ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

September 19, 2018

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

cc: Clark Short, Angela Persico

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

Project ID: 4506946843
ACZ Project ID: L46194

Kent Applegate:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 10, 2018. This project has been assigned to ACZ's project number, L46194. 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 L46194. 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 19, 2018. 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.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Case Narrative

Rio Algom Mining Company

September 19, 2018

Project ID: 4506946843
ACZ Project ID: L46194

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 11 groundwater samples from Rio Algom Mining Company on August 10, 2018. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L46194. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Holding Times

All analyses were performed within EPA recommended holding times.

Sample Analysis

These samples were analyzed for inorganic, radiochemistry parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. (N1) Carrier recovery outside of acceptance limits due to sx matrix. Sample had excessive amounts of precipitation after step 11.16 resulting in low carrier yield.

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 32-45 KD-R

ACZ Sample ID: ***L46194-01***
Date Sampled: *08/06/18 16:21*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M200.8 ICP-MS	1	0.0011	B		mg/L	0.0004	0.002	08/31/18 1:49	msh
Arsenic, dissolved	M200.8 ICP-MS	1	0.0005	B		mg/L	0.0002	0.001	08/31/18 1:49	msh
Barium, dissolved	M200.7 ICP	1	0.031			mg/L	0.003	0.02	08/29/18 16:46	aeh
Beryllium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.00005	0.0003	08/31/18 1:49	msh
Cadmium, dissolved	M200.8 ICP-MS	1		U		mg/L	0.0001	0.0005	08/31/18 1:49	msh
Calcium, dissolved	M200.7 ICP	1	222		*	mg/L	0.1	0.5	08/29/18 16:46	aeh
Iron, dissolved	M200.7 ICP	1	0.05			mg/L	0.02	0.05	08/29/18 16:46	aeh
Lead, dissolved	M200.8 ICP-MS	1	0.0001	B		mg/L	0.0001	0.0005	08/31/18 1:49	msh
Magnesium, dissolved	M200.7 ICP	1	56.8			mg/L	0.2	1	08/29/18 16:46	aeh
Molybdenum, dissolved	M200.8 ICP-MS	1	0.133			mg/L	0.0005	0.003	08/31/18 1:49	msh
Nickel, dissolved	M200.8 ICP-MS	1	0.0018	B		mg/L	0.0006	0.003	08/31/18 1:49	msh
Potassium, dissolved	M200.7 ICP	1	7.2			mg/L	0.2	1	08/29/18 16:46	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1	0.0011	B	*	mg/L	0.001	0.005	08/16/18 13:29	che
Sodium, dissolved	M200.7 ICP	1	164			mg/L	0.2	1	08/29/18 16:46	aeh
Uranium, dissolved	M200.8 ICP-MS	1	0.0588			mg/L	0.0001	0.0005	08/31/18 1:49	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	322			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	322			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.2			%			09/18/18 0:00	calc
Sum of Anions			22			meq/L			09/18/18 0:00	calc
Sum of Cations			23			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	1	95.2		*	mg/L	0.5	2	08/27/18 12:45	mss2
Conductivity @25C	SM2510B	1	1890			umhos/cm	1	10	08/17/18 17:54	emk
Cyanide, Total	D7511-09	1		U		mg/L	0.003	0.01	08/13/18 11:53	rbt
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.55			mg/L	0.02	0.1	08/29/18 0:17	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1490			mg/L	10	20	08/10/18 16:52	nmc
Sulfate	D516-02/-07 - Turbidimetric	50	605		*	mg/L	50	250	08/30/18 13:21	mss2
TDS (calculated)	Calculation		1350			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.10						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 31-01 TRA-R

ACZ Sample ID: ***L46194-02***
Date Sampled: *08/06/18 15:17*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	1	205		*	mg/L	0.1	0.5	08/29/18 16:55	aeh
Iron, dissolved	M200.7 ICP	1	0.06			mg/L	0.02	0.05	08/29/18 16:55	aeh
Magnesium, dissolved	M200.7 ICP	1	88.4			mg/L	0.2	1	08/29/18 16:55	aeh
Molybdenum, dissolved	M200.8 ICP-MS	1	0.0088			mg/L	0.0005	0.003	08/31/18 1:52	msh
Nickel, dissolved	M200.8 ICP-MS	1	0.0036			mg/L	0.0006	0.003	08/31/18 1:52	msh
Potassium, dissolved	M200.7 ICP	1	6.6			mg/L	0.2	1	08/29/18 16:55	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1		U	*	mg/L	0.001	0.005	08/16/18 13:31	che
Sodium, dissolved	M200.7 ICP	1	150			mg/L	0.2	1	08/29/18 16:55	aeh
Uranium, dissolved	M200.8 ICP-MS	1	0.0008			mg/L	0.0001	0.0005	08/31/18 1:52	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	154			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	154			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.0			%			09/18/18 0:00	calc
Sum of Anions			25			meq/L			09/18/18 0:00	calc
Sum of Cations			24			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	1	21.2		*	mg/L	0.5	2	08/27/18 12:45	mss2
Conductivity @25C	SM2510B	1	1850			umhos/cm	1	10	08/17/18 18:13	emk
Cyanide, Total	D7511-09	1		U		mg/L	0.003	0.01	08/13/18 11:59	rbt
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.03	B		mg/L	0.02	0.1	08/29/18 0:18	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	1590	H	*	mg/L	10	20	08/15/18 11:21	oah
Sulfate	D516-02/-07 - Turbidimetric	50	1000		*	mg/L	50	250	08/30/18 13:21	mss2
TDS (calculated)	Calculation		1570			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.01						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 31-02 TRB-R

ACZ Sample ID: ***L46194-03***
Date Sampled: *08/06/18 14:20*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	5	675		*	mg/L	0.5	3	08/29/18 16:58	aeh
Iron, dissolved	M200.7 ICP	5	6.2			mg/L	0.1	0.3	08/29/18 16:58	aeh
Magnesium, dissolved	M200.7 ICP	5	771			mg/L	1	5	08/29/18 16:58	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.01	08/31/18 2:01	msh
Nickel, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.02	08/31/18 2:01	msh
Potassium, dissolved	M200.7 ICP	5	20			mg/L	1	5	08/29/18 16:58	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1		U	*	mg/L	0.001	0.005	08/16/18 13:33	che
Sodium, dissolved	M200.7 ICP	5	633			mg/L	1	5	08/29/18 16:58	aeh
Uranium, dissolved	M200.8 ICP-MS	5	0.0037			mg/L	0.0005	0.003	08/31/18 2:01	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	1100			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	1100			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-0.4			%			09/18/18 0:00	calc
Sum of Anions			127			meq/L			09/18/18 0:00	calc
Sum of Cations			126			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	50	1150			mg/L	30	100	08/27/18 13:36	mss2
Conductivity @25C	SM2510B	1	7710			umhos/cm	1	10	08/17/18 18:31	emk
Cyanide, Total	D7511-09	1		U	*	mg/L	0.003	0.01	08/13/18 12:01	rbt
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U		mg/L	0.02	0.1	08/29/18 0:24	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	7770	H	*	mg/L	50	100	08/15/18 11:24	oah
Sulfate	D516-02/-07 - Turbidimetric	250	3490		*	mg/L	250	1250	08/30/18 13:21	mss2
TDS (calculated)	Calculation		7420			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.05						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 36-06 KD

ACZ Sample ID: ***L46194-04***
Date Sampled: *08/06/18 12:00*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Antimony, dissolved	M200.8 ICP-MS	5		U		mg/L	0.002	0.01	08/31/18 2:04	msh
Arsenic, dissolved	M200.8 ICP-MS	5	0.005			mg/L	0.001	0.005	08/31/18 2:04	msh
Barium, dissolved	M200.7 ICP	5		U		mg/L	0.02	0.08	08/29/18 17:01	aeh
Beryllium, dissolved	M200.8 ICP-MS	5	0.0092			mg/L	0.0003	0.001	08/31/18 2:04	msh
Cadmium, dissolved	M200.8 ICP-MS	5	0.0077			mg/L	0.0005	0.003	08/31/18 2:04	msh
Calcium, dissolved	M200.7 ICP	5	519		*	mg/L	0.5	3	08/29/18 17:01	aeh
Iron, dissolved	M200.7 ICP	5	12.4			mg/L	0.1	0.3	08/29/18 17:01	aeh
Lead, dissolved	M200.8 ICP-MS	5	0.0018	B		mg/L	0.0005	0.003	08/31/18 2:04	msh
Magnesium, dissolved	M200.7 ICP	5	338			mg/L	1	5	08/29/18 17:01	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.01	08/31/18 2:04	msh
Nickel, dissolved	M200.8 ICP-MS	5	0.131			mg/L	0.003	0.02	08/31/18 2:04	msh
Potassium, dissolved	M200.7 ICP	5	12			mg/L	1	5	08/29/18 17:01	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1	0.0026	B	*	mg/L	0.001	0.005	08/16/18 13:35	che
Sodium, dissolved	M200.7 ICP	5	499			mg/L	1	5	08/29/18 17:01	aeh
Uranium, dissolved	M200.8 ICP-MS	5	0.463			mg/L	0.0005	0.003	08/31/18 2:04	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1		U		mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-7.8			%			09/18/18 0:00	calc
Sum of Anions			90			meq/L			09/18/18 0:00	calc
Sum of Cations			77			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	50	930			mg/L	30	100	08/27/18 13:36	mss2
Conductivity @25C	SM2510B	1	6670			umhos/cm	1	10	08/17/18 18:35	emk
Cyanide, Total	D7511-09	1		U		mg/L	0.003	0.01	08/13/18 12:05	rbt
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U		mg/L	0.02	0.1	08/29/18 0:25	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	6050			mg/L	20	40	08/13/18 16:08	nmc
Sulfate	D516-02/-07 - Turbidimetric	120	3050		*	mg/L	120	600	08/30/18 13:27	mss2
TDS (calculated)	Calculation		5360			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.13						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-08 ALL-R

ACZ Sample ID: ***L46194-05***
Date Sampled: *08/07/18 09:52*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	2	524		*	mg/L	0.2	1	08/29/18 17:04	aeh
Iron, dissolved	M200.7 ICP	2		U		mg/L	0.04	0.1	08/29/18 17:04	aeh
Magnesium, dissolved	M200.7 ICP	2	185			mg/L	0.4	2	08/29/18 17:04	aeh
Molybdenum, dissolved	M200.8 ICP-MS	2	0.004	B		mg/L	0.001	0.005	08/31/18 2:07	msh
Nickel, dissolved	M200.8 ICP-MS	2	0.002	B		mg/L	0.001	0.006	08/31/18 2:07	msh
Potassium, dissolved	M200.7 ICP	2	4.0			mg/L	0.4	2	08/29/18 17:04	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1	0.0095		*	mg/L	0.001	0.005	08/16/18 13:37	che
Sodium, dissolved	M200.7 ICP	2	302			mg/L	0.4	2	08/29/18 17:04	aeh
Uranium, dissolved	M200.8 ICP-MS	2	0.0235			mg/L	0.0002	0.001	08/31/18 2:07	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	234			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	234			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			4.8			%			09/18/18 0:00	calc
Sum of Anions			50.0			meq/L			09/18/18 0:00	calc
Sum of Cations			55			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	10	164			mg/L	5	20	08/27/18 13:00	mss2
Conductivity @25C	SM2510B	1	3760			umhos/cm	1	10	08/17/18 18:44	emk
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	10	21.6			mg/L	0.2	1	08/29/18 1:06	pjb
Residue, Filterable (TDS) @180C	SM2540C	1	3810	H	*	mg/L	10	20	08/15/18 11:27	oah
Sulfate	D516-02/-07 - Turbidimetric	100	1940		*	mg/L	100	500	08/30/18 13:28	mss2
TDS (calculated)	Calculation		3260			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.17						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-04 ALL

ACZ Sample ID: ***L46194-06***
Date Sampled: *08/07/18 11:04*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	5	286		*	mg/L	0.5	3	08/29/18 17:08	aeh
Iron, dissolved	M200.7 ICP	5	46.4			mg/L	0.1	0.3	08/29/18 17:08	aeh
Magnesium, dissolved	M200.7 ICP	5	674			mg/L	1	5	08/29/18 17:08	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.01	08/31/18 2:11	msh
Nickel, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.02	08/31/18 2:11	msh
Potassium, dissolved	M200.7 ICP	5	5			mg/L	1	5	08/29/18 17:08	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1		U	*	mg/L	0.001	0.005	08/16/18 13:43	che
Sodium, dissolved	M200.7 ICP	5	315			mg/L	1	5	08/29/18 17:08	aeh
Uranium, dissolved	M200.8 ICP-MS	5		U		mg/L	0.0005	0.003	08/31/18 2:11	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	15.3	B		mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	15.3	B	*	mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.4			%			09/18/18 0:00	calc
Sum of Anions			82			meq/L			09/18/18 0:00	calc
Sum of Cations			86.0			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	10	970			mg/L	5	20	08/27/18 13:00	mss2
Conductivity @25C	SM2510B	1	5070		*	umhos/cm	1	10	08/17/18 18:52	emk
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U		mg/L	0.02	0.1	08/29/18 1:07	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	5440	H	*	mg/L	50	100	08/15/18 11:29	oah
Sulfate	D516-02/-07 - Turbidimetric	100	2610		*	mg/L	100	500	08/30/18 13:28	mss2
TDS (calculated)	Calculation		4920			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.11						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-73 ALL-R

ACZ Sample ID: ***L46194-07***
Date Sampled: *08/07/18 15:22*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	5	797		*	mg/L	0.5	3	08/29/18 17:16	aeh
Iron, dissolved	M200.7 ICP	5		U		mg/L	0.1	0.3	08/29/18 17:16	aeh
Magnesium, dissolved	M200.7 ICP	5	376			mg/L	1	5	08/29/18 17:16	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5	0.005	B		mg/L	0.003	0.01	08/31/18 2:20	msh
Nickel, dissolved	M200.8 ICP-MS	5	0.011	B		mg/L	0.003	0.02	08/31/18 2:20	msh
Potassium, dissolved	M200.7 ICP	5	2	B		mg/L	1	5	08/29/18 17:16	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	5	0.105			mg/L	0.005	0.025	08/16/18 14:22	che
Sodium, dissolved	M200.7 ICP	5	779			mg/L	1	5	08/29/18 17:16	aeh
Uranium, dissolved	M200.8 ICP-MS	5	1.64			mg/L	0.0005	0.003	08/31/18 2:20	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	592			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	592		*	mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			8.2			%			09/18/18 0:00	calc
Sum of Anions			89			meq/L			09/18/18 0:00	calc
Sum of Cations			105			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	50	1520			mg/L	30	100	08/27/18 13:36	mss2
Conductivity @25C	SM2510B	1	6620		*	umhos/cm	1	10	08/17/18 19:03	emk
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	3	5.24			mg/L	0.06	0.3	08/29/18 2:32	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	6510	H	*	mg/L	50	100	08/21/18 10:10	oah
Sulfate	D516-02/-07 - Turbidimetric	250	1630		*	mg/L	250	1250	08/30/18 13:22	mss2
TDS (calculated)	Calculation		5470			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.19						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-03 ALL-R

ACZ Sample ID: ***L46194-08***
Date Sampled: *08/07/18 17:01*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	5	543		*	mg/L	0.5	3	08/29/18 17:20	aeh
Iron, dissolved	M200.7 ICP	5		U		mg/L	0.1	0.3	08/29/18 17:20	aeh
Magnesium, dissolved	M200.7 ICP	5	290			mg/L	1	5	08/29/18 17:20	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.01	08/31/18 2:23	msh
Nickel, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.02	08/31/18 2:23	msh
Potassium, dissolved	M200.7 ICP	5	4	B		mg/L	1	5	08/29/18 17:20	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1	0.0016	B	*	mg/L	0.001	0.005	08/16/18 13:47	che
Sodium, dissolved	M200.7 ICP	5	442			mg/L	1	5	08/29/18 17:20	aeh
Uranium, dissolved	M200.8 ICP-MS	5	0.0926			mg/L	0.0005	0.003	08/31/18 2:23	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	299			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	299			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			2.9			%			09/18/18 0:00	calc
Sum of Anions			67			meq/L			09/18/18 0:00	calc
Sum of Cations			71			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	10	604			mg/L	5	20	08/27/18 13:02	mss2
Conductivity @25C	SM2510B	1	4040			umhos/cm	1	10	08/17/18 19:13	emk
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	0.46			mg/L	0.02	0.1	08/29/18 0:33	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	4430			mg/L	20	40	08/13/18 16:10	nmc
Sulfate	D516-02/-07 - Turbidimetric	100	2080		*	mg/L	100	500	08/30/18 15:03	mss2
TDS (calculated)	Calculation		4150			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.07						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 32-59 ALL

ACZ Sample ID: ***L46194-09***
Date Sampled: *08/08/18 08:46*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	5	562		*	mg/L	0.5	3	08/29/18 17:23	aeh
Iron, dissolved	M200.7 ICP	5		U		mg/L	0.1	0.3	08/29/18 17:23	aeh
Magnesium, dissolved	M200.7 ICP	5	244			mg/L	1	5	08/29/18 17:23	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5	0.004	B		mg/L	0.003	0.01	08/31/18 2:26	msh
Nickel, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.02	08/31/18 2:26	msh
Potassium, dissolved	M200.7 ICP	5	2	B		mg/L	1	5	08/29/18 17:23	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	10	0.249			mg/L	0.01	0.05	08/16/18 14:31	che
Sodium, dissolved	M200.7 ICP	5	535			mg/L	1	5	08/29/18 17:23	aeh
Uranium, dissolved	M200.8 ICP-MS	5	0.210			mg/L	0.0005	0.003	08/31/18 2:26	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	327			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	327			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			9.9			%			09/18/18 0:00	calc
Sum of Anions			59.0			meq/L			09/18/18 0:00	calc
Sum of Cations			72			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	10	547			mg/L	5	20	08/27/18 13:02	mss2
Conductivity @25C	SM2510B	1	4110			umhos/cm	1	10	08/17/18 19:22	emk
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1	2.39			mg/L	0.02	0.1	08/29/18 0:34	pjb
Residue, Filterable (TDS) @180C	SM2540C	2	4530			mg/L	20	40	08/13/18 16:13	nmc
Sulfate	D516-02/-07 - Turbidimetric	100	1770		*	mg/L	100	500	08/30/18 15:03	mss2
TDS (calculated)	Calculation		3860			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.17						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 31-61 ALL

ACZ Sample ID: ***L46194-10***
Date Sampled: *08/08/18 15:56*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	10	568			mg/L	1	5	08/29/18 17:26	aeh
Iron, dissolved	M200.7 ICP	10		U		mg/L	0.2	0.5	08/29/18 17:26	aeh
Magnesium, dissolved	M200.7 ICP	10	1370			mg/L	2	10	08/29/18 17:26	aeh
Molybdenum, dissolved	M200.8 ICP-MS	10		U		mg/L	0.005	0.03	08/31/18 2:30	msh
Nickel, dissolved	M200.8 ICP-MS	10	0.054			mg/L	0.006	0.03	08/31/18 2:30	msh
Potassium, dissolved	M200.7 ICP	10	29			mg/L	2	10	08/29/18 17:26	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1	0.0070			mg/L	0.001	0.005	08/16/18 13:51	che
Sodium, dissolved	M200.7 ICP	10	1760			mg/L	2	10	08/29/18 17:26	aeh
Uranium, dissolved	M200.8 ICP-MS	10	0.646			mg/L	0.001	0.005	08/31/18 2:30	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	1860			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	1860			mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			-2.4			%			09/18/18 0:00	calc
Sum of Anions			230			meq/L			09/18/18 0:00	calc
Sum of Cations			219			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	50	2010			mg/L	30	100	08/27/18 13:36	mss2
Conductivity @25C	SM2510B	1	11600			umhos/cm	1	10	08/17/18 19:45	emk
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	4	7.46			mg/L	0.08	0.4	08/29/18 1:15	pjb
Residue, Filterable (TDS) @180C	SM2540C	10	14100			mg/L	100	200	08/13/18 16:16	nmc
Sulfate	D516-02/-07 - Turbidimetric	500	6490		*	mg/L	500	2500	08/30/18 14:23	mss2
TDS (calculated)	Calculation		13400			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.05						09/18/18 0:00	calc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 36-02 TRB

ACZ Sample ID: ***L46194-11***
Date Sampled: *08/08/18 09:18*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	5	385			mg/L	0.5	3	08/29/18 17:29	aeh
Iron, dissolved	M200.7 ICP	5	24.1			mg/L	0.1	0.3	08/29/18 17:29	aeh
Magnesium, dissolved	M200.7 ICP	5	1190			mg/L	1	5	08/29/18 17:29	aeh
Molybdenum, dissolved	M200.8 ICP-MS	5		U		mg/L	0.003	0.01	08/31/18 2:33	msh
Nickel, dissolved	M200.8 ICP-MS	5	0.005	B		mg/L	0.003	0.02	08/31/18 2:33	msh
Potassium, dissolved	M200.7 ICP	5	16			mg/L	1	5	08/29/18 17:29	aeh
Selenium, dissolved	SM 3114 B, AA-Hydride	1	0.0013	B		mg/L	0.001	0.005	08/16/18 13:58	che
Sodium, dissolved	M200.7 ICP	5	676			mg/L	1	5	08/29/18 17:29	aeh
Uranium, dissolved	M200.8 ICP-MS	5	0.0031			mg/L	0.0005	0.003	08/31/18 2:33	msh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO3	SM2320B - Titration									
Bicarbonate as CaCO3		1	1180			mg/L	2	20	08/17/18 0:00	emk
Carbonate as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Hydroxide as CaCO3		1		U		mg/L	2	20	08/17/18 0:00	emk
Total Alkalinity		1	1180		*	mg/L	2	20	08/17/18 0:00	emk
Cation-Anion Balance	Calculation									
Cation-Anion Balance			3.9			%			09/18/18 0:00	calc
Sum of Anions			137			meq/L			09/18/18 0:00	calc
Sum of Cations			148			meq/L			09/18/18 0:00	calc
Chloride	SM4500Cl-E	50	2020			mg/L	30	100	08/27/18 13:36	mss2
Conductivity @25C	SM2510B	1	7140		*	umhos/cm	1	10	08/17/18 20:02	emk
Cyanide, Total	D7511-09	1		U	*	mg/L	0.003	0.01	08/13/18 12:15	rbt
Nitrate/Nitrite as N	M353.2 - H2SO4 preserved	1		U		mg/L	0.02	0.1	08/29/18 0:41	pjb
Residue, Filterable (TDS) @180C	SM2540C	5	8500		*	mg/L	50	100	08/15/18 11:34	oah
Sulfate	D516-02/-07 - Turbidimetric	250	2700		*	mg/L	250	1250	08/30/18 14:23	mss2
TDS (calculated)	Calculation		7730			mg/L			09/18/18 0:00	calc
TDS (ratio - measured/calculated)	Calculation		1.10						09/18/18 0:00	calc

Report Header Explanations

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

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	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: http://www.acz.com/public/extquallist.pdf

Rio Algom Mining Company

ACZ Project ID: ***L46194***

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
WG454327													
WG454327PBW1	PBW	08/17/18 16:24				2.1	mg/L		-20	20			
WG454327LCSW3	LCSW	08/17/18 16:41	WC180807-3	820.0001		797	mg/L	97	90	110			
L46194-01DUP	DUP	08/17/18 18:04			322	342	mg/L				6	20	
L46194-11DUP	DUP	08/17/18 20:18			1180	1170	mg/L				1	20	
WG454327LCSW6	LCSW	08/17/18 20:35	WC180807-3	820.0001		802	mg/L	98	90	110			
WG454327PBW2	PBW	08/17/18 20:40				U	mg/L		-20	20			
WG454327LCSW9	LCSW	08/17/18 23:58	WC180807-3	820.0001		787	mg/L	96	90	110			
WG454327PBW3	PBW	08/18/18 0:03				U	mg/L		-20	20			
WG454327LCSW12	LCSW	08/18/18 3:18	WC180807-3	820.0001		819	mg/L	100	90	110			
WG454327PBW4	PBW	08/18/18 3:23				U	mg/L		-20	20			
WG454327LCSW15	LCSW	08/18/18 6:51	WC180807-3	820.0001		793	mg/L	97	90	110			

Antimony, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.02		.01965	mg/L	98	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.00088	0.00088			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.01		.0096	mg/L	96	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.01	U	.00964	mg/L	96	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.01	U	.00982	mg/L	98	70	130	2	20	

Arsenic, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.05		.05015	mg/L	100	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.00044	0.00044			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.0501		.04944	mg/L	99	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.0501	.0009	.05382	mg/L	106	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.0501	.0009	.05324	mg/L	104	70	130	1	20	

Barium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455169													
WG455169ICV	ICV	08/29/18 16:22	II180824-2	2		1.992	mg/L	100	95	105			
WG455169ICB	ICB	08/29/18 16:28				U	mg/L		-0.009	0.009			
WG455169LFB	LFB	08/29/18 16:40	II180827-2	.5025		.5371	mg/L	107	85	115			
L46194-01AS	AS	08/29/18 16:49	II180827-2	.5025	.031	.5672	mg/L	107	85	115			
L46194-01ASD	ASD	08/29/18 16:52	II180827-2	.5025	.031	.5617	mg/L	106	85	115	1	20	

Beryllium, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.05		.04653	mg/L	93	90	110			
WG455341ICB	ICB	08/31/18 1:42				.000065	mg/L		-0.00011	0.00011			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.05035		.04747	mg/L	94	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.05035	U	.04479	mg/L	89	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.05035	U	.04529	mg/L	90	70	130	1	20	

Rio Algom Mining Company

ACZ Project ID: ***L46194***

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
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.05		.05089	mg/L	102	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.00022	0.00022			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.05005		.04953	mg/L	99	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.05005	U	.04891	mg/L	98	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.05005	U	.04916	mg/L	98	70	130	1	20	

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455169													
WG455169ICV	ICV	08/29/18 16:22	II180824-2	100		97.88	mg/L	98	95	105			
WG455169ICB	ICB	08/29/18 16:28				U	mg/L		-0.3	0.3			
WG455169LFB	LFB	08/29/18 16:40	II180827-2	68.16145		68.46	mg/L	100	85	115			
L46194-01AS	AS	08/29/18 16:49	II180827-2	68.16145	222	279.7	mg/L	85	85	115			
L46194-01ASD	ASD	08/29/18 16:52	II180827-2	68.16145	222	278	mg/L	82	85	115	1	20	M3
L46335-01AS	AS	08/29/18 17:41	II180827-2	68.16145	17.9	87.04	mg/L	101	85	115			
L46335-01ASD	ASD	08/29/18 17:44	II180827-2	68.16145	17.9	87.75	mg/L	102	85	115	1	20	

Chloride SM4500Cl-E

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG454952													
WG454952ICB	ICB	08/27/18 8:15				U	mg/L		-1.5	1.5			
WG454952ICV	ICV	08/27/18 8:15	WI180530-1	54.89		55.53	mg/L	101	90	110			
WG454952LFB1	LFB	08/27/18 12:43	WI171229-5	30.03		31.98	mg/L	106	90	110			
L42792-27DUP	DUP	08/27/18 12:43			U	U	mg/L				0	20	RA
L42793-27AS	AS	08/27/18 12:43	WI171229-5	30.03	U	32.27	mg/L	107	90	110			
WG454952LFB2	LFB	08/27/18 12:47	WI171229-5	30.03		32.12	mg/L	107	90	110			
L46194-05AS	AS	08/27/18 13:00	10XCL	30	164	191.3	mg/L	91	90	110			
L46194-04DUP	DUP	08/27/18 13:36			930	900	mg/L				3	20	

Conductivity @25C SM2510B

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG454327													
WG454327LCSW2	LCSW	08/17/18 16:29	PCN55810	1410		1440	umhos/cm	102	90	110			
L46194-01DUP	DUP	08/17/18 18:04			1890	1880	umhos/cm				1	20	
L46194-11DUP	DUP	08/17/18 20:18			7140	7290	umhos/cm				2	20	
WG454327LCSW5	LCSW	08/17/18 20:23	PCN55810	1410		1360	umhos/cm	96	90	110			
WG454327LCSW8	LCSW	08/17/18 23:46	PCN55810	1410		1350	umhos/cm	96	90	110			

Cyanide, Total D7511-09

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG453859													
WG453859ICV	ICV	08/13/18 11:43	WI180809-7	.3		.296	mg/L	99	90	110			
WG453859ICB	ICB	08/13/18 11:45				U	mg/L		-0.003	0.003			
WG453859LFB	LFB	08/13/18 11:51	WI180809-4	.1		.099	mg/L	99	84	116			
L46194-01AS	AS	08/13/18 11:55	WI180809-4	.1	U	.097	mg/L	97	84	116			
L46194-01ASD	ASD	08/13/18 11:57	WI180809-4	.1	U	.1058	mg/L	106	84	116	9	20	

Rio Algom Mining Company ACZ Project ID: ***L46194***

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
WG455169													
WG455169ICV	ICV	08/29/18 16:22	II180824-2	2		1.911	mg/L	96	95	105			
WG455169ICB	ICB	08/29/18 16:28				U	mg/L		-0.06	0.06			
WG455169LFB	LFB	08/29/18 16:40	II180827-2	1.0018		1.068	mg/L	107	85	115			
L46194-01AS	AS	08/29/18 16:49	II180827-2	1.0018	.05	1.08	mg/L	103	85	115			
L46194-01ASD	ASD	08/29/18 16:52	II180827-2	1.0018	.05	1.088	mg/L	104	85	115	1	20	
L46335-01AS	AS	08/29/18 17:41	II180827-2	1.0018	.04	1.103	mg/L	106	85	115			
L46335-01ASD	ASD	08/29/18 17:44	II180827-2	1.0018	.04	1.105	mg/L	106	85	115	0	20	

Lead, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.05		.05101	mg/L	102	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.00022	0.00022			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.0496		.04861	mg/L	98	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.0496	.0001	.05104	mg/L	103	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.0496	.0001	.05036	mg/L	101	70	130	1	20	

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455169													
WG455169ICV	ICV	08/29/18 16:22	II180824-2	100		98.94	mg/L	99	95	105			
WG455169ICB	ICB	08/29/18 16:28				U	mg/L		-0.6	0.6			
WG455169LFB	LFB	08/29/18 16:40	II180827-2	50.2933		47.84	mg/L	95	85	115			
L46194-01AS	AS	08/29/18 16:49	II180827-2	50.2933	56.8	102	mg/L	90	85	115			
L46194-01ASD	ASD	08/29/18 16:52	II180827-2	50.2933	56.8	101.3	mg/L	88	85	115	1	20	
L46335-01AS	AS	08/29/18 17:41	II180827-2	50.2933	5.1	53.39	mg/L	96	85	115			
L46335-01ASD	ASD	08/29/18 17:44	II180827-2	50.2933	5.1	53.88	mg/L	97	85	115	1	20	

Molybdenum, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.02006		.01989	mg/L	99	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.0011	0.0011			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.05015		.04658	mg/L	93	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.05015	.0088	.0573	mg/L	97	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.05015	.0088	.05781	mg/L	98	70	130	1	20	
L46323-01AS	AS	08/31/18 2:39	MS180806-8	.05015	U	.04642	mg/L	93	70	130			
L46323-01ASD	ASD	08/31/18 2:42	MS180806-8	.05015	U	.04549	mg/L	91	70	130	2	20	

Rio Algom Mining Company ACZ Project ID: ***L46194***

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.

Nickel, dissolved M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.05		.05242	mg/L	105	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.00132	0.00132			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.0501		.04755	mg/L	95	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.0501	.0036	.0493	mg/L	91	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.0501	.0036	.04922	mg/L	91	70	130	0	20	
L46323-01AS	AS	08/31/18 2:39	MS180806-8	.0501	U	.04781	mg/L	95	70	130			
L46323-01ASD	ASD	08/31/18 2:42	MS180806-8	.0501	U	.046	mg/L	92	70	130	4	20	

Nitrate/Nitrite as N M353.2 - H2SO4 preserved

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455107													
WG455107ICV	ICV	08/28/18 23:26	WI180602-1	2.416		2.359	mg/L	98	90	110			
WG455107ICB	ICB	08/28/18 23:27				U	mg/L		-0.02	0.02			
WG455109													
WG455109LFB1	LFB	08/29/18 0:07	WI180703-7	2		1.948	mg/L	97	90	110			
L46165-01AS	AS	08/29/18 0:09	WI180703-7	2	U	1.83	mg/L	92	90	110			
L46165-02DUP	DUP	08/29/18 0:12			2.72	2.738	mg/L				1	20	
WG455109LFB2	LFB	08/29/18 0:47	WI180703-7	2		1.906	mg/L	95	90	110			
L46194-06AS	AS	08/29/18 1:08	WI180703-7	2	U	1.908	mg/L	95	90	110			
L46194-07DUP	DUP	08/29/18 2:33			5.24	5.158	mg/L				2	20	

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455169													
WG455169ICV	ICV	08/29/18 16:22	II180824-2	20		19.76	mg/L	99	95	105			
WG455169ICB	ICB	08/29/18 16:28				U	mg/L		-0.6	0.6			
WG455169LFB	LFB	08/29/18 16:40	II180827-2	101.3833		101.1	mg/L	100	85	115			
L46194-01AS	AS	08/29/18 16:49	II180827-2	101.3833	7.2	109.8	mg/L	101	85	115			
L46194-01ASD	ASD	08/29/18 16:52	II180827-2	101.3833	7.2	108.8	mg/L	100	85	115	1	20	
L46335-01AS	AS	08/29/18 17:41	II180827-2	101.3833	1.2	103.8	mg/L	101	85	115			
L46335-01ASD	ASD	08/29/18 17:44	II180827-2	101.3833	1.2	105.1	mg/L	102	85	115	1	20	

Rio Algom Mining Company ACZ Project ID: ***L46194***

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.

Residue, Filterable (TDS) @180C SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG453799													
WG453799PBW	PBW	08/10/18 16:19				U	mg/L		-20	20			
WG453799LCSW	LCSW	08/10/18 16:22	PCN56037	260		246	mg/L	95	80	120			
L46194-01DUP	DUP	08/10/18 16:56			1490	1490	mg/L				0	10	
WG453909													
WG453909PBW	PBW	08/13/18 15:50				U	mg/L		-20	20			
WG453909LCSW	LCSW	08/13/18 15:52	PCN56037	260		258	mg/L	99	80	120			
L46195-05DUP	DUP	08/13/18 16:21			13300	13000	mg/L				2	10	
WG454076													
WG454076PBW	PBW	08/15/18 10:40				10	mg/L		-20	20			
WG454076LCSW	LCSW	08/15/18 10:42	PCN56042	260		266	mg/L	102	80	120			
L46228-02DUP	DUP	08/15/18 11:40			950	800	mg/L				17	10	RA
WG454494													
WG454494PBW	PBW	08/21/18 10:05				U	mg/L		-20	20			
WG454494LCSW	LCSW	08/21/18 10:07	PCN56357	260		248	mg/L	95	80	120			
L46347-02DUP	DUP	08/21/18 10:36			244	246	mg/L				1	10	

Selenium, dissolved SM 3114 B, AA-Hydride

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG454156													
WG454156ICV	ICV	08/16/18 13:15	SE180801-2	.025025		.0263	mg/L	105	90	110			
WG454156ICB	ICB	08/16/18 13:17				U	mg/L		-0.003	0.003			
WG454156LRB	LRB	08/16/18 13:19				U	mg/L		-0.003	0.003			
WG454156LFB	LFB	08/16/18 13:21	SE180709-4	.02224		.0234	mg/L	105	85	115			
L46050-01LFM	LFM	08/16/18 13:25	SE5XPREP	.1112	.0919	.1	mg/L	7	85	115			M2
L46050-01LFMD	LFMD	08/16/18 13:27	SE5XPREP	.1112	.0919	.0998	mg/L	7	85	115	0	20	M2
L46194-10LFM	LFM	08/16/18 13:53	SE180709-4	.02224	.007	.029	mg/L	99	85	115			
L46194-10LFMD	LFMD	08/16/18 13:56	SE180709-4	.02224	.007	.0288	mg/L	98	85	115	1	20	

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455169													
WG455169ICV	ICV	08/29/18 16:22	II180824-2	100		98.56	mg/L	99	95	105			
WG455169ICB	ICB	08/29/18 16:28				U	mg/L		-0.6	0.6			
WG455169LFB	LFB	08/29/18 16:40	II180827-2	100.8796		100.9	mg/L	100	85	115			
L46194-01AS	AS	08/29/18 16:49	II180827-2	100.8796	164	258.6	mg/L	94	85	115			
L46194-01ASD	ASD	08/29/18 16:52	II180827-2	100.8796	164	256.1	mg/L	91	85	115	1	20	
L46335-01AS	AS	08/29/18 17:41	II180827-2	100.8796	8.3	111	mg/L	102	85	115			
L46335-01ASD	ASD	08/29/18 17:44	II180827-2	100.8796	8.3	112.2	mg/L	103	85	115	1	20	

Rio Algom Mining Company

ACZ Project ID: ***L46194***

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 - Turbidimetric

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG455303													
WG455303ICB	ICB	08/30/18 8:13				U	mg/L		-3	3			
WG455303ICV	ICV	08/30/18 8:13	WI180827-2	20		18.6	mg/L	93	90	110			
L41361-40DUP	DUP	08/30/18 13:16			155	150	mg/L				3	20	
L41361-41AS	AS	08/30/18 13:16	SO4TURB5X	10	132	156	mg/L	240	90	110			M3
WG455303LFB	LFB	08/30/18 13:19	WI180726-1	10		9.5	mg/L	95	90	110			
L46323-01DUP	DUP	08/30/18 13:39			64.1	64.8	mg/L				1	20	
L46323-02AS	AS	08/30/18 13:39	SO4TURB5X	10	106	120	mg/L	140	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
WG455341													
WG455341ICV	ICV	08/31/18 1:39	MS180730-1	.05		.05266	mg/L	105	90	110			
WG455341ICB	ICB	08/31/18 1:42				U	mg/L		-0.00022	0.00022			
WG455341LFB	LFB	08/31/18 1:45	MS180806-8	.05		.05118	mg/L	102	85	115			
L46194-02AS	AS	08/31/18 1:55	MS180806-8	.05	.0008	.05679	mg/L	112	70	130			
L46194-02ASD	ASD	08/31/18 1:58	MS180806-8	.05	.0008	.05668	mg/L	112	70	130	0	20	
L46323-01AS	AS	08/31/18 2:39	MS180806-8	.05	.0001	.05086	mg/L	102	70	130			
L46323-01ASD	ASD	08/31/18 2:42	MS180806-8	.05	.0001	.04905	mg/L	98	70	130	4	20	

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L46194-01	WG455169	Calcium, 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.
	WG454952	Chloride	SM4500Cl-E	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).
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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.
L46194-02	WG455169	Calcium, 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.
	WG454952	Chloride	SM4500Cl-E	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).
	WG454076	Residue, Filterable (TDS) @180C	SM2540C	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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.
L46194-03	WG455169	Calcium, 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.
	WG453859	Cyanide, Total	D7511-09	Q3	Sample received with improper or inadequate chemical preservation.
	WG454076	Residue, Filterable (TDS) @180C	SM2540C	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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.
L46194-04	WG455169	Calcium, 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.
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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 ACZ Project ID: ***L46194***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L46194-05	WG455169	Calcium, 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.
	WG454076	Residue, Filterable (TDS) @180C	SM2540C	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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.
L46194-06	WG455169	Calcium, 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.
	WG454327	Conductivity @25C	SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG454076	Residue, Filterable (TDS) @180C	SM2540C	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			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).
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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.
	WG454327	Total Alkalinity	SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
L46194-07	WG455169	Calcium, 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.
	WG454327	Conductivity @25C	SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG454494	Residue, Filterable (TDS) @180C	SM2540C	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
	WG455303	Sulfate	D516-02/-07 - 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.
	WG454327	Total Alkalinity	SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
L46194-08	WG455169	Calcium, 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.
	WG454156	Selenium, dissolved	SM 3114 B, AA-Hydride	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455303	Sulfate	D516-02/-07 - 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 ACZ Project ID: ***L46194***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L46194-09	WG455169	Calcium, 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.
	WG455303	Sulfate	D516-02/-07 - 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.
L46194-10	WG455303	Sulfate	D516-02/-07 - 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.
L46194-11	WG454327	Conductivity @25C	SM2510B	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.
	WG453859	Cyanide, Total	D7511-09	Q3	Sample received with improper or inadequate chemical preservation.
	WG454076	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).
	WG455303	Sulfate	D516-02/-07 - 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.
	WG454327	Total Alkalinity	SM2320B - Titration	ZW	Method deviation. The sample was centrifuged prior to analysis due to high solid content.

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 32-45 KD-R
Locator:

ACZ Sample ID: ***L46194-01***
Date Sampled: *08/06/18 16:21*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha - Corrected
Calculation
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha - Corrected	09/18/18 11:06		110			pCi/L		calc

Gross Alpha, dissolved
M9310
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		150	20	14	pCi/L	*	amk

Lead 210, dissolved
EICHROM, OTW01
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 13:43		2.1	1.3	2.3	pCi/L	*	jlg

Radium 226, dissolved
M903.1
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:08		1.1	0.17	0.13	pCi/L		amk

Radium 228, dissolved
M9320
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 16:50		1.6	0.77	0.73	pCi/L		jlg

Thorium 230, dissolved
ESM 4506
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:02		-0.05	0.39	0.71	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 31-01 TRA-R
Locator:

ACZ Sample ID: ***L46194-02***
Date Sampled: *08/06/18 15:17*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha - Corrected
Calculation
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha - Corrected	09/18/18 11:06		0.06			pCi/L		calc

Gross Alpha, dissolved
M9310
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		0.6	3.4	17	pCi/L	*	amk

Lead 210, dissolved
EICHROM, OTW01
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 13:43		1.2	1.3	2.4	pCi/L	*	jlg

Radium 226, dissolved
M903.1
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:10		0.33	0.12	0.23	pCi/L		amk

Radium 228, dissolved
M9320
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 16:50		0.6	0.8	0.81	pCi/L		jlg

Thorium 230, dissolved
ESM 4506
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:04		0.07	0.31	0.63	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 31-02 TRB-R
Locator:

ACZ Sample ID: ***L46194-03***
Date Sampled: *08/06/18 14:20*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha - Corrected
Calculation
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha - Corrected	09/18/18 11:06		6.3			pCi/L		calc

Gross Alpha, dissolved
M9310
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		8.8	24	87	pCi/L	*	amk

Lead 210, dissolved
EICHROM, OTW01
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 13:43		2.5	1.4	2.7	pCi/L	*	jlg

Radium 226, dissolved
M903.1
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:11		3.7	0.26	0.19	pCi/L	*	amk

Radium 228, dissolved
M9320
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 16:50		11	1.2	0.75	pCi/L	*	jlg

Thorium 230, dissolved
ESM 4506
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:05		0.0	0.22	0.71	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 36-06 KD
Locator:

ACZ Sample ID: ***L46194-04***
Date Sampled: *08/06/18 12:00*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha - Corrected
Calculation
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha - Corrected	09/18/18 11:06		-90			pCi/L		calc

Gross Alpha, dissolved
M9310
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		220	48	65	pCi/L	*	amk

Lead 210, dissolved
EICHROM, OTW01
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 13:43		6.2	2.7	4.8	pCi/L	*	jlg

Radium 226, dissolved
M903.1
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:12		11	0.47	0.11	pCi/L		amk

Radium 228, dissolved
M9320
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 16:50		7.1	0.98	0.72	pCi/L		jlg

Thorium 230, dissolved
ESM 4506
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:07		21	1.6	0.85	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-08 ALL-R
Locator:

ACZ Sample ID: ***L46194-05***
Date Sampled: *08/07/18 9:52*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha, dissolved — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		2.5	8.2	34	pCi/L	*	amk

Lead 210, dissolved — Prep Method:
EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 13:43		2.2	1.6	3.1	pCi/L	*	jlg

Radium 226, dissolved — Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:14		0.27	0.08	0.2	pCi/L		amk

Radium 228, dissolved — Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 16:50		2.7	1.6	1.5	pCi/L	*	jlg

Thorium 230, dissolved — Prep Method:
ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:08		0.17	0.47	1.4	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-04 ALL
Locator:

ACZ Sample ID: ***L46194-06***
Date Sampled: *08/07/18 11:04*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha, dissolved — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		1.9	13	63	pCi/L	*	amk

Lead 210, dissolved — Prep Method:
EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 13:43		2.2	2	3.7	pCi/L	*	jlg

Radium 226, dissolved — Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:15		0.53	0.1	0.11	pCi/L		amk

Radium 228, dissolved — Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 16:50		-0.13	0.84	0.89	pCi/L		jlg

Thorium 230, dissolved — Prep Method:
ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:10		-0.08	0.25	1.1	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-73 ALL-R
Locator:

ACZ Sample ID: ***L46194-07***
Date Sampled: *08/07/18 15:22*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha, dissolved — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		710	100	170	pCi/L	*	amk

Lead 210, dissolved — Prep Method:
EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 15:21		3	4.1	8	pCi/L	*	jlg

Radium 226, dissolved — Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:17		0.26	0.1	0.26	pCi/L	*	amk

Radium 228, dissolved — Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 18:28		2	2.5	2.6	pCi/L	*	jlg

Thorium 230, dissolved — Prep Method:
ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:11		-0.76	1.5	3.4	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 5-03 ALL-R
Locator:

ACZ Sample ID: ***L46194-08***
Date Sampled: *08/07/18 17:01*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha, dissolved — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		42	22	42	pCi/L	*	amk

Lead 210, dissolved — Prep Method:
EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 15:21		1	1.5	2.9	pCi/L	*	jlg

Radium 226, dissolved — Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:18		0.36	0.08	0.2	pCi/L		amk

Radium 228, dissolved — Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 18:28		-0.14	0.8	0.84	pCi/L		jlg

Thorium 230, dissolved — Prep Method:
ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:12		-0.35	0.31	0.91	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 32-59 ALL
Locator:

ACZ Sample ID: ***L46194-09***
Date Sampled: *08/08/18 8:46*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha, dissolved — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		84	26	50	pCi/L	*	amk

Lead 210, dissolved — Prep Method:
EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 15:21		0.48	1.8	3.6	pCi/L	*	jlg

Radium 226, dissolved — Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:20		0.13	0.08	0.13	pCi/L		amk

Radium 228, dissolved — Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 18:28		0.31	1.5	1.6	pCi/L	*	jlg

Thorium 230, dissolved — Prep Method:
ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:14		-0.22	0.24	1.4	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 31-61 ALL
Locator:

ACZ Sample ID: ***L46194-10***
Date Sampled: *08/08/18 15:56*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha, dissolved — Prep Method:
M9310

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		190	89	180	pCi/L	*	amk

Lead 210, dissolved — Prep Method:
EICHROM, OTW01

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 15:21		0.51	4.7	9.3	pCi/L	*	jlg

Radium 226, dissolved — Prep Method:
M903.1

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:21		0.39	0.1	0.07	pCi/L	*	amk

Radium 228, dissolved — Prep Method:
M9320

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 18:28		1.9	0.89	0.84	pCi/L	*	jlg

Thorium 230, dissolved — Prep Method:
ESM 4506

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:15		-0.19	0.21	0.79	pCi/L	*	jlg/djc

Rio Algom Mining Company
Project ID: 4506946843
Sample ID: 36-02 TRB
Locator:

ACZ Sample ID: ***L46194-11***
Date Sampled: *08/08/18 9:18*
Date Received: *08/10/18*
Sample Matrix: *Groundwater*

Gross Alpha - Corrected
Calculation
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha - Corrected	09/18/18 11:06		-25			pCi/L		calc

Gross Alpha, dissolved
M9310
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Gross Alpha, dissolved	08/20/18 0:00		-23	23	170	pCi/L	*	amk

Lead 210, dissolved
EICHROM, OTW01
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Lead 210, dissolved	09/17/18 15:21		7.1	7.7	15	pCi/L	*	jlg

Radium 226, dissolved
M903.1
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 226, dissolved	08/22/18 0:23		0.72	0.13	0.07	pCi/L	*	amk

Radium 228, dissolved
M9320
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Radium 228, dissolved	09/05/18 18:28		1.2	0.85	0.83	pCi/L	*	jlg

Thorium 230, dissolved
ESM 4506
Prep Method:

Parameter	Measure Date	Prep Date	Result	Error(+/-)	LLD	Units	XQ	Analyst
Thorium 230, dissolved	08/23/18 0:17		-0.24	0.19	0.85	pCi/L	*	jlg/djc

Report Header Explanations

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

QC Sample Types

DUP	Sample Duplicate	*MS/MSD*	Matrix Spike/Matrix Spike Duplicate
LCSS	Laboratory Control Sample - Soil	*PBS*	Prep Blank - Soil
LCSW	Laboratory Control Sample - Water	*PBW*	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.

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: http://www.acz.com/public/extquallist.pdf

Rio Algom Mining Company

ACZ Project ID: ***L46194***

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
WG454470																
L46173-01DUP	DUP-RER	08/20/18			38	6.7	7.6	49	7.7	13				1.08	2	
WG453910LCSWA	LCSW	08/20/18	PCN55778	100				88	7.8	1.3	88	67	144			
WG453910PBW	PBW	08/20/18						.24	0.66	0.85			1.7			
L46080-01DUP	DUP-RER	08/20/18			0.73	1.6	2	-.57	1.1	2				0.67	2	
L46080-01MSA	MS	08/20/18	PCN55778	75.19	0.73	1.6	2	42	6.7	2	55	67	144			M2

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
WG456032																
WG455293LCSW	LCSW	09/17/18	PCN54282	96.72				87	3.2	2.3	90	55	121			
WG455293PBW	PBW	09/17/18						1.8	1.3	2.4			4.8			
L46194-03DUP	DUP-RER	09/17/18			2.5	1.4	2.7	3	1.4	2.6				0.25	2	
L46201-01DUP	DUP-RER	09/17/18			2	1.3	2.4	1.1	1.3	2.5				0.49	2	
L46301-01MS	MS	09/17/18	PCN54282	96.72	2.5	1.5	2.8	96	4.1	3.1	97	55	121			

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
WG454661																
WG453970PBW	PBW	08/22/18						.07	0.06	0.05			0.1			
WG453970LCSW	LCSW	08/22/18	PCN54813	20				22	0.6	0.05	110	43	148			
L46194-01DUP	DUP-RER	08/22/18			1.1	0.17	0.13	1.1	0.15	0.06				0	2	
L46194-10DUP	DUP-RER	08/22/18			0.39	0.1	0.07	.26	0.1	0.06				0.92	2	
L45931-01MS	MS	08/22/18	PCN54813	20	0.11	0.07	0.09	24	0.62	0.1	119	43	148			

Rio Algom Mining Company

ACZ Project ID: ***L46194***

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 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
WG455769																
WG455209LCSW	LCSW	09/05/18	PCN57186	9.95				9.6	1.2	0.83	97	47	123			
WG455209PBW	PBW	09/05/18						-.08	0.41	0.43			0.86			
L46194-08DUP	DUP-RER	09/05/18			-0.14	0.8	0.84	.91	1.7	1.7				0.56	2	
L46194-11MS	MS	09/05/18	PCN57186	24.86	1.2	0.85	0.83	29	3.1	2.1	112	47	123			
L46488-01DUP	DUP-RER	09/05/18			0.24	0.91	0.95	.8	0.84	0.84				0.45	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
WG455123																
WG454386PBW	PBW	08/23/18						-.12	0.18	0.66			1.32			
WG454386LCSW	LCSW	08/23/18	PCN56774	200				210	4.7	0.64	105	91	126			
L46194-02DUP	DUP-RER	08/23/18			0.07	0.31	0.63	-.05	0.37	0.68				0.25	2	
L46196-01DUP	DUP-RER	08/23/18			0.29	0.24	0.72	-.13	0.31	0.7				1.07	2	
L46194-06MS	MS	08/23/18	PCN56774	200	-0.08	0.25	1.1	220	5.2	0.84	110	91	126			

Rio Algom Mining Company ACZ Project ID: ***L46194***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L46194-01	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L46194-02	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L46194-03	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9310	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG456032	Lead 210, dissolved	EICHROM, OTW01	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG454661	Radium 226, dissolved	M903.1	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG455769	Radium 228, dissolved	M9320	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
L46194-04	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L46194-05	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG455769	Radium 228, dissolved	M9320	DJ	Sample dilution required due to insufficient sample.
	WG455123	Thorium 230, dissolved	ESM 4506	DJ	Sample dilution required due to insufficient sample.
L46194-06	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L46194-07	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG456032	Lead 210, dissolved	EICHROM, OTW01	DJ	Sample dilution required due to insufficient sample.
	WG454661	Radium 226, dissolved	M903.1	DJ	Sample dilution required due to insufficient sample.
	WG455769	Radium 228, dissolved	M9320	DJ	Sample dilution required due to insufficient sample.
	WG455123	Thorium 230, dissolved	ESM 4506	DJ	Sample dilution required due to insufficient sample.
L46194-08	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
L46194-09	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
	WG456032	Lead 210, dissolved	EICHROM, OTW01	DJ	Sample dilution required due to insufficient sample.
	WG455769	Radium 228, dissolved	M9320	DJ	Sample dilution required due to insufficient sample.
	WG455123	Thorium 230, dissolved	ESM 4506	DJ	Sample dilution required due to insufficient sample.
L46194-10	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9310	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG456032	Lead 210, dissolved	EICHROM, OTW01	DJ	Sample dilution required due to insufficient sample.
			EICHROM, OTW01	N1	See Case Narrative.
			EICHROM, OTW01	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG454661	Radium 226, dissolved	M903.1	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG455769	Radium 228, dissolved	M9320	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.

RadChem Extended Qualifier Report

Rio Algom Mining Company

ACZ Project ID: ***L46194***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L46194-11	WG454470	Gross Alpha, dissolved	M9310	M2	Matrix spike recovery was low, the recovery of the associated control sample (LCS or LFB) was acceptable.
			M9310	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG456032	Lead 210, dissolved	EICHROM, OTW01	N1	See Case Narrative.
			EICHROM, OTW01	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG454661	Radium 226, dissolved	M903.1	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.
	WG455769	Radium 228, dissolved	M9320	Q5	Sample received with inadequate chemical preservation. Additional preservation performed by the laboratory.

Radiochemistry

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

Lead 210, dissolved	EICHROM, OTW01
Thorium 230, dissolved	ESM 4506

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Rio Algom Mining Company
4506946843

ACZ Project ID: L46194
Date Received: 08/10/2018 10:54
Received By:
Date Printed: 8/13/2018

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?		X	
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples?		X	

Samples/Containers

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

NA indicates Not Applicable

[1] L46194-03 Container B2022399 (GREEN CUBE): Added 10 mls nitric acid to the sub-sample to adjust the pH to the appropriate range.

L46194-03 Container B2022399 (GREEN CUBE): Added 10 mls nitric acid to the sub-sample to adjust the pH to the appropriate range.

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp(°C)	Temp Criteria(°C)	Rad(µR/Hr)	Custody Seal Intact?
4089	13.5	NA	15	N/A
4189	15.7	NA	15	N/A
4491	2.4	<=6.0	15	N/A

Rio Algom Mining Company
4506946843

ACZ Project ID: L46194
Date Received: 08/10/2018 10:54
Received By:
Date Printed: 8/13/2018

4656	1.7	<=6.0	15	N/A

Was ice present in the shipment container(s)?

Yes - Wet ice was present in the shipment container(s).

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

[1] 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), Na2S2O3 preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

ACZ Laboratories, Inc. L46194

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Kent Applegate
Company: Rio Algom Mining LLC
E-mail: Kent.KC.Applegate@bhpbilliton.com
Address: PO Box 218
Grants, NM 87020
Telephone: 1-505-287-8851

Copy of Report to:

Name: Michaella Gorospe/Clark Short
Company: INTERA, INC.
E-mail: See remarks
Telephone: 505-246-1600 x1207

Invoice to:

Name: Kent Applegate
Company: Rio Algom Mining LLC
E-mail: Kent.KC.Applegate@BHPBilliton.com
Address: PO Box 218
Grants, NM 87020
Telephone: 1-505-287-8851

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☐ NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes ☐ No ☒

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: C. SHORT Sampler's Site Information State NM Zip code 87020 Time Zone MST

*Sampler's Signature: [signature]

*I attest to the authenticity and validity of this sample. I understand that intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: 58757
PO#: 4502696253
Reporting state for compliance testing:
Check box if samples include NRC licensed material? ☐

ANALYSES REQUESTED (attach list or use quote number)

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SAP-GW	NRC-KD	NRC-TRA	NRC-TRB	NRC-ALL			
32-45 KD-R	08/06/2018 1621	GW	6	☐	☒	☐	☐	☐	☐	☐	☐
31-01 TRA-R	08/06/2018 1517	GW	6	☐	☐	☒	☐	☐	☐	☐	☐
31-02 TRB-R	08/06/2018 1426	GW	6	☐	☐	☐	☒	☐	☐	☐	☐
30-06 KD	08/06/2018 1200	GW	6	☐	☒	☐	☐	☐	☐	☐	☐
5-08 ALL-R	08/07/2018 0952	GW	5	☐	☐	☐	☐	☒	☐	☐	☐
5-04 ALL	08/07/2018 1104	GW	5	☐	☐	☐	☐	☒	☐	☐	☐
5-73 ALL-R	08/07/2018 1522	GW	5	☐	☐	☐	☐	☒	☐	☐	☐
5-03 ALL-R	08/07/2018 1701	GW	5	☐	☐	☐	☐	☒	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

RAML COC#: 18-01 PO 1/2. Note different COC's may have different PO's. Shipment of 4 Coolers.

Please CC report to: cshort@intera.com, apersico@intera.com, Michaella.Gorospe@bhpbilliton.com

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[signature]	8/9/18 1800	[signature]	8/10/18 16:55

FRMAD050.06.14.14 White - Return with sample. Yellow - Retain for your records.

L46194 Chain of Custod

ACZ Laboratories, Inc. L46194

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Kent Applegate	Address: PO Box 218
Company: Rio Algom Mining LLC	Grants, NM 87020
E-mail: Kent.KC.Applegate@bhpbilliton.com	Telephone: 1-505-287-8851

Copy of Report to:

Name: Michaella Gorospe/Clark Short	E-mail: See remarks
Company: INTERA, INC.	Telephone: 505-246-1600 x1207

Invoice to:

Name: Kent Applegate	Address: PO Box 218
Company: Rio Algom Mining LLC	Grants, NM 87020
E-mail: Kent.KC.Applegate@BHPBilliton.com	Telephone: 1-505-287-8851

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☐ NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified

Are samples for SDWA Compliance Monitoring? Yes ☐ No ☐

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: C SHORT **Sampler's Site Information** State NM Zip code 87020 Time Zone MST

***Sampler's Signature:** [signature]

*I attest to the authenticity and validity of this sample. I understand that intentionally mislabeling the time/date/location or tampering with the sample in anyway, is considered fraud and punishable by State Law.

PROJECT INFORMATION

Quote #: 58757

PO#: 4502696253

Reporting state for compliance testing:

Check box if samples include NRC licensed material? ☐

ANALYSES REQUESTED (attach list or use quote number)

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SAP-GW	NRC-KD	NRC-TRA	NRC-TRB	NRC-ALL			
32-59 ALL	08/08/2018 0846	GW	5	☐	☐	☐	☐	☒	☐	☐	☐
31-61 ALL	08/08/2018 1556	GW	5	☐	☐	☐	☐	☒	☐	☐	☐
36-02 TRB	08/09/2018 0918	GW	6	☐	☐	☐	☒	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐	☐	☐

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

RAML COC#: 18-01 Pg 2/2. Note different COC's may have different PO's. Shipment of 4 Coolers.

Please CC report to: cshort@intera.com, apersico@intera.com, Michaella.Gorospe@bhpbilliton.com

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[signature]	8/9/18 1300	[signature]	8/10/18 10.55

FRMAD050.06.14.14 White - Return with sample. Yellow - Retain for your records.