

**Quality Analysis ...**



**Innovative Technologies**

**Date Submitted:** 10-Feb-17  
**Invoice No.:** A17-01252-Revised  
**Invoice Date:** 22-Mar-17  
**Your Reference:** GEM-CORDILLERA

**Geological Survey of Canada-Vancouver**  
**1500-605 Robinson Street**  
**Vancouver BC V6B 5J3**  
**Canada**

**ATTN:** Jim Ryan

## CERTIFICATE OF ANALYSIS

29 Rock samples were submitted for analysis.

The following analytical package(s) were requested:

Code 4LITHORES (11+) Major Elements Fusion ICP(WRA)/Trace Elements Fusion ICP/MS(WRA4B2)

**REPORT**      **A17-01252-Revised**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

We recommend using option 4B1 for accurate levels of the base metals Cu, Pb, Zn, Ni and Ag. Option 4B-INAA for As, Sb, high W >100ppm, Cr >1000ppm and Sn >50ppm by Code 5D. Values for these elements provided by Fusion ICP/MS, are order of magnitude only and are provided for general information. Mineralized samples should have the Quant option selected or request assays for values which exceed the range of option 4B1. Total includes all elements in % oxide to the left of total. Zr is now being reported from FUS-ICP instead of FUS-MS.

**CERTIFIED BY:**

A handwritten signature in black ink, appearing to read "Emmanuel Eseme".

Emmanuel Eseme , Ph.D.  
Quality Control

ACTIVATION LABORATORIES LTD.  
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5  
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613  
E-MAIL [Ancaster@actlabs.com](mailto:Ancaster@actlabs.com) ACTLABS GROUP WEBSITE [www.actlabs.com](http://www.actlabs.com)

## Results

## Activation Laboratories Ltd.

## Report: A17-01252

Analyte Symbol	SiO2	Al2O3	Fe2O3( T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1	1	5	20	1	20	10	30	1	0.5	5	
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS								
16RAY-AP076A1	60.90	12.42	5.34	0.125	5.01	5.72	2.78	0.08	0.465	0.10	5.88	98.84	21	< 1	112	120	27	40	70	60	12	1.1	< 5
16RAY-AP076B1	48.90	15.82	10.80	0.173	8.31	5.82	3.23	0.82	0.726	0.11	4.05	98.76	39	< 1	349	30	38	30	220	80	17	1.5	< 5
16RAY-AP077B1	42.25	15.16	11.33	0.061	8.11	8.39	0.93	3.97	0.726	0.04	7.69	98.67	16	5	88	80	18	40	10	160	22	3.1	< 5
16RAY-AP077B3	52.03	22.25	8.28	0.096	3.26	4.04	1.86	4.47	0.902	0.06	2.68	99.93	22	5	97	110	22	50	30	80	28	2.6	< 5
16RAY-AP078C1	41.63	18.57	9.62	0.126	9.73	16.28	0.44	0.12	0.416	0.01	3.03	99.96	45	< 1	367	210	46	70	< 10	40	14	1.4	< 5
16RAY-AP088A1	40.81	16.67	17.40	0.182	6.28	12.95	1.47	0.14	1.218	< 0.01	2.36	99.51	50	< 1	694	< 20	19	< 20	60	80	18	1.4	< 5
16RAY-AP088D1	36.37	1.22	8.20	0.116	41.48	0.85	0.09	0.02	0.061	< 0.01	11.03	99.45	6	< 1	47	2770	108	2250	< 10	50	1	0.7	< 5
16RAY-AP093A1	36.76	0.96	12.24	0.168	41.14	1.25	0.07	0.01	0.039	< 0.01	6.06	98.68	8	< 1	59	2930	145	2430	< 10	50	1	0.7	< 5
16RAY-AP094A1	33.27	0.15	6.53	0.140	42.99	0.03	0.01	< 0.01	0.004	< 0.01	16.67	99.79	6	< 1	13	2640	146	2290	< 10	30	< 1	< 0.5	< 5
16RAY-AP095A1	44.69	17.20	9.58	0.143	11.26	12.81	1.44	0.06	0.315	0.04	3.15	100.7	39	< 1	210	300	56	200	10	60	14	1.2	< 5
16RAY-AP101A1	40.79	2.00	8.83	0.112	34.64	4.97	0.10	< 0.01	0.066	0.01	7.33	98.86	18	< 1	70	2470	105	1830	40	40	2	0.6	< 5
16RAY-AP104A1	60.59	16.25	6.55	0.087	3.98	5.06	4.14	0.12	0.651	0.12	2.10	99.64	19	< 1	140	130	17	100	170	< 30	16	1.2	< 5
16RAY-AP121B2	47.12	14.59	10.87	0.137	6.80	11.73	2.52	0.03	1.418	0.13	3.37	98.71	39	< 1	348	60	8	40	80	70	17	1.2	< 5
16RAY-AP143A1	51.13	13.49	15.70	0.269	4.83	6.81	0.57	1.71	2.817	1.14	1.95	100.4	29	< 1	205	30	9	40	40	120	21	4.8	< 5
16RAY-AP151A1	37.70	1.49	8.05	0.094	35.74	0.78	0.17	0.04	0.136	0.03	15.12	99.35	6	< 1	33	2370	82	1700	< 10	< 30	2	1.0	6
16RAY-AP159A1	58.45	16.98	6.02	0.124	3.77	9.24	2.20	0.06	0.677	0.18	2.74	100.4	19	< 1	92	150	19	90	40	50	17	1.6	< 5
16RAY-AP161A1	73.48	11.93	3.13	0.058	1.09	5.47	3.80	0.04	0.303	0.06	1.05	100.4	12	< 1	32	100	5	50	60	< 30	15	1.6	< 5
16RAY-AP172A1	43.25	1.04	8.85	0.162	36.54	3.38	0.15	< 0.01	0.051	< 0.01	5.17	98.60	14	< 1	39	2110	105	1750	20	50	2	1.0	< 5
16RAY-AP181A1	57.29	18.00	5.66	0.099	4.06	7.52	4.83	0.12	0.778	0.21	1.58	100.1	21	< 1	160	110	20	90	< 10	< 30	16	1.4	< 5
16RAY-AP188A1	79.42	8.62	3.95	0.038	1.84	0.78	0.95	1.97	0.542	0.15	1.76	100.0	8	1	88	120	11	60	20	70	10	1.4	< 5
16RAY-AP195A1	45.94	18.80	6.46	0.153	9.61	13.00	1.18	0.30	0.403	0.05	3.35	99.24	34	< 1	131	180	42	120	10	70	11	1.4	< 5
16RAY-AP196D1	34.75	1.62	7.79	0.140	39.32	0.93	0.11	0.03	0.037	0.01	14.46	99.19	5	< 1	22	3060	104	1430	< 10	50	1	0.7	< 5
16RAY-AP202A1	52.21	16.43	8.85	0.130	7.26	5.13	4.78	0.05	0.511	0.08	3.54	98.98	38	< 1	222	150	19	60	160	70	12	1.2	< 5
16RAY-AP205A1	40.69	1.38	9.03	0.096	35.97	0.76	0.21	< 0.01	0.062	< 0.01	10.46	98.68	15	< 1	58	2350	96	1720	10	40	1	0.9	< 5
16RAY-AP206A1	40.12	0.51	8.03	0.152	44.91	0.23	0.09	< 0.01	0.017	< 0.01	6.10	100.2	7	< 1	18	2690	128	1970	< 10	40	< 1	0.8	< 5
16RAY-AP209A1	56.31	17.47	5.80	0.079	4.51	8.63	3.22	0.04	0.483	0.08	2.52	99.15	17	< 1	144	180	18	120	20	< 30	15	1.1	< 5
16RAY-AP212B1	46.47	15.89	5.70	0.102	11.69	17.77	0.45	0.02	0.205	< 0.01	2.40	100.7	49	< 1	139	530	31	120	< 10	< 30	10	1.7	< 5
16RAY-AP234A1	57.37	16.87	6.42	0.095	3.29	7.30	3.65	0.04	0.741	0.20	2.56	98.54	24	< 1	172	50	11	30	140	50	16	1.2	< 5
16RAY-JR140A1	73.81	13.09	2.40	0.042	0.75	1.54	3.09	4.36	0.249	0.05	1.00	100.4	5	3	24	30	3	< 20	< 10	30	15	1.3	< 5

## Results

## Activation Laboratories Ltd.

## Report: A17-01252

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS						
16RAY-AP076A1	2	189	21.1	92	1.4	< 2	< 0.5	< 0.1	< 1	< 0.2	0.6	33	10.0	23.1	3.11	13.4	3.35	0.887	3.48	0.56	3.58	0.75	2.20
16RAY-AP076B1	12	209	14.8	46	0.6	< 2	< 0.5	< 0.1	< 1	< 0.2	0.8	189	5.12	12.4	1.77	8.06	2.46	0.836	2.75	0.43	2.62	0.51	1.56
16RAY-AP077B1	201	284	23.5	307	12.8	< 2	1.4	< 0.1	3	< 0.2	9.7	326	47.8	99.0	10.6	39.0	6.67	1.03	5.22	0.72	4.44	0.86	2.74
16RAY-AP077B3	200	519	43.9	251	18.9	< 2	1.0	< 0.1	6	< 0.2	17.0	686	75.6	149	16.8	60.1	11.1	2.07	8.72	1.28	7.77	1.56	4.78
16RAY-AP078C1	4	514	4.6	31	0.3	< 2	< 0.5	< 0.1	< 1	< 0.2	0.3	29	2.23	4.76	0.63	2.93	0.74	0.350	0.96	0.15	0.93	0.18	0.53
16RAY-AP088A1	2	365	10.2	20	0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	0.2	88	2.36	5.81	0.87	4.42	1.36	0.574	1.71	0.30	1.91	0.41	1.13
16RAY-AP088D1	< 1	20	0.7	6	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	0.3	7	0.44	0.86	0.10	0.42	0.13	0.036	0.11	0.02	0.10	0.02	0.08
16RAY-AP093A1	< 1	11	0.9	24	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	2	0.40	0.84	0.11	0.47	0.11	0.027	0.14	0.02	0.14	0.03	0.11
16RAY-AP094A1	< 1	< 2	< 0.5	3	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	< 2	< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
16RAY-AP095A1	1	312	6.5	9	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	0.1	41	1.49	3.33	0.48	2.34	0.72	0.364	1.05	0.17	1.13	0.24	0.68
16RAY-AP101A1	< 1	16	1.7	4	< 0.2	< 2	< 0.5	< 0.1	< 1	0.9	0.1	3	0.24	0.52	0.08	0.31	0.12	0.055	0.23	0.04	0.30	0.07	0.20
16RAY-AP104A1	1	420	24.3	98	1.6	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	165	10.1	23.3	3.16	14.3	3.69	1.15	3.96	0.66	4.29	0.86	2.50
16RAY-AP121B2	< 1	295	31.7	99	1.6	< 2	< 0.5	0.1	< 1	< 0.2	0.1	23	4.40	12.0	1.87	9.62	3.33	1.20	4.37	0.83	5.28	1.12	3.33
16RAY-AP143A1	99	182	75.2	434	35.3	3	1.8	0.1	3	< 0.2	27.3	179	44.0	102	13.2	58.2	14.3	4.46	15.3	2.36	14.0	2.73	7.80
16RAY-AP151A1	2	22	2.8	14	< 0.2	< 2	< 0.5	< 0.1	< 1	0.6	0.6	9	1.36	2.72	0.38	1.70	0.41	0.156	0.50	0.09	0.52	0.11	0.30
16RAY-AP159A1	2	302	30.5	120	1.7	< 2	< 0.5	< 0.1	< 1	< 0.2	0.3	82	13.0	30.4	4.20	18.6	4.92	1.63	5.45	0.86	5.35	1.11	3.21
16RAY-AP161A1	< 1	212	65.0	272	< 0.2	< 2	< 0.5	0.1	2	< 0.2	0.2	13	8.85	27.1	4.31	21.6	6.68	1.84	8.43	1.64	11.1	2.35	7.26
16RAY-AP172A1	< 1	10	2.4	8	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	0.1	< 2	0.48	1.16	0.16	0.80	0.25	0.076	0.30	0.06	0.41	0.08	0.26
16RAY-AP181A1	< 1	365	30.2	99	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	223	10.5	25.4	3.67	17.0	4.57	1.39	4.88	0.82	5.42	1.09	2.99
16RAY-AP188A1	60	66	15.0	184	7.2	< 2	0.8	< 0.1	< 1	< 0.2	2.3	577	25.3	51.6	5.85	21.6	4.12	0.872	3.43	0.49	2.79	0.53	1.42
16RAY-AP195A1	5	262	9.7	32	0.4	< 2	< 0.5	< 0.1	< 1	< 0.2	0.1	286	1.86	4.53	0.68	3.39	1.01	0.396	1.56	0.28	1.82	0.37	1.08
16RAY-AP196D1	< 1	21	0.9	7	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	21	0.35	0.78	0.10	0.50	0.14	0.038	0.15	0.03	0.16	0.04	0.10
16RAY-AP202A1	< 1	121	13.7	30	0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	18	1.60	4.43	0.73	4.17	1.38	0.540	2.01	0.36	2.39	0.50	1.57
16RAY-AP205A1	< 1	8	1.4	4	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	5	0.29	0.71	0.09	0.42	0.13	0.041	0.18	0.03	0.21	0.05	0.17
16RAY-AP206A1	< 1	3	0.5	2	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	2	0.14	0.42	0.05	0.28	0.06	0.006	0.06	0.01	0.09	0.02	0.08
16RAY-AP209A1	< 1	300	17.4	65	0.8	< 2	< 0.5	< 0.1	< 1	< 0.2	0.1	49	6.26	14.2	1.96	9.10	2.44	0.814	2.94	0.49	3.00	0.59	1.75
16RAY-AP212B1	< 1	217	6.2	14	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	16	0.95	2.01	0.31	1.55	0.63	0.426	0.81	0.16	1.05	0.22	0.64
16RAY-AP234A1	< 1	267	28.2	127	1.6	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	40	12.1	29.9	4.10	18.6	4.78	1.46	4.97	0.79	5.02	1.02	2.97
16RAY-JR140A1	165	115	21.6	135	5.6	< 2	< 0.5	< 0.1	2	< 0.2	3.3	994	36.5	67.7	7.59	26.1	4.99	0.526	4.27	0.66	3.94	0.78	2.20

**Results****Activation Laboratories Ltd.****Report: A17-01252**

Analyte Symbol	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.005	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
16RAY-AP076A1	0.326	2.22	0.369	2.1	0.17	< 0.5	0.09	< 5	< 0.1	1.37	0.59
16RAY-AP076B1	0.221	1.54	0.246	1.2	0.11	< 0.5	0.08	< 5	< 0.1	0.65	0.25
16RAY-AP077B1	0.411	2.64	0.407	6.8	1.08	< 0.5	0.73	< 5	0.1	16.2	3.18
16RAY-AP077B3	0.777	5.20	0.801	5.5	1.66	2.5	0.95	8	0.8	20.5	4.01
16RAY-AP078C1	0.077	0.47	0.069	0.7	0.04	< 0.5	0.17	< 5	< 0.1	0.52	0.12
16RAY-AP088A1	0.158	0.99	0.163	0.6	0.01	< 0.5	0.06	< 5	< 0.1	0.38	0.11
16RAY-AP088D1	0.015	0.09	0.013	< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	0.10	0.03
16RAY-AP093A1	0.018	0.12	0.021	0.4	< 0.01	< 0.5	< 0.05	< 5	< 0.1	0.10	0.04
16RAY-AP094A1	< 0.005	0.02	< 0.002	< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	< 0.05	< 0.01
16RAY-AP095A1	0.105	0.72	0.113	0.2	0.03	0.9	< 0.05	< 5	< 0.1	0.15	0.05
16RAY-AP101A1	0.029	0.21	0.030	0.1	0.01	< 0.5	< 0.05	< 5	< 0.1	0.05	0.01
16RAY-AP104A1	0.374	2.53	0.410	2.2	0.27	< 0.5	< 0.05	< 5	< 0.1	1.24	0.47
16RAY-AP121B2	0.491	3.17	0.523	2.3	0.11	< 0.5	< 0.05	< 5	< 0.1	0.29	0.15
16RAY-AP143A1	1.09	6.88	1.08	8.0	2.32	0.7	0.36	6	0.3	5.79	1.85
16RAY-AP151A1	0.043	0.28	0.042	0.3	0.05	< 0.5	< 0.05	< 5	< 0.1	0.17	0.06
16RAY-AP159A1	0.483	3.17	0.505	2.8	0.11	< 0.5	< 0.05	< 5	< 0.1	1.76	0.73
16RAY-AP161A1	1.11	7.38	1.18	6.4	0.20	< 0.5	< 0.05	< 5	< 0.1	0.44	0.20
16RAY-AP172A1	0.038	0.26	0.040	0.2	< 0.01	< 0.5	< 0.05	< 5	< 0.1	0.06	0.02
16RAY-AP181A1	0.477	3.25	0.503	2.7	0.06	< 0.5	< 0.05	< 5	< 0.1	1.18	0.44
16RAY-AP188A1	0.202	1.29	0.193	3.8	0.64	< 0.5	0.25	9	< 0.1	7.63	1.39
16RAY-AP195A1	0.156	0.98	0.155	0.7	0.04	< 0.5	< 0.05	< 5	< 0.1	0.31	0.08
16RAY-AP196D1	0.016	0.11	0.018	< 0.1	0.01	< 0.5	< 0.05	< 5	< 0.1	0.08	0.02
16RAY-AP202A1	0.214	1.42	0.213	0.8	0.03	< 0.5	< 0.05	< 5	< 0.1	0.18	0.07
16RAY-AP205A1	0.028	0.18	0.029	< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	0.07	0.01
16RAY-AP206A1	0.011	0.05	0.006	< 0.1	< 0.01	1.3	< 0.05	< 5	< 0.1	< 0.05	< 0.01
16RAY-AP209A1	0.272	1.82	0.293	1.7	0.06	< 0.5	< 0.05	< 5	< 0.1	0.85	0.33
16RAY-AP212B1	0.098	0.61	0.094	0.3	< 0.01	< 0.5	< 0.05	< 5	< 0.1	< 0.05	0.02
16RAY-AP234A1	0.432	2.99	0.471	3.0	0.08	< 0.5	< 0.05	< 5	< 0.1	1.72	0.64
16RAY-JR140A1	0.326	2.16	0.354	3.4	0.70	1.2	0.65	29	< 0.1	21.5	4.80

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr
Unit Symbol	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.001	0.01	1	1	5	20	1	20	10	30	1	0.5	5	1	2	
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	
NIST 694 Meas	11.17	1.96	0.74	0.010	0.34	42.78	0.85	0.52	0.110	30.16			1602										
NIST 694 Cert	11.2	1.80	0.790	0.0116	0.330	43.6	0.860	0.510	0.110	30.2			1740										
DNC-1 Meas	47.58	18.86	9.88	0.150	10.14	11.55	1.95	0.22	0.490	0.08	32		151	280	54	250	100	60			4	145	
DNC-1 Cert	47.15	18.34	9.97	0.150	10.13	11.49	1.890	0.234	0.480	0.070	31		148	270	57	247	100	70			5	144.0	
GBW 07113 Meas	71.66	12.94	3.06	0.140	0.15	0.61	2.54	5.47	0.280	0.03	5	4	5									42	
GBW 07113 Cert	72.8	13.0	3.21	0.140	0.160	0.590	2.57	5.43	0.300	0.0500	5.00	4.00	5.00									43.0	
LKSD-3 Meas														80	30	50	30	160			25	75	
LKSD-3 Cert														87.0	30.0	47.0	35.0	152			27.0	78.0	
TDB-1 Meas														250		90	320	150					
TDB-1 Cert														251		92	323	155					
W-2a Meas	53.32	15.30	10.84	0.170	6.37	11.14	2.27	0.62	1.070	0.17	36	< 1	272	90	43	70	110	80	17	1.6		20	199
W-2a Cert	52.4	15.4	10.7	0.163	6.37	10.9	2.14	0.626	1.06	0.130	36.0	1.30	262	92.0	43.0	70.0	110	80.0	17.0	1.00		21.0	190
DTS-2b Meas														> 10000	131	3380							
DTS-2b Cert														15500	120	3780							
SY-4 Meas	49.75	20.35	6.11	0.110	0.52	8.17	6.83	1.63	0.290	0.13	< 1	3	7									1207	
SY-4 Cert	49.9	20.69	6.21	0.108	0.54	8.05	7.10	1.66	0.287	0.131	1.1	2.6	8.0									1191	
CTA-AC-1 Meas																	60	40					
CTA-AC-1 Cert																	54.0	38.0					
BIR-1a Meas	48.02	15.70	11.16	0.170	9.50	13.45	1.84	0.02	0.960	0.01	43	< 1	327	380	51	170	130	70	15			107	
BIR-1a Cert	47.96	15.50	11.30	0.175	9.700	13.30	1.82	0.030	0.96	0.021	44	0.58	310	370	52	170	125	70	16			110	
NCS DC86312 Meas																							
NCS DC86312 Cert																							
NCS DC70009 (GBW07241) Meas														4		960	90	16	11.2	68	487		
NCS DC70009 (GBW07241) Cert														3.7		960	100	16.5	11.2	69.9	500		
OREAS 100a (Fusion) Meas														17		160							
OREAS 100a (Fusion) Cert														18.1		169							
OREAS 101a (Fusion) Meas														51		460							
OREAS 101a (Fusion) Cert														48.8		434							
OREAS 101b (Fusion) Meas														45		410							
OREAS 101b (Fusion) Cert														47		416							
JR-1 Meas														< 20		30	17	2.0	17	250			
JR-1 Cert														1.67		30.6	16.1	1.88	16.3	257			

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr
Unit Symbol	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.001	0.01	1	1	5	20	1	20	10	30	1	0.5	5	1	2	
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-ICP									
Method Blank	< 0.01	< 0.01	0.01	0.002	< 0.01	< 0.01	< 0.01	< 0.01	0.001	0.01	< 1	< 1	< 5	< 20	< 1	< 20	< 10	< 30	< 1	< 0.5	< 5	< 1	< 2

Analyte Symbol	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Lower Limit	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	2	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.005	0.01	
Method Code	FUS-MS	FUS-ICP	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS							
NIST 694 Meas																								
NIST 694 Cert																								
DNC-1 Meas	18.8	37						0.9		106	3.40			4.80		0.560								1.80
DNC-1 Cert	18.0	38						0.96		118	3.6			5.20		0.59								2.0
GBW 07113 Meas		405								505														
GBW 07113 Cert		403								506														
LKSD-3 Meas	29.7			< 2	2.6		3		2.5		53.2	88.6		39.9	7.80			0.90	4.50					2.60
LKSD-3 Cert	30.0			2.00	2.70		3.00		2.30		52.0	90.0		44.0	8.00			1.00	4.90					2.70
TDB-1 Meas	34.1										17.1	39.7		23.8		2.00								3.30
TDB-1 Cert	36										17	41		23		2.1								3.4
W-2a Meas	21.2	95	7.9	< 2						1.0	175	10.8	23.3		12.7	3.30			0.59	3.90	0.78	2.50	0.370	2.10
W-2a Cert	24.0	94.0	7.90	0.600						0.990	182	10.0	23.0		13.0	3.30			0.630	3.60	0.760	2.50	0.380	2.10
DTS-2b Meas																								
DTS-2b Cert																								
SY-4 Meas		515								343														
SY-4 Cert		517								340														
CTA-AC-1 Meas	286										> 2000	> 3000		1100	155	44.9	115	13.7						
CTA-AC-1 Cert	272										2176	3326		1087	162	46.7	124	13.9						
BIR-1a Meas	16.7	15								5	0.70	2.00		2.50	1.10	0.520	1.90		3.60					1.70
BIR-1a Cert	16	18								6	0.63	1.9		2.5	1.1	0.55	2.0		4					1.7
NCS DC86312 Meas	896										> 2000	181		1560			219	32.9	179	32.9	95.1	14.5	84.4	
NCS DC86312 Cert	976										2360	190		1600			225.0	34.6	183	36	96.2	15.1	87.79	
NCS DC70009 (GBW07241) Meas	128				1.6	1.0	> 1000	3.0	37.2		23.2	59.1			11.6		14.4	3.10	19.5		12.6	2.00	15.0	
NCS DC70009 (GBW07241) Cert	128				1.8	1.3	1701	3.1	41		23.7	60.3			12.5		14.8	3.3	20.7		13.4	2.2	14.9	
OREAS 100a (Fusion) Meas	135			23							247	466	43.6	145	21.6	3.38		3.96	22.9	4.69	14.7	2.15	14.0	
OREAS 100a (Fusion) Cert	142			24.1							260	463	47.1	152	23.6	3.71		3.80	23.2	4.81	14.9	2.31	14.9	
OREAS 101a (Fusion) Meas	178			21							797	1310	126	391	44.9	7.98	41.4	6.29	32.3			2.80	16.6	
OREAS 101a (Fusion) Cert	183			21.9							816	1396	134	403	48.8	8.06	43.4	5.92	33.3			2.90	17.5	
OREAS 101b (Fusion) Meas	178			20							802	1380	127	382	50.0	8.12			32.3	6.33	19.0	2.75	18.0	
OREAS 101b (Fusion) Cert	178			20.9							789	1331	127	378	48	7.77			32.1	6.34	18.7	2.66	17.6	
JR-1 Meas	43.0		14.3	3	< 0.1	3		19.8		20.3	48.3	6.00	24.1	5.68	0.270		0.91	6.04	1.21	3.72	0.640	4.87		
JR-1 Cert	45.1		15.2	3.25		0.028	2.86		20.8		19.7	47.2	5.58	23.3	6.03	0.30		1.01	5.69	1.11	3.61	0.67	4.55	
Method Blank	< 0.5	1	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1	< 2	< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005	< 0.01	

Analyte Symbol	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U	LOI	Total
Unit Symbol	ppm	%	%								
Lower Limit	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01		0.01
Method Code	FUS-MS	FUS-ICP	FUS-ICP								
NIST 694 Meas											
NIST 694 Cert											
DNC-1 Meas											
DNC-1 Cert											
GBW 07113 Meas											
GBW 07113 Cert											
LKSD-3 Meas	0.370	4.5	0.75				10.7	4.70			
LKSD-3 Cert	0.400	4.80	0.700				11.4	4.60			
TDB-1 Meas							2.80				
TDB-1 Cert							2.7				
W-2a Meas	0.320	2.5	0.52	< 0.5	< 0.05		< 0.1	2.30	0.48		
W-2a Cert	0.330	2.60	0.500	0.300	0.200		0.0300	2.40	0.530		
DTS-2b Meas											
DTS-2b Cert											
SY-4 Meas											
SY-4 Cert											
CTA-AC-1 Meas	1.02	1.2	2.70				20.0	4.50			
CTA-AC-1 Cert	1.08	1.13	2.65				21.8	4.4			
BIR-1a Meas		0.6									
BIR-1a Cert		0.60									
NCS DC86312 Meas	11.7						22.2				
NCS DC86312 Cert	11.96						23.6				
NCS DC70009 (GBW07241) Meas			2180	1.75			26.7				
NCS DC70009 (GBW07241) Cert			2200	1.8			28.3				
OREAS 100a (Fusion) Meas	2.30						50.5	129			
OREAS 100a (Fusion) Cert	2.26						51.6	135			
OREAS 101a (Fusion) Meas	2.60						35.5	420			
OREAS 101a (Fusion) Cert	2.66						36.6	422			
OREAS 101b (Fusion) Meas	2.75						34.4	385			
OREAS 101b (Fusion) Cert	2.58						37.1	396			
JR-1 Meas	0.720	4.3	1.97	2.0	1.50	20	0.4	25.4	8.40		
JR-1 Cert	0.71	4.51	1.86	1.59	1.56	19.3	0.56	26.7	8.88		
Method Blank		< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	< 0.05	< 0.01		