



Date Submitted: 14-Jun-13
Invoice No.: A13-06741-1
Invoice Date: 27-Jun-13
Your Reference:

MINNESOTA DEPT OF NAT RESOURCES
500 LAFAYETTE RD BOX 45
ST PAUL MN 55155-4045
United States

ATTN: Don Elsenheimer

CERTIFICATE OF ANALYSIS

70 Pulp samples were submitted for analysis.

The following analytical packages were requested:

REPORT	A13-06741-1	Code 1C-Exp Fire Assay-ICP/MS
		Code 4F-S Infrared
		Code 4LITHORES (11+) Major Elements Fusion ICP(WRA)/Trace
		Elements Fusion ICP/MS(WRA4B2)

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Notes:

We recommend reanalysis by fire assay Au, Pt, Pd Code 8 if values exceed upper limit.

CERTIFIED BY :

A handwritten signature in black ink, appearing to read "Emmanuel Esemé". The signature is written over a horizontal line.

Emmanuel Esemé , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.

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Activation Laboratories Ltd. Report: A13-06741-1

Analyte Symbol	Total S	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
Detection Limit	0.01	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5
Analysis Method	IR	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-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
TK0171T--63	0.02	73.44	9.98	5.97	0.047	1.03	0.89	0.96	3.65	0.922	0.14	3.87	100.9	8	2	93	50	9	< 20	20	40	13	1.4	< 5
TK0177T--63	0.03	73.51	9.25	3.92	0.063	1.30	1.58	0.96	3.82	0.894	0.13	3.24	98.68	7	2	79	40	8	< 20	20	60	12	1.9	6
TK0179T--63	0.06	66.02	11.51	6.16	0.087	2.56	4.69	2.03	2.34	1.078	0.16	4.23	100.9	13	2	124	90	16	40	40	60	15	1.6	5
TK0182T--63	0.39	67.00	11.06	5.61	0.078	1.65	3.29	0.92	3.12	0.948	0.14	5.78	99.60	12	2	103	80	18	30	30	50	15	1.6	21
TK0185T--63	0.04	72.44	9.87	4.44	0.069	1.60	2.63	1.03	3.80	0.999	0.13	3.98	101.0	8	2	74	40	8	30	20	40	12	1.3	< 5
TK0186T--63	0.07	68.20	10.15	4.36	0.063	1.95	3.88	1.08	3.50	0.973	0.14	5.11	99.40	9	2	82	50	9	20	20	190	13	1.2	5
TK0187T--63	0.06	73.56	9.19	3.86	0.056	1.59	2.21	1.16	3.61	0.984	0.16	3.32	99.69	7	2	74	50	7	< 20	20	30	11	1.4	< 5
TK0188T--63	0.06	70.01	9.81	4.91	0.088	1.79	3.42	1.11	3.62	1.009	0.16	4.73	100.7	8	2	81	50	9	< 20	30	40	12	1.3	6
TK0192T--63	0.07	72.27	9.32	5.01	0.096	1.46	2.36	1.10	3.45	1.023	0.15	4.13	100.4	7	2	83	50	8	< 20	20	40	11	1.4	6
TK0193T--63	0.03	71.79	9.39	4.45	0.071	1.42	2.47	1.09	3.67	1.063	0.15	3.71	99.28	7	2	81	40	8	< 20	30	130	12	1.4	5
TK0171S--63	0.82	32.21	4.02	17.21	0.301	18.72	7.88	0.18	0.47	0.309	0.05	14.57	95.92	10	< 1	83	4100	230	2790	3330	170	6	1.3	7
TK0177S--63	0.33	12.42	14.55	57.94	0.276	1.64	0.26	0.02	< 0.01	1.113	0.08	7.65	95.95	39	2	358	> 10000	789	5070	1310	260	22	4.4	8
TK0179S--63	0.78	26.41	18.35	38.95	0.104	1.27	0.36	0.03	0.01	1.797	0.04	11.57	98.90	62	2	440	5520	> 1000	5220	2090	140	26	3.2	5
TK0180S--63	0.09	35.44	2.21	13.70	0.213	29.22	3.07	0.06	0.17	0.175	0.03	14.27	98.55	7	< 1	58	3520	175	1820	390	80	3	1.2	< 5
TK0182S--63	0.94	29.56	21.13	29.44	0.169	1.28	0.42	0.04	0.02	1.582	0.03	13.04	96.73	45	2	400	> 10000	> 1000	4940	2230	190	31	2.0	< 5
TK0185S--63	0.20	18.71	17.78	48.70	0.226	1.30	0.28	0.02	< 0.01	1.910	0.13	7.90	96.95	53	2	501	> 10000	548	4780	1600	170	25	7.1	7
TK0186S--63	0.30	35.47	13.95	30.26	0.098	3.57	2.18	0.37	1.01	1.046	0.09	9.02	97.09	32	3	261	7070	569	6560	2540	470	19	2.2	8
TK0187S--63	0.05	12.65	13.09	57.12	0.163	3.33	0.16	0.02	< 0.01	1.314	0.08	6.49	94.42	47	5	333	> 10000	> 1000	9730	2140	400	20	5.3	< 5
TK0188S--63	0.06	32.30	20.18	22.91	0.095	5.25	0.33	0.08	0.13	1.538	0.05	12.44	95.31	56	3	351	4870	489	> 10000	3460	750	26	3.4	< 5
TK0192S--63	0.40	5.04	20.27	55.82	0.301	0.51	0.33	0.01	< 0.01	2.030	0.19	12.33	96.85	53	1	528	> 10000	616	3250	1050	270	43	3.3	24
TK0193S-1--63	0.61	4.68	19.92	57.63	0.153	0.75	0.37	0.01	< 0.01	1.845	0.15	10.38	95.89	45	< 1	467	> 10000	175	1100	800	80	47	3.4	15
TK0193S-2--63	0.11	6.79	14.17	60.53	0.186	1.63	0.30	0.01	< 0.01	1.180	0.13	11.35	96.28	53	2	402	7540	> 1000	5720	1390	150	21	4.4	< 5

Activation Laboratories Ltd. Report: A13-06741-1

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	Tm
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	ppm
Detection Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	3	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.005
Analysis Method	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	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
TK0171T--63	88	106	28.6	402	10.5	<2	2.0	<0.1	2	0.9	2.2	592	27.3	56.5	6.64	26.9	5.73	1.14	5.61	0.95	5.74	1.12	3.30	0.511
TK0177T--63	97	114	31.7	458	10.2	<2	3.2	<0.1	1	0.8	2.0	588	27.0	59.0	6.99	29.3	6.22	1.20	5.47	0.93	5.66	1.13	3.35	0.515
TK0179T--63	67	202	25.8	320	11.2	<2	1.5	<0.1	1	0.7	2.1	518	25.8	51.8	6.19	25.2	5.26	1.17	4.96	0.83	4.93	0.96	2.77	0.406
TK0182T--63	86	109	30.0	385	11.3	<2	2.0	<0.1	1	1.0	2.7	537	34.5	73.0	8.25	33.4	6.97	1.38	6.01	0.97	5.87	1.16	3.45	0.521
TK0185T--63	91	116	31.0	399	11.0	<2	1.9	<0.1	1	0.9	2.1	579	27.3	54.5	6.67	26.7	6.00	1.18	5.54	0.96	6.01	1.19	3.61	0.564
TK0186T--63	88	115	32.3	395	11.7	<2	2.1	<0.1	1	1.0	2.3	542	29.9	62.3	7.39	29.8	6.30	1.17	6.04	1.01	6.27	1.20	3.58	0.563
TK0187T--63	86	122	31.2	471	10.8	<2	2.3	<0.1	1	0.9	1.8	569	30.2	58.6	7.17	28.8	6.45	1.14	5.99	1.01	6.19	1.20	3.61	0.546
TK0188T--63	88	121	32.1	462	13.1	<2	2.2	<0.1	1	1.0	2.2	558	30.7	61.8	7.41	29.7	6.63	1.26	5.95	1.02	6.34	1.25	3.65	0.564
TK0192T--63	83	115	32.7	488	11.9	<2	2.4	<0.1	1	0.9	1.9	555	29.6	61.2	7.14	29.0	6.23	1.25	5.96	1.03	6.38	1.27	3.74	0.578
TK0193T--63	87	112	32.8	464	11.3	<2	2.4	<0.1	1	0.9	2.0	567	28.7	58.4	7.03	28.3	6.22	1.15	5.74	1.02	6.28	1.27	3.77	0.574
TK0171S--63	14	62	10.9	63	1.7	<2	<0.5	<0.1	<1	0.8	0.6	99	12.8	15.7	2.58	10.6	2.09	0.532	2.19	0.35	2.04	0.40	1.19	0.175
TK0177S--63	<1	7	12.6	156	9.4	3	2.8	<0.1	2	1.1	<0.1	36	21.3	150	4.89	19.9	4.05	0.851	3.64	0.59	3.46	0.67	1.92	0.297
TK0179S--63	<1	25	8.3	165	7.9	<2	1.3	<0.1	1	0.4	<0.1	37	27.9	85.7	6.24	25.4	5.23	1.20	4.04	0.54	2.57	0.42	1.04	0.141
TK0180S--63	5	64	3.2	27	0.3	<2	<0.5	<0.1	<1	0.2	0.3	43	3.22	5.79	0.68	2.93	0.70	0.186	0.62	0.12	0.73	0.13	0.34	0.048
TK0182S--63	<1	22	6.2	121	5.0	3	1.4	<0.1	<1	0.5	<0.1	35	19.2	87.3	3.77	15.8	3.01	0.691	2.95	0.34	1.56	0.26	0.66	0.090
TK0185S--63	<1	12	12.8	146	6.6	<2	1.3	<0.1	1	0.3	<0.1	23	23.5	105	3.73	15.3	3.32	0.853	3.05	0.51	3.03	0.56	1.51	0.223
TK0186S--63	32	61	35.2	174	6.9	<2	1.2	<0.1	1	1.0	1.7	231	33.7	37.7	8.99	37.4	8.72	2.32	8.07	1.49	9.02	1.67	4.53	0.673
TK0187S--63	<1	8	95.5	97	5.2	<2	0.7	<0.1	<1	0.5	<0.1	26	90.6	24.3	30.6	127	29.9	7.15	25.6	4.52	27.2	5.29	15.0	2.24
TK0188S--63	3	31	34.1	122	6.1	<2	1.4	<0.1	<1	0.3	0.3	71	31.4	25.3	9.10	38.5	9.36	2.54	8.96	1.50	8.80	1.62	4.44	0.647
TK0192S--63	<1	12	16.9	302	20.7	3	1.7	<0.1	4	1.9	<0.1	87	14.7	111	3.07	12.8	3.00	0.803	3.26	0.57	3.44	0.67	1.91	0.288
TK0193S-1--63	<1	14	10.0	374	23.3	3	2.2	0.1	5	2.5	<0.1	126	8.17	98.8	1.88	7.29	1.72	0.384	1.79	0.34	2.18	0.45	1.33	0.213
TK0193S-2--63	<1	7	13.8	111	4.4	<2	1.1	<0.1	1	0.7	<0.1	37	13.0	196	2.79	11.9	2.66	0.642	4.78	0.51	2.47	0.46	1.35	0.210

Analyte Symbol	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U	Pd	Pt	Au
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb
Detection Limit	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01	1	1	2
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FA-MS	FA-MS	FA-MS
TK0171T-63	3.53	0.599	9.9	0.80	3.4	0.32	15	< 0.1	8.15	2.54	< 1	< 1	3
TK0177T-63	3.51	0.591	10.6	1.12	2.1	0.47	14	0.5	9.36	5.09	< 1	< 1	3
TK0179T-63	2.70	0.447	7.2	0.74	1.5	0.33	11	< 0.1	6.57	2.28	2	2	< 2
TK0182T-63	3.47	0.560	9.9	0.91	2.3	0.41	15	< 0.1	8.57	4.10	1	< 1	5
TK0185T-63	3.87	0.653	9.9	1.30	1.3	0.43	14	< 0.1	7.89	2.81	< 1	< 1	3
TK0186T-63	3.80	0.658	9.5	0.98	1.1	0.40	13	< 0.1	8.91	2.94	< 1	< 1	3
TK0187T-63	3.72	0.633	11.5	0.94	0.9	0.45	15	0.2	9.02	3.28	< 1	< 1	< 2
TK0188T-63	3.91	0.667	11.6	1.41	1.5	0.43	13	< 0.1	8.14	3.07	< 1	< 1	< 2
TK0192T-63	4.00	0.695	11.8	1.07	1.3	0.47	14	< 0.1	8.11	3.11	< 1	< 1	< 2
TK0193T-63	3.93	0.670	11.5	1.03	1.2	0.41	15	< 0.1	8.43	2.95	< 1	< 1	< 2
TK0171S-63	1.14	0.180	1.5	6.27	1.0	0.20	< 5	< 0.1	1.87	1.85	2	4	4
TK0177S-63	2.10	0.372	4.2	0.68	0.5	0.74	29	1.9	8.34	3.70	16	13	12
TK0179S-63	0.90	0.146	4.1	1.52	< 0.5	1.28	54	0.5	4.42	2.48	13	16	21
TK0180S-63	0.31	0.051	0.6	0.03	< 0.5	0.17	< 5	< 0.1	0.62	0.32	2	3	8
TK0182S-63	0.55	0.086	2.8	0.73	< 0.5	1.83	61	0.8	3.45	0.72	9	10	16
TK0185S-63	1.60	0.284	3.7	0.43	< 0.5	0.27	42	1.7	4.75	2.17	6	7	10
TK0186S-63	4.61	0.786	4.3	0.53	1.5	0.27	54	0.6	6.30	2.22	24	30	14
TK0187S-63	15.2	2.55	2.6	0.95	< 0.5	< 0.05	8	1.2	2.31	0.67	7	12	6
TK0188S-63	4.32	0.736	3.5	0.52	< 0.5	< 0.05	11	< 0.1	3.52	0.62	77	52	11
TK0192S-63	2.04	0.355	7.9	1.49	4.2	< 0.05	54	3.9	17.8	5.12	12	25	7
TK0193S-1-63	1.52	0.271	10.3	1.69	2.5	0.97	50	5.6	22.8	9.62	19	36	8
TK0193S-2-63	1.47	0.246	2.7	0.52	< 0.5	0.08	54	2.4	4.29	4.16	26	58	28

Activation Laboratories Ltd. Report: A13-06741-1

Quality Control																									
Analyte Symbol	Total S	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	
Detection Limit	0.01	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5	
Analysis Method	IR	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-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	
NIST 694 Meas		11.22	1.92	0.76	0.013	0.34	43.93	0.87	0.56	0.119	30.17					1664									
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		46.83	18.43	9.99	0.147	9.88	11.20	1.91	0.23	0.479	0.08		31		161	280	58	260	100	70					
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					
GBW 07113 Meas		71.69	12.58	3.20	0.139	0.13	0.56	2.48	5.42	0.278	0.04		5	4	7										
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										
LKSD-3 Meas																		31	50	30	140				
LKSD-3 Cert																		30.0	47.0	35.0	152				
LKSD-4 Meas	1.11																								
LKSD-4 Cert	0.990																								
LKSD-4 Meas	1.00																								
LKSD-4 Cert	0.990																								
LKSD-4 Meas	0.94																								
LKSD-4 Cert	0.990																								
LKSD-4 Meas	0.90																								
LKSD-4 Cert	0.990																								
BaSO4 Meas	14.2																								
BaSO4 Cert	14.0																								
BaSO4 Meas	14.1																								
BaSO4 Cert	14.0																								
BaSO4 Meas	13.6																								
BaSO4 Cert	14.0																								
BaSO4 Meas	13.6																								
BaSO4 Cert	14.0																								
W-2a Meas		52.80	15.22	10.72	0.165	6.15	10.77	2.24	0.63	1.070	0.14		35	< 1	274										
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										
DTS-2b Meas																	> 10000	126	3710						
DTS-2b Cert																	15500	120	3780						
SY-4 Meas		49.45	20.77	6.19	0.108	0.49	7.92	6.98	1.69	0.284	0.13		< 1	3	11										
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										
CTA-AC-1 Meas																						60			
CTA-AC-1 Cert																						54.0			
BIR-1a Meas		47.97	15.83	11.32	0.173	9.47	13.25	1.82	0.02	0.961	0.03		44	< 1	339	370	51	160	120	70					
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					
NCS DC86312 Meas																									
NCS DC86312 Cert																									
ZW-C Meas																						1050	99		
ZW-C Cert																						1050	99		
NCS DC70014 Meas																		26	70	2600	7400	25			
NCS DC70014 Cert																		26	70	2600	7400	25.2			
NCS DC86316 Meas																									
NCS DC86316 Cert																									
NCS DC70009 (GBW07241) Meas																	30		< 20	970	100	17	11.2	72	
NCS DC70009 (GBW07241) Cert																	30		2.8	960	100	16.5	11.2	69.9	
OREAS 100a (Fusion) Meas																		17		170					
OREAS 100a (Fusion) Cert																		18.1		169					
OREAS 101a (Fusion) Meas																		49		420					
OREAS 101a (Fusion) Cert																		48.8		434					
JR-1 Meas																				< 20		< 30	16		
JR-1 Cert																				1.67		30.6	16.1		
SARM 3 Meas																									
SARM 3 Cert																									
NCS DC73372 Meas																									

Activation Laboratories Ltd. Report: A13-06741-1

Quality Control																									
Analyte Symbol	Total S	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	
Detection Limit	0.01	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	0.5	5	
Analysis Method	IR	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-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	
NCS DC73372 Cert																									
GS311-4 Meas	0.56																								
GS311-4 Cert	0.54																								
GS311-4 Meas	0.59																								
GS311-4 Cert	0.54																								
GS311-4 Meas	0.57																								
GS311-4 Cert	0.54																								
GS311-4 Meas	0.54																								
GS311-4 Cert	0.54																								
GS900-5 Meas	0.35																								
GS900-5 Cert	0.34																								
GS900-5 Meas	0.36																								
GS900-5 Cert	0.34																								
GS900-5 Meas	0.36																								
GS900-5 Cert	0.34																								
GS900-5 Meas	0.35																								
GS900-5 Cert	0.34																								
CDN-PGMS-22 Meas																									
CDN-PGMS-22 Cert																									
TK0177T-<63 Orig		72.90	9.20	3.90	0.062	1.30	1.57	0.96	3.80	0.892	0.13	3.24	97.94	7	2	77	40	8	< 20	20	40	13	2.0	6	
TK0177T-<63 Dup		74.13	9.30	3.94	0.063	1.31	1.59	0.96	3.85	0.896	0.13	3.24	99.41	7	2	81	40	8	< 20	20	80	12	1.9	6	
TK0193T-<63 Orig	0.03																								
TK0193T-<63 Dup	0.03																								
TK0182S-<63 Orig		29.68	21.23	29.34	0.168	1.28	0.41	0.04	0.02	1.562	0.04	13.04	96.82	45	2	400	> 10000	> 1000	5170	2220	190	31	2.0	< 5	
TK0182S-<63 Dup		29.45	21.04	29.54	0.171	1.27	0.42	0.04	0.03	1.603	0.03	13.04	96.63	44	2	400	> 10000	> 1000	4710	2240	190	31	2.0	< 5	
TK0192S-<63 Orig	0.40																								
TK0192S-<63 Dup	0.39																								
TK0193S-2-<63 Orig		6.80	14.18	60.45	0.187	1.62	0.30	0.01	< 0.01	1.185	0.13	11.35	96.23	53	2	402	7560	> 1000	5750	1390	150	21	4.3	< 5	
TK0193S-2-<63 Dup		6.77	14.16	60.60	0.185	1.64	0.30	0.01	< 0.01	1.175	0.14	11.35	96.33	53	2	401	7510	> 1000	5690	1390	140	21	4.5	< 5	
Method Blank																	< 20	< 1	< 20	< 10	< 30	< 1	< 0.5	< 5	
Method Blank																									

Activation Laboratories Ltd. Report: A13-06741-1

Quality Control																								
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	Tm
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	ppm
Detection Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	3	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.005
Analysis Method	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	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
NIST 694 Meas																								
NIST 694 Cert																								
DNC-1 Meas		146	16.3									106	3.80			4.71		0.576						
DNC-1 Cert		144.0	18.0									118	3.6			5.20		0.59						
GBW 07113 Meas		40										502												
GBW 07113 Cert		43.0										506												
LKSD-3 Meas	72		27.4	165		< 2	2.8			1.4	2.3		47.2	87.6		41.4	7.62	1.36				4.80		
LKSD-3 Cert	78.0		30.0	178		2.00	2.70			1.30	2.30		52.0	90.0		44.0	8.00	1.50				4.90		
LKSD-4 Meas																								
LKSD-4 Cert																								
LKSD-4 Meas																								
LKSD-4 Cert																								
LKSD-4 Meas																								
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BaSO4 Meas																								
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BaSO4 Meas																								
BaSO4 Cert																								
BaSO4 Meas																								
BaSO4 Cert																								
BaSO4 Meas																								
BaSO4 Cert																								
W-2a Meas		195										174												
W-2a Cert		190										182												
DTS-2b Meas																								
DTS-2b Cert																								
SY-4 Meas		1191		557								349												
SY-4 Cert		1191		517								340												
CTA-AC-1 Meas													> 2000	> 3000		1140	167	45.2	126	15.0				
CTA-AC-1 Cert													2176	3326		1087	162	46.7	124	13.9				
BIR-1a Meas		110										7	0.69	1.96				1.05						
BIR-1a Cert		110										6	0.63	1.9				1.1						
NCS DC86312 Meas			969										> 2000	183		1560			226	34.3	183	35.7	96.2	14.4
NCS DC86312 Cert			976										2360	190		1600			225.0	34.6	183	36	96.2	15.1
ZW-C Meas					202																			
ZW-C Cert					198																			
NCS DC70014 Meas			31.3			> 100	16.4			180			46.2	89.8	10.2	38.2	7.99	1.67	7.29	1.18	6.59	1.30	3.50	0.544
NCS DC70014 Cert			32.1			270	16.7			180			45.3	87.0	10.8	39.9	8.0	1.8	7.4	1.1	6.7	1.3	3.5	0.57
NCS DC86316 Meas																								
NCS DC86316 Cert																								
NCS DC70009 (GBW07241) Meas	506		138					1.3	> 1000		44.5		24.8	61.7	7.78	31.7	12.4		14.3	3.22	20.3	4.24	12.7	2.30
NCS DC70009 (GBW07241) Cert	500		128					1.3	1701		41		23.7	60.3	7.9	32.9	12.5		14.8	3.3	20.7	4.5	13.4	2.2
OREAS 100a (Fusion) Meas			132			24							263	467	44.7	145	23.8	3.56		3.63	22.4	4.85	14.1	2.35
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
OREAS 101a (Fusion) Meas			169										793	1350	126	381	49.4	7.87		5.38	31.0	6.43	18.7	2.93
OREAS 101a (Fusion) Cert			183										816	1396	134	403	48.8	8.06		5.92	33.3	6.46	19.5	2.90
JR-1 Meas	244				14.1		0.6	< 0.1	3	1.3	20.7		20.9	48.3	5.83	22.7	5.83	0.278	5.43	1.04	6.25		3.93	0.696
JR-1 Cert	257				15.2		0.031	0.028	2.86	1.19	20.8		19.7	47.2	5.58	23.3	6.03	0.30	5.06	1.01	5.69		3.61	0.67
SARM 3 Meas				> 10000																				
SARM 3 Cert				11119																				
NCS DC73372 Meas				229																				

Activation Laboratories Ltd. Report: A13-06741-1

Quality Control																								
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	Tm
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	ppm
Detection Limit	1	2	0.5	1	0.2	2	0.5	0.1	1	0.2	0.1	3	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01	0.01	0.01	0.005
Analysis Method	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	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
NCS DC73372 Cert				233																				
GS311-4 Meas																								
GS311-4 Cert																								
GS311-4 Meas																								
GS311-4 Cert																								
GS311-4 Meas																								
GS311-4 Cert																								
GS311-4 Meas																								
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GS900-5 Meas																								
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GS900-5 Meas																								
GS900-5 Cert																								
GS900-5 Meas																								
GS900-5 Cert																								
CDN-PGMS-22 Meas																								
CDN-PGMS-22 Cert																								
TK0177T--63 Orig	97	113	31.4	448	10.6	< 2	3.3	< 0.1	1	0.9	2.0	582	27.4	59.7	7.15	30.0	6.24	1.27	5.50	0.93	5.65	1.13	3.33	0.517
TK0177T--63 Dup	97	116	32.0	467	9.9	< 2	3.1	< 0.1	1	0.8	2.0	594	26.7	58.3	6.82	28.5	6.20	1.14	5.44	0.93	5.66	1.13	3.37	0.513
TK0193T--63 Orig																								
TK0193T--63 Dup																								
TK0182S--63 Orig	< 1	22	6.2	117	5.1	3	1.3	< 0.1	< 1	0.4	< 0.1	35	19.3	88.1	3.79	15.8	3.10	0.698	2.97	0.34	1.56	0.26	0.66	0.090
TK0182S--63 Dup	< 1	22	6.2	125	5.0	2	1.6	< 0.1	< 1	0.6	< 0.1	35	19.1	86.5	3.75	15.8	2.91	0.684	2.92	0.34	1.56	0.26	0.66	0.089
TK0192S--63 Orig																								
TK0192S--63 Dup																								
TK0193S-2--63 Orig	< 1	7	13.8	112	4.3	2	1.1	< 0.1	1	0.7	< 0.1	36	13.1	197	2.80	12.0	2.65	0.633	4.85	0.51	2.47	0.46	1.34	0.210
TK0193S-2--63 Dup	< 1	7	13.7	110	4.4	< 2	1.1	< 0.1	1	0.6	< 0.1	37	12.9	194	2.78	11.8	2.68	0.652	4.70	0.51	2.47	0.46	1.36	0.210
Method Blank	< 1		< 0.5	< 1	< 0.2	< 2	< 0.5	< 0.1	< 1	< 0.2	< 0.1		< 0.05	< 0.05	< 0.01	< 0.05	< 0.01	< 0.005	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.005
Method Blank																								

Quality Control													
Analyte Symbol	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U	Pd	Pt	Au
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb
Detection Limit	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01	1	1	2
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FA-MS	FA-MS	FA-MS

NIST 694 Meas													
NIST 694 Cert													
DNC-1 Meas	1.96												
DNC-1 Cert	2.0												
GBW 07113 Meas													
GBW 07113 Cert													
LKSD-3 Meas	2.75	0.402		0.63					10.4				
LKSD-3 Cert	2.70	0.400		0.700					11.4				
LKSD-4 Meas													
LKSD-4 Cert													
LKSD-4 Meas													
LKSD-4 Cert													
LKSD-4 Meas													
LKSD-4 Cert													
LKSD-4 Meas													
LKSD-4 Cert													
BaSO4 Meas													
BaSO4 Cert													
BaSO4 Meas													
BaSO4 Cert													
BaSO4 Meas													
BaSO4 Cert													
BaSO4 Meas													
BaSO4 Cert													
W-2a Meas													
W-2a Cert													
DTS-2b Meas													
DTS-2b Cert													
SY-4 Meas													
SY-4 Cert													
CTA-AC-1 Meas	10.9	1.10		2.41					23.2	4.20			
CTA-AC-1 Cert	11.4	1.08		2.65					21.8	4.4			
BIR-1a Meas	1.57												
BIR-1a Cert	1.7												
NCS DC86312 Meas	87.0	12.0							25.3				
NCS DC86312 Cert	87.79	11.96							23.6				
ZW-C Meas			9.8		327		81						
ZW-C Cert			9.7		320		80						
NCS DC70014 Meas	3.51	0.492					> 10000	80.3					
NCS DC70014 Cert	3.3	0.50					27200	80.3					
NCS DC86316 Meas			712										
NCS DC86316 Cert			712										
NCS DC70009 (GBW07241) Meas	15.7	2.20			2200				28.7				
NCS DC70009 (GBW07241) Cert	14.9	2.4			2200				28.3				
OREAS 100a (Fusion) Meas	15.2	2.11							51.0	138			
OREAS 100a (Fusion) Cert	14.9	2.26							51.6	135			
OREAS 101a (Fusion) Meas	18.1	2.49							35.4	421			
OREAS 101a (Fusion) Cert	17.5	2.66							36.6	422			
JR-1 Meas	4.67	0.688	4.1	1.85		1.56	20		26.3	9.00			
JR-1 Cert	4.55	0.71	4.51	1.86		1.56	19.3		26.7	8.88			
SARM 3 Meas													
SARM 3 Cert													
NCS DC73372 Meas													

Quality Control													
Analyte Symbol	Yb	Lu	Hf	Ta	W	Tl	Pb	Bi	Th	U	Pd	Pt	Au
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppb
Detection Limit	0.01	0.002	0.1	0.01	0.5	0.05	5	0.1	0.05	0.01	1	1	2
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FA-MS	FA-MS	FA-MS

NCS DC73372 Cert													
GS311-4 Meas													
GS311-4 Cert													
GS311-4 Meas													
GS311-4 Cert													
GS311-4 Meas													
GS311-4 Cert													
GS311-4 Meas													
GS311-4 Cert													
GS900-5 Meas													
GS900-5 Cert													
GS900-5 Meas													
GS900-5 Cert													
GS900-5 Meas													
GS900-5 Cert													
GS900-5 Meas													
GS900-5 Cert													
GS900-5 Meas													
CDN-PGMS-22 Meas										5990	1270	1170	
CDN-PGMS-22 Cert										6150.00	1360.00	1230.00	
TK0177T-<63 Orig	3.51	0.589	10.6	1.31	2.1	0.47	14	0.6	9.57	5.04			
TK0177T-<63 Dup	3.50	0.593	10.7	0.92	2.2	0.48	13	0.5	9.15	5.14			
TK0193T-<63 Orig											< 1	< 1	2
TK0193T-<63 Dup											< 1	< 1	< 2
TK0182S-<63 Orig	0.55	0.087	2.9	1.06	< 0.5	1.88	67	1.0	3.41	0.74			
TK0182S-<63 Dup	0.55	0.085	2.7	0.39	< 0.5	1.78	56	0.5	3.49	0.71			
TK0192S-<63 Orig											12	25	6
TK0192S-<63 Dup											13	25	8
TK0193S-2-<63 Orig	1.46	0.247	2.7	0.58	< 0.5	0.09	55	2.4	4.31	4.23			
TK0193S-2-<63 Dup	1.47	0.245	2.7	0.47	< 0.5	0.06	54	2.4	4.28	4.08			
Method Blank	< 0.01	< 0.002	< 0.1	< 0.01	< 0.5	< 0.05	< 5	< 0.1	< 0.05	< 0.01			
Method Blank											< 1	< 1	< 2