn	67		ug/L		4073.914	0.018
Zn	68		ug/L		18737.617	0.082
>Ge	74		ug/L		225240.471	225240.471
As	75	0.203	ug/L	36.055	243.113	0.000
Se	77		ug/L		100.000	0.000
Se	78	1.417	ug/L	12.423	92.775	0.000
Se	82		ug/L		44.667	0.000
Kr	83		ug/L		9.600	-0.000
Sr	88	149.652	ug/L	1.757	259872.892	1.023
Zr	90	0.028	ug/L	9.227	271.336	0.000
Mo	98	0.498	ug/L	7.528	674.765	0.003
Ag	107	0.006	ug/L	15.559	29.333	0.000
Cd	111	0.018	ug/L	136.376	20.000	0.000
Cd	114		ug/L		28.330	0.000
>In	115		ug/L		253873.996	253873.996
Sn	120	2.951	ug/L	3.337	7106.401	0.026
Sb	121	-0.003	ug/L	215.063	40.000	-0.000
Sb	123		ug/L		26.331	-0.000
Ba	135		ug/L		4067.913	0.005
Ba	137	8.620	ug/L	2.040	7301.866	0.009
>Lu	175		ug/L		855965.268	855965.268
Tl	205	0.019	ug/L	10.526	430.673	0.000
Pb	208	0.196	ug/L	1.755	3911.545	0.004
Th	232	-0.013	ug/L	14.792	1291.392	-0.000
U	238	0.031	ug/L	16.432	901.029	0.001

Sample ID: 489537010

Report Date/Time: Monday, September 23, 2019 20:33:50

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		104.13			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		97.94			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		98.87			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.03			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537011
 Sample Date/Time: Monday, September 23, 2019 20:35:22
 Sample Type: Sample
 Sample Description: ACAL 6020
 Number of Replicates: 3
 Batch ID: 1914842|2|baj
 Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth
 Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537011.088

Concentration Results Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.016	ug/L	69.902	26.000	-0.000
Be	9	-0.008	ug/L	98.054	3.333	-0.000
B	11	-2.717	ug/L	8.751	238.002	-0.001
Na	23	1756.071	ug/L	1.065	1301755.742	2.766
Mg	24	1465.681	ug/L	1.696	547338.330	1.170
Al	27	2.539	ug/L	7.951	1040.038	0.002
P	31	9098.174	ug/L	2.457	215165.933	0.459
K	39	22637.688	ug/L	0.925	7246577.694	15.455
Ca	44	524.447	ug/L	2.192	7927.533	0.017
>Sc	45		ug/L		467858.674	467858.674
Ti	47	2.103	ug/L	4.359	169.334	0.000
V	51	-0.610	ug/L	12.087	6092.633	-0.003
Cr	52	0.323	ug/L	6.583	1024.037	0.002
Cr	53		ug/L		1994.139	-0.001
Mn	55	1.129	ug/L	7.920	1604.757	0.003
Fe	57	11.440	ug/L	5.039	618.013	0.001
Co	59	0.016	ug/L	8.394	93.334	0.000
Ni	60	0.110	ug/L	14.412	153.334	0.000
Cu	63		ug/L		1642.094	0.003
Cu	65	0.600	ug/L	4.854	792.689	0.002
Zn	66	50.171	ug/L	4.043	16374.055	0.069
Zn	67		ug/L		2418.872	0.010
Zn	68		ug/L		11291.127	0.048
>Ge	74		ug/L		232053.902	232053.902
As	75	0.028	ug/L	265.702	218.224	0.000
Se	77		ug/L		98.667	0.000
Se	78	1.790	ug/L	15.267	104.738	0.000
Se	82		ug/L		42.667	0.000
Kr	83		ug/L		10.800	-0.000
Sr	88	0.562	ug/L	1.913	1072.707	0.004
Zr	90	-0.019	ug/L	66.965	184.001	-0.000
Mo	98	0.106	ug/L	20.813	164.375	0.001
Ag	107	-0.001	ug/L	155.834	8.000	-0.000
Cd	111	-0.011	ug/L	62.093	6.000	-0.000
Cd	114		ug/L		-16.888	-0.000
>In	115		ug/L		262546.467	262546.467
Sn	120	2.538	ug/L	2.365	6396.073	0.022
Sb	121	-0.010	ug/L	32.379	30.000	-0.000
Sb	123		ug/L		21.748	-0.000
Ba	135		ug/L		130.667	0.000
Ba	137	0.249	ug/L	3.248	237.335	0.000
>Lu	175		ug/L		868556.684	868556.684
Tl	205	0.010	ug/L	6.963	307.337	0.000
Pb	208	0.025	ug/L	3.896	833.343	0.001
Th	232	-0.026	ug/L	8.007	1020.703	-0.001
U	238	0.001	ug/L	89.974	144.667	0.000

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		108.61			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.90			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		102.25			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		104.54			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 8

Sample Date/Time: Monday, September 23, 2019 20:38:46

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 8.089

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	49.845	ug/L	1.830	35243.435	0.082
Be	9	49.597	ug/L	1.214	12616.903	0.029
B	11	91.595	ug/L	1.559	12832.430	0.028
Na	23	4862.578	ug/L	1.848	3310758.554	7.658
Mg	24	4672.032	ug/L	1.706	1608305.291	3.728
Al	27	4599.544	ug/L	1.672	1243767.356	2.883
P	31	4836.605	ug/L	2.724	105601.870	0.244
K	39	4641.029	ug/L	0.730	1381389.940	3.169
Ca	44	4777.975	ug/L	3.499	65365.293	0.151
>Sc	45		ug/L		431405.638	431405.638
Ti	47	48.799	ug/L	4.223	3445.082	0.008
V	51	49.733	ug/L	1.868	96466.004	0.208
Cr	52	49.778	ug/L	0.975	110048.340	0.255
Cr	53		ug/L		13695.899	0.026
Mn	55	49.325	ug/L	3.160	62186.438	0.144
Fe	57	4870.508	ug/L	0.869	217613.648	0.504
Co	59	50.415	ug/L	2.465	173708.789	0.403
Ni	60	49.641	ug/L	4.165	46910.283	0.109
Cu	63		ug/L		126680.755	0.293
Cu	65	51.905	ug/L	1.097	60758.264	0.141
Zn	66	49.908	ug/L	0.552	15607.188	0.068
Zn	67		ug/L		2569.565	0.011
Zn	68		ug/L		11451.256	0.050
>Ge	74		ug/L		222316.545	222316.545
As	75	50.137	ug/L	1.852	9085.556	0.040
Se	77		ug/L		422.006	0.001
Se	78	51.786	ug/L	0.676	1273.687	0.005
Se	82		ug/L		673.349	0.003
Kr	83		ug/L		12.133	0.000
Sr	88	49.406	ug/L	1.842	82897.281	0.338
Zr	90	49.065	ug/L	3.322	94311.090	0.384
Mo	98	50.122	ug/L	0.940	63673.977	0.260
Ag	107	50.613	ug/L	1.097	149127.026	0.608
Cd	111	50.748	ug/L	1.468	24584.471	0.100
Cd	114		ug/L		65438.767	0.267
>In	115		ug/L		245157.841	245157.841
Sn	120	51.309	ug/L	1.871	111025.746	0.451
Sb	121	50.623	ug/L	0.826	74638.475	0.304
Sb	123		ug/L		60995.438	0.249
Ba	135		ug/L		23018.530	0.028
Ba	137	50.936	ug/L	1.813	41058.255	0.050
>Lu	175		ug/L		816618.292	816618.292
Tl	205	50.710	ug/L	0.931	679943.217	0.832
Pb	208	51.191	ug/L	0.596	881647.484	1.079
Th	232	50.794	ug/L	2.054	1064646.071	1.302
U	238	48.883	ug/L	0.490	1153982.004	1.413

Sample ID: QC Std 8

Report Date/Time: Monday, September 23, 2019 20:40:36

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	99.690				
|	Be	9	99.194				
|	B	11	91.595				
|	Na	23	97.252				
|	Mg	24	93.441				
|	Al	27	91.080				
|	P	31	96.732				
|	K	39	92.821				
|	Ca	44	95.559				
>	Sc	45		100.15			
|	Ti	47	97.598				
|	V	51	99.466				
|	Cr	52	99.555				
|	Cr	53					
|	Mn	55	98.649				
|	Fe	57	97.410				
|	Co	59	100.830				
|	Ni	60	99.282				
|	Cu	63					
|	Cu	65	103.810				
[	Zn	66	99.817				
|	Zn	67					
|	Zn	68					
>	Ge	74		96.67			
|	As	75	100.273				
|	Se	77					
|	Se	78	103.571				
|	Se	82					
[	Kr	83					
[	Sr	88	98.813				
|	Zr	90	98.129				
|	Mo	98	100.245				
|	Ag	107	101.227				
|	Cd	111	101.496				
|	Cd	114					
>	In	115		95.48			
|	Sn	120	102.618				
|	Sb	121	101.246				
[	Sb	123					
[	Ba	135					
|	Ba	137	101.873				
>	Lu	175		98.29			
|	Tl	205	101.419				
|	Pb	208	102.381				
|	Th	232	101.588				
[	U	238	97.767				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 9

Sample Date/Time: Monday, September 23, 2019 20:42:09

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 9.090

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.007	ug/L	107.571	30.000	-0.000
Be	9	0.005	ug/L	81.279	6.333	0.000
B	11	-1.680	ug/L	12.138	354.671	-0.001
Na	23	-3.899	ug/L	4.249	4550.725	-0.006
Mg	24	0.116	ug/L	8.477	169.334	0.000
Al	27	0.160	ug/L	89.876	312.670	0.000
P	31	3.630	ug/L	34.037	296.670	0.000
K	39	9.499	ug/L	8.614	17096.894	0.006
Ca	44	1.178	ug/L	115.009	166.001	0.000
>Sc	45		ug/L		427310.878	427310.878
Ti	47	0.020	ug/L	217.810	9.333	0.000
V	51	-0.603	ug/L	28.220	5577.758	-0.003
Cr	52	-0.014	ug/L	30.145	199.335	-0.000
Cr	53		ug/L		1806.115	-0.001
Mn	55	-0.001	ug/L	1312.983	55.333	-0.000
Fe	57	0.724	ug/L	148.739	90.000	0.000
Co	59	0.003	ug/L	139.276	40.000	0.000
Ni	60	-0.003	ug/L	213.099	34.667	-0.000
Cu	63		ug/L		64.667	0.000
Cu	65	0.001	ug/L	155.997	30.667	0.000
Zn	66	0.086	ug/L	166.228	434.673	0.000
Zn	67		ug/L		72.667	0.000
Zn	68		ug/L		288.003	0.000
>Ge	74		ug/L		226328.139	226328.139
As	75	-0.025	ug/L	530.272	203.113	-0.000
Se	77		ug/L		90.000	-0.000
Se	78	0.249	ug/L	135.934	65.275	0.000
Se	82		ug/L		58.000	0.000
Kr	83		ug/L		10.667	-0.000
Sr	88	-0.008	ug/L	75.435	46.667	-0.000
Zr	90	0.142	ug/L	23.130	483.342	0.001
Mo	98	0.022	ug/L	25.034	46.383	0.000
Ag	107	0.000	ug/L	1027.479	10.000	0.000
Cd	111	-0.013	ug/L	66.324	4.667	-0.000
Cd	114		ug/L		13.411	0.000
>In	115		ug/L		246714.659	246714.659
Sn	120	-0.076	ug/L	12.468	343.902	-0.001
Sb	121	-0.008	ug/L	138.199	32.000	-0.000
Sb	123		ug/L		28.993	-0.000
Ba	135		ug/L		10.667	0.000
Ba	137	-0.003	ug/L	455.674	20.000	-0.000
>Lu	175		ug/L		808417.055	808417.055
Tl	205	0.034	ug/L	18.306	607.346	0.001
Pb	208	0.000	ug/L	480.142	355.335	0.000
Th	232	0.149	ug/L	13.012	4580.739	0.004
U	238	0.005	ug/L	17.784	239.335	0.000

Sample ID: QC Std 9

Report Date/Time: Monday, September 23, 2019 20:44:00

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		99.20			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		98.41			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		96.08			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		97.31			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537012

Sample Date/Time: Monday, September 23, 2019 20:45:33

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537012.091

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.010	ug/L	163.965	45.333	0.000
Be	9	0.001	ug/L	360.618	5.667	0.000
B	11	-2.061	ug/L	9.080	328.004	-0.001
Na	23	3860.148	ug/L	2.327	2808157.383	6.079
Mg	24	1060.074	ug/L	2.254	389757.865	0.846
Al	27	8.654	ug/L	5.502	2789.606	0.005
P	31	15280.483	ug/L	1.807	355655.383	0.772
K	39	12469.664	ug/L	1.824	3937021.230	8.513
Ca	44	22898.430	ug/L	3.467	333893.525	0.725
>Sc	45		ug/L		460632.708	460632.708
Ti	47	3.307	ug/L	5.075	257.336	0.001
V	51	-0.527	ug/L	17.376	6159.328	-0.002
Cr	52	0.102	ug/L	22.268	486.675	0.001
Cr	53		ug/L		1676.765	-0.002
Mn	55	37.570	ug/L	1.770	50599.472	0.110
Fe	57	50.966	ug/L	0.551	2493.551	0.005
Co	59	0.038	ug/L	9.153	171.334	0.000
Ni	60	0.093	ug/L	18.393	133.334	0.000
Cu	63		ug/L		8208.359	0.018
Cu	65	2.976	ug/L	1.078	3749.825	0.008
Zn	66	69.114	ug/L	0.383	22042.994	0.095
Zn	67		ug/L		3352.394	0.014
Zn	68		ug/L		15520.426	0.067
>Ge	74		ug/L		228371.367	228371.367
As	75	-0.045	ug/L	169.002	201.557	-0.000
Se	77		ug/L		95.334	0.000
Se	78	1.834	ug/L	17.541	104.096	0.000
Se	82		ug/L		44.667	0.000
Kr	83		ug/L		10.000	-0.000
Sr	88	64.181	ug/L	2.300	113681.443	0.439
Zr	90	0.447	ug/L	11.875	1125.378	0.003
Mo	98	0.523	ug/L	1.877	720.767	0.003
Ag	107	0.001	ug/L	223.351	12.667	0.000
Cd	111	0.031	ug/L	27.365	27.333	0.000
Cd	114		ug/L		63.420	0.000
>In	115		ug/L		258853.629	258853.629
Sn	120	2.394	ug/L	1.770	5977.866	0.021
Sb	121	-0.005	ug/L	157.827	38.000	-0.000
Sb	123		ug/L		33.497	0.000
Ba	135		ug/L		5112.248	0.006
Ba	137	10.654	ug/L	2.868	9112.907	0.011
>Lu	175		ug/L		864626.427	864626.427
Tl	205	0.014	ug/L	11.662	362.671	0.000
Pb	208	0.084	ug/L	1.135	1894.049	0.002
Th	232	0.099	ug/L	21.409	3791.175	0.003
U	238	0.007	ug/L	11.689	299.336	0.000

Sample ID: 489537012

Report Date/Time: Monday, September 23, 2019 20:47:23

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.93			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		99.30			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		100.81			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		104.07			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537013

Sample Date/Time: Monday, September 23, 2019 20:48:55

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537013.092

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.011	ug/L	100.436	29.333	-0.000
Be	9	0.006	ug/L	100.961	7.000	0.000
B	11	-2.328	ug/L	12.005	286.003	-0.001
Na	23	1370.723	ug/L	3.018	988626.544	2.159
Mg	24	1049.473	ug/L	1.375	380723.408	0.837
Al	27	1.478	ug/L	3.715	708.018	0.001
P	31	7087.176	ug/L	1.015	162882.109	0.358
K	39	18099.961	ug/L	1.498	5631295.584	12.357
Ca	44	376.903	ug/L	2.512	5579.089	0.012
>Sc	45		ug/L		454462.367	454462.367
Ti	47	1.449	ug/L	11.634	116.000	0.000
V	51	-0.674	ug/L	16.682	5797.844	-0.003
Cr	52	0.129	ug/L	10.163	542.677	0.001
Cr	53		ug/L		2022.143	-0.001
Mn	55	1.157	ug/L	3.558	1596.089	0.003
Fe	57	4.819	ug/L	11.419	288.670	0.000
Co	59	0.004	ug/L	42.151	47.333	0.000
Ni	60	0.062	ug/L	17.233	101.334	0.000
Cu	63		ug/L		1818.116	0.004
Cu	65	0.637	ug/L	9.677	816.023	0.002
Zn	66	26.509	ug/L	1.627	8875.423	0.036
Zn	67		ug/L		1291.392	0.005
Zn	68		ug/L		6130.649	0.025
>Ge	74		ug/L		232736.519	232736.519
As	75	-0.043	ug/L	114.493	205.557	-0.000
Se	77		ug/L		99.334	0.000
Se	78	1.059	ug/L	42.869	87.037	0.000
Se	82		ug/L		32.000	0.000
Kr	83		ug/L		9.733	-0.000
Sr	88	0.380	ug/L	2.103	737.352	0.003
Zr	90	0.158	ug/L	7.455	540.677	0.001
Mo	98	0.068	ug/L	4.467	110.977	0.000
Ag	107	-0.000	ug/L	2085.906	10.000	-0.000
Cd	111	-0.015	ug/L	26.434	4.000	-0.000
Cd	114		ug/L		4.369	-0.000
>In	115		ug/L		259580.009	259580.009
Sn	120	1.745	ug/L	3.798	4516.698	0.015
Sb	121	-0.012	ug/L	12.356	27.333	-0.000
Sb	123		ug/L		28.499	-0.000
Ba	135		ug/L		286.003	0.000
Ba	137	0.618	ug/L	6.694	550.011	0.001
>Lu	175		ug/L		863810.077	863810.077
Tl	205	0.018	ug/L	12.110	423.340	0.000
Pb	208	0.029	ug/L	7.679	900.678	0.001
Th	232	0.020	ug/L	22.615	2036.812	0.001
U	238	0.000	ug/L	52.340	134.001	0.000

Sample ID: 489537013

Report Date/Time: Monday, September 23, 2019 20:50:45

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		105.50			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		101.20			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		101.09			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.97			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537014

Sample Date/Time: Monday, September 23, 2019 20:52:18

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537014.093

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.037	ug/L	32.264	64.000	0.000
Be	9	0.012	ug/L	98.031	8.333	0.000
B	11	-2.579	ug/L	0.086	248.669	-0.001
Na	23	4566.898	ug/L	2.512	3248444.059	7.193
Mg	24	2080.715	ug/L	1.821	748285.203	1.660
Al	27	40.215	ug/L	2.058	11642.076	0.025
P	31	36979.466	ug/L	2.254	841661.152	1.867
K	39	15424.751	ug/L	2.363	4760171.328	10.531
Ca	44	66145.637	ug/L	3.019	943172.706	2.093
>Sc	45		ug/L		450678.978	450678.978
Ti	47	8.519	ug/L	6.645	635.348	0.001
V	51	-0.232	ug/L	23.998	6581.516	-0.001
Cr	52	0.139	ug/L	4.766	562.011	0.001
Cr	53		ug/L		1512.747	-0.002
Mn	55	165.611	ug/L	1.366	218002.227	0.484
Fe	57	119.721	ug/L	2.354	5647.116	0.012
Co	59	0.070	ug/L	9.997	284.003	0.001
Ni	60	0.142	ug/L	17.539	178.668	0.000
Cu	63		ug/L		6534.828	0.014
Cu	65	2.478	ug/L	1.694	3058.994	0.007
Zn	66	124.508	ug/L	1.627	38124.805	0.171
Zn	67		ug/L		5917.893	0.026
Zn	68		ug/L		26885.956	0.120
>Ge	74		ug/L		221120.379	221120.379
As	75	0.002	ug/L	1880.763	203.335	0.000
Se	77		ug/L		83.334	-0.000
Se	78	1.231	ug/L	16.441	86.705	0.000
Se	82		ug/L		22.000	-0.000
Kr	83		ug/L		11.867	0.000
Sr	88	220.104	ug/L	1.973	377320.579	1.505
Zr	90	0.103	ug/L	16.632	415.339	0.001
Mo	98	1.269	ug/L	0.894	1666.627	0.007
Ag	107	0.001	ug/L	192.293	11.333	0.000
Cd	111	0.027	ug/L	22.753	24.667	0.000
Cd	114		ug/L		43.899	0.000
>In	115		ug/L		250669.847	250669.847
Sn	120	2.407	ug/L	3.248	5817.826	0.021
Sb	121	-0.006	ug/L	64.382	34.667	-0.000
Sb	123		ug/L		25.748	-0.000
Ba	135		ug/L		11677.438	0.014
Ba	137	25.100	ug/L	1.349	21125.612	0.025
>Lu	175		ug/L		852088.297	852088.297
Tl	205	0.027	ug/L	15.883	540.010	0.000
Pb	208	0.256	ug/L	2.145	4973.671	0.005
Th	232	0.002	ug/L	181.980	1624.093	0.000
U	238	0.030	ug/L	3.551	858.026	0.001

Sample ID: 489537014

Report Date/Time: Monday, September 23, 2019 20:54:09

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		104.62			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		96.15			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		97.62			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		102.56			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
P 31 Upper, S, EEEP		31	Sample is out of limits (over linear range)
Ca 44 Upper, S, EECa		44	Sample is out of limits (over linear range)

QC Action

QC Action Line: Continue

ICPMS #12 - Summary Report

Sample ID: 489537015

Sample Date/Time: Monday, September 23, 2019 20:55:41

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537015.094

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.010	ug/L	139.165	30.000	-0.000
Be	9	-0.002	ug/L	92.266	4.667	-0.000
B	11	-2.462	ug/L	6.998	270.669	-0.001
Na	23	1957.783	ug/L	2.608	1427093.227	3.083
Mg	24	1233.323	ug/L	2.945	453155.770	0.984
Al	27	3.192	ug/L	3.667	1212.051	0.002
P	31	7779.486	ug/L	1.874	181075.038	0.393
K	39	18212.395	ug/L	1.815	5739426.575	12.434
Ca	44	474.841	ug/L	2.642	7077.753	0.015
>Sc	45		ug/L		460418.828	460418.828
Ti	47	1.535	ug/L	6.627	124.001	0.000
V	51	-0.623	ug/L	7.452	5970.581	-0.003
Cr	52	0.108	ug/L	19.910	500.676	0.001
Cr	53		ug/L		1908.128	-0.001
Mn	55	2.170	ug/L	4.595	2977.644	0.006
Fe	57	10.383	ug/L	6.782	558.011	0.001
Co	59	0.017	ug/L	37.939	96.667	0.000
Ni	60	0.185	ug/L	16.767	226.002	0.000
Cu	63		ug/L		37509.864	0.081
Cu	65	14.177	ug/L	2.402	17738.349	0.038
Zn	66	31.545	ug/L	6.111	10366.432	0.043
Zn	67		ug/L		1576.087	0.007
Zn	68		ug/L		7009.721	0.029
>Ge	74		ug/L		230301.893	230301.893
As	75	-0.048	ug/L	7.626	202.668	-0.000
Se	77		ug/L		86.000	-0.000
Se	78	1.253	ug/L	30.114	90.819	0.000
Se	82		ug/L		54.667	0.000
Kr	83		ug/L		8.133	-0.000
Sr	88	0.729	ug/L	7.919	1356.731	0.005
Zr	90	0.032	ug/L	23.321	286.003	0.000
Mo	98	0.048	ug/L	7.513	84.603	0.000
Ag	107	0.001	ug/L	100.641	14.000	0.000
Cd	111	-0.000	ug/L	5001.398	11.333	-0.000
Cd	114		ug/L		-12.727	-0.000
>In	115		ug/L		259462.466	259462.466
Sn	120	2.533	ug/L	0.869	6308.667	0.022
Sb	121	-0.011	ug/L	31.170	28.667	-0.000
Sb	123		ug/L		26.079	-0.000
Ba	135		ug/L		120.001	0.000
Ba	137	0.261	ug/L	2.654	244.669	0.000
>Lu	175		ug/L		858280.545	858280.545
Tl	205	0.006	ug/L	8.516	249.336	0.000
Pb	208	0.296	ug/L	2.328	5725.118	0.006
Th	232	-0.017	ug/L	18.954	1204.051	-0.000
U	238	0.001	ug/L	121.839	136.334	0.000

Sample ID: 489537015

Report Date/Time: Monday, September 23, 2019 20:57:32

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		106.88			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
[	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.14			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
[	Kr	83					
[	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		101.05			
|	Sn	120					
|	Sb	121					
[	Sb	123					
[	Ba	135					
|	Ba	137					
>	Lu	175		103.31			
|	Tl	205					
|	Pb	208					
|	Th	232					
[	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537016

Sample Date/Time: Monday, September 23, 2019 20:59:04

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537016.095

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.039	ug/L	54.988	66.000	0.000
Be	9	0.003	ug/L	130.120	6.000	0.000
B	11	-2.581	ug/L	8.629	250.002	-0.001
Na	23	5378.452	ug/L	1.274	3847613.423	8.471
Mg	24	2123.962	ug/L	2.689	768305.839	1.695
Al	27	21.934	ug/L	2.123	6516.820	0.014
P	31	41983.665	ug/L	1.784	961182.440	2.120
K	39	13149.663	ug/L	2.722	4084264.070	8.978
Ca	44	79555.407	ug/L	1.967	1141132.457	2.517
>Sc	45		ug/L		453301.159	453301.159
Ti	47	9.721	ug/L	5.431	728.019	0.002
V	51	0.488	ug/L	26.460	7984.231	0.002
Cr	52	0.130	ug/L	20.265	546.011	0.001
Cr	53		ug/L		1534.749	-0.002
Mn	55	74.369	ug/L	3.391	98490.506	0.217
Fe	57	100.569	ug/L	1.877	4782.134	0.010
Co	59	0.071	ug/L	10.707	288.003	0.001
Ni	60	0.142	ug/L	15.743	180.001	0.000
Cu	63		ug/L		6500.145	0.014
Cu	65	2.494	ug/L	2.837	3097.002	0.007
Zn	66	89.369	ug/L	1.196	27672.777	0.122
Zn	67		ug/L		4156.605	0.018
Zn	68		ug/L		19184.210	0.085
>Ge	74		ug/L		222667.956	222667.956
As	75	0.096	ug/L	68.476	221.335	0.000
Se	77		ug/L		93.334	0.000
Se	78	2.137	ug/L	1.988	108.637	0.000
Se	82		ug/L		50.667	0.000
Kr	83		ug/L		9.733	-0.000
Sr	88	243.025	ug/L	3.418	415658.191	1.662
Zr	90	0.015	ug/L	104.725	242.669	0.000
Mo	98	0.661	ug/L	3.358	874.712	0.003
Ag	107	0.001	ug/L	233.156	12.000	0.000
Cd	111	0.017	ug/L	35.886	19.333	0.000
Cd	114		ug/L		39.300	0.000
>In	115		ug/L		250045.386	250045.386
Sn	120	2.243	ug/L	4.809	5442.987	0.020
Sb	121	-0.003	ug/L	316.004	40.000	-0.000
Sb	123		ug/L		37.497	0.000
Ba	135		ug/L		8555.895	0.010
Ba	137	18.805	ug/L	0.461	15758.687	0.019
>Lu	175		ug/L		848116.789	848116.789
Tl	205	0.009	ug/L	32.636	290.670	0.000
Pb	208	0.239	ug/L	3.666	4640.963	0.005
Th	232	-0.019	ug/L	16.703	1157.380	-0.000
U	238	0.019	ug/L	0.681	587.345	0.001

Sample ID: 489537016

Report Date/Time: Monday, September 23, 2019 21:00:55

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		105.23			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		96.82			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		97.38			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		102.08			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
P 31	Upper, S, EEEP	31	Sample is out of limits (over linear range)
Ca 44	Upper, S, EECa	44	Sample is out of limits (over linear range)

QC Action

QC Action Line: Continue

ICPMS #12 - Summary Report

Sample ID: 489537017

Sample Date/Time: Monday, September 23, 2019 21:02:27

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537017.096

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.020	ug/L	34.793	22.667	-0.000
Be	9	0.004	ug/L	63.734	6.333	0.000
B	11	-2.726	ug/L	2.693	233.335	-0.001
Na	23	2081.732	ug/L	2.135	1519432.678	3.279
Mg	24	1552.123	ug/L	0.707	571251.335	1.239
Al	27	5.147	ug/L	3.197	1778.111	0.003
P	31	11192.499	ug/L	1.680	260817.483	0.565
K	39	19999.900	ug/L	1.462	6310925.493	13.654
Ca	44	5477.906	ug/L	1.524	80089.281	0.173
>Sc	45		ug/L		461101.970	461101.970
Ti	47	2.274	ug/L	22.359	180.001	0.000
V	51	-0.699	ug/L	11.594	5833.191	-0.003
Cr	52	0.119	ug/L	12.578	529.343	0.001
Cr	53		ug/L		1908.795	-0.001
Mn	55	5.377	ug/L	0.695	7301.866	0.016
Fe	57	18.943	ug/L	5.436	967.366	0.002
Co	59	0.014	ug/L	32.529	84.000	0.000
Ni	60	0.132	ug/L	18.589	173.334	0.000
Cu	63		ug/L		3887.862	0.008
Cu	65	1.380	ug/L	3.674	1756.775	0.004
Zn	66	37.009	ug/L	1.457	12098.455	0.051
Zn	67		ug/L		1774.777	0.007
Zn	68		ug/L		8286.403	0.035
>Ge	74		ug/L		230352.685	230352.685
As	75	-0.015	ug/L	87.932	208.668	-0.000
Se	77		ug/L		112.667	0.000
Se	78	1.428	ug/L	17.406	95.122	0.000
Se	82		ug/L		45.333	0.000
Kr	83		ug/L		6.933	-0.000
Sr	88	15.264	ug/L	2.038	27008.180	0.104
Zr	90	0.011	ug/L	111.888	241.335	0.000
Mo	98	0.071	ug/L	11.670	114.749	0.000
Ag	107	0.000	ug/L	753.923	10.667	0.000
Cd	111	-0.012	ug/L	37.908	5.333	-0.000
Cd	114		ug/L		-2.558	-0.000
>In	115		ug/L		258157.002	258157.002
Sn	120	2.732	ug/L	2.944	6729.552	0.024
Sb	121	0.010	ug/L	124.657	60.667	0.000
Sb	123		ug/L		46.998	0.000
Ba	135		ug/L		632.014	0.001
Ba	137	1.368	ug/L	2.133	1188.049	0.001
>Lu	175		ug/L		862632.852	862632.852
Tl	205	0.013	ug/L	26.662	359.338	0.000
Pb	208	0.071	ug/L	8.502	1658.705	0.001
Th	232	-0.027	ug/L	8.235	996.701	-0.001
U	238	0.001	ug/L	48.766	157.001	0.000

Sample ID: 489537017

Report Date/Time: Monday, September 23, 2019 21:04:17

Page 1

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		107.04			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		100.16			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		100.54			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		103.83			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: 489537018

Sample Date/Time: Monday, September 23, 2019 21:05:50

Sample Type: Sample

Sample Description: ACAL 6020

Number of Replicates: 3

Batch ID: 1914842|2|baj

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\489537018.097

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	0.111	ug/L	6.418	116.000	0.000
Be	9	0.005	ug/L	92.272	6.333	0.000
B	11	-2.681	ug/L	3.801	228.002	-0.001
Na	23	5469.605	ug/L	0.660	3784012.287	8.614
Mg	24	2649.390	ug/L	1.585	926997.630	2.114
Al	27	40.500	ug/L	2.160	11405.219	0.025
P	31	57598.536	ug/L	0.202	1275405.249	2.909
K	39	12863.648	ug/L	1.091	3865096.018	8.782
Ca	44	112608.307	ug/L	1.217	1562326.549	3.563
>Sc	45		ug/L		438420.098	438420.098
Ti	47	12.225	ug/L	4.784	883.361	0.002
V	51	-0.329	ug/L	17.506	6225.356	-0.001
Cr	52	0.127	ug/L	8.947	519.343	0.001
Cr	53		ug/L		1536.083	-0.002
Mn	55	116.167	ug/L	1.649	148786.939	0.339
Fe	57	105.365	ug/L	2.074	4842.821	0.011
Co	59	0.079	ug/L	11.702	307.337	0.001
Ni	60	0.288	ug/L	2.506	314.003	0.001
Cu	63		ug/L		8960.142	0.020
Cu	65	3.583	ug/L	3.969	4289.978	0.010
Zn	66	150.727	ug/L	1.432	44972.681	0.207
Zn	67		ug/L		6671.558	0.031
Zn	68		ug/L		30981.561	0.142
>Ge	74		ug/L		215839.698	215839.698
As	75	0.109	ug/L	79.023	216.891	0.000
Se	77		ug/L		103.334	0.000
Se	78	1.353	ug/L	5.068	87.425	0.000
Se	82		ug/L		41.333	0.000
Kr	83		ug/L		10.133	-0.000
Sr	88	325.288	ug/L	0.829	544603.394	2.224
Zr	90	0.033	ug/L	53.562	272.003	0.000
Mo	98	0.885	ug/L	6.501	1141.023	0.005
Ag	107	0.003	ug/L	65.727	17.333	0.000
Cd	111	0.029	ug/L	63.465	24.667	0.000
Cd	114		ug/L		18.785	0.000
>In	115		ug/L		244812.879	244812.879
Sn	120	3.087	ug/L	1.029	7145.744	0.027
Sb	121	-0.000	ug/L	1220.199	42.667	-0.000
Sb	123		ug/L		29.580	-0.000
Ba	135		ug/L		10040.861	0.012
Ba	137	22.754	ug/L	1.388	18566.727	0.022
>Lu	175		ug/L		825974.218	825974.218
Tl	205	0.018	ug/L	4.488	406.006	0.000
Pb	208	0.332	ug/L	0.196	6136.523	0.007
Th	232	-0.022	ug/L	13.438	1063.373	-0.001
U	238	0.045	ug/L	3.847	1202.051	0.001

Sample ID: 489537018

Report Date/Time: Monday, September 23, 2019 21:07:41

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		101.77			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		93.85			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		95.34			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		99.42			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type	Analyte	Mass	Out of Limits Message
P 31 Upper, S, EEEP		31	Sample is out of limits (over linear range)
Ca 44 Upper, S, EECa		44	Sample is out of limits (over linear range)

QC Action

QC Action Line: Continue

ICPMS #12 - Summary Report

Sample ID: QC Std 6
 Sample Date/Time: Monday, September 23, 2019 21:09:15
 Sample Type: Sample
 Sample Description:
 Number of Replicates: 3
 Batch ID:
 Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth
 Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 6.098

Concentration Results Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	48.646	ug/L	3.196	33703.056	0.080
Be	9	49.262	ug/L	2.124	12281.277	0.029
B	11	92.994	ug/L	1.859	12761.034	0.029
Na	23	5032.101	ug/L	2.848	3357638.359	7.925
Mg	24	4633.275	ug/L	2.705	1563021.417	3.697
Al	27	4602.138	ug/L	1.893	1219611.418	2.884
P	31	4888.628	ug/L	1.691	104580.754	0.247
K	39	4577.552	ug/L	2.404	1335312.774	3.125
Ca	44	4883.687	ug/L	3.146	65469.716	0.155
>Sc	45		ug/L		422813.983	422813.983
Ti	47	48.819	ug/L	3.107	3377.733	0.008
V	51	49.426	ug/L	2.129	93999.656	0.207
Cr	52	48.666	ug/L	2.474	105436.438	0.249
Cr	53		ug/L		13450.330	0.026
Mn	55	49.549	ug/L	1.031	61238.339	0.145
Fe	57	4832.386	ug/L	1.020	211616.734	0.500
Co	59	51.116	ug/L	3.864	172571.241	0.408
Ni	60	49.765	ug/L	0.680	46099.596	0.109
Cu	63		ug/L		122820.673	0.290
Cu	65	52.257	ug/L	0.169	59956.903	0.142
Zn	66	50.113	ug/L	2.887	15649.903	0.069
Zn	67		ug/L		2467.547	0.011
Zn	68		ug/L		11618.724	0.051
>Ge	74		ug/L		222069.454	222069.454
As	75	49.775	ug/L	1.125	9010.841	0.040
Se	77		ug/L		434.007	0.002
Se	78	50.219	ug/L	3.281	1235.503	0.005
Se	82		ug/L		664.682	0.003
Kr	83		ug/L		9.333	-0.000
Sr	88	48.780	ug/L	1.509	81367.782	0.334
Zr	90	48.308	ug/L	1.068	92336.115	0.378
Mo	98	48.732	ug/L	0.470	61553.964	0.252
Ag	107	49.021	ug/L	0.632	143608.221	0.589
Cd	111	49.671	ug/L	1.455	23925.354	0.098
Cd	114		ug/L		64542.201	0.265
>In	115		ug/L		243748.146	243748.146
Sn	120	50.335	ug/L	1.514	108317.823	0.442
Sb	121	50.634	ug/L	0.633	74229.028	0.304
Sb	123		ug/L		61026.236	0.250
Ba	135		ug/L		22581.838	0.028
Ba	137	50.419	ug/L	0.899	40567.520	0.050
>Lu	175		ug/L		815073.965	815073.965
Tl	205	49.202	ug/L	1.756	658525.431	0.808
Pb	208	50.733	ug/L	0.648	872107.482	1.070
Th	232	50.268	ug/L	1.169	1051715.815	1.289
U	238	47.848	ug/L	0.156	1127441.466	1.383

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
[	Li	7	97.293				
|	Be	9	98.525				
|	B	11	92.994				
|	Na	23	100.642				
|	Mg	24	92.666				
|	Al	27	91.131				
|	P	31	97.773				
|	K	39	91.551				
|	Ca	44	97.674				
>	Sc	45		98.15			
|	Ti	47	97.637				
|	V	51	98.852				
|	Cr	52	97.332				
|	Cr	53					
|	Mn	55	99.098				
|	Fe	57	96.648				
|	Co	59	102.232				
|	Ni	60	99.531				
|	Cu	63					
|	Cu	65	104.515				
[	Zn	66	100.225				
|	Zn	67					
|	Zn	68					
>	Ge	74		96.56			
|	As	75	99.550				
|	Se	77					
|	Se	78	100.438				
|	Se	82					
[	Kr	83					
[	Sr	88	97.560				
|	Zr	90	96.615				
|	Mo	98	97.464				
|	Ag	107	98.042				
|	Cd	111	99.343				
|	Cd	114					
>	In	115		94.93			
|	Sn	120	100.671				
|	Sb	121	101.268				
[	Sb	123					
[	Ba	135					
|	Ba	137	100.838				
>	Lu	175		98.11			
|	Tl	205	98.405				
|	Pb	208	101.467				
|	Th	232	100.535				
[	U	238	95.697				

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

ICPMS #12 - Summary Report

Sample ID: QC Std 7

Sample Date/Time: Monday, September 23, 2019 21:12:38

Sample Type: Sample

Sample Description:

Number of Replicates: 3

Batch ID:

Method File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\Method\6020.mth

Dataset File: C:\Users\Public\Documents\PerkinElmer Syngistix\ICPMS\DataSet\190923\QC Std 7.099

Concentration Results

Summary

Analyte	Mass	Conc. Mean	Report Unit	Conc. RSD	Meas. Intens. Mean	Net Intens. Mean
Li	7	-0.018	ug/L	72.409	22.667	-0.000
Be	9	-0.004	ug/L	112.951	4.000	-0.000
B	11	-1.480	ug/L	22.418	379.338	-0.000
Na	23	-4.472	ug/L	5.886	4145.268	-0.007
Mg	24	0.026	ug/L	133.361	138.001	0.000
Al	27	0.044	ug/L	347.206	280.003	0.000
P	31	0.713	ug/L	197.258	232.669	0.000
K	39	7.886	ug/L	2.459	16550.916	0.005
Ca	44	-0.007	ug/L	11818.105	149.334	-0.000
>Sc	45		ug/L		425415.245	425415.245
Ti	47	-0.028	ug/L	269.406	6.000	-0.000
V	51	-0.898	ug/L	13.973	5026.218	-0.004
Cr	52	-0.016	ug/L	77.170	194.668	-0.000
Cr	53		ug/L		1708.102	-0.002
Mn	55	0.012	ug/L	59.649	71.334	0.000
Fe	57	0.395	ug/L	13.615	75.334	0.000
Co	59	0.001	ug/L	395.631	32.667	0.000
Ni	60	0.000	ug/L	3363.105	37.333	0.000
Cu	63		ug/L		51.333	-0.000
Cu	65	0.000	ug/L	1553.547	29.333	0.000
Zn	66	-0.082	ug/L	68.946	383.338	-0.000
Zn	67		ug/L		70.000	-0.000
Zn	68		ug/L		241.335	-0.000
>Ge	74		ug/L		226777.486	226777.486
As	75	-0.066	ug/L	120.182	196.224	-0.000
Se	77		ug/L		82.000	-0.000
Se	78	0.110	ug/L	137.954	62.112	0.000
Se	82		ug/L		56.667	0.000
Kr	83		ug/L		9.467	-0.000
Sr	88	-0.004	ug/L	92.768	52.667	-0.000
Zr	90	0.132	ug/L	9.119	466.674	0.001
Mo	98	0.011	ug/L	43.179	32.603	0.000
Ag	107	-0.000	ug/L	471.438	8.667	-0.000
Cd	111	-0.014	ug/L	50.050	4.000	-0.000
Cd	114		ug/L		14.775	0.000
>In	115		ug/L		247899.459	247899.459
Sn	120	-0.075	ug/L	14.358	348.620	-0.001
Sb	121	-0.007	ug/L	27.498	33.333	-0.000
Sb	123		ug/L		27.496	-0.000
Ba	135		ug/L		14.000	0.000
Ba	137	-0.005	ug/L	132.852	18.000	-0.000
>Lu	175		ug/L		809156.830	809156.830
Tl	205	0.031	ug/L	11.712	572.011	0.001
Pb	208	0.001	ug/L	33.302	370.669	0.000
Th	232	0.159	ug/L	7.240	4795.473	0.004
U	238	0.005	ug/L	28.634	233.002	0.000

Sample ID: QC Std 7

Report Date/Time: Monday, September 23, 2019 21:14:28

Calibration

Analyte	MassCurve Type	Correlation Coefficient
Li	7Linear Thru Zero	1.0000
Be	9Linear Thru Zero	1.0000
B	11Linear Thru Zero	1.0000
Na	23Linear Thru Zero	1.0000
Mg	24Linear Thru Zero	1.0000
Al	27Linear Thru Zero	1.0000
P	31Linear Thru Zero	1.0000
K	39Linear Thru Zero	1.0000
Ca	44Linear Thru Zero	1.0000
Sc	45Linear Thru Zero	
Ti	47Linear Thru Zero	1.0000
V	51Linear Thru Zero	1.0000
Cr	52Linear Thru Zero	1.0000
Cr	53Linear Thru Zero	
Mn	55Linear Thru Zero	1.0000
Fe	57Linear Thru Zero	1.0000
Co	59Linear Thru Zero	1.0000
Ni	60Linear Thru Zero	1.0000
Cu	63Linear Thru Zero	
Cu	65Linear Thru Zero	1.0000
Zn	66Linear Thru Zero	1.0000
Zn	67Linear Thru Zero	
Zn	68Linear Thru Zero	
Ge	74Linear Thru Zero	
As	75Linear Thru Zero	1.0000
Se	77Linear Thru Zero	
Se	78Linear Thru Zero	1.0000
Se	82Linear Thru Zero	
Kr	83Linear Thru Zero	
Sr	88Linear Thru Zero	1.0000
Zr	90Linear Thru Zero	1.0000
Mo	98Linear Thru Zero	1.0000
Ag	107Linear Thru Zero	1.0000
Cd	111Linear Thru Zero	1.0000
Cd	114Linear Thru Zero	
In	115Linear Thru Zero	
Sn	120Linear Thru Zero	1.0000
Sb	121Linear Thru Zero	1.0000
Sb	123Linear Thru Zero	
Ba	135Linear Thru Zero	
Ba	137Linear Thru Zero	1.0000
Lu	175Linear Thru Zero	
Tl	205Linear Thru Zero	1.0000
Pb	208Linear Thru Zero	1.0000
Th	232Linear Thru Zero	1.0000
U	238Linear Thru Zero	1.0000

QC Calculated Values

Inte	Analyte	Mass	QC Std % Recovery	Int Std % Recovery	Spike % Reco	Dilution % D	Duplicate Rel. % Difference
|	Li	7					
|	Be	9					
|	B	11					
|	Na	23					
|	Mg	24					
|	Al	27					
|	P	31					
|	K	39					
|	Ca	44					
>	Sc	45		98.76			
|	Ti	47					
|	V	51					
|	Cr	52					
|	Cr	53					
|	Mn	55					
|	Fe	57					
|	Co	59					
|	Ni	60					
|	Cu	63					
|	Cu	65					
|	Zn	66					
|	Zn	67					
|	Zn	68					
>	Ge	74		98.61			
|	As	75					
|	Se	77					
|	Se	78					
|	Se	82					
|	Kr	83					
|	Sr	88					
|	Zr	90					
|	Mo	98					
|	Ag	107					
|	Cd	111					
|	Cd	114					
>	In	115		96.54			
|	Sn	120					
|	Sb	121					
|	Sb	123					
|	Ba	135					
|	Ba	137					
>	Lu	175		97.39			
|	Tl	205					
|	Pb	208					
|	Th	232					
|	U	238					

QC Out of Limits

Measurement Type Analyte Mass Out of Limits Message

QC Action

QC Action Line: No QC action taken

Miscellaneous

Prep Logbook

Acid Digestion of Sediments, Sludges, and Soils

Batch ID:	1914841	Type	Sample Id	Description	Serial Number	Spike Amount	Spike Units
Analyst:	Hannah Hatherly Prep: Stephen Michaels	LCS	1204376392	ICP-MS spiking solution A	UI190703-A	.25	mL
Method:	SW846 3050B	LCS	1204376392	ICP-MS spiking solution B	UI190703-B	.25	mL
Lab SOP:	GL-MA-E-009 REV# 28	MS	1204376394	ICP-MS spiking solution A	UI190703-A	.25	mL
Instrument:	BAL-591	MS	1204376394	ICP-MS spiking solution B	UI190703-B	.25	mL

Sample ID	Initial Prep Date	Matrix	Initial Weight (g)	Final Volume (mL)	Hot Block Stop Date (date)	Prep Factor (mL/g)
1204376391 MB	12-SEP-2019 16:26:04	Tissue	0.511	50	09/13/19 23:30	97.84736
1204376392 LCS	12-SEP-2019 16:26:04	Tissue	0.508	50	09/13/19 23:30	98.4252
489537001	12-SEP-2019 16:26:04	Tissue	0.518	50	09/13/19 23:30	96.5251
1204376395 SDILT (489537001)	12-SEP-2019 16:26:04	Tissue	0.518	50	09/13/19 23:30	96.5251
1204376393 DUP (489537001)	12-SEP-2019 16:26:04	Tissue	0.517	50	09/13/19 23:30	96.7118
1204376394 MS (489537001)	12-SEP-2019 16:26:04	Tissue	0.516	50	09/13/19 23:30	96.89922
489537002	12-SEP-2019 16:26:04	Tissue	0.503	50	09/13/19 23:30	99.40358
489537003	12-SEP-2019 16:26:04	Tissue	0.501	50	09/13/19 23:30	99.8004
489537004	12-SEP-2019 16:26:04	Tissue	0.512	50	09/13/19 23:30	97.65625
489537005	12-SEP-2019 16:26:04	Tissue	0.524	50	09/13/19 23:30	95.41985
489537006	12-SEP-2019 16:26:04	Tissue	0.525	50	09/13/19 23:30	95.2381
489537007	12-SEP-2019 16:26:04	Tissue	0.529	50	09/13/19 23:30	94.51796
489537008	12-SEP-2019 16:26:04	Tissue	0.5	50	09/13/19 23:30	100
489537009	12-SEP-2019 16:26:04	Tissue	0.504	50	09/13/19 23:30	99.20635
489537010	12-SEP-2019 16:26:04	Tissue	0.501	50	09/13/19 23:30	99.8004
489537011	12-SEP-2019 16:26:04	Tissue	0.55	50	09/13/19 23:30	90.90909
489537012	12-SEP-2019 16:26:04	Tissue	0.544	50	09/13/19 23:30	91.91176
489537013	12-SEP-2019 16:26:04	Tissue	0.512	50	09/13/19 23:30	97.65625
489537014	12-SEP-2019 16:26:04	Tissue	0.544	50	09/13/19 23:30	91.91176
489537015	12-SEP-2019 16:26:04	Tissue	0.51	50	09/13/19 23:30	98.03922
489537016	12-SEP-2019 16:26:04	Tissue	0.539	50	09/13/19 23:30	92.76438
489537017	12-SEP-2019 16:26:04	Tissue	0.531	50	09/13/19 23:30	94.16196
489537018	12-SEP-2019 16:26:04	Tissue	0.505	50	09/13/19 23:30	99.0099

Reagent/Solvent Lot ID	Description	Amount	Comments:
190815	Concentrated Nitric Acid	5 mL	Block Temperature (90-100C): 94 C Temperature within limits (Y/N)?: Y Thermometer ID: 2127021 Hot Block ID: 10 Prep Date: 13-SEP-2019 18:00 METALMAN Hannah Hatherly Digestion tube lot #: 1902243
190828	Hydrogen Peroxide 30%, from Bioassay (LIMS ID 2971422)	1.5 mL	
I-BC190213	Teflon chips for MB/LCS metals Solids	.5 g	

Standard Logbook

Serial ID: UI190307-07 **Open/Reference Date:** 07-MAR-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master B **Received:** 07-MAR-19 **Catalog Number :** 160054-02-03
Type: Source Material **Expires:** 07-MAR-20 **Lot Number :** 10066767-8
Employee: Paul Boyd **Solvent :** 2% HNO3 100 cm2
Supplier: 02SI
Description: ICPMS ICV/CCV Soln B - 20ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	20 mg/L	Barium	20 mg/L
Beryllium	20 mg/L	Boron	40 mg/L
Cadmium	20 mg/L	Chromium	20 mg/L
Cobalt	20 mg/L	Copper	20 mg/L
Lead	20 mg/L	Lithium	20 mg/L
Manganese	20 mg/L	Nickel	20 mg/L
Selenium	20 mg/L	Strontium	20 mg/L
Thallium	20 mg/L	Thorium	20 mg/L
Uranium	20 mg/L	Vanadium	20 mg/L
Zinc	20 mg/L		

Serial ID: UI190307-09 **Open/Reference Date:** 07-MAR-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master A **Received:** 07-MAR-19 **Catalog Number :** 160055-01-03
Type: Source Material **Expires:** 07-MAR-20 **Lot Number :** 10066767-9
Employee: Paul Boyd **Solvent :** 2% HNO3 100 cm2
Supplier: 02SI
Description: ICPMS ICV/CCV SOLN A - 2000ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	2020 mg/L	Calcium	2000 mg/L
Iron	2000 mg/L	Magnesium	2000 mg/L
Phosphorous	2000 mg/L	Potassium	2000 mg/L
Sodium	2000 mg/L		

Serial ID: UI190415-09 **Open/Reference Date:** 15-APR-19 **Amount :** 250 mL
Name: ICP-MS CRDL Master #1 **Received:** 15-APR-19 **Catalog Number :** 090014-MC-02
Type: Source Material **Expires:** 15-APR-20 **Lot Number :** 10091735-1
Employee: Paul Boyd **Solvent :** +/- 0.5% IN 2% HNO3
Supplier: 02SI
Description: ICPMS CRDL Master Soln #1
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	50 mg/L	Arsenic	5 mg/L
Barium	4 mg/L	Beryllium	.5 mg/L
Boron	15 mg/L	Cadmium	1 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Calcium	200 mg/L	Chromium	30 mg/L
Cobalt	1 mg/L	Copper	2 mg/L
Iron	100 mg/L	Lead	2 mg/L
Lithium	10 mg/L	Magnesium	30 mg/L
Manganese	5 mg/L	Nickel	2 mg/L
Phosphorous	50 mg/L	Potassium	300 mg/L
Selenium	5 mg/L	Sodium	250 mg/L
Strontium	10 mg/L	Thallium	2 mg/L
Thorium	2 mg/L	Uranium	.2 mg/L
Vanadium	20 mg/L	Zinc	20 mg/L

Serial ID: UI190415-10 **Open/Reference Date:** 15-APR-19 **Amount :** 250 mL
Name: ICP-MS CRDL Master #2 **Received:** 15-APR-19 **Catalog Number :** 160044-11-02
Type: Source Material **Expires:** 15-APR-20 **Lot Number :** 10091735-2
Employee: Paul Boyd **Solvent :** +/- 0.5% IN 2% HNO3
Supplier: O2SI
Description: ICPMS CRDL Soln #2
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	3 mg/L	Molybdenum	1 mg/L
Silver	1 mg/L	Tin	5 mg/L
Titanium	10 mg/L	Tungsten	5 mg/L
Zirconium	2 mg/L		

Serial ID: UI190424-60 **Open/Reference Date:** 24-APR-19 **Amount :** 100 mL
Name: ICPMS High Range Standard **Received:** 24-APR-19 **Catalog Number :** 160212-02-01-A
Type: Source Material **Expires:** 24-APR-20 **Lot Number :** 10066129-12
Employee: Paul Boyd **Solvent :** 2%HNO3
Supplier: O2SI
Description: Linear Range Standard A
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	5000 mg/L	Arsenic	100 mg/L
Barium	250 mg/L	Beryllium	100 mg/L
Cadmium	100 mg/L	Calcium	5000 mg/L
Chromium	100 mg/L	Cobalt	100 mg/L
Copper	100 mg/L	Iron	5000 mg/L
Lead	500 mg/L	Lithium	100 mg/L
Magnesium	5000 mg/L	Manganese	100 mg/L
Nickel	100 mg/L	Phosphorous	2500 mg/L
Potassium	5000 mg/L	Selenium	50 mg/L
Sodium	5000 mg/L	Strontium	100 mg/L
Thallium	50 mg/L	Thorium	250 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Uranium	500 mg/L	Vanadium	100 mg/L
Zinc	250 mg/L		

Serial ID: UI190424-61 **Open/Reference Date:** 24-APR-19 **Amount :** 100 mL
Name: ICPMS High Range Standar **Received:** 24-APR-19 **Catalog Number :** 160212-02-01-B
Type: Source Material **Expires:** 24-APR-20 **Lot Number :** 10066129-13
Employee: Paul Boyd **Solvent :** 2% in 2%HNO3 + Tr HF
Supplier: O2SI
Description: Linear Range Standard B
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	25 mg/L	Molybdenum	100 mg/L
Silver	25 mg/L	Tin	100 mg/L
Tungsten	100 mg/L	Zirconium	50 mg/L

Serial ID: UI190605-08 **Open/Reference Date:** 05-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICV/CCV Master C **Received:** 05-JUN-19 **Catalog Number :** ZGEL-107-500
Type: Source Material **Expires:** 30-MAY-20 **Lot Number :** 5-093AB
Employee: Paul Boyd **Solvent :** 2% HNO3/Tr. Tart Acid/ Tr. HF 100
Supplier: Spex
Description: ICPMS ICV/CCV Soln C - 20ppm
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	20 mg/L	Molybdenum	20 mg/L
Silver	20 mg/L	Tin	20 mg/L
Titanium	20 mg/L	Tungsten	20 mg/L
Zirconium	20 mg/L		

Serial ID: UI190621-12 **Open/Reference Date:** 21-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICSAB Master B **Received:** 21-JUN-19 **Catalog Number :** 160033-02-02
Type: Source Material **Expires:** 21-JUN-20 **Lot Number :** 10069799-7
Employee: Paul Boyd **Solvent :** +/- 2.0% in 2% HNO3
Supplier: O2SI
Description: ICPMS ICSAB Master B
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	2 mg/L	Barium	2 mg/L
Beryllium	2 mg/L	Boron	2 mg/L
Cadmium	2 mg/L	Chromium	2 mg/L
Cobalt	2 mg/L	Copper	2 mg/L
Lead	2 mg/L	Lithium	2 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Manganese	2 mg/L	Nickel	2 mg/L
Selenium	2 mg/L	Strontium	2 mg/L
Thallium	2 mg/L	Thorium	2 mg/L
Uranium	2 mg/L	Vanadium	2 mg/L
Zinc	2 mg/L		

Serial ID: UI190621-13 **Open/Reference Date:** 21-JUN-19 **Amount :** 250 mL
Name: ICP-MS ICSAB Master C **Received:** 21-JUN-19 **Catalog Number :** 160033-03-02
Type: Source Material **Expires:** 21-JUN-20 **Lot Number :** 10069799-8
Employee: Paul Boyd **Solvent :** +/- 2.0% in 2% HNO3 + tr HF
Supplier: 02SI
Description: ICPMS ICSAB Master C
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	2 mg/L	Silver	2 mg/L
Tin	2 mg/L	Tungsten	2 mg/L
Zirconium	2 mg/L		

Serial ID: UI190703-A **Open/Reference Date:** 24-JUL-19 **Catalog Number :** GEL-12A
Name: ICP-MS SPIKE A **Received:** 03-JUL-19 **Lot Number :** N2-MEB673694
Type: Source Material **Expires:** 03-JUL-20
Employee: Shanta Mack
Supplier: Inorganic Ventures
Description: ICP-MS spiking solution A
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	10 mg/L	Hafnium	10 mg/L
Molybdenum	10 mg/L	Tantalum	10 mg/L
Tin	10 mg/L	Titanium	10 mg/L
Tungsten	10 mg/L	Zirconium	10 mg/L

Serial ID: UI190703-B **Open/Reference Date:** 24-JUL-19 **Catalog Number :** GEL-12B
Name: ICP-MS SPIKE B **Received:** 03-JUL-19 **Lot Number :** N2-MEB673693
Type: Source Material **Expires:** 03-JUL-20
Employee: Hannah Hatherly
Supplier: Inorganic Ventures
Description: ICP-MS spiking solution B
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	400 mg/L	Arsenic	10 mg/L
Barium	10 mg/L	Beryllium	10 mg/L

Standard Logbook

Analyte	Concentration	Analyte	Concentration
Bismuth	10 mg/L	Boron	20 mg/L
Cadmium	10 mg/L	Calcium	400 mg/L
Cesium	10 mg/L	Chromium	10 mg/L
Cobalt	10 mg/L	Copper	10 mg/L
Iron	400 mg/L	Lead	10 mg/L
Lithium	10 mg/L	Magnesium	400 mg/L
Manganese	10 mg/L	Nickel	10 mg/L
Phosphorous	400 mg/L	Potassium	400 mg/L
Rhenium	10 mg/L	Rhodium	10 mg/L
Selenium	10 mg/L	Silver	10 mg/L
Sodium	400 mg/L	Strontium	10 mg/L
Thallium	10 mg/L	Thorium	10 mg/L
Uranium	10 mg/L	Uranium-235	.072 mg/L
Uranium-238	9.928 mg/L	Vanadium	10 mg/L
Zinc	10 mg/L		

Serial ID: UI190807-03 **Open/Reference Date:** 07-AUG-19 **Catalog Number :** 060074-05-01
Name: ICPMS Tungsten - 10mg/L **Received:** 07-AUG-19 **Lot Number :** 10070573-9
Type: Source Material **Expires:** 07-AUG-20 **Solvent :** 2% HNO3 + Tr HF
Employee: Paul Boyd
Supplier: O2SI
Description: ICPMS Tungsten standard SPIKE - 10mg/L
Comments: None

Analyte	Concentration	Analyte	Concentration
Tungsten	10 mg/L		

Serial ID: UI190820-11 **Open/Reference Date:** 20-AUG-19 **Amount :** 1000 mL
Name: ICP-MS ICSA Master A Nex **Received:** 20-AUG-19 **Catalog Number :** 60013-01-01LNexion
Type: Source Material **Expires:** 20-AUG-20 **Lot Number :** 10065549-12
Employee: Paul Boyd **Solvent :** 5% HNO3 + Tr HF
Supplier: O2SI
Description: ICP-MS ICSA Master A NEXION
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	1000 mg/L	Calcium	1000 mg/L
Carbon	2000 mg/L	Chloride	10000 mg/L
Iron	1000 mg/L	Magnesium	1000 mg/L
Molybdenum	20 mg/L	Phosphorous	1000 mg/L
Potassium	1000 mg/L	Sodium	1000 mg/L
Sulfur	1000 mg/L	Titanium	20 mg/L

Standard Logbook

Serial ID: UMS190824-01 **Open/Reference Date:** 24-AUG-19 **Amount :** 250 mL
Name: ICPMSCaSPIKEB **Received:** 24-AUG-19 **Catalog Number :** ZGEL-100-250
Type: Source Material **Expires:** 24-AUG-20 **Lot Number :** 6-188AB
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution B
Comments: None

Analyte	Concentration	Analyte	Concentration
Arsenic	10 mg/L	Barium	10 mg/L
Beryllium	10 mg/L	Boron	20 mg/L
Cadmium	10 mg/L	Chromium	10 mg/L
Cobalt	10 mg/L	Copper	10 mg/L
Lead	10 mg/L	Lithium	10 mg/L
Manganese	10 mg/L	Nickel	10 mg/L
Selenium	10 mg/L	Silver	10 mg/L
Strontium	10 mg/L	Thallium	10 mg/L
Thorium	10 mg/L	Uranium	10 mg/L
Vanadium	10 mg/L	Zinc	10 mg/L

Serial ID: UMS190824-02 **Open/Reference Date:** 24-AUG-19 **Catalog Number :** ZGEL-102-250
Name: ICPMSCaSPIKEA **Received:** 24-AUG-19 **Lot Number :** 6-189AB
Type: Source Material **Expires:** 24-AUG-20
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution A
Comments: None

Analyte	Concentration	Analyte	Concentration
Aluminum	1000 mg/L	Calcium	1000 mg/L
Iron	1000 mg/L	Magnesium	1000 mg/L
Phosphorous	1000 mg/L	Potassium	1000 mg/L
Sodium	1000 mg/L		

Serial ID: UMS190824-03 **Open/Reference Date:** 24-AUG-19 **Amount :** 250 ml
Name: ICPMSCaSPIKEC **Received:** 24-AUG-19 **Catalog Number :** ZGEL-101-250
Type: Source Material **Expires:** 24-AUG-20 **Lot Number :** 6-190AB
Employee: Paul Boyd
Supplier: SPEX
Description: ICPMS Calibration Standard Solution C
Comments: None

Analyte	Concentration	Analyte	Concentration
Antimony	10 mg/L	Molybdenum	10 mg/L
Tin	10 mg/L	Titanium	10 mg/L
Zirconium	10 mg/L		

Standard Logbook

Serial ID: WMS190923-04 **Open/Reference Date:** 23-SEP-19 **Amount :** 50 mL
Name: ICPMS Cal Standard 100 **Received:** 23-SEP-19 **Balance Id :** 4025216
Type: Working **Expires:** 24-SEP-19 **Pipet Id :** 3541598
Employee: Paul Boyd **Solvent :** 2%HNO3/1%HCl -2980091
Supplier: GEL
Description: ICPMS Calibration Standard (100 ppb)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190807-03	Tungsten	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Arsenic	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Barium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Beryllium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Boron	20 mg/L	5 mL	500 mL	200 ug/l
UMS190824-01	Cadmium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Chromium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Cobalt	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Copper	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Lead	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Lithium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Manganese	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Nickel	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Selenium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Silver	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Strontium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Thallium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Thorium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Uranium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Vanadium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-01	Zinc	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-02	Aluminum	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Calcium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Iron	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Magnesium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Phosphorous	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Potassium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-02	Sodium	1000 mg/L	5 mL	500 mL	10000 ug/l
UMS190824-03	Antimony	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Molybdenum	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Tin	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Titanium	10 mg/L	5 mL	500 mL	100 ug/l
UMS190824-03	Zirconium	10 mg/L	5 mL	500 mL	100 ug/l

Standard Logbook

Serial ID: WMS190923-04A **Open/Reference Date:** 23-SEP-19 **Balance Id :** 4025216
Name: ICPMS Cal Standard 10 **Received:** 23-SEP-19 **Pipet Id :** 3541598
Type: Working **Expires:** 24-SEP-19 **Solvent :** 2%HNO3/1%HCl -2980091
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS Calibration Standard (10 ppb)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
WMS190923-04	Aluminum	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Antimony	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Arsenic	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Barium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Beryllium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Boron	200 ug/l	50 mL	500 mL	20 ug/l
WMS190923-04	Cadmium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Calcium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Chromium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Cobalt	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Copper	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Iron	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Lead	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Lithium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Magnesium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Manganese	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Molybdenum	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Nickel	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Phosphorous	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Potassium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Selenium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Silver	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Sodium	10000 ug/l	50 mL	500 mL	1000 ug/l
WMS190923-04	Strontium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Thallium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Thorium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Tin	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Titanium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Tungsten	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Uranium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Vanadium	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Zinc	100 ug/l	50 mL	500 mL	10 ug/l
WMS190923-04	Zirconium	100 ug/l	50 mL	500 mL	10 ug/l

Standard Logbook

Serial ID: WMS190923-05 **Open/Reference Date:** 23-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICV **Received:** 23-SEP-19 **Pipet Id :** 3541598
Type: Working **Expires:** 24-SEP-19 **Solvent :** 2%HNO3/1%HCl -2980091
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS ICV
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190307-07	Arsenic	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Barium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Beryllium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Boron	40 mg/L	2.5 mL	1000 mL	100 ug/L
UI190307-07	Cadmium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Chromium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Cobalt	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Copper	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Lead	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Lithium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Manganese	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Nickel	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Selenium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Strontium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Thallium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Thorium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Uranium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Vanadium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-07	Zinc	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190307-09	Aluminum	2020 mg/L	2.5 mL	1000 mL	5050 ug/L
UI190307-09	Calcium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Iron	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Magnesium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Phosphorous	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Potassium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190307-09	Sodium	2000 mg/L	2.5 mL	1000 mL	5000 ug/L
UI190605-08	Antimony	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Molybdenum	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Silver	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Tin	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Titanium	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Tungsten	20 mg/L	2.5 mL	1000 mL	50 ug/L
UI190605-08	Zirconium	20 mg/L	2.5 mL	1000 mL	50 ug/L

Standard Logbook

Serial ID: WMS190923-06 **Open/Reference Date:** 23-SEP-19 **Balance Id :** BAL216
Name: ICPMS CRDL **Received:** 23-SEP-19 **Pipet Id :** 3820544
Type: Working **Expires:** 24-SEP-19 **Solvent :** 2%HNO3/1%HCl - 2980091
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS CRDL
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190415-09	Aluminum	50 mg/L	.5 mL	500 mL	30 ug/L
UI190415-09	Arsenic	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Barium	4 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Beryllium	.5 mg/L	.5 mL	500 mL	.5 ug/L
UI190415-09	Boron	15 mg/L	.5 mL	500 mL	15 ug/L
UI190415-09	Cadmium	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Calcium	200 mg/L	.5 mL	500 mL	200 ug/L
UI190415-09	Chromium	30 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Cobalt	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Copper	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Iron	100 mg/L	.5 mL	500 mL	100 ug/L
UI190415-09	Lead	2 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Lithium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Magnesium	30 mg/L	.5 mL	500 mL	15 ug/L
UI190415-09	Manganese	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Nickel	2 mg/L	.5 mL	500 mL	2 ug/L
UI190415-09	Phosphorous	50 mg/L	.5 mL	500 mL	50 ug/L
UI190415-09	Potassium	300 mg/L	.5 mL	500 mL	300 ug/L
UI190415-09	Selenium	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-09	Sodium	250 mg/L	.5 mL	500 mL	250 ug/L
UI190415-09	Strontium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Thallium	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Thorium	2 mg/L	.5 mL	500 mL	1 ug/L
UI190415-09	Uranium	.2 mg/L	.5 mL	500 mL	.2 ug/L
UI190415-09	Vanadium	20 mg/L	.5 mL	500 mL	10 ug/L
UI190415-09	Zinc	20 mg/L	.5 mL	500 mL	10 ug/L
UI190415-10	Antimony	3 mg/L	.5 mL	500 mL	3 ug/L
UI190415-10	Molybdenum	1 mg/L	.5 mL	500 mL	.5 ug/L
UI190415-10	Silver	1 mg/L	.5 mL	500 mL	1 ug/L
UI190415-10	Tin	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-10	Titanium	10 mg/L	.5 mL	500 mL	10 ug/L
UI190415-10	Tungsten	5 mg/L	.5 mL	500 mL	5 ug/L
UI190415-10	Zirconium	2 mg/L	.5 mL	500 mL	2 ug/L

Standard Logbook

Serial ID: WMS190923-20 **Open/Reference Date:** 23-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICSA **Received:** 23-SEP-19 **Lot Number :** 1064482
Type: Working **Expires:** 24-SEP-19 **Pipet Id :** 3541598
Employee: Paul Boyd **Solvent :** 2%HNO3/1%HCl -2980091
Supplier: GEL
Description: ICPMS ICSA NexION
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190820-11	Aluminum	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Calcium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Carbon	2000 mg/L	25 mL	250 mL	200000 ug/L
UI190820-11	Chloride	10000 mg/L	25 mL	250 mL	1000000 ug/L
UI190820-11	Iron	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Magnesium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Molybdenum	20 mg/L	25 mL	250 mL	2000 ug/L
UI190820-11	Phosphorous	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Potassium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sodium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sulfur	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Titanium	20 mg/L	25 mL	250 mL	2000 ug/L

Serial ID: WMS190923-21 **Open/Reference Date:** 23-SEP-19 **Balance Id :** BAL216
Name: ICPMS ICSAB **Received:** 23-SEP-19 **Pipet Id :** 1758088
Type: Working **Expires:** 24-SEP-19 **Solvent :** 2%HNO3/1%HCl -2980091
Employee: Paul Boyd
Supplier: GEL
Description: ICPMS ICSAB NexION
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190621-12	Arsenic	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Barium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Beryllium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Boron	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Cadmium	2 mg/L	2.5 mL	250 mL	20.2 ug/L
UI190621-12	Chromium	2 mg/L	2.5 mL	250 mL	22.2 ug/L
UI190621-12	Cobalt	2 mg/L	2.5 mL	250 mL	20.4 ug/L
UI190621-12	Copper	2 mg/L	2.5 mL	250 mL	23.4 ug/L
UI190621-12	Lead	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Lithium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Manganese	2 mg/L	2.5 mL	250 mL	22.7 ug/L
UI190621-12	Nickel	2 mg/L	2.5 mL	250 mL	22.4 ug/L
UI190621-12	Selenium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Strontium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Thallium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Thorium	2 mg/L	2.5 mL	250 mL	20 ug/L

Standard Logbook

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190621-12	Uranium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Vanadium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-12	Zinc	2 mg/L	2.5 mL	250 mL	27 ug/L
UI190621-13	Antimony	2 mg/L	2.5 mL	250 mL	20.5 ug/L
UI190621-13	Silver	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Tin	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Tungsten	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190621-13	Zirconium	2 mg/L	2.5 mL	250 mL	20 ug/L
UI190820-11	Aluminum	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Calcium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Carbon	2000 mg/L	25 mL	250 mL	200000 ug/L
UI190820-11	Chloride	10000 mg/L	25 mL	250 mL	1000000 ug/L
UI190820-11	Iron	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Magnesium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Molybdenum	20 mg/L	25 mL	250 mL	2000 ug/L
UI190820-11	Phosphorous	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Potassium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sodium	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Sulfur	1000 mg/L	25 mL	250 mL	100000 ug/L
UI190820-11	Titanium	20 mg/L	25 mL	250 mL	2000 ug/L

Serial ID: WMS190923-70 **Open/Reference Date:** 23-SEP-19 **Balance Id :** BAL216
Name: ICPMS LINEAR RANGE ST **Received:** 23-SEP-19 **Pipet Id :** 2878988
Type: Working **Expires:** 24-SEP-19 **Solvent :** 2%HNO3/1%HCl -2980091
Employee: Paul Boyd
Supplier: 02SI
Description: ICPMS LINEAR RANGE STANDARD
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190424-60	Aluminum	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Arsenic	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Barium	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-60	Beryllium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Cadmium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Calcium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Chromium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Cobalt	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Copper	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Iron	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Lead	500 mg/L	2.5 mL	250 mL	5000 ug/L
UI190424-60	Lithium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Magnesium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Manganese	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Nickel	100 mg/L	2.5 mL	250 mL	1000 ug/L

Standard Logbook

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
UI190424-60	Phosphorous	2500 mg/L	2.5 mL	250 mL	25000 ug/L
UI190424-60	Potassium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Selenium	50 mg/L	2.5 mL	250 mL	500 ug/L
UI190424-60	Sodium	5000 mg/L	2.5 mL	250 mL	50000 ug/L
UI190424-60	Strontium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Thallium	50 mg/L	2.5 mL	250 mL	500 ug/L
UI190424-60	Thorium	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-60	Uranium	500 mg/L	2.5 mL	250 mL	5000 ug/L
UI190424-60	Vanadium	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-60	Zinc	250 mg/L	2.5 mL	250 mL	2500 ug/L
UI190424-61	Antimony	25 mg/L	2.5 mL	250 mL	250 ug/L
UI190424-61	Molybdenum	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Silver	25 mg/L	2.5 mL	250 mL	250 ug/L
UI190424-61	Tin	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Tungsten	100 mg/L	2.5 mL	250 mL	1000 ug/L
UI190424-61	Zirconium	50 mg/L	2.5 mL	250 mL	500 ug/L

Serial ID: 190815 **Open/Reference Date:** 23-AUG-19 **Lot Number :** 2019041788
Name: I-HNO3 **Received:** 15-AUG-19
Type: Reagent/Solvent **Expires:** 15-AUG-21
Employee: Hannah Hatherly
Supplier: VWR - BDH Chemicals
Description: Concentrated Nitric Acid
Comments: None

Serial ID: 190828 **Open/Reference Date:** 28-AUG-19 **Lot Number :** 0000233294 mL
Name: B-H2O2 **Received:** 28-AUG-19
Type: Reagent/Solvent **Expires:** 28-AUG-21
Employee: Hannah Hatherly
Supplier: J.T. BAKER
Description: Hydrogen Peroxide 30%, from Bioassay (LIMS ID 2971422)
Comments: None

Serial ID: 2968776 **Open/Reference Date:** 10-SEP-19 **Lot Number :** 2019062064
Name: I-HCL **Received:** 15-AUG-19
Type: Reagent/Solvent **Expires:** 15-AUG-21
Employee: Hannah Hatherly
Supplier: VWR
Description: HYDROCHLORIC ACID
Comments: None

Standard Logbook

Serial ID: 2980091 **Open/Reference Date:** 16-SEP-19 **Solvent :** Type I Water
Name: B-2%HNO3/1%HCl-ICPMS **Received:** 16-SEP-19
Type: Reagent/Solvent **Expires:** 30-SEP-19
Employee: Paul Boyd
Supplier: GEL
Description: 2%HNO3/1%HCl Solution (Type I Water)
Comments: None

Parent Material	Analyte	Parent Conc.	Aliquot	Final Vol.	Final Conc.
190815	I-HNO3	68.0-70.0%	160 mL	8 l	N/A
2968776	I-HCL	36.5-38.0	80 mL	8 l	N/A

Serial ID: I-BC190213 **Open/Reference Date:** 29-JUL-19 **Lot Number :** 24462227
Name: I-Boiling chips **Received:** 13-FEB-19
Type: Reagent/Solvent **Expires:** 13-FEB-21
Employee: Edmund Frampton
Supplier: Chemware
Description: Teflon chips for MB/LCS metals Solids
Comments: None



Access Lab Report #: <u>21688</u>		PO#: _____																																																																																																					
Sub Lab (if applicable): _____ / Sub Report #: _____		ACCESS ANALYTICAL, INC. 15 Thames Valley Rd. Irmo, SC 29063 Phone: 803-781-4243 Web: www.aaxs-inc.com																																																																																																					
Client: <u>SCDMC</u>		Preservatives (see codes): _____																																																																																																					
Attn: <u>Chad Altman</u>		Bottle Types (see codes): _____																																																																																																					
Address: <u>2600 Bull St</u>		REQUESTED LAB ANALYSIS <table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> <td style="width: 20%;"># Containers per Test >></td> </tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>		# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>	# Containers per Test >>																																																																																										
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Phone: <u>803-998-4335</u>		Fax: <u>898-4200</u>																																																																																																					
Email: <u>Altman.KC@DHCC.SC.gov</u>		Project ID: _____																																																																																																					
Sampled By: _____		Notes / Comments: _____																																																																																																					

Lab ID:	Sample Name:	Date Collected:	Time Collected:	Genab. C-Comp:	Matrix (see codes):	Program Area (see codes):	Total # Containers:	Notes / Comments:
001	19-662 F	9/26/14						Conserve River @
002	19-662 W							Cooper
003	19-662 F							
004	19-663 W							
005	19-664 F							
006	19-664 W							
007	19-665 F							
008	19-665 W							
009	19-666 F							
010	19-666 W							

Auto Sampler Data (composite samples only):
 Date/Time On: _____ by whom: _____ Meter Reading Before: _____ Difference: _____
 Date/Time Off: _____ by whom: _____ Meter Reading After: _____



Access Lab Report #: 21688 / Sub Report #:		PO#:		PRESERVATIVES (see codes):		BOTTLE TYPES (see codes):		REQUESTED LAB ANALYSIS		Notes / Comments			
Client: SDHEC				15 Thames Valley Rd. Irmo, SC 29063 Phone: 803-781-4243 Web: www.axs-inc.com				*Preservative Codes: 0 = None, 1 = HCL, 2 = HNO ₃ , 3 = H ₂ SO ₄ , 4 = NaOH, 5 = Na ₂ SO ₄ , 6 = Method 5035 set w/ NaHSO ₄ & CH ₃ OH, 7 = NaOH/NaOAc, 8 = H ₂ PO ₄ , 9 = cooled to 5°C, 10 = cooled to 510°C, 11 = Amm.Cl, 12 = Acetic Acid/HCL, 13 = EDTA		*Matrix Codes: GW = ground water, WW = waste water, DW = drinking water, SW = surface/storm water, S = soil, SL = sludge, A = air, IW = industrial waste, O = other (specify in comments section) NA = for non-regulatory samples		*Container Type: G = Glass, P = Plastic	
Sub Lab (if applicable):				Address: 2600 Blythe St				City: Atlanta		State: GA		Zip Code: 30327	
Phone: 403-898-4035				Fax: 898-4200				Project ID: Altmonke @ DHEC.SC.520		Program Area Code: Fluore		Program Area Codes: SWWA = Safe Drinking Water Act (for drinking water), SHW = Solid and Hazardous Wastes (for soils, ground waters and waste samples)	
Sampled By:		Date Collected:		Time Collected:		G-Grab C-Comp		Matrix (see code)		Total # Containers			
10/11/15		10-667 F		8:45h								Chrysal River @ Coycu	
10/12/15		19-667 W											
10/13/15		19-668 F											
10/14/15		19-669 W											
10/15/15		19-669 F											
10/16/15		19-668 W											
10/17/15		19-670 F											
10/18/15		19-670 W											
Turnaround Time Requested:		Standard <input checked="" type="checkbox"/>		Rush* <input type="checkbox"/>		Project Location:		Reinquisitioned By:		Received By:		Date:	
*DAS Required		Rush data emailed/faxed by the end of business day on date required. Standard TAT is 7-10 business days.		SC		NC		Other (Specify):		Received in lab by: ANORT		Date: 9-2-19 0857	
Chain of Custody Page _____ of _____		Date/Time On: _____ by whom: _____		Date/Time Off: _____ by whom: _____		Meter Reading Before: _____		Meter Reading After: _____		Difference: _____		Samples Received on Ice:	
												Y N N/A Y N N/A Y N N/A X Y N N/A	
												Sample Temp. Upon Receipt in Lab: _____ °C	

NOTE: Relinquishing samples via this Chain of Custody document constitutes client acceptance of Access Analytical terms and conditions.

White Copy: Lab original / Canary Copy: File Copy / Pink Copy: Client Copy

Appendix B: QAPP

Section A. Project Management

A1. Title Page

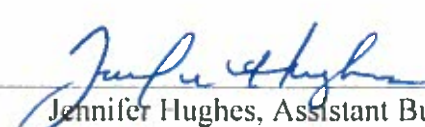
Westinghouse Uranium Project
Prepared by Taylor Shearer
South Carolina Department of Health and Environmental Control
2600 Bull St.
Columbia, SC 29201
August 2019

Lead Organization: Department of Health and Environmental Control, Columbia SC
2600 Bull St.
Columbia, SC 29201

Project Location: South Carolina

Project Manager:  Date: 8/2/2019
Taylor Shearer, Aquatic Science Programs

SC DHEC BOW:  Date: 8/2/2019
Bryan Rabon, Aquatic Science Program, Manager

SCDHEC BOW:  Date: 8/9/19
Jennifer Hughes, Assistant Bureau Chief

SCDHEC QAM:  Date: 8/12/19
David Graves, QAM

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A3. Distribution List

Table 1. Distribution List

Name	Title	Organization	Phone	Email
Taylor Shearer	Project Manager	SC DHEC	803-898-1538	shearetv@dhec.gov.sc
Chad Altman	Field Manager	SC DHEC	803-898-4035	altmankc@dhec.sc.gov
Bryan Rabon	ASP Manager	SC DHEC	803-898-4402	raboneb@dhec.sc.gov
David Graves	QAM	Environmental Affairs	803-898-4272	gravesda@dhec.sc.gov
Emily Bores	Project Validation	SC DHEC	803-898-4837	boreseb@dhec.sc.gov
Ashley Amick	Manager	Access Analytical	803-781-4243	aamick@axs-inc.com

A4. Project/Task Organization

Taylor Shearer- is the Project Manager and is responsible for developing and maintaining the QAPP. She will also serve as field personnel and will assist in the collection, processing and delivery of the samples to the laboratory.

Chad Altman- is the field manager and will help with the collection, processing and delivery of the samples to the laboratory.

David Graves- Will review and approve the QAPP.

Bryan Rabon- Will provide guidance and expertise from SC DHEC.

Emily Bores- Validator of the samples and data.

Ashley Amick- General Manager of Access Analytical and liaison for project

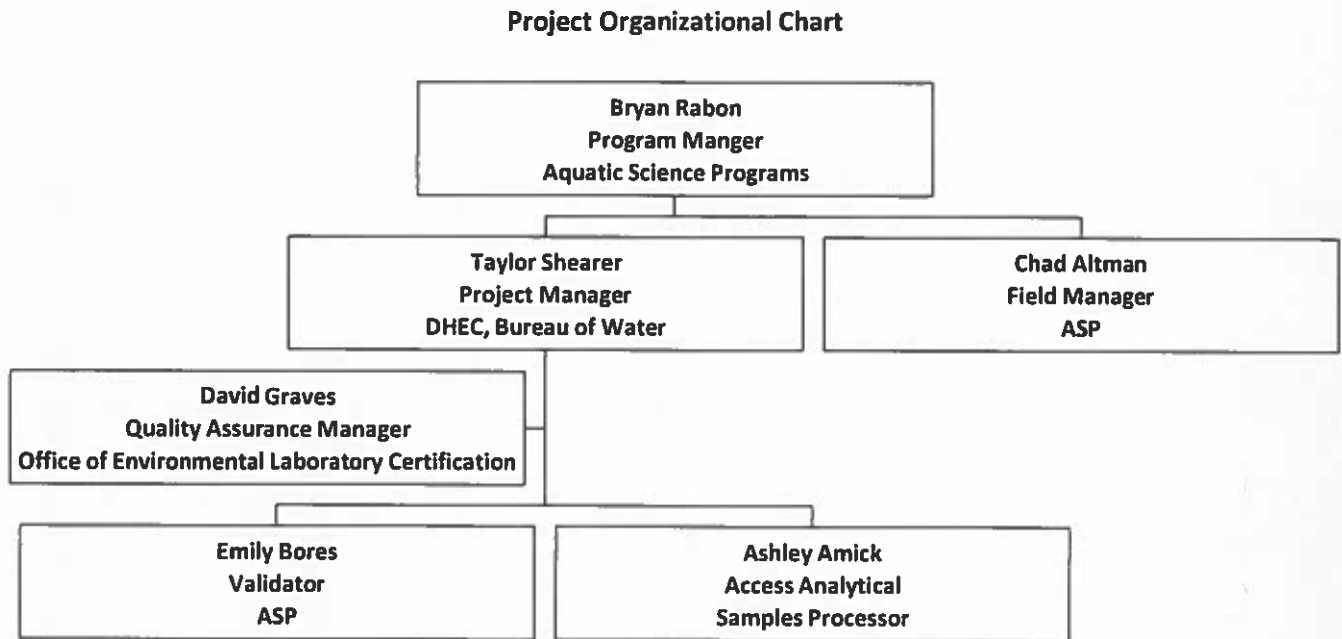


Figure 1. Organizational Chart

A5. Problem Definition/Background

This study plan describes the collection and analysis of fish tissue samples for uranium and fluoride from the Congaree River. Community concern prompted this study due to issues that have occurred from unpermitted discharges at the Westinghouse facility located in Hopkins, South Carolina. Most recently in July 2018, Westinghouse reported a uranium leak at the facility. This is one of multiple leaks that have occurred at the facility over the past decade, potentially impacting groundwater. Westinghouse also has an NPDES permit with South Carolina Department of Health and Environmental Control that discharges process wastewater into the Congaree River. This study will determine if the facility has impacted the Congaree River by testing the tissue and whole fish of sunfishes at three locations on the Congaree River. Bluegill sunfish is the targeted species, while other sunfishes will be accepted if bluegills are not present in the desired quantities while sampling. Bluegill sunfish was selected because it is an invertebrate consuming fish species, which has been found to bioaccumulate uranium at a higher level than fish species that are primarily piscivores (Kraemer and Evans, 2012). The whole fish sample will determine if Westinghouse has impacted the Congaree, while the fish filet tissue sample will determine if there are possible human health impacts.

A6. Project/Task Description

As previously stated, the purpose of this project is to collect and analyze the tissue and whole fish of sunfishes from the Congaree River to determine if uranium or fluoride from the Westinghouse facility has impacted the water body. Approximately 9 to 18 fish will be collected by SCDHEC staff members at each of the three site locations for a total of at least 27 fish, but not to exceed 40. Fish must be large enough to perform tissue analysis. Collection will be performed via electroshocking and dip netting following the SCDHEC SOP for Fish and Shellfish Tissue Collection. Fish will then be transported on ice back to the SCDHEC Aquatic Biology Lab. At the lab, samples will be weighed, measured for total length, scaled, and a fillet removed. The remaining fish will be wrapped in clean aluminum foil (dull side to fillet) and placed in the freezer at -20 C or lower. The separated fillet will also be wrapped in foil and placed in the freezer at -20 C or lower. These samples will then be transported on ice to Access Analytical for analysis. Samples will be digested following the SOP for acid digestion (GL-MA-E-009 REVISION 28) and then analyzed using EPA method 6020 for uranium and modified SM 4500-F C-2011 method for fluoride. Due to holding times for fluoride, samples must be analyzed within 28 days of collection. Table 2 provides the project activities and their anticipated date of initiation and completion. Table 3 provides the station codes and site descriptions. All SOPs are attached in Appendix A.

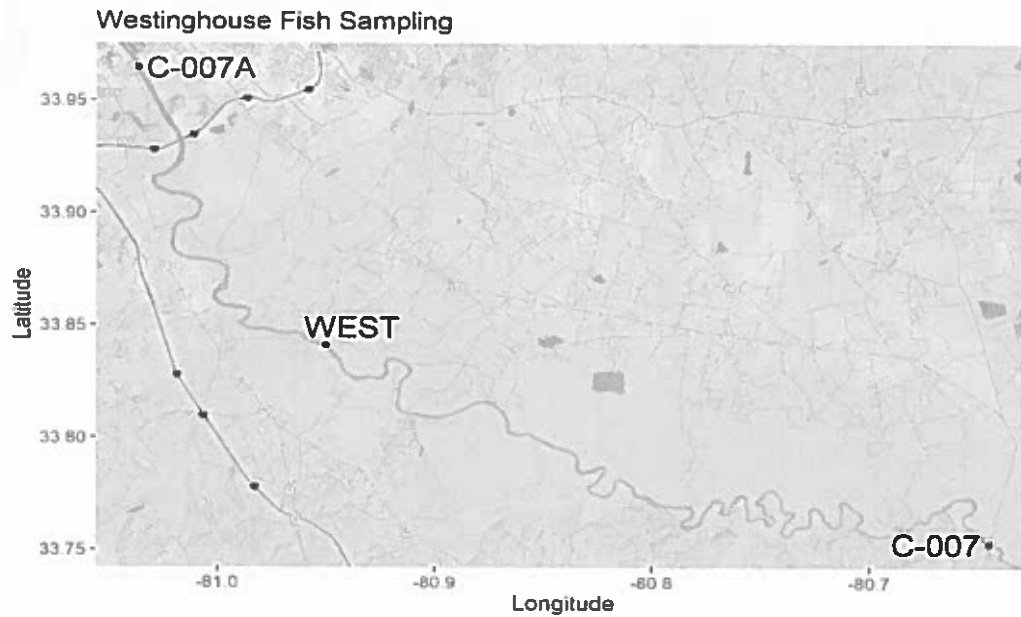
Table 2. Project Activities

Activity	Organization	Anticipated Start Date(s)	Anticipated Date(s) of Completion
Site Determination	SCDHEC	06/01/2019	06/17/2019
QAPP Approval	SCDHEC	07/15/2019	08/05/2019
Sampling Begins	SCDHEC	Based on field conditions	08/09/2019
Lab Reports	SCDHEC	08/16/2019	09/06/2019
Data Validation	SCDHEC	09/09/2019	09/20/2019
Final Report Due	SCDHEC	09/23/2019	10/04/2019

Table 3. Site Locations

Station	Description	Location
C-007A	Upstream of Westinghouse diffuser	Approximately a two mile section beginning at 33.964704 -81.036252, below the Rosewood Drive Landing.
WEST	Westinghouse diffuser	Approximately a two mile section beginning at 33.840369 -80.949075 (the diffuser), traveling downstream
C-007	Downstream of Westinghouse diffuser	Current existing station at the 601 bridge (C-007). Approximately one mile upstream and downstream of bridge.

Figure 2. Sampling Locations Map



A7. Quality Objectives and Criteria for Measurement Data

The overall data quality objective is to collect fish tissue samples for uranium and fluoride analysis to determine if uranium or fluoride from the Westinghouse facility has impacted the water body. Samples will be collected on the same day at 3 different sites to assess if discharges from the Westinghouse facility have impacted the Congaree River. The goal is to collect nine (9) bluegill, with redbreast also being accepted, at each site. If less than nine fish are collected, samplers will return for follow up sample runs until nine are collected. The number of fish is not to exceed forty (40). SCDHEC staff will collect and process the fish following the Standard Operating Procedures for Fish and Shellfish Tissue Collection (Technical Report No. 003-01). Access Analytical will prepare the samples for analysis by digest following Standard Operating Procedure for Acid Digestion of Sediments, Sludges, and Soils (GL-MA-E-009 Revision 28). Uranium will be analyzed following Standard Operating Procedure for Determination of Metals by ICP-MS (GL-MA-E-014 Revision 33). Fluoride will be analyzed following Standard Operating Procedure for Fluoride (Ion Selective Electrode) via SM 4500-F C-2011 (AXS-SOP-013/Fluoride).

A8. Training and Certification

Access Analytical is certified by SC DHEC (32571) for the analysis of low level metals analysis using US EPA method 6020 as well as certified for the analysis of fluoride using SM 4500-F C-2011.

A9. Documentation and Records

QAPP Formulation and Distribution

Taylor Shearer is responsible for writing, maintaining and distributing the QAPP. The QAPP will be distributed electronically. If the QAPP needs to be revised during the study period, the person in charge of the QAPP will do so and submit to the QAM designee for approval. Once the QAPP is approved, the updated QAPP is sent to those individuals on the distribution list.

Data Report Package

Data will be reported in both electronic and hard copy PDF of the analysis results (including the QA/QC data). The values will be reported in concentration units of: ug/g for total uranium and mg/kg for total fluoride. The project manager is responsible for receiving the data report package from Access Analytical.

Other Records Generated by this Project

The information in Table 6 is an itemized list of the records generated by the project and how they are stored.

Table 4. Project Records and Archives

Item	Produced by:	Hardcopy/Electronic	Storage Location/Time	Archival	Disposal (Time)
Chain of Custody	Field Manager & Access Analytical	Hardcopy	Filled out in field and shipped with samples.	Stored at ASP	10 years
Corrective Action Reports	Program Manager	Electronic	Reported in excel sheet with data results	ASP-Uranium Study Folder	10 years
Data Report	Access Analytical	Both	Stored in folder on computer with hard copy print off for the uranium folder	ASP Lab	10 years
QC Narrative	Access Analytical	Both	Stored in folder on computer with hard copy print off for the uranium folder	ASP Lab	10 years

Section B Measurement/Data Acquisition

B1-B7 Sampling and Analysis Design and Requirements

The sampling locations were chosen by SC DHEC to adequately determine if the Congaree River has been impacted. The upstream site will serve as the control. The area below the Westinghouse diffuser serves as the initial impact area. Lastly the downstream site will be used to determine if contaminants have reached the lower Congaree, with potential to impact downstream water bodies such as the Santee River, which forms Lake Marion. These sites are listed in Table 4 of section A6. Sample population means will be compared for significant differences.

Sample analysis and design are covered in the SCDHEC SOPs and the Access Analytical SOPs.

B8 Inspection/Acceptance Requirements for Supplies and Consumables

Not Applicable for a Class 3 QAPP.

B9. Data Acquisition Requirements for Non-Direct Measurements

Not Applicable for a Class 3 QAPP.

B10. Data Management

Not Applicable for a Class 3 QAPP.

Section C Assessment and Oversight

Not Applicable for a Class 3 QAPP.

Section D Data Validation and Usability

D1. Data Review, Verification and Validation

Not Applicable for a Class 3 QAPP.

D2. Validation and Verification Methods

Prior to their release from the laboratory data will be validated. Validation is defined as the process through which data are accepted or rejected and consists of proofing, verifying editing, and technical reviewing activities. Data validation will occur at multiple levels as data are collected and processed. These levels include:

Individuals recording data during field or laboratory operations are responsible for verifying their work at the end of the day to ensure that the data are complete and accurate.

Analysts and instrument users are responsible for monitoring the instrument operation to ensure that the instrument has been properly calibrated.

Laboratory analysts and project Managers are responsible for verifying analytical and supporting documentation to assess sample holding times and conditions, equipment calibration, and sample integrity. As an additional measure of acceptability, the results of QC samples are compared to the project DQOs of section A7.

All manual entries into databases and spreadsheets are verified, either through proofing or by double entry/comparison programs and all calculations performed by hand are checked for accuracy.

Complete data packages including sample and analysis plan, hard copies of instrument outputs, and summary data sheets are provided to the laboratory technical leader or designee for review. Analytical data packages are reviewed against a checklist. Data are reviewed to ensure that the data are accurate, traceable, defensible, and complete, as compared to the planning documents

and/or project requirements. Concerns that can be corrected will be corrected before the data are released. Deviations are required to be summarized and provided to the client.

Data that do not meet the established criteria for acceptance may be flagged, not reported, or reported with an explanation of the limitations, at the discretion of the Project Manager and the client.

Taylor Shearer will be responsible for validating all components of the project data/information. See Table 17 for items that are used for validation. Following internal data validation and the correction of any errors discovered, the data will be forwarded to the project manager. The project manager reviews the field data and ensures that for every sample sent to the laboratory, a result was received. This check will ensure that the sample data is complete. The project manager will determine completeness was achieved. Completeness is expressed as a percentage of the number of valid measurements that should have been collected (see section A7).

If issues arise from the validation and verification, the project manager is responsible for conveying these results to data users. The goal of this project is to reach 9 fish per site for completeness and if this is not achieved, then the Project Manager may contact the laboratory informing them that the project will be extended to increase the amount of valid data. Once the data has been determined to have met project quality objectives, it will then be logged into the database.

Table 5. QA Items Validated

QA Item	Comments/Purpose
Chain-of-custody for each sample	Must include sampling location and include the handling of the sample from collection to final disposal. Preservation information and condition of the sample upon receipt to the lab must also be included. This allows the Validator to assess if sample treatment was according to the QAPP and allow the Validator to look for anomalies such as time travel (example: when the sample arrives at the lab before it has been collected)
Methods and SOPs (sampling and analysis)	Must be checked against what was originally dictated in the QAPP. If deviations exist, the validator would assess the impact.
Detection Limit information for each method and analysis	The Validator would determine if the detection limit requirement was met by the lab. If not, the Validator would assess the impact of this on the study.
List of Qualifier Flags from the lab and an explanation for each	Depending on the flag, the Validator will assess the impact of these flags. The list of these flags will be reported and kept in the binder with the results from each analysis.
Sample chronology (time of receipt, extraction and analysis)	Will allow the Validator to determine that the sample was within hold time when analyzed and to note anomalies.
Calibration Data associated with each sample analysis	The Validator will determine if the standards and controls ran with the samples in an analysis batch pass the calibration requirements.
Documentation of Laboratory Method/ SOP Deviations	The lab may report this, and the verifier will include it in the report, or the verifier may well note this as part of the verification process and report it. The Validator will assess the impact of this on the study.
Reporting Forms with actual results	These are checked for transcription errors by the Validator.

D3. Reconciliation and User Requirements
 Not Applicable for a Class 3 QAPP.

Literature Cited

Access Analytical, INC. 2014. Standard Operating Procedure for Fluoride (Ion Selective Electrode) via SM 4500-F C-2011. AXS-SOP-013/Fluoride.

DHEC. 2001. Standard Operating Procedures for Fish and Shellfish Tissue Collection. South Carolina Department of Health and Environmental Control. Bureau of Water, Aquatic Biology Section. Columbia SC.

GEL'S Laboratories LLC. 2018. Standard Operating Procedure for Acid Digestion of Sediments, Sludges, and Soils. GL-MA-E-009 Revision 28.

GEL'S Laboratories LLC. 2018. Standard Operating Procedure for Determination of Metals by ICP-MS. GL-MA-E-014 Revision 33.

Kraemer, L.D. and Evans, D. 2012. Uranium bioaccumulation in a freshwater ecosystem: Impact of feeding ecology. *Aquatic Toxicology*. 124-125: 163-170.