Quality Analysis ... *Innovative Technologies*

Report No.: **A23-14754**
Report Date: **27-Nov-23**
Date Submitted: **12-Oct-23**
Your Reference: **SHEEP CREEK**

U.S. CRITICAL MATERIALS
4190 SOUTH HIGHLANDS DRIVE, SUITE 230, S
SALT LAKE CITY UTAH
United States

CERTIFICATE OF ANALYSIS

40 Rock samples were submitted for analysis.

The following analytical package(s) were requested:		Testing Date:
8-REE Assay Package	QOP WRA/ QOP WRA 4B2 (Major/Trace Elements Fusion ICPOES/ICPMS)	2023-10-27 09:31:45

REPORT **A23-14754**

Notes:

Total includes all elements in % oxide to the left of total. If P2O5 is >0.3%, Nb may be under reported by FUS-MS.
Footnote:Ga/Ge/As semi-quantitative for samples with high REE. HREE are semi-quantitative at low concentrations for highly concentrated LREE due to interference.

Refer to the Scope of Accreditation for information on accredited elements.

SCC Accredited LAB Accrédité CCN TM

LabID: 266

CERTIFIED BY:

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Quality Control Coordinator

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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
Lower Limit	0.01	0.01	0.01	0.005	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	1	5
Method Code	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	GRAV	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
21083	6.43	1.35	4.65	0.432	0.95	36.63	0.20	0.11	0.431	4.10	29.66	84.94	46	5	176	< 20	22	40	100	< 30	< 1	< 1	92
21084	4.64	0.73	8.10	0.718	8.45	30.34	0.08	0.05	0.132	3.49	31.12	87.86	34	< 1	50	< 20	13	< 20	20	40	2	< 1	14
21085	5.92	0.44	7.91	0.673	4.60	31.03	0.23	0.05	0.124	3.58	29.39	83.95	56	1	99	20	18	40	770	40	< 1	< 1	36
21086	2.46	0.46	5.02	0.638	5.86	38.35	0.03	0.08	0.101	4.20	34.98	92.18	23	< 1	33	< 20	9	< 20	< 10	30	2	< 1	22
21087	2.62	0.49	5.15	0.654	6.08	39.07	0.03	0.08	0.104	4.31	34.87	93.44	24	< 1	36	< 20	10	< 20	< 10	< 30	2	< 1	19
21088	49.96	10.46	6.91	0.218	2.06	13.50	0.59	2.23	0.584	0.06	14.17	100.7	24	2	151	130	29	60	30	40	13	2	< 5
21089	63.64	10.34	5.55	0.119	0.91	6.59	1.44	2.17	0.831	0.11	7.96	99.66	14	2	162	80	19	50	< 10	40	15	3	< 5
21090	58.84	18.25	7.27	0.110	0.48	1.22	7.53	1.14	1.492	0.22	3.70	100.2	37	2	117	80	20	40	< 10	40	19	3	< 5
21091	13.62	1.56	13.43	0.424	7.35	28.69	0.02	0.14	0.118	0.03	35.19	100.6	9	< 1	32	< 20	28	50	< 10	50	2	1	< 5
21092	71.18	12.37	3.62	0.061	0.81	2.22	1.57	4.67	0.262	0.04	1.55	98.35	22	3	52	20	6	< 20	< 10	< 30	16	3	17
21093	69.09	13.69	3.45	0.057	1.40	3.17	3.38	2.43	0.319	0.13	1.40	98.51	7	1	56	70	8	20	10	30	17	< 1	< 5
21094	3.20	0.21	0.92	0.402	0.41	32.69	0.02	0.09	0.025	0.45	32.19	70.60	41	6	17	< 20	< 1	< 20	< 10	< 30	< 1	< 1	114
21095	3.07	0.51	4.79	0.500	2.16	35.16	0.07	0.05	0.065	3.13	31.70	81.22	44	2	152	< 20	2	< 20	< 10	30	5	2	65
21096	19.70	4.83	12.80	0.439	1.02	24.89	0.03	0.07	0.047	0.56	17.36	81.75	42	5	398	< 20	39	< 20	90	< 30	31	5	79
21097	7.01	2.30	6.60	0.610	9.89	35.09	0.06	0.58	0.258	5.06	31.77	99.23	26	< 1	70	50	16	< 20	20	< 30	5	< 1	10
21098	20.47	7.50	10.60	0.385	5.04	20.61	0.21	0.14	0.585	4.44	13.81	83.78	105	4	315	230	17	40	< 10	50	7	4	82
21099	4.60	1.39	3.18	0.280	0.80	30.44	0.04	0.09	0.161	7.11	25.85	73.94	54	7	74	< 20	2	< 20	< 10	< 30	< 1	< 1	174
21100	3.20	12.38	47.50	0.340	0.67	1.25	0.09	0.04	9.981	8.64	1.41	85.50	184	13	547	530	23	100	140	1100	53	< 1	109
21101	3.76	0.71	2.17	0.333	1.16	34.45	0.20	0.07	0.084	1.88	31.89	76.93	43	4	71	< 20	< 1	< 20	< 10	< 30	< 1	< 1	62
21102	3.28	0.43	5.55	0.581	4.14	39.87	0.09	0.05	0.163	3.53	32.93	90.61	51	< 1	86	< 20	9	< 20	< 10	< 30	< 1	< 1	18
21103	14.08	2.45	7.90	0.361	1.04	32.03	0.05	0.08	0.076	1.86	24.86	84.78	45	4	411	< 20	6	< 20	< 10	< 30	10	5	79
21104	1.97	0.47	4.17	0.452	5.47	26.03	0.17	0.05	0.071	2.83	28.96	70.63	28	2	39	< 20	7	< 20	< 10	< 30	< 1	< 1	52
21105	15.61	3.76	9.99	0.554	0.69	29.23	0.03	0.09	0.134	0.82	22.34	83.24	69	5	409	< 20	6	< 20	< 10	80	12	7	96
21106	0.23	0.07	0.72	0.134	0.31	34.10	0.03	0.09	0.012	0.19	36.62	72.51	40	4	19	< 20	7	< 20	20	< 30	< 1	< 1	111
21107	5.63	0.11	2.18	0.194	0.37	23.59	0.01	0.09	0.006	0.19	30.17	62.53	44	6	18	< 20	88	60	30	< 30	< 1	1	110
21108	15.14	2.86	4.60	0.382	3.00	25.18	0.04	0.85	0.382	1.86	24.72	79.01	55	6	116	30	32	40	< 10	60	< 1	< 1	51
21109	69.90	14.33	3.54	0.058	1.38	3.23	3.50	2.54	0.332	0.14	1.40	100.3	7	1	57	80	9	20	20	50	17	1	< 5
21110	32.65	1.35	17.50	0.316	6.65	13.50	1.93	0.14	0.248	3.40	12.34	90.03	239	3	632	140	29	60	< 10	110	3	2	38
21111	3.63	0.24	2.65	0.573	2.11	41.60	0.04	0.07	0.036	3.53	34.93	89.41	36	1	34	< 20	1	< 20	10	< 30	< 1	< 1	48
21112	21.57	7.56	12.70	0.316	1.03	15.69	0.05	0.12	0.374	5.95	6.86	72.22	180	6	1294	20	8	< 20	320	50	11	5	128
21113	6.80	1.89	6.87	0.491	5.28	25.01	0.38	0.08	0.449	3.35	23.82	74.42	76	< 1	174	20	18	< 20	70	30	4	1	19
21114	17.01	4.50	9.55	0.529	7.52	23.47	2.00	0.14	1.056	1.64	26.61	94.03	48	< 1	236	70	30	20	10	30	7	< 1	11
21115	2.58	0.32	2.78	0.284	1.52	23.94	0.03	0.07	0.067	4.16	24.53	60.29	43	5	92	< 20	4	< 20	< 10	< 30	< 1	2	85
21116	27.18	10.51	48.20	0.165	1.68	1.81	0.22	0.13	3.023	1.33	1.21	95.47	72	6	372	520	13	80	70	370	31	2	49
21117	8.39	0.39	3.65	0.388	4.36	22.46	0.05	0.08	0.070	2.69	24.36	66.89	31	2	37	< 20	8	< 20	< 10	< 30	< 1	< 1	56
21118	4.35	0.43	2.70	0.466	2.24	34.43	0.05	0.07	0.097	2.23	33.31	80.37	36	4	40	< 20	7	< 20	< 10	< 30	< 1	< 1	77
21119	41.49	11.76	5.15	0.298	3.41	15.75	5.62	0.42	0.269	0.12	15.91	100.2	17	< 1	68	100	17	30	20	< 30	11	< 1	< 5
21120	9.98	2.35	6.04	0.569	5.27	30.72	0.65	0.30	0.187	2.54	26.74	85.35	48	< 1	96	30	11	20	20	40	3	< 1	7
21121	52.19	14.76	10.55	0.137	6.74	7.88	2.18	1.39	1.005	0.13	3.30	100.3	38	1	237	150	44	80	50	80	20	1	< 5
21122	50.26	14.64	9.80	0.148	9.10	9.98	1.97	0.39	0.764	0.06	3.49	100.6	38	< 1	221	340	49	150	90	70	16	2	< 5

Analyte Symbol	Rb	Sr	Y	Zr	Nb	Mo	Ag	In	Sn	Sb	Cs	Ba	Bi	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho
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	2	2	2	4	1	2	0.5	0.2	1	0.5	0.5	3	0.4	0.1	0.1	0.05	0.1	0.1	0.05	0.1	0.1	0.1	0.1
Method Code	FUS-MS	FUS-ICP	FUS-ICP	FUS-ICP	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
21083	2	924	225	17	108	21	< 0.5	< 0.2	< 1	0.5	0.5	647	< 0.4	41600	53200	4340	11800	837	151	259	19.9	72.8	9.0
21084	2	2720	154	50	511	12	< 0.5	< 0.2	16	< 0.5	< 0.5	55670	< 0.4	6010	8100	674	1900	157	31.4	68.1	7.3	35.0	6.2
21085	< 2	3653	89	20	394	14	1.0	0.2	2	< 0.5	< 0.5	61990	< 0.4	17900	22800	1880	5120	336	60.6	104	8.2	30.1	3.7
21086	2	3912	95	33	1260	< 2	< 0.5	< 0.2	< 1	< 0.5	< 0.5	19970	< 0.4	9480	12300	1030	2850	200	39.1	72.6	6.4	25.6	3.7
21087	2	4034	98	35	1160	2	< 0.5	< 0.2	< 1	< 0.5	< 0.5	20660	< 0.4	9180	12000	1020	2810	198	38.2	70.8	6.3	25.8	3.7
21088	149	199	23	72	20	< 2	< 0.5	< 0.2	< 1	1.1	1.7	637	< 0.4	40.6	59.0	5.75	18.2	3.3	0.92	3.5	0.6	4.0	0.8
21089	153	110	19	161	9	3	< 0.5	< 0.2	1	3.3	1.6	436	< 0.4	30.7	50.6	5.40	19.2	3.5	1.00	3.3	0.6	3.4	0.7
21090	68	394	37	427	44	3	< 0.5	< 0.2	2	5.4	0.6	458	< 0.4	70.6	124	13.0	45.9	7.7	2.33	6.9	1.0	6.3	1.3
21091	9	748	22	20	3	< 2	< 0.5	< 0.2	< 1	2.0	< 0.5	67	< 0.4	11.4	21.1	2.51	9.4	2.5	1.72	3.2	0.6	3.7	0.7
21092	229	77	466	206	8	< 2	< 0.5	< 0.2	4	< 0.5	10.3	444	< 0.4	3570	7330	690	2250	324	5.84	189	22.9	108	16.7
21093	67	446	11	103	5	< 2	< 0.5	< 0.2	< 1	< 0.5	1.1	1038	< 0.4	38.2	60.5	6.55	22.4	3.7	0.82	2.7	0.3	1.9	0.4
21094	< 2	15790	158	10	103	< 2	< 0.5	< 0.2	< 1	0.5	< 0.5	54830	< 0.4	59100	76300	6290	17100	1050	188	297	20.1	59.8	6.5
21095	< 2	16480	97	8	665	19	< 0.5	0.2	1	< 0.5	< 0.5	30000	< 0.4	33400	43600	3510	9500	615	106	175	11.8	36.5	4.1
21096	< 2	1758	90	7	190	10	< 0.5	0.2	4	< 0.5	< 0.5	21690	< 0.4	45700	58900	4600	12300	715	65.9	186	11.7	34.0	3.7
21097	20	3787	118	106	861	< 2	< 0.5	< 0.2	< 1	< 0.5	1.1	1628	< 0.4	3570	4670	407	1230	120	26.5	58.9	6.3	28.6	4.4
21098	2	3906	218	65	600	< 2	< 0.5	0.4	2	< 0.5	< 0.5	4666	0.4	40900	59700	5050	13400	798	141	212	16.1	61.7	8.7
21099	< 2	21580	234	17	41	< 2	< 0.5	< 0.2	< 1	< 0.5	< 0.5	772	< 0.4	56300	90700	8350	24400	1700	305	500	33.4	94.9	9.9
21100	< 2	4934	525	1704	3800	113	6.2	3.3	125	0.9	< 0.5	4356	16.1	25000	40400	3910	12300	1390	286	574	54.4	210	26.7
21101	< 2	24680	102	7	147	2	< 0.5	< 0.2	1	< 0.5	< 0.5	38230	< 0.4	41400	52200	4240	10800	641	108	174	9.7	39.5	4.7
21102	< 2	8512	62	20	8480	29	< 0.5	< 0.2	5	< 0.5	< 0.5	26100	< 0.4	7350	10100	840	2470	177	33.5	64.7	5.3	19.1	2.5
21103	3	3664	122	13	136	2	< 0.5	0.3	4	< 0.5	< 0.5	6261	< 0.4	43200	54800	4370	11600	702	106	198	13.3	40.7	4.9
21104	< 2	23500	95	6	451	5	< 0.5	< 0.2	< 1	< 0.5	< 0.5	103900	< 0.4	29600	36400	3060	8020	464	78.1	131	9.2	32.4	4.0
21105	3	3597	118	10	121	5	< 0.5	0.8	27	< 0.5	0.5	4388	0.7	46800	61000	4860	13500	829	132	222	14.2	40.7	4.8
21106	< 2	48750	114	6	340	6	< 0.5	< 0.2	< 1	< 0.5	< 0.5	5365	< 0.4	57700	75400	6330	16800	1040	190	288	18.8	50.4	5.9
21107	< 2	38880	99	8	109	5	< 0.5	< 0.2	< 1	0.6	< 0.5	46330	< 0.4	58800	75200	6220	16700	982	175	268	16.1	43.3	4.3
21108	37	5649	72	14	379	29	< 0.5	< 0.2	3	1.0	1.0	77440	< 0.4	27200	34400	2930	7800	457	77.3	126	7.9	26.5	3.0
21109	67	530	12	97	11	< 2	< 0.5	< 0.2	1	< 0.5	1.2	1449	0.9	168	227	19.9	57.5	5.9	1.26	3.4	0.4	2.0	0.4
21110	2	2239	66	51	846	< 2	< 0.5	0.4	18	< 0.5	< 0.5	19170	< 0.4	19800	24700	2010	5460	350	63.4	109	7.6	25.8	2.9
21111	< 2	4093	91	11	1330	< 2	< 0.5	< 0.2	1	< 0.5	< 0.5	1605	< 0.4	28700	35900	2870	7470	466	79.0	137	9.7	32.1	3.9
21112	< 2	2437	206	22	111	62	< 0.5	0.7	56	< 0.5	< 0.5	18530	< 0.4	73500	97500	7930	20400	1230	195	330	22.4	70.1	8.6
21113	2	9156	147	13	797	26	< 0.5	0.3	2	< 0.5	< 0.5	129900	< 0.4	8690	11400	963	2700	207	44.2	86.4	8.5	37.2	5.5
21114	4	2607	78	45	1180	6	< 0.5	< 0.2	5	< 0.5	< 0.5	22650	< 0.4	5750	7480	606	1660	123	24.7	46.9	4.2	18.3	2.9
21115	< 2	34130	114	< 4	53	15	< 0.5	< 0.2	1	< 0.5	< 0.5	110200	< 0.4	49600	64500	4850	12700	702	121	202	13.8	38.4	4.6
21116	6	966	184	366	1130	53	1.2	0.9	24	2.0	< 0.5	1196	3.2	5010	6620	1000	3650	527	112	219	19.9	67.8	8.2
21117	< 2	10370	83	13	485	6	< 0.5	< 0.2	< 1	< 0.5	< 0.5	132000	< 0.4	33900	41400	3370	8720	487	81.6	134	8.9	30.3	3.5
21118	< 2	26910	93	16	3930	8	< 0.5	< 0.2	< 1	< 0.5	< 0.5	8437	< 0.4	45600	55600	4500	11800	686	116	188	12.1	39.1	4.4
21119	12	783	12	61	99	71	< 0.5	< 0.2	< 1	< 0.5	< 0.5	4727	< 0.4	667	826	66.5	170	11.9	2.33	4.5	0.4	2.6	0.5
21120	5	5795	86	18	1300	17	< 0.5	< 0.2	1	< 0.5	< 0.5	86130	< 0.4	2540	3470	298	876	86.8	18.8	42.0	4.4	19.4	3.1
21121	55	445	40	129	19	< 2	< 0.5	< 0.2	1	< 0.5	2.1	5034	< 0.4	82.0	117	11.0	34.8	6.1	1.17	5.9	1.1	6.6	1.4
21122	12	201	19	62	6	< 2	< 0.5	< 0.2	< 1	< 0.5	< 0.5	1331	< 0.4	28.2	42.0	4.05	14.3	2.7	0.91	3.0	0.5	3.5	0.7

Analyte Symbol	Er	Tm	Yb	Lu	Hf	Ta	W	Tl	Pb	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.1	0.05	0.1	0.04	0.2	0.1	1	0.1	5	0.1	0.1
Method Code	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
21083	16.6	1.81	10.8	1.18	0.3	0.3	4	< 0.1	124	767	7.9
21084	16.1	2.28	14.1	2.01	0.7	3.0	4	< 0.1	17	70.2	27.3
21085	7.1	0.80	4.7	0.58	0.6	1.5	1	< 0.1	42	390	7.7
21086	8.0	0.96	5.9	0.74	0.4	7.0	4	< 0.1	18	104	16.3
21087	7.6	0.97	5.7	0.75	0.4	6.1	3	< 0.1	16	99.0	18.9
21088	2.3	0.31	2.2	0.31	1.7	0.3	3	0.7	< 5	1.9	0.6
21089	2.0	0.29	2.0	0.30	3.6	0.5	6	0.5	< 5	1.5	0.8
21090	3.8	0.55	4.1	0.65	10.6	1.8	10	0.4	7	12.5	2.3
21091	2.1	0.28	1.9	0.31	0.3	< 0.1	< 1	< 0.1	< 5	0.7	0.2
21092	39.5	5.05	29.8	4.32	6.8	1.0	1	1.0	97	1340	43.5
21093	1.1	0.16	1.2	0.17	2.6	0.3	3	0.4	16	8.8	1.4
21094	11.9	1.08	5.2	0.61	0.2	< 0.1	2	< 0.1	120	751	0.5
21095	8.4	0.70	3.4	0.32	< 0.2	2.2	3	< 0.1	81	300	12.1
21096	7.8	0.72	3.7	0.36	< 0.2	0.3	45	0.2	7	401	2.5
21097	9.9	1.15	6.2	0.83	1.0	4.3	2	0.1	7	38.6	24.2
21098	18.1	2.14	13.5	1.81	0.7	0.6	10	< 0.1	13	1530	13.3
21099	17.7	1.64	7.6	0.81	< 0.2	< 0.1	< 1	< 0.1	140	1600	1.3
21100	48.5	4.34	19.3	1.96	35.5	66.5	5	< 0.1	477	843	13.5
21101	7.9	1.07	5.9	0.54	< 0.2	< 0.1	6	< 0.1	71	371	2.3
21102	5.1	0.54	2.9	0.34	0.7	25.3	4	< 0.1	25	165	2.9
21103	11.0	1.10	6.1	0.74	0.3	0.5	22	< 0.1	35	297	13.9
21104	7.6	0.79	3.9	0.40	< 0.2	1.5	4	< 0.1	52	228	5.5
21105	10.6	1.00	5.6	0.63	0.2	0.1	14	< 0.1	15	395	4.7
21106	9.6	0.73	2.5	0.24	< 0.2	0.6	< 1	< 0.1	205	411	0.6
21107	8.3	0.74	3.5	0.33	< 0.2	< 0.1	< 1	< 0.1	125	419	0.2
21108	5.3	0.59	3.4	0.40	0.6	0.7	15	0.2	32	492	1.2
21109	1.1	0.16	1.1	0.17	2.5	0.3	1	0.3	15	9.9	1.5
21110	4.8	0.50	2.8	0.31	2.5	5.9	1	< 0.1	21	268	5.1
21111	7.4	0.87	4.4	0.50	0.3	3.6	< 1	< 0.1	34	236	18.1
21112	17.1	1.81	9.6	1.19	1.3	1.5	2	< 0.1	13	1150	22.7
21113	12.3	1.54	9.3	1.28	0.4	4.7	7	< 0.1	19	94.9	8.2
21114	6.9	0.83	5.4	0.78	0.9	11.4	13	< 0.1	9	77.5	8.5
21115	10.9	1.08	8.4	0.75	< 0.2	< 0.1	30	< 0.1	88	798	1.0
21116	14.9	1.60	7.4	0.79	8.1	17.3	3	< 0.1	111	283	7.6
21117	6.3	0.69	3.5	0.41	0.4	1.2	3	< 0.1	66	279	3.2
21118	7.3	0.74	3.3	0.39	< 0.2	6.7	2	< 0.1	103	370	2.7
21119	1.3	0.19	1.4	0.23	1.6	0.4	1	< 0.1	5	20.5	0.9
21120	7.2	0.90	5.4	0.80	0.5	3.2	2	< 0.1	22	20.5	1.3
21121	4.3	0.62	4.0	0.61	3.4	0.4	4	0.2	< 5	3.3	0.9
21122	2.3	0.31	2.0	0.30	1.8	0.2	< 1	< 0.1	< 5	2.2	0.3