



ALS USA Inc.
4977 Energy Way
Reno NV 89502
Phone: +1 775 356 5395 Fax: +1 775 355 0179 www.alsglobal.com

To: MINNESOTA STATE DEPARTMENT OF
NATURAL RESOURCES
1525 3RD AVENUE EAST
HIBBING MN 55746

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Total # Pages: 2 (A - E)
Plus Appendix Pages
Finalized Date: 27-APR-2017
Account: MINSTA

CERTIFICATE RE17063583

Project: Research on MN Potential

P.O. No.: R2901-3000110700

This report is for 4 Rock samples submitted to our lab in Reno, NV, USA on
4-APR-2017.

The following have access to data associated with this certificate:

ANDREA REED

To: MINNESOTA STATE DEPARTMENT OF NATURAL RESOURCES
ATTN: ANDREA REED
1525 3RD AVENUE EAST
HIBBING MN 55746

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
CRU-22c	Crush entire sample >70% -19 mm
LOG-22	Sample login - Rcd w/o BarCode
CRU-31	Fine crushing - 70% <2mm
OA-GRA10b	Moisture - Bulk Samples
SPL-21	Split sample - riffle splitter
PUL-31	Pulverize split to 85% <75 um

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
ME-ICP06	Whole Rock Package - ICP-AES	ICP-AES
C-IR07	Total Carbon (Leco)	LECO
S-IR08	Total Sulphur (Leco)	LECO
ME-MS81	Lithium Borate Fusion ICP-MS	ICP-MS
ME-MS42	Up to 34 elements by ICP-MS	ICP-MS
OA-GRA05	Loss on Ignition at 1000C	WST-SEQ
TOT-ICP06	Total Calculation for ICP06	ICP-AES
ME-4ACD81	Base Metals by 4-acid dig.	ICP-AES
CI-IC881	CI - KOH fusion and IC	
F-IC881	F - KOH fusion and IC	
OA-IR06	H2O+ Water of crystallization	
B-MS82L	Trace Boron - NaOH Fusion/MS	ICP-MS
ME-ICP61	33 element four acid ICP-AES	ICP-AES
Au-AA23	Au 30g FA-AA finish	AAS

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

***** See Appendix Page for comments regarding this certificate *****

Comments: Full Project: Research on MN Potential for Lithium

Signature:

Colin Ramshaw, Vancouver Laboratory Manager



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Sample Description	Method Analyte Units LOR	WEI-21 Recvd Wt. kg	OA-IR06 H2O+ %	Au-AA23 Au ppm	ME-ICP06 SiO2 %	ME-ICP06 Al2O3 %	ME-ICP06 Fe2O3 %	ME-ICP06 CaO %	ME-ICP06 MgO %	ME-ICP06 Na2O %	ME-ICP06 K2O %	ME-ICP06 Cr2O3 %	ME-ICP06 TiO2 %	ME-ICP06 MnO %	ME-ICP06 P2O5 %	ME-ICP06 SrO %
ORR2-BULK1		6.40	0.32	<0.005	78.6	13.05	0.59	1.10	0.11	4.11	3.50	<0.01	0.03	0.01	0.02	0.03
ORR2-BULK2		5.46	0.31	<0.005	75.6	13.70	0.55	0.83	0.11	3.48	5.58	<0.01	0.03	0.01	0.02	0.03
ORR2-BULK3		3.58	0.33	<0.005	76.1	13.20	0.58	0.53	0.06	2.96	6.40	<0.01	0.03	0.01	0.02	0.02
ORR2-BULK4		2.24	0.40	<0.005	77.5	12.60	0.81	1.13	0.07	3.86	3.65	<0.01	0.03	0.01	<0.01	0.02

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Sample Description	Method Analyte Units LOR	ME-ICP06	OA-GRA05	TOT-ICP06	C-IR07	S-IR08	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81
		BaO	LOI	Total	C	S	Ba	Ce	Cr	Cs	Dy	Er	Eu	Ga	Gd
		%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.01	0.01	0.01	0.01	0.01	0.5	0.5	10	0.01	0.05	0.03	0.03	0.1	0.05
ORR2-BULK1		0.04	0.43	101.62	0.08	<0.01	363	19.6	20	1.68	0.59	0.29	0.39	16.9	0.85
ORR2-BULK2		0.06	0.24	100.24	0.02	<0.01	563	17.9	20	4.04	0.91	0.47	0.42	16.3	1.04
ORR2-BULK3		0.04	0.28	100.23	0.05	<0.01	367	2.7	20	3.05	0.19	0.10	0.36	15.8	0.26
ORR2-BULK4		0.03	0.24	99.95	0.05	<0.01	233	6.4	20	1.60	0.72	0.42	0.43	16.5	0.84

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Sample Description	Method Analyte Units LOR	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81	ME-MS81
		Hf	Ho	La	Lu	Nb	Nd	Pr	Rb	Sm	Sn	Sr	Ta	Tb	Th
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		0.2	0.01	0.5	0.01	0.2	0.1	0.03	0.2	0.03	1	0.1	0.1	0.01	0.05
ORR2-BULK1		1.5	0.12	9.4	0.05	1.0	8.7	2.45	82.4	1.47	<1	261	<0.1	0.10	6.34
ORR2-BULK2		1.3	0.15	8.7	0.07	2.5	7.8	2.17	136.0	1.68	<1	249	0.5	0.16	5.59
ORR2-BULK3		0.3	0.04	1.4	0.02	0.8	1.3	0.34	146.5	0.31	<1	193.0	<0.1	0.04	2.06
ORR2-BULK4		1.5	0.15	3.2	0.06	1.3	3.2	0.76	87.2	0.86	<1	170.5	<0.1	0.12	21.9

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Sample Description	Method Analyte Units LOR	ME-4ACD81 Ag ppm 0.5	ME-4ACD81 Cd ppm 0.5	ME-4ACD81 Co ppm 1	ME-4ACD81 Cu ppm 1	ME-4ACD81 Li ppm 10	ME-4ACD81 Mo ppm 1	ME-4ACD81 Ni ppm 1	ME-4ACD81 Pb ppm 2	ME-4ACD81 Sc ppm 1	ME-4ACD81 Zn ppm 2	CI-IC881 Cl ppm 50	F-IC881 F ppm 20	B-MS82L B ppm 5	ME-ICP61 Be ppm 0.5	OA-GRA10b H2O % 0.01
ORR2-BULK1		<0.5	<0.5	<1	3	<10	1	2	20	<1	9	190	<20	10	1.7	0.06
ORR2-BULK2		<0.5	<0.5	1	2	10	1	2	35	1	9	140	<20	7	1.7	0.05
ORR2-BULK3		<0.5	<0.5	1	1	<10	1	1	26	<1	6	70	<20	<5	0.9	0.09
ORR2-BULK4		<0.5	<0.5	1	1	<10	1	<1	30	<1	9	120	<20	<5	1.6	0.07

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CERTIFICATE COMMENTS

LABORATORY ADDRESSES

Applies to Method: Processed at ALS Reno located at 4977 Energy Way, Reno, NV, USA.
WEI-21

Applies to Method: Processed at ALS Vancouver located at 2103 Dollarton Hwy, North Vancouver, BC, Canada.

Au-AA23	B-MS82L	C-IR07	CI-IC881
CRU-22c	CRU-31	F-IC881	LOG-22
ME-4ACD81	ME-ICP06	ME-ICP61	ME-MS42
ME-MS81	OA-GRA05	OA-GRA10b	OA-IR06
PUL-31	S-IR08	SPL-21	TOT-ICP06