

September 03, 2020

Report to:  
Kent Applegate  
Rio Algom Mining Company  
P.O. Box 218  
Grants, NM 87020

Bill to:  
Accounts Payable  
Rio Algom Mining Company  
P.O. Box 218  
Grants, NM 87020

cc: Clark Short, Angela Persico, Michaela Gorospe

Project ID: 4508122295  
ACZ Project ID: L60593

Kent Applegate:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 03, 2020. This project has been assigned to ACZ's project number, L60593. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L60593. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 03, 2020. If the samples are determined to be hazardous, additional charges apply for disposal (typically \$11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.



Sue Webber has reviewed and approved this report.



### Rio Algom Mining Company

Project ID: 4508122295

Sample ID: 17-01 KD

ACZ Sample ID: **L60593-01**

Date Sampled: 07/30/20 14:55

Date Received: 08/03/20

Sample Matrix: Groundwater

#### Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.002	08/12/20 15:40	mfm
Arsenic, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0002	0.001	08/12/20 15:40	mfm
Barium, dissolved	M200.7 ICP	1	0.013	B		mg/L	0.007	0.04	08/06/20 15:01	jlw
Beryllium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00008	0.0003	08/12/20 15:40	mfm
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	08/12/20 15:40	mfm
Calcium, dissolved	M200.7 ICP	1	57.7			mg/L	0.1	0.5	08/06/20 15:01	jlw
Iron, dissolved	M200.7 ICP	1	0.15	B	*	mg/L	0.06	0.2	08/06/20 15:01	jlw
Lead, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	08/12/20 15:40	mfm
Magnesium, dissolved	M200.7 ICP	1	40.9			mg/L	0.2	1	08/06/20 15:01	jlw
Molybdenum, dissolved	M200.8 ICP-MS	1	0.0009			mg/L	0.0002	0.0005	08/12/20 15:40	mfm
Nickel, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0004	0.001	08/12/20 15:40	mfm
Potassium, dissolved	M200.7 ICP	1	6.6			mg/L	0.2	1	08/06/20 15:01	jlw
Selenium, dissolved	SM 3114 B, AA-Hydride	1		U		mg/L	0.002	0.005	08/13/20 14:30	slm
Sodium, dissolved	M200.7 ICP	1	227			mg/L	0.2	1	08/06/20 15:01	jlw
Uranium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	08/12/20 15:40	mfm

#### Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	39.6			mg/L	2	20	08/05/20 0:00	emk
Carbonate as CaCO3		1	18.4	B		mg/L	2	20	08/05/20 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/05/20 0:00	emk
Total Alkalinity		1	57.9			mg/L	2	20	08/05/20 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-3.0			%			09/03/20 0:00	calc
Sum of Anions			17			meq/L			09/03/20 0:00	calc
Sum of Cations			16			meq/L			09/03/20 0:00	calc
Chloride	SM4500Cl-E	1	11.5			mg/L	0.5	2	08/11/20 10:50	wtc
Conductivity @25C	SM2510B	1	1600			umhos/cm	1	10	08/07/20 1:10	eep
Cyanide, Total	D7511-09	1	0.018			mg/L	0.003	0.01	08/05/20 12:48	rbt
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U	*	mg/L	0.02	0.1	08/18/20 23:41	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1160		*	mg/L	20	40	08/03/20 21:06	jck
Sulfate	D516-02/-07/-11 - Turbidimetric	25	742		*	mg/L	25	125	08/12/20 11:58	rbt
TDS (calculated)	Calculation		1120			mg/L			09/03/20 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.04						09/03/20 0:00	calc

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #5). Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

**QC Sample Types**

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

**QC Sample Type Explanations**

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

**ACZ Qualifiers (Qual)**

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

**Method References**

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (4) EPA SW-846. Test Methods for Evaluating Solid Waste.
- (5) Standard Methods for the Examination of Water and Wastewater.

**Comments**

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
- (5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click:

<https://acz.com/wp-content/uploads/2019/04/Ext-Qual-List.pdf>

Rio Algom Mining Company

ACZ Project ID: **L60593**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Alkalinity as CaCO3** SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502754</b>													
WG502754PBW1	PBW	08/04/20 18:03				U	mg/L		-20	20			
WG502754LCSW3	LCSW	08/04/20 18:23	WC200723-2	820.0001		849	mg/L	104	90	110			
WG502754LCSW6	LCSW	08/04/20 22:12	WC200723-2	820.0001		852	mg/L	104	90	110			
WG502754PBW2	PBW	08/04/20 22:21				U	mg/L		-20	20			
WG502754LCSW9	LCSW	08/05/20 0:45	WC200723-2	820.0001		851	mg/L	104	90	110			
WG502754PBW3	PBW	08/05/20 0:54				U	mg/L		-20	20			
L60593-01DUP	DUP	08/05/20 4:09			57.9	59.8	mg/L				3	20	
WG502754LCSW12	LCSW	08/05/20 4:30	WC200723-2	820.0001		853	mg/L	104	90	110			
WG502754PBW4	PBW	08/05/20 4:39				U	mg/L		-20	20			
WG502754LCSW15	LCSW	08/05/20 8:07	WC200723-2	820.0001		860	mg/L	105	90	110			

**Antimony, dissolved** M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.02004		.01994	mg/L	100	90	110			
WG503232ICB	ICB	08/12/20 15:37				.00053	mg/L		-0.00088	0.00088			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.01		.00959	mg/L	96	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.01	U	.00938	mg/L	94	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.01	U	.00975	mg/L	98	70	130	4	20	

**Arsenic, dissolved** M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.05		.04937	mg/L	99	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.00044	0.00044			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.05005		.05159	mg/L	103	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.05005	.0009	.05917	mg/L	116	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.05005	.0009	.0589	mg/L	116	70	130	0	20	

**Barium, dissolved** M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502876</b>													
WG502876ICV	ICV	08/06/20 13:41	II200723-1	2		1.9818	mg/L	99	95	105			
WG502876ICB	ICB	08/06/20 13:47				U	mg/L		-0.021	0.021			
WG502876LFB	LFB	08/06/20 14:00	II200805-3	.5005		.4985	mg/L	100	85	115			
L60603-02AS	AS	08/06/20 15:17	II200805-3	.5005	.014	.517	mg/L	100	85	115			
L60603-02ASD	ASD	08/06/20 15:20	II200805-3	.5005	.014	.5169	mg/L	100	85	115	0	20	

**Beryllium, dissolved** M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.05		.048983	mg/L	98	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.000176	0.000176			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.05005		.05195	mg/L	104	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.05005	U	.055087	mg/L	110	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.05005	U	.054852	mg/L	110	70	130	0	20	

**Rio Algom Mining Company**

ACZ Project ID: **L60593**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Cadmium, dissolved**

M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.05		.048541	mg/L	97	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.00011	0.00011			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.05005		.050532	mg/L	101	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.05005	U	.056899	mg/L	114	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.05005	U	.056688	mg/L	113	70	130	0	20	

**Calcium, dissolved**

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502876</b>													
WG502876ICV	ICV	08/06/20 13:41	II200723-1	100		98.41	mg/L	98	95	105			
WG502876ICB	ICB	08/06/20 13:47				U	mg/L		-0.3	0.3			
WG502876LFB	LFB	08/06/20 14:00	II200805-3	67.9908		69.9	mg/L	103	85	115			
L60603-02AS	AS	08/06/20 15:17	II200805-3	67.9908	240	301.2	mg/L	90	85	115			
L60603-02ASD	ASD	08/06/20 15:20	II200805-3	67.9908	240	300.2	mg/L	89	85	115	0	20	

**Chloride**

SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503140</b>													
WG503140ICB	ICB	08/11/20 7:55				U	mg/L		-1.5	1.5			
WG503140ICV	ICV	08/11/20 7:55	WI200506-2	55.055		57.49	mg/L	104	90	110			
WG503140LFB1	LFB	08/11/20 10:50	WI200327-3	30.03		32.01	mg/L	107	90	110			
L60593-01DUP	DUP	08/11/20 10:50			11.5	11.49	mg/L				0	20	
L60595-01AS	AS	08/11/20 10:50	WI200327-3	30.03	5.5	36.09	mg/L	102	90	110			
WG503140LFB2	LFB	08/11/20 10:54	WI200327-3	30.03		32.07	mg/L	107	90	110			

**Conductivity @25C**

SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502930</b>													
WG502930LCSW2	LCSW	08/06/20 19:02	PCN61372	1410		1410	umhos/cm	100	90	110			
WG502930LCSW5	LCSW	08/06/20 22:27	PCN61372	1410		1410	umhos/cm	100	90	110			
L60619-01DUP	DUP	08/07/20 1:30			477	477	umhos/cm				0	20	
WG502930LCSW8	LCSW	08/07/20 1:53	PCN61372	1410		1400	umhos/cm	99	90	110			
WG502930LCSW11	LCSW	08/07/20 5:37	PCN61372	1410		1400	umhos/cm	99	90	110			
WG502930LCSW14	LCSW	08/07/20 9:10	PCN61372	1410		1390	umhos/cm	99	90	110			

**Cyanide, Total**

D7511-09

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502768</b>													
WG502768ICV	ICV	08/05/20 12:10	WI200804-5	.3003		.2775	mg/L	92	90	110			
WG502768ICB	ICB	08/05/20 12:12				U	mg/L		-0.003	0.003			
WG502768LFB	LFB	08/05/20 12:18	WI200804-6	.1		.096	mg/L	96	84	116			
L60580-02AS	AS	08/05/20 12:22	WI200804-6	.1	U	.0909	mg/L	91	84	116			
L60580-02ASD	ASD	08/05/20 12:24	WI200804-6	.1	U	.0926	mg/L	93	84	116	2	20	

**Rio Algom Mining Company**

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NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Iron, dissolved**

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502876</b>													
WG502876ICV	ICV	08/06/20 13:41	II200723-1	2		1.932	mg/L	97	95	105			
WG502876ICB	ICB	08/06/20 13:47				U	mg/L		-0.18	0.18			
WG502876LFB	LFB	08/06/20 14:00	II200805-3	1.0018		1.042	mg/L	104	85	115			
L60603-02AS	AS	08/06/20 15:17	II200805-3	1.0018	70.8	68.71	mg/L	-179	85	115			M3
L60603-02ASD	ASD	08/06/20 15:20	II200805-3	1.0018	70.8	68.49	mg/L	-201	85	115	0	20	M3

**Lead, dissolved**

M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.05		.05115	mg/L	102	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.00022	0.00022			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.05005		.05195	mg/L	104	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.05005	U	.05474	mg/L	109	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.05005	U	.05478	mg/L	109	70	130	0	20	

**Magnesium, dissolved**

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502876</b>													
WG502876ICV	ICV	08/06/20 13:41	II200723-1	100		96.77	mg/L	97	95	105			
WG502876ICB	ICB	08/06/20 13:47				U	mg/L		-0.6	0.6			
WG502876LFB	LFB	08/06/20 14:00	II200805-3	49.9996		49.42	mg/L	99	85	115			
L60603-02AS	AS	08/06/20 15:17	II200805-3	49.9996	86	133.1	mg/L	94	85	115			
L60603-02ASD	ASD	08/06/20 15:20	II200805-3	49.9996	86	133.2	mg/L	94	85	115	0	20	

**Molybdenum, dissolved**

M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.0199		.0198	mg/L	99	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.00044	0.00044			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.0501		.049	mg/L	98	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.0501	.0008	.05488	mg/L	108	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.0501	.0008	.05497	mg/L	108	70	130	0	20	

**Nickel, dissolved**

M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.05		.05181	mg/L	104	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.00088	0.00088			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.05		.05184	mg/L	104	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.05	.0009	.05345	mg/L	105	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.05	.0009	.05304	mg/L	104	70	130	1	20	

Rio Algom Mining Company

ACZ Project ID: **L60593**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Nitrate/Nitrite as N**

M353.2 - H2SO4 preserved

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503574</b>													
WG503574ICV	ICV	08/18/20 21:44	WI200815-1	2.416		2.431	mg/L	101	90	110			
WG503574ICB	ICB	08/18/20 21:45				U	mg/L		-0.02	0.02			
<b>WG503576</b>													
WG503576LFB	LFB	08/18/20 23:34	WI200331-15	2		1.802	mg/L	90	90	110			
L60561-01AS	AS	08/18/20 23:37	WI200331-15	2	.04	1.679	mg/L	82	90	110			M2
L60576-01DUP	DUP	08/18/20 23:39			U	U	mg/L				0	20	RA

**Potassium, dissolved**

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502876</b>													
WG502876ICV	ICV	08/06/20 13:41	II200723-1	20		19.68	mg/L	98	95	105			
WG502876ICB	ICB	08/06/20 13:47				U	mg/L		-0.6	0.6			
WG502876LFB	LFB	08/06/20 14:00	II200805-3	99.96847		101.5	mg/L	102	85	115			
L60603-02AS	AS	08/06/20 15:17	II200805-3	99.96847	4.8	107.6	mg/L	103	85	115			
L60603-02ASD	ASD	08/06/20 15:20	II200805-3	99.96847	4.8	108.1	mg/L	103	85	115	0	20	

**Residue, Filterable (TDS) @180C**

SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502684</b>													
WG502684PBW	PBW	08/03/20 20:20				U	mg/L		-20	20			
WG502684LCSW	LCSW	08/03/20 20:22	PCN61598	1000		1000	mg/L	100	80	120			
L60594-06DUP	DUP	08/03/20 21:20			134	130	mg/L				3	10	RA

**Selenium, dissolved**

SM 3114 B, AA-Hydride

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503277</b>													
WG503277ICV	ICV	08/13/20 12:43	SE200702-2	.025		.026	mg/L	104	90	110			
WG503277ICB	ICB	08/13/20 12:45				U	mg/L		-0.006	0.006			
<b>WG503279</b>													
WG503279LRB	LRB	08/13/20 14:26				U	mg/L		-0.006	0.006			
WG503279LFB	LFB	08/13/20 14:28	SE200529-14	.0225		.0242	mg/L	108	85	115			
L60597-01LFM	LFM	08/13/20 14:34	SE200529-14	.0225	U	.0214	mg/L	95	85	115			
L60597-01LFMD	LFMD	08/13/20 14:37	SE200529-14	.0225	U	.0218	mg/L	97	85	115	2	20	

**Sodium, dissolved**

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG502876</b>													
WG502876ICV	ICV	08/06/20 13:41	II200723-1	100		99.06	mg/L	99	95	105			
WG502876ICB	ICB	08/06/20 13:47				U	mg/L		-0.6	0.6			
WG502876LFB	LFB	08/06/20 14:00	II200805-3	100.0157		101	mg/L	101	85	115			
L60603-02AS	AS	08/06/20 15:17	II200805-3	100.0157	4.8	107.4	mg/L	103	85	115			
L60603-02ASD	ASD	08/06/20 15:20	II200805-3	100.0157	4.8	107.9	mg/L	103	85	115	0	20	

Rio Algom Mining Company

ACZ Project ID: **L60593**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Sulfate**

D516-02/-07/-11 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503201</b>													
WG503201ICB	ICB	08/12/20 9:37				U	mg/L		-3	3			
WG503201ICV	ICV	08/12/20 9:37	WI200812-2	20		20	mg/L	100	90	110			
WG503201LFB	LFB	08/12/20 11:07	WI200803-1	10.01		9.8	mg/L	98	90	110			
L60576-01DUP	DUP	08/12/20 11:55			172	170	mg/L				1	20	
L60572-08AS	AS	08/12/20 12:18	SO4TURB	20	4740	4670	mg/L	-350	90	110			M3

**Uranium, dissolved**

M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
<b>WG503232</b>													
WG503232ICV	ICV	08/12/20 15:35	MS200812-2	.05		.04938	mg/L	99	90	110			
WG503232ICB	ICB	08/12/20 15:37				U	mg/L		-0.00022	0.00022			
WG503232LFB	LFB	08/12/20 15:39	MS200803-2	.05		.05042	mg/L	101	85	115			
L60616-03AS	AS	08/12/20 15:48	MS200803-2	.05	.0009	.05555	mg/L	109	70	130			
L60616-03ASD	ASD	08/12/20 15:49	MS200803-2	.05	.0009	.05629	mg/L	111	70	130	1	20	



Rio Algom Mining Company

ACZ Project ID: **L60593**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L60593-01	WG502876	Iron, dissolved	M200.7 ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG503576	Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M353.2 - H2SO4 preserved	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG502684	Residue, Filterable (TDS) @180C	SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
	WG503201	Sulfate	D516-02/-07/-11 - Turbidimetric	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

### Rio Algom Mining Company

Project ID: 4508122295

Sample ID: 17-01 KD

Locator:

ACZ Sample ID: **L60593-01**

Date Sampled: 07/30/20 14:55

Date Received: 08/03/20

Sample Matrix: Groundwater

Gross Alpha - Corrected

Prep Method:

Calculation

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha - Corrected	09/03/20 13:29		0.96			pCi/L		calc

Gross Alpha, dissolved

Prep Method:

M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/14/20 0:04		0.96	2.4	10	pCi/L	*	fdw

Lead 210, dissolved

Prep Method:

EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	08/25/20 14:30		2.3	2.1	4.3	pCi/L	*	isn

Polonium 210, dissolved

Prep Method:

HASL Po-01-RC

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Polonium 210, dissolved	08/14/20 14:25		-0.184	1.4	3	pCi/L	*	isn

Radium 226, dissolved

Prep Method:

M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/26/20 0:02		-0.51	1.6	1.4	pCi/L	*	djc

Radium 228, dissolved

Prep Method:

M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	08/31/20 17:04		2	12	32	pCi/L	*	fdw

**Rio Algom Mining Company**

Project ID: 4508122295

Sample ID: 17-01 KD

Locator:

ACZ Sample ID: **L60593-01**

Date Sampled: 07/30/20 14:55

Date Received: 08/03/20

Sample Matrix: Groundwater

Thorium 230, dissolved

Prep Method:

ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/19/20 16:19		-0.205	0.96	2.1	pCi/L	*	djc

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Error(+/-)</i>	Calculated sample specific uncertainty
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>LCL</i>	Lower Control Limit, in % (except for LCSS, mg/Kg)
<i>LLD</i>	Calculated sample specific Lower Limit of Detection
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>REr</i>	Relative Error Ratio, calculation used for Dup. QC taking into account the error factor.
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>UCL</i>	Upper Control Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

**QC Sample Types**

<i>DUP</i>	Sample Duplicate	<i>MS/MSD</i>	Matrix Spike/Matrix Spike Duplicate
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBS</i>	Prep Blank - Soil
<i>LCSW</i>	Laboratory Control Sample - Water	<i>PBW</i>	Prep Blank - Water

**QC Sample Type Explanations**

Blanks	Verifies that there is no or minimal contamination in the prep method procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Matrix Spikes	Determines sample matrix interferences, if any.

**ACZ Qualifiers (Qual)**

H	Analysis exceeded method hold time.
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**Method Prefix Reference**

M	EPA methodology, including those under SDWA, CWA, and RCRA
SM	Standard Methods for the Examination of Water and Wastewater.
D	ASTM
RP	DOE
ESM	DOE/ESM

**Comments**

- (1) Solid matrices are reported on a dry weight basis.
- (2) Preparation method: "Method" indicates preparation defined in analytical method.
- (3) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click:

<https://acz.com/wp-content/uploads/2019/04/Ext-Qual-List.pdf>

Rio Algom Mining Company

ACZ Project ID: **L60593**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Gross Alpha, dissolved**

M9310

Units: pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
<b>WG502928</b>																
WG502928PBW	PBW	08/14/20						.83	1.1	11			22			
WG502928LCSWA	LCSW	08/14/20	PCN60283	100				110	8.9	12	110	67	144			
L60593-01DUP	DUP-RER	08/14/20			0.96	2.4	10	1.2	2.3	9.1				0.07	2	
L60593-01DUP	DUP-RPD	08/14/20			0.96	2.4	10	1.2	2.3	9.1				22	20	RG
L60613-03MSA	MS	08/14/20	PCN60283	1666.67	9	27	350	1700	200	360	101	67	144			
L60629-01DUP	DUP-RPD	08/14/20			88	9.7	5.6	57	8	7.4				43	20	RM

**Lead 210, dissolved**

EICHROM, OTW01

Units: pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
<b>WG503216</b>																
WG503216LCSW	LCSW	08/25/20	PCN59634	96.85				93	3.6	2.7	96	55	121			
WG503216PBW	PBW	08/25/20						-22	1.6	3.4			6.8			
L60729-01DUP	DUP-RER	08/25/20			-0.49	2.7	5.9	-1.2	2.8	6				0.18	2	
L60695-03DUP	DUP-RPD	08/25/20			-4	2.7	6	.86	2.8	5.8				310	20	RG
L60729-01DUP	DUP-RPD	08/25/20			-0.49	2.7	5.9	-1.2	2.8	6				84	20	RG
L60695-03DUP	DUP-RER	08/25/20			-4	2.7	6	.86	2.8	5.8				1.25	2	
L60730-01MS	MS	08/25/20	PCN59634	161.41	4.4	2.4	4.8	140	6.1	5.9	84	55	121			

**Polonium 210, dissolved**

HASL Po-01-RC

Units: pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
<b>WG503109</b>																
WG503109LCSW	LCSW	08/14/20	PCN59634	500				496	88	5	99	51	128			
L60597-01DUP	DUP-RPD	08/14/20			-0.721	2.3	4.6	-1.28	2.3	4.8				56	20	RG
L60597-01DUP	DUP-RER	08/14/20			-0.721	2.3	4.6	-1.28	2.3	4.8				0.17	2	
L60700-01MS	MS	08/14/20	PCN59634	500	0.515	2	3.9	492	83	3.7	98	51	128			
WG503109PBW	PBW	08/14/20						.613	2.2	4.2			8.4			

Rio Algom Mining Company

ACZ Project ID: **L60593**

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

**Radium 226, dissolved**

M903.1

Units: pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
<b>WG503657</b>																
WG503657PBW	PBW	08/26/20						.16	0.11	0.15			0.3			
WG503657LCSW	LCSW	08/26/20	PCN61539	20				16	0.6	0.15	80	43	148			
L60613-01DUP	DUP-RPD	08/26/20			23	1.8	0.84	33	1.7	1.1				36	20	RM
L60729-03DUP	DUP-RPD	08/26/20			1.5	0.18	0.31	1.4	0.27	0.45				7	20	
L60613-01MS	MS	08/26/20	PCN61539	100	23	1.8	0.84	130	3.8	0.58	107	43	148			

**Radium 228, dissolved**

M9320

Units: pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
<b>WG503967</b>																
L60746-03MS	MS	08/31/20	PCN61541	6.49	1.2	0.81	0.79	9.2	1.5	1.2	123	47	123			
L60707-01DUP	DUP-RER	08/31/20			-0.14	1.1	2.7	1	1.1	2.6				0.73	2	
WG503967LCSW	LCSW	08/31/20	PCN61541	9.74				10	1.7	1.3	103	47	123			
WG503967PBW	PBW	08/31/20						-44	0.53	0.58			1.16			
L60707-01DUP	DUP-RPD	08/31/20			-0.14	1.1	2.7	1	1.1	2.6				265	20	RG
L60870-05DUP	DUP-RPD	08/31/20			1.5	1.3	3	.68	1.4	3.2				75	20	RG
L60870-05DUP	DUP-RER	08/31/20			1.5	1.3	3	.68	1.4	3.2				0.43	2	

**Thorium 230, dissolved**

ESM 4506

Units: pCi/L

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Error	LLD	Found	Error	LLD	Rec%	Lower	Upper	RPD/RER	Limit	Qual
<b>WG503732</b>																
WG503732PBW	PBW	08/19/20						.158	0.22	0.38			0.76			
WG503732LCSW	LCSW	08/19/20	PCN58726	200				206	28	0.4	103	91	126			
L60729-01DUP	DUP-RER	08/19/20			0.0272	0.22	0.43	.224	0.34	0.59				0.49	2	
L60729-01DUP	DUP-RPD	08/19/20			0.0272	0.22	0.43	.224	0.34	0.59				157	20	RG
L60730-01DUP	DUP-RPD	08/20/20			0.466	0.41	0.64	.574	0.5	0.73				21	20	RG
L60730-01DUP	DUP-RER	08/20/20			0.466	0.41	0.64	.574	0.5	0.73				0.17	2	
L60729-03MS	MS	08/20/20	PCN58726	200	-0.0581	0.29	0.58	178	24	0.36	89	91	126			M2

Rio Algom Mining Company

ACZ Project ID: **L60593**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L60593-01	WG502928	Gross Alpha, dissolved	M9310	RG	Sample concentration is less than 5x LLD; RPD was not used for data validation. Replicate Error Ratio (RER) is less than 2. Precision judged to be in control.
	WG503216	Lead 210, dissolved	EICHROM, OTW01	D1	Sample required dilution due to matrix.
			EICHROM, OTW01	RG	Sample concentration is less than 5x LLD; RPD was not used for data validation. Replicate Error Ratio (RER) is less than 2. Precision judged to be in control.
	WG503109	Polonium 210, dissolved	HASL Po-01-RC	RG	Sample concentration is less than 5x LLD; RPD was not used for data validation. Replicate Error Ratio (RER) is less than 2. Precision judged to be in control.
	WG503657	Radium 226, dissolved	M903.1	DJ	Sample dilution required due to insufficient sample.
			M903.1	RM	For a water matrix, the duplicate precision assessment (RPD or RER) exceeded the control limit. High sediment, turbidity, or presence of an immiscible liquid attributed to non-homogeneity of the sample.
	WG503967	Radium 228, dissolved	M9320	DJ	Sample dilution required due to insufficient sample.
			M9320	RG	Sample concentration is less than 5x LLD; RPD was not used for data validation. Replicate Error Ratio (RER) is less than 2. Precision judged to be in control.
	WG503732	Thorium 230, dissolved	ESM 4506	DJ	Sample dilution required due to insufficient sample.
			ESM 4506	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
ESM 4506			RG	Sample concentration is less than 5x LLD; RPD was not used for data validation. Replicate Error Ratio (RER) is less than 2. Precision judged to be in control.	

**Rio Algom Mining Company**

ACZ Project ID: **L60593**

Radiochemistry

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Lead 210, dissolved	EICHROM, OTW01
Polonium 210, dissolved	HASL Po-01-RC
Thorium 230, dissolved	ESM 4506



Rio Algom Mining Company  
 4508122295

ACZ Project ID: L60593  
 Date Received: 08/03/2020 15:03  
 Received By:  
 Date Printed: 8/4/2020

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Is the Chain of Custody form or other directive shipping papers present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Does this project require special handling procedures such as CLP protocol?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) Are any samples NRC licensable material?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5) If samples are received past hold time, proceed with requested short hold time analyses?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Is the Chain of Custody form complete and accurate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples? A change was made in the # of containers section prior to ACZ custody.  A change was made in the # of containers section prior to ACZ custody.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Samples/Containers**

	YES	NO	NA
8) Are all containers intact and with no leaks?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) Are all labels on containers and are they intact and legible?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) For preserved bottle types, was the pH checked and within limits? <sup>1</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) Is there sufficient sample volume to perform all requested work?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) Is the custody seal intact on all containers?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14) Are samples that require zero headspace acceptable?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15) Are all sample containers appropriate for analytical requirements?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) Is there an Hg-1631 trip blank present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17) Is there a VOA trip blank present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18) Were all samples received within hold time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NA indicates Not Applicable

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Temp Criteria (°C)	Rad (µR/Hr)	Custody Seal Intact?
UNKNOWN		<=6.0		

Was ice present in the shipment container(s)?

Yes - Wet ice was present in the shipment container(s) but was thawed by receipt at ACZ.

Rio Algom Mining Company  
4508122295

ACZ Project ID: L60593  
Date Received: 08/03/2020 15:03  
Received By:  
Date Printed: 8/4/2020

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

<sup>1</sup> The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

