

- NOTE 1: Portable XRF data from well cuttings Kansas Geological Survey
- NOTE 2: Non-destructive analyses performed by the Kansas Geological Survey in Lawrence, KS on samples from the KGS cuttings repository in Wichita
- NOTE 3: Data collected on April 3, 2025
- NOTE 4: Initial survey and non-destructive bulk geochemistry as requested by patron
- NOTE 5: Cuttings sampled at ~100-foot intervals; placed into pXRF analysis cups; covered with pXRF prolene thin-film
- NOTE 6: KGS pXRF unit: Vanta M Series Handheld XRF Analyzer with Rhodium anode 50 kV X-ray tube with 3 beam
- NOTE 7: Beam times: Beam 1 (30s); Beam 2 (60s); Beam 3 (30s)
- NOTE 8: pXRF analyses of cuttings should be used and interpreted as a semi-quantitative screening technique

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	Hole ID	Sample ID	Depth (ft)	Sample Typ	Real Time 1	Real Time 2	Real Time 3	Instrument	Readir	Date	Time	Method Name	Units	Mg	Mg Error1s	Al	Al Error1s	Si	Si Error1s
2	Balsmeier 21-32	170-180	170-180	Cuttings	30	60	30	822196	6	4/3/2025	15:46:01	Geochem(3-Beam)	PPM	14397	994	23906	243	87842	284
3	Balsmeier 21-32	260-300	260-300	Cuttings	30	60	30	822196	7	4/3/2025	15:48:38	Geochem(3-Beam)	PPM	26962	1014	30644	266	96485	306
4	Balsmeier 21-32	350-400	350-400	Cuttings	30	60	30	822196	8	4/3/2025	15:51:36	Geochem(3-Beam)	PPM	15817	967	31813	268	92601	296
5	Balsmeier 21-32	450-500	450-500	Cuttings	30	60	30	822196	9	4/3/2025	15:54:27	Geochem(3-Beam)	PPM	36209	1016	29568	258	96718	306
6	Balsmeier 21-32	550-600	550-600	Cuttings	30	60	30	822196	10	4/3/2025	15:57:20	Geochem(3-Beam)	PPM	27319	958	45299	301	133495	380
7	Balsmeier 21-32	650-700	650-700	Cuttings	30	60	30	822196	11	4/3/2025	16:00:27	Geochem(3-Beam)	PPM	14457	941	39145	283	92146	294
8	Balsmeier 21-32	750-800	750-800	Cuttings	30	60	30	822196	12	4/3/2025	16:03:22	Geochem(3-Beam)	PPM	8489	914	27849	248	70688	241
9	Balsmeier 21-32	850-900	850-900	Cuttings	30	60	30	822196	13	4/3/2025	16:06:13	Geochem(3-Beam)	PPM	30762	972	37120	276	104519	322
10	Balsmeier 21-32	950-1000	950-1000	Cuttings	30	60	30	822196	14	4/3/2025	16:09:13	Geochem(3-Beam)	PPM	10896	880	42104	284	114770	335
11	Balsmeier 21-32	1050-1100	1050-1100	Cuttings	30	60	30	822196	15	4/3/2025	16:12:19	Geochem(3-Beam)	PPM	17549	947	30603	259	83803	276
12	Balsmeier 21-32	1150-1200	1150-1200	Cuttings	30	60	30	822196	16	4/3/2025	16:15:20	Geochem(3-Beam)	PPM	10293	917	26152	244	77522	259
13	Balsmeier 21-32	1275-1300	1275-1300	Cuttings	30	60	30	822196	17	4/3/2025	16:18:10	Geochem(3-Beam)	PPM	6669	905	21247	228	66904	236
14	Balsmeier 21-32	1375-1400	1375-1400	Cuttings	30	60	30	822196	18	4/3/2025	16:21:06	Geochem(3-Beam)	PPM	5656	874	8233	175	61132	216
15	Balsmeier 21-32	1475-1500	1475-1500	Cuttings	30	60	30	822196	19	4/3/2025	16:23:56	Geochem(3-Beam)	PPM	8928	934	12320	198	38965	164
16	Balsmeier 21-32	1575-1600	1575-1600	Cuttings	30	60	30	822196	20	4/3/2025	16:27:04	Geochem(3-Beam)	PPM	6589	842	36439	265	99312	301
17	Balsmeier 21-32	1675-1700	1675-1700	Cuttings	30	60	30	822196	21	4/3/2025	16:30:07	Geochem(3-Beam)	PPM	37780	925	9284	168	135873	370
18	Balsmeier 21-32	1775-1800	1775-1800	Cuttings	30	60	30	822196	22	4/3/2025	16:33:08	Geochem(3-Beam)	PPM	81467	1060	4174	154	19569	104
19	Balsmeier 21-32	1875-1900	1875-1900	Cuttings	30	60	30	822196	23	4/3/2025	16:35:59	Geochem(3-Beam)	PPM	83791	1106	1531	145	4772	57
20	Balsmeier 21-32	1970-1980	1970-1980	Cuttings	30	60	30	822196	24	4/3/2025	16:38:49	Geochem(3-Beam)	PPM	82733	1076	1338	140	16958	97
21	Balsmeier 21-32	2070-2080	2070-2080	Cuttings	30	60	30	822196	29	4/3/2025	16:54:21	Geochem(3-Beam)	PPM	85953	1063	1724	141	4927	56
22	Balsmeier 21-32	2160-2170	2160-2170	Cuttings	30	60	30	822196	30	4/3/2025	16:57:39	Geochem(3-Beam)	PPM	85750	1042	3377	148	21696	109
23	Balsmeier 21-32	2270-2280	2270-2280	Cuttings	30	60	30	822196	31	4/3/2025	17:00:44	Geochem(3-Beam)	PPM	41374	909	14139	183	128838	351
24	Balsmeier 21-32	2370-2380	2370-2380	Cuttings	30	60	30	822196	32	4/3/2025	17:03:55	Geochem(3-Beam)	PPM	6563	857	3261	152	26210	123
25	Balsmeier 21-32	2470-2480	2470-2480	Cuttings	30	60	30	822196	33	4/3/2025	17:07:01	Geochem(3-Beam)	PPM	7024	918	7523	176	32991	147
26	Balsmeier 21-32	2570-2580	2570-2580	Cuttings	30	60	30	822196	34	4/3/2025	17:10:07	Geochem(3-Beam)	PPM	2871	845	8884	181	28049	128
27	Balsmeier 21-32	2670-2680	2670-2680	Cuttings	30	60	30	822196	35	4/3/2025	17:13:11	Geochem(3-Beam)	PPM	11596	852	38513	286	137333	413
28	Balsmeier 21-32	2770-2780	2770-2780	Cuttings	30	60	30	822196	37	4/3/2025	17:20:58	Geochem(3-Beam)	PPM	39988	930	57323	319	169677	455
29	Balsmeier 21-32	2870-2880	2870-2880	Cuttings	30	60	30	822196	38	4/3/2025	17:23:52	Geochem(3-Beam)	PPM	36955	934	66967	346	180308	482
30	Balsmeier 21-32	2970-2980	2970-2980	Cuttings	30	60	30	822196	39	4/3/2025	17:26:43	Geochem(3-Beam)	PPM	40013	933	72580	356	176232	470
31	Balsmeier 21-32	3070-3080	3070-3080	Cuttings	30	60	30	822196	40	4/3/2025	17:29:34	Geochem(3-Beam)	PPM	34726	932	64872	341	191512	501
32	Balsmeier 21-32	3170-3180	3170-3180	Cuttings	30	60	30	822196	6	4/4/2025	9:49:29	Geochem(3-Beam)	PPM	37499	1003	72681	367	190373	501
33	Balsmeier 21-32	3270-3280	3270-3280	Cuttings	30	60	30	822196	7	4/4/2025	9:53:11	Geochem(3-Beam)	PPM	37310	1015	77049	382	185384	502
34	Balsmeier 21-32	3370-3380	3370-3380	Cuttings	30	60	30	822196	8	4/4/2025	9:56:15	Geochem(3-Beam)	PPM	36324	993	61415	339	168591	463
35	Balsmeier 21-32	3470-3480	3470-3480	Cuttings	30	60	30	822196	9	4/4/2025	9:59:08	Geochem(3-Beam)	PPM	32155	976	67072	357	188423	505
36	Balsmeier 21-32	3570-3580	3570-3580	Cuttings	30	60	30	822196	10	4/4/2025	10:02:19	Geochem(3-Beam)	PPM	38245	996	63918	348	165970	466
37	Balsmeier 21-32	3670-3680	3670-3680	Cuttings	30	60	30	822196	11	4/4/2025	10:07:11	Geochem(3-Beam)	PPM	51393	1019	66025	351	171668	477
38	Balsmeier 21-32	3770-3780	3770-3780	Cuttings	30	60	30	822196	12	4/4/2025	10:10:03	Geochem(3-Beam)	PPM	31838	984	74743	374	180502	493
39	Balsmeier 21-32	3870-3880	3870-3880	Cuttings	30	60	30	822196	13	4/4/2025	10:12:52	Geochem(3-Beam)	PPM	26899	946	71652	364	171201	472
40	Balsmeier 21-32	3970-3980	3970-3980	Cuttings	30	60	30	822196	14	4/4/2025	10:15:48	Geochem(3-Beam)	PPM	24647	904	74911	362	184854	484
41	Balsmeier 21-32	4070-4080	4070-4080	Cuttings	30	60	30	822196	24	4/4/2025	11:05:43	Geochem(3-Beam)	PPM	38345	1028	67660	369	164623	486
42	Balsmeier 21-32	4170-4180	4170-4180	Cuttings	30	60	30	822196	25	4/4/2025	11:08:27	Geochem(3-Beam)	PPM	41231	917	69877	344	178234	465
43	Balsmeier 21-32	4270-4280	4270-4280	Cuttings	30	60	30	822196	26	4/4/2025	11:11:21	Geochem(3-Beam)	PPM	35337	984	63447	349	169259	480



	A	B	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	Hole ID	Sample ID	P	P Error1s	S	S Error1s	K	K Error1s	Ca	Ca Error1s	Ti	Ti Error1s	V	V Error1s	Cr	Cr Error1s	Mn	Mn Error1s	Fe	Fe Error1s	Co
2	Balsmeier 21-32	170-180	660	22	36787	115	8753	33	196024	451	1914	85	<LOD	99	<LOD	45	241	11	10112	47	49
3	Balsmeier 21-32	260-300	126	20	15921	58	12183	42	177522	422	2418	86	<LOD	100	<LOD	46	267	11	16344	65	<LOD
4	Balsmeier 21-32	350-400	158	21	11921	47	12384	43	205842	470	2386	90	<LOD	108	<LOD	47	260	11	17931	70	<LOD
5	Balsmeier 21-32	450-500	157	20	15050	56	10224	37	171281	410	2093	85	<LOD	99	<LOD	46	375	12	16763	66	<LOD
6	Balsmeier 21-32	550-600	546	21	1175	19	16726	54	127876	314	3445	88	<LOD	106	<LOD	48	493	13	28205	95	63
7	Balsmeier 21-32	650-700	649	19	15926	59	10891	38	107561	275	3532	85	<LOD	104	<LOD	45	794	14	29339	99	<LOD
8	Balsmeier 21-32	750-800	275	22	5517	28	6454	26	279012	578	2086	87	<LOD	105	<LOD	49	1079	18	20763	80	<LOD
9	Balsmeier 21-32	850-900	228	21	3269	23	9616	35	173924	411	2563	87	<LOD	103	<LOD	48	1696	20	27343	95	<LOD
10	Balsmeier 21-32	950-1000	649	22	4398	26	11030	38	170747	391	3495	90	173	26	<LOD	56	477	13	27787	95	<LOD
11	Balsmeier 21-32	1050-1100	321	22	4384	26	8071	31	235851	522	2108	88	<LOD	108	<LOD	49	514	14	16455	67	<LOD
12	Balsmeier 21-32	1150-1200	672	23	7460	34	7636	29	239970	525	2312	90	690	33	<LOD	63	239	12	20186	78	<LOD
13	Balsmeier 21-32	1275-1300	167	22	454	14	5402	23	294332	611	1786	90	<LOD	109	<LOD	50	276	12	12069	56	<LOD
14	Balsmeier 21-32	1375-1400	220	22	378	14	2165	14	344339	658	895	76	<LOD	96	<LOD	48	75	10	4404	30	<LOD
15	Balsmeier 21-32	1475-1500	108	21	151	13	3327	17	340658	685	1229	83	<LOD	104	<LOD	50	182	11	7422	42	<LOD
16	Balsmeier 21-32	1575-1600	505	22	359	15	8273	30	198034	437	3152	91	99	25	<LOD	50	327	12	23170	83	<LOD
17	Balsmeier 21-32	1675-1700	207	20	229	14	1958	14	175672	392	696	71	<LOD	82	<LOD	39	375	11	5833	31	<LOD
18	Balsmeier 21-32	1775-1800	146	19	360	12	749	10	241854	550	<LOD	85	<LOD	76	<LOD	38	164	9	1976	18	<LOD
19	Balsmeier 21-32	1875-1900	63	18	369	12	464	9	216288	527	206	61	<LOD	73	<LOD	38	59	8	950	13	<LOD
20	Balsmeier 21-32	1970-1980	<LOD	119	1115	14	292	9	217372	516	<LOD	91	<LOD	74	<LOD	37	94	8	1993	18	<LOD
21	Balsmeier 21-32	2070-2080	<LOD	115	448	12	423	9	229885	534	<LOD	85	<LOD	74	<LOD	36	122	8	1552	16	<LOD
22	Balsmeier 21-32	2160-2170	<LOD	114	264	12	1275	11	220064	505	299	61	<LOD	72	<LOD	37	170	8	1724	16	<LOD
23	Balsmeier 21-32	2270-2280	506	19	233	14	3127	17	129040	301	889	68	<LOD	80	<LOD	38	212	9	7688	36	<LOD
24	Balsmeier 21-32	2370-2380	376	21	580	13	1163	11	384396	701	788	57	<LOD	76	<LOD	43	60	9	2140	21	<LOD
25	Balsmeier 21-32	2470-2480	363	21	1170	15	2393	15	282597	610	925	75	<LOD	97	<LOD	47	79	10	5534	34	<LOD
26	Balsmeier 21-32	2570-2580	536	21	1079	14	5748	23	360614	675	830	71	<LOD	92	<LOD	47	219	11	4612	31	<LOD
27	Balsmeier 21-32	2670-2680	4546	32	1607	22	17733	60	50620	150	2064	73	254	21	<LOD	53	1855	20	126359	358	<LOD
28	Balsmeier 21-32	2770-2780	1094	19	<LOD	187	3711	20	31708	92	9675	103	245	27	<LOD	46	764	13	50773	152	278
29	Balsmeier 21-32	2870-2880	546	19	<LOD	161	3988	22	56736	157	8077	106	219	28	<LOD	54	855	15	63209	188	211
30	Balsmeier 21-32	2970-2980	434	19	<LOD	154	3305	20	62627	170	7341	102	218	27	<LOD	52	839	15	62367	184	121
31	Balsmeier 21-32	3070-3080	826	20	<LOD	168	4374	23	46189	130	9426	111	292	29	<LOD	52	942	15	53511	162	147
32	Balsmeier 21-32	3170-3180	643	20	<LOD	145	6294	27	58478	161	8679	108	209	28	<LOD	51	870	15	56211	168	177
33	Balsmeier 21-32	3270-3280	680	20	<LOD	153	6656	29	52321	148	8417	108	247	28	<LOD	52	840	15	60158	182	192
34	Balsmeier 21-32	3370-3380	455	19	<LOD	151	2516	18	68625	188	7963	101	215	26	<LOD	52	994	15	65513	194	227
35	Balsmeier 21-32	3470-3480	1073	22	<LOD	148	6249	28	56178	158	13187	123	410	32	<LOD	55	1222	17	85909	247	297
36	Balsmeier 21-32	3570-3580	780	20	<LOD	156	2808	19	58573	165	12047	117	239	29	<LOD	52	1180	17	77941	229	222
37	Balsmeier 21-32	3670-3680	679	19	<LOD	162	978	15	53295	152	8398	103	175	26	<LOD	53	1073	16	71371	212	187
38	Balsmeier 21-32	3770-3780	584	20	<LOD	162	2030	18	62865	176	8635	111	204	29	<LOD	54	830	15	55552	171	128
39	Balsmeier 21-32	3870-3880	678	20	<LOD	165	3253	20	59606	167	8981	110	270	29	<LOD	55	954	16	63699	192	<LOD
40	Balsmeier 21-32	3970-3980	1099	22	<LOD	153	2425	18	66212	178	10454	117	267	30	<LOD	55	992	16	63404	186	<LOD
41	Balsmeier 21-32	4070-4080	722	21	<LOD	175	1257	16	64145	189	8661	112	214	29	<LOD	55	843	16	68180	215	202
42	Balsmeier 21-32	4170-4180	485	19	<LOD	149	1215	15	75381	196	8701	106	262	28	<LOD	53	983	16	66467	191	137
43	Balsmeier 21-32	4270-4280	715	21	<LOD	160	885	15	76926	215	8812	113	232	29	<LOD	56	904	16	67193	207	148



	A	B	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
1	Hole ID	Sample ID	Co Error1s	Ni	Ni Error1s	Cu	Cu Error1s	Zn	Zn Error1s	As	As Error1s	Se	Se Error1s	Rb	Rb Error1s	Sr	Sr Error1s	Y	Y Error1s	Zr	Zr Error1s
2	Balsmeier 21-32	170-180	14	10	3	13	3	26	2	3	1	<LOD	3	42	1	235	2	11	1	83	1
3	Balsmeier 21-32	260-300	84	11	3	22	3	34	2	5	1	<LOD	3	55	1	594	3	10	1	102	2
4	Balsmeier 21-32	350-400	89	12	3	19	3	31	2	<LOD	5	<LOD	3	60	1	1066	4	14	1	99	2
5	Balsmeier 21-32	450-500	83	16	3	34	3	39	2	3	1	<LOD	3	54	1	1356	5	15	1	90	2
6	Balsmeier 21-32	550-600	21	32	3	12	3	46	2	4	1	<LOD	3	87	1	613	3	21	1	118	2
7	Balsmeier 21-32	650-700	103	32	3	29	3	35	2	19	1	<LOD	3	61	1	625	3	18	1	84	1
8	Balsmeier 21-32	750-800	99	11	3	<LOD	14	28	2	7	1	<LOD	3	39	1	611	3	14	1	66	2
9	Balsmeier 21-32	850-900	105	22	3	20	3	34	2	5	1	<LOD	3	52	1	888	4	24	1	89	2
10	Balsmeier 21-32	950-1000	106	99	4	53	3	136	3	10	1	<LOD	3	76	1	418	2	23	1	107	2
11	Balsmeier 21-32	1050-1100	89	18	3	20	3	94	3	<LOD	5	<LOD	3	46	1	613	3	13	1	67	2
12	Balsmeier 21-32	1150-1200	96	135	4	66	4	334	5	18	1	20	1	40	1	434	2	12	1	53	1
13	Balsmeier 21-32	1275-1300	80	13	3	11	3	17	2	5	1	<LOD	4	41	1	1250	5	10	1	64	2
14	Balsmeier 21-32	1375-1400	54	<LOD	15	<LOD	15	22	2	<LOD	5	<LOD	4	15	1	902	4	8	1	22	2
15	Balsmeier 21-32	1475-1500	67	<LOD	15	83	4	45	2	4	1	<LOD	4	24	1	951	4	6	1	32	2
16	Balsmeier 21-32	1575-1600	99	25	3	<LOD	13	44	2	4	1	<LOD	3	54	1	352	2	26	1	85	1
17	Balsmeier 21-32	1675-1700	51	<LOD	11	39	3	25	2	<LOD	4	<LOD	3	12	1	99	1	13	1	25	1
18	Balsmeier 21-32	1775-1800	34	<LOD	11	8	2	6	1	<LOD	4	<LOD	3	<LOD	3	110	1	3	1	6	1
19	Balsmeier 21-32	1875-1900	27	<LOD	10	<LOD	11	<LOD	8	<LOD	4	<LOD	3	<LOD	3	109	1	<LOD	4	<LOD	6
20	Balsmeier 21-32	1970-1980	34	<LOD	10	<LOD	11	<LOD	8	<LOD	4	<LOD	3	<LOD	3	80	1	2	1	<LOD	6
21	Balsmeier 21-32	2070-2080	31	<LOD	10	<LOD	11	<LOD	8	<LOD	4	<LOD	3	<LOD	3	79	1	<LOD	4	<LOD	6
22	Balsmeier 21-32	2160-2170	31	<LOD	10	6	2	6	1	<LOD	4	<LOD	3	4	0	56	1	6	1	14	1
23	Balsmeier 21-32	2270-2280	54	<LOD	10	17	2	33	2	<LOD	4	<LOD	3	15	1	52	1	11	1	38	1
24	Balsmeier 21-32	2370-2380	42	<LOD	14	36	3	17	2	<LOD	5	<LOD	3	4	1	170	1	4	1	7	1
25	Balsmeier 21-32	2470-2480	58	<LOD	14	196	5	104	3	<LOD	5	<LOD	3	11	1	327	2	4	1	23	1
26	Balsmeier 21-32	2570-2580	55	<LOD	15	<LOD	14	<LOD	10	<LOD	5	<LOD	4	21	1	381	2	4	1	21	1
27	Balsmeier 21-32	2670-2680	179	35	4	17	4	27	3	11	2	<LOD	2	64	1	150	1	82	1	226	2
28	Balsmeier 21-32	2770-2780	26	58	3	93	4	97	3	<LOD	3	<LOD	2	12	1	255	2	37	1	180	2
29	Balsmeier 21-32	2870-2880	30	162	5	94	4	88	3	<LOD	4	<LOD	3	12	1	290	2	23	1	112	2
30	Balsmeier 21-32	2970-2980	30	151	5	163	5	91	3	<LOD	4	<LOD	2	9	1	302	2	20	1	104	2
31	Balsmeier 21-32	3070-3080	28	95	4	151	4	124	3	<LOD	4	<LOD	3	15	1	331	2	31	1	151	2
32	Balsmeier 21-32	3170-3180	28	106	4	142	4	128	3	<LOD	4	<LOD	3	22	1	331	2	29	1	125	2
33	Balsmeier 21-32	3270-3280	29	130	4	122	4	97	3	<LOD	4	<LOD	2	20	1	324	2	26	1	127	2
34	Balsmeier 21-32	3370-3380	30	136	4	126	4	93	3	<LOD	4	<LOD	2	9	1	256	2	25	1	110	1
35	Balsmeier 21-32	3470-3480	35	62	4	109	4	129	3	<LOD	4	<LOD	2	21	1	342	2	39	1	189	2
36	Balsmeier 21-32	3570-3580	33	72	4	110	4	165	4	<LOD	4	<LOD	2	9	1	191	2	35	1	164	2
37	Balsmeier 21-32	3670-3680	31	168	5	926	9	126	3	<LOD	4	<LOD	2	4	1	262	2	29	1	122	2
38	Balsmeier 21-32	3770-3780	29	103	4	143	4	91	3	3	1	<LOD	3	8	1	275	2	30	1	137	2
39	Balsmeier 21-32	3870-3880	149	66	4	113	4	85	3	<LOD	4	<LOD	3	12	1	324	2	27	1	114	2
40	Balsmeier 21-32	3970-3980	147	57	4	171	5	87	3	<LOD	4	<LOD	3	10	1	275	2	34	1	149	2
41	Balsmeier 21-32	4070-4080	33	195	6	231	6	102	3	<LOD	4	<LOD	3	6	1	226	2	24	1	106	2
42	Balsmeier 21-32	4170-4180	31	185	5	404	6	103	3	<LOD	4	<LOD	3	4	1	223	2	23	1	94	1
43	Balsmeier 21-32	4270-4280	32	153	5	78	4	75	3	4	1	<LOD	3	4	1	498	3	26	1	127	2



	A	B	BF	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX
1	Hole ID	Sample ID	Nb	Nb Error1s	Mo	Mo Error1s	Ag	Ag Error1s	Cd	Cd Error1s	Sn	Sn Error1s	Sb	Sb Error1s	Ba	Ba Error1s	La	La Error1s	Ce	Ce Error1s	Pr
2	Balsmeier 21-32	170-180	4	1	<LOD	6	<LOD	88	21	5	<LOD	39	<LOD	51	160	16	<LOD	1824	111	27	142
3	Balsmeier 21-32	260-300	5	1	<LOD	6	<LOD	89	<LOD	27	<LOD	37	<LOD	48	208	16	<LOD	1851	<LOD	2223	<LOD
4	Balsmeier 21-32	350-400	5	1	<LOD	6	<LOD	93	<LOD	28	<LOD	38	<LOD	50	243	17	76	23	<LOD	2314	139
5	Balsmeier 21-32	450-500	4	1	5	1	<LOD	88	16	5	<LOD	36	<LOD	48	181	17	<LOD	1839	100	27	<LOD
6	Balsmeier 21-32	550-600	6	1	<LOD	6	<LOD	95	15	5	<LOD	35	<LOD	45	270	16	<LOD	1891	<LOD	2273	<LOD
7	Balsmeier 21-32	650-700	5	1	4	1	<LOD	90	<LOD	24	<LOD	32	<LOD	42	236	15	<LOD	1878	103	24	<LOD
8	Balsmeier 21-32	750-800	2	1	<LOD	6	<LOD	103	18	5	<LOD	38	<LOD	49	224	18	<LOD	2018	<LOD	2413	<LOD
9	Balsmeier 21-32	850-900	4	1	<LOD	6	<LOD	89	<LOD	26	<LOD	36	<LOD	47	227	17	<LOD	1867	87	28	<LOD
10	Balsmeier 21-32	950-1000	4	1	3	1	<LOD	89	25	5	<LOD	36	<LOD	47	237	17	<LOD	1897	87	27	<LOD
11	Balsmeier 21-32	1050-1100	<LOD	5	4	1	<LOD	91	23	5	<LOD	39	<LOD	51	222	18	<LOD	1912	121	29	<LOD
12	Balsmeier 21-32	1150-1200	<LOD	5	45	1	<LOD	98	<LOD	28	21	6	<LOD	50	126	17	<LOD	1966	<LOD	2361	<LOD
13	Balsmeier 21-32	1275-1300	4	1	<LOD	6	<LOD	91	19	5	<LOD	41	<LOD	54	89	18	<LOD	1919	<LOD	2323	<LOD
14	Balsmeier 21-32	1375-1400	<LOD	5	<LOD	7	<LOD	93	21	5	<LOD	42	<LOD	55	113	19	<LOD	1965	<LOD	2375	<LOD
15	Balsmeier 21-32	1475-1500	<LOD	5	<LOD	7	<LOD	91	16	5	<LOD	42	<LOD	55	55	19	<LOD	1909	<LOD	2322	<LOD
16	Balsmeier 21-32	1575-1600	4	1	<LOD	6	<LOD	88	21	5	19	6	<LOD	48	141	17	<LOD	1870	91	28	<LOD
17	Balsmeier 21-32	1675-1700	<LOD	4	<LOD	6	<LOD	87	17	4	<LOD	37	<LOD	48	49	15	<LOD	1790	86	26	<LOD
18	Balsmeier 21-32	1775-1800	<LOD	4	<LOD	6	<LOD	80	<LOD	27	<LOD	38	<LOD	49	56	17	<LOD	1687	87	28	<LOD
19	Balsmeier 21-32	1875-1900	<LOD	4	<LOD	6	<LOD	85	<LOD	27	<LOD	37	<LOD	49	<LOD	1239	<LOD	1717	<LOD	2057	<LOD
20	Balsmeier 21-32	1970-1980	<LOD	4	<LOD	6	<LOD	84	14	4	<LOD	37	<LOD	48	51	15	<LOD	1738	<LOD	2097	<LOD
21	Balsmeier 21-32	2070-2080	<LOD	4	<LOD	6	<LOD	83	<LOD	27	<LOD	37	<LOD	48	<LOD	1228	<LOD	1713	<LOD	2056	<LOD
22	Balsmeier 21-32	2160-2170	<LOD	4	<LOD	6	<LOD	80	13	4	<LOD	36	<LOD	47	<LOD	1219	<LOD	1697	80	26	<LOD
23	Balsmeier 21-32	2270-2280	<LOD	4	<LOD	5	<LOD	79	13	4	<LOD	35	<LOD	45	54	14	<LOD	1708	<LOD	2046	<LOD
24	Balsmeier 21-32	2370-2380	<LOD	5	<LOD	7	<LOD	123	16	5	<LOD	39	<LOD	50	98	16	<LOD	2249	<LOD	2646	<LOD
25	Balsmeier 21-32	2470-2480	<LOD	5	<LOD	7	<LOD	95	19	5	<LOD	41	<LOD	54	<LOD	1397	<LOD	1948	81	27	<LOD
26	Balsmeier 21-32	2570-2580	<LOD	5	<LOD	7	<LOD	106	23	5	<LOD	41	<LOD	54	107	18	<LOD	2025	<LOD	2434	<LOD
27	Balsmeier 21-32	2670-2680	<LOD	3	<LOD	4	<LOD	106	18	6	<LOD	23	<LOD	30	298	19	<LOD	2213	201	30	<LOD
28	Balsmeier 21-32	2770-2780	8	1	3	1	<LOD	87	16	5	21	6	<LOD	38	175	15	<LOD	1829	87	24	<LOD
29	Balsmeier 21-32	2870-2880	5	1	<LOD	5	<LOD	89	<LOD	23	<LOD	31	<LOD	41	149	16	<LOD	1899	85	27	<LOD
30	Balsmeier 21-32	2970-2980	4	1	<LOD	5	<LOD	88	<LOD	22	<LOD	31	<LOD	40	178	16	71	22	<LOD	2351	<LOD
31	Balsmeier 21-32	3070-3080	7	1	<LOD	5	<LOD	90	17	5	21	7	<LOD	41	128	15	<LOD	1887	<LOD	2295	<LOD
32	Balsmeier 21-32	3170-3180	5	1	<LOD	5	<LOD	91	<LOD	23	<LOD	31	<LOD	41	246	17	<LOD	1885	<LOD	2260	<LOD
33	Balsmeier 21-32	3270-3280	5	1	<LOD	5	<LOD	91	22	5	<LOD	31	<LOD	41	233	16	<LOD	1894	<LOD	2305	<LOD
34	Balsmeier 21-32	3370-3380	5	1	<LOD	5	<LOD	93	<LOD	22	<LOD	30	<LOD	39	161	16	<LOD	1910	<LOD	2302	<LOD
35	Balsmeier 21-32	3470-3480	10	1	<LOD	4	<LOD	94	25	5	<LOD	28	<LOD	36	243	18	<LOD	2008	124	29	<LOD
36	Balsmeier 21-32	3570-3580	8	1	6	1	<LOD	96	<LOD	20	<LOD	28	<LOD	37	201	17	<LOD	1959	107	28	<LOD
37	Balsmeier 21-32	3670-3680	5	1	<LOD	5	<LOD	88	21	5	26	7	<LOD	38	136	17	<LOD	1895	<LOD	2293	<LOD
38	Balsmeier 21-32	3770-3780	6	1	4	1	<LOD	94	22	5	<LOD	33	<LOD	43	152	16	<LOD	1937	88	26	<LOD
39	Balsmeier 21-32	3870-3880	5	1	5	1	<LOD	94	18	5	<LOD	31	<LOD	40	164	16	74	22	90	27	<LOD
40	Balsmeier 21-32	3970-3980	7	1	4	1	<LOD	91	<LOD	22	30	7	<LOD	40	163	17	<LOD	1927	<LOD	2322	204
41	Balsmeier 21-32	4070-4080	5	1	4	1	<LOD	96	21	6	<LOD	32	<LOD	42	112	16	<LOD	1989	<LOD	2411	<LOD
42	Balsmeier 21-32	4170-4180	5	1	<LOD	5	<LOD	94	20	5	<LOD	30	<LOD	39	152	17	<LOD	1928	<LOD	2323	<LOD
43	Balsmeier 21-32	4270-4280	7	1	<LOD	5	<LOD	93	27	6	<LOD	32	<LOD	42	117	17	<LOD	1977	<LOD	2403	<LOD



	A	B	BY	BZ	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	CN	CO
1	Hole ID	Sample ID	Pr Error1s	Nd	Nd Error1s	W	W Error1s	Hg	Hg Error1s	Pb	Pb Error1s	Bi	Bi Error1s	Th	Th Error1s	U	U Error1s	LE	LE Error1s
2	Balsmeier 21-32	170-180	45	<LOD	4804	<LOD	12	<LOD	15	12	1	<LOD	57	8	3	<LOD	9	618433	828
3	Balsmeier 21-32	260-300	3565	<LOD	4793	<LOD	12	<LOD	14	9	1	<LOD	58	17	3	<LOD	10	620056	844
4	Balsmeier 21-32	350-400	46	<LOD	5031	<LOD	12	6	2	7	1	<LOD	61	16	3	<LOD	11	607094	820
5	Balsmeier 21-32	450-500	3557	<LOD	4781	<LOD	11	<LOD	14	7	1	<LOD	60	10	3	<LOD	11	619632	847
6	Balsmeier 21-32	550-600	3659	<LOD	4866	<LOD	11	7	2	11	1	<LOD	54	15	3	<LOD	9	614102	809
7	Balsmeier 21-32	650-700	3642	<LOD	4910	59	3	56	3	43	1	<LOD	52	13	3	6	1	684134	805
8	Balsmeier 21-32	750-800	3894	<LOD	5180	<LOD	12	<LOD	16	13	1	<LOD	59	12	3	<LOD	10	576742	804
9	Balsmeier 21-32	850-900	3624	<LOD	4817	<LOD	12	<LOD	15	20	1	<LOD	57	12	3	<LOD	10	607474	821
10	Balsmeier 21-32	950-1000	3699	<LOD	4959	<LOD	12	6	2	27	1	<LOD	55	16	3	5	1	612140	765
11	Balsmeier 21-32	1050-1100	3726	<LOD	5027	8	2	<LOD	16	15	1	<LOD	60	9	3	<LOD	10	599070	819
12	Balsmeier 21-32	1150-1200	3838	<LOD	5132	<LOD	15	<LOD	17	25	1	<LOD	58	11	3	14	1	605513	802
13	Balsmeier 21-32	1275-1300	3769	<LOD	5112	<LOD	13	7	2	5	1	<LOD	67	13	3	<LOD	12	589145	817
14	Balsmeier 21-32	1375-1400	3834	<LOD	5112	<LOD	13	<LOD	16	4	1	<LOD	65	<LOD	16	6	1	571390	806
15	Balsmeier 21-32	1475-1500	3778	<LOD	5079	<LOD	14	8	2	8	1	<LOD	67	12	3	<LOD	12	585466	853
16	Balsmeier 21-32	1575-1600	3678	<LOD	4935	<LOD	11	<LOD	15	12	1	<LOD	56	14	3	<LOD	9	622849	751
17	Balsmeier 21-32	1675-1700	3415	<LOD	4584	<LOD	11	<LOD	13	5	1	<LOD	53	7	2	<LOD	8	631715	791
18	Balsmeier 21-32	1775-1800	3302	215	65	<LOD	11	<LOD	13	3	1	<LOD	52	<LOD	13	<LOD	8	649048	924
19	Balsmeier 21-32	1875-1900	3304	<LOD	4448	<LOD	10	<LOD	13	<LOD	5	<LOD	52	<LOD	13	<LOD	8	691397	981
20	Balsmeier 21-32	1970-1980	3384	<LOD	4513	<LOD	10	<LOD	13	6	1	<LOD	52	<LOD	13	<LOD	8	677951	945
21	Balsmeier 21-32	2070-2080	3317	184	60	<LOD	10	<LOD	12	3	1	<LOD	51	<LOD	13	<LOD	8	674700	941
22	Balsmeier 21-32	2160-2170	3272	<LOD	4365	<LOD	10	<LOD	12	<LOD	5	<LOD	50	<LOD	13	<LOD	8	665193	912
23	Balsmeier 21-32	2270-2280	3289	<LOD	4411	<LOD	10	<LOD	12	3	1	<LOD	49	8	2	<LOD	7	673710	784
24	Balsmeier 21-32	2370-2380	4264	<LOD	5681	<LOD	13	<LOD	16	7	1	<LOD	60	8	3	3	1	574092	818
25	Balsmeier 21-32	2470-2480	3857	<LOD	5162	<LOD	14	<LOD	16	9	1	<LOD	61	12	3	<LOD	10	658615	848
26	Balsmeier 21-32	2570-2580	3921	<LOD	5252	<LOD	13	<LOD	16	7	1	<LOD	61	<LOD	15	<LOD	10	585994	807
27	Balsmeier 21-32	2670-2680	4342	231	70	<LOD	8	<LOD	11	17	2	<LOD	36	31	3	9	1	606104	787
28	Balsmeier 21-32	2770-2780	3579	<LOD	4813	<LOD	10	7	2	<LOD	4	<LOD	44	16	3	<LOD	7	633698	814
29	Balsmeier 21-32	2870-2880	3699	<LOD	5009	<LOD	10	9	2	7	1	<LOD	45	15	3	<LOD	7	580879	817
30	Balsmeier 21-32	2970-2980	3814	<LOD	5159	10	2	<LOD	13	7	1	<LOD	45	20	3	<LOD	7	572793	812
31	Balsmeier 21-32	3070-3080	3728	<LOD	4992	<LOD	11	<LOD	13	7	1	<LOD	47	13	3	<LOD	8	592091	818
32	Balsmeier 21-32	3170-3180	3643	201	62	<LOD	11	6	2	6	1	<LOD	46	16	3	<LOD	7	566520	845
33	Balsmeier 21-32	3270-3280	3775	<LOD	5071	10	2	<LOD	13	6	1	<LOD	45	12	3	<LOD	7	569611	859
34	Balsmeier 21-32	3370-3380	3717	<LOD	4965	<LOD	10	<LOD	12	5	1	<LOD	43	11	3	<LOD	7	586227	841
35	Balsmeier 21-32	3470-3480	3994	<LOD	5427	<LOD	10	<LOD	12	9	1	<LOD	41	14	3	<LOD	7	546507	841
36	Balsmeier 21-32	3570-3580	3839	<LOD	5165	9	3	<LOD	12	7	1	<LOD	41	19	3	<LOD	7	576974	849
37	Balsmeier 21-32	3670-3680	3737	<LOD	5025	<LOD	10	<LOD	12	8	1	<LOD	42	16	3	<LOD	7	572911	862
38	Balsmeier 21-32	3770-3780	3806	<LOD	5158	<LOD	11	7	2	4	1	<LOD	47	13	3	<LOD	7	581001	847
39	Balsmeier 21-32	3870-3880	3899	<LOD	5261	<LOD	11	7	2	6	1	<LOD	45	9	3	<LOD	7	591690	826
40	Balsmeier 21-32	3970-3980	46	379	65	<LOD	11	11	2	7	1	<LOD	46	20	3	<LOD	7	569129	800
41	Balsmeier 21-32	4070-4080	3935	205	61	13	3	<LOD	13	7	1	<LOD	47	21	3	<LOD	7	583871	885
42	Balsmeier 21-32	4170-4180	3772	<LOD	5059	<LOD	10	<LOD	13	7	1	<LOD	44	14	3	<LOD	7	555792	797
43	Balsmeier 21-32	4270-4280	3926	<LOD	5315	9	3	<LOD	14	6	1	<LOD	47	14	3	<LOD	8	574998	851



Sample ID	Core	Instrument	Reading #	Date	Time	Method Na	User Facto	Test Label	Collimatio	Units	Mg Concer	Mg Error1s	Al Concer	Al Error1s	Si Concer	Si Error1s	P Concer	P Error1s	S Concer	S Error1s	K Concer	K Error1s	Ca Concer	Ca Error1s
BHVO-1 1	Balsmeier 21-32	822196	5	4/3/2025	15:41:41	Geochem(3-Beam)		5	No	PPM	27858	971	74774	367	210528	527	709	23	<LOD	123	3292	20	91604	233
BHVO-1 2	Balsmeier 21-32	822196	28	4/3/2025	16:51:33	Geochem(3-Beam)		28	No	PPM	26192	854	73660	346	207276	499	759	22	<LOD	126	3326	20	91088	223
BHVO-1 3	Balsmeier 21-32	822196	44	4/3/2025	17:40:48	Geochem(3-Beam)		44	No	PPM	27627	849	73368	344	207053	497	756	22	<LOD	125	3296	20	91672	224
BHVO-1 4	Balsmeier 21-32	822196	5	4/4/2025	9:45:38	Geochem(3-Beam)		5	No	PPM	29996	971	75583	367	213150	527	682	23	<LOD	121	3293	20	92969	234
BHVO-1 5	Balsmeier 21-32	822196	23	4/4/2025	11:02:14	Geochem(3-Beam)		23	No	PPM	27187	844	74290	344	209157	496	727	22	<LOD	123	3216	20	92209	223
BHVO-1 6	Balsmeier 21-32	822196	44	4/4/2025	12:11:09	Geochem(3-Beam)		44	No	PPM	27030	842	74340	344	208113	495	723	22	<LOD	124	3292	20	92291	223
Average											27648.3		74335.8		209212.8		726.0		<LOD		3285.8		91972.2	
Standard Deviation											1286.2		792.8		2317.8		29.1		<LOD		36.7		657.1	
RSD %											4.7		1.1		1.1		4.0		<LOD		1.1		0.7	
Accepted Value											43497.4		72455.9		232736.7		1210.2		76.0		4363.3		81690	
Std											193.0		264.6		560.9		10.5		29.0		38.2		286	
% Difference											-36		3		-10		-40		<LOD		-24.7		12.6	
OREAS 70 B 1	Balsmeier 21-32	822196	3	4/3/2025	15:35:49	Geochem(3-Beam)		3	No	PPM	143393	1080	35344	267	225294	557	220	15	2115	23	5019	23	34526	97
OREAS 70B 2	Balsmeier 21-32	822196	26	4/3/2025	16:45:33	Geochem(3-Beam)		26	No	PPM	141917	982	35103	250	223093	523	266	15	2123	22	5020	23	34761	93
OREAS 70B 3	Balsmeier 21-32	822196	42	4/3/2025	17:35:21	Geochem(3-Beam)		42	No	PPM	141499	971	35154	248	224070	522	229	14	2053	22	5089	23	34782	93
OREAS 70B 4	Balsmeier 21-32	822196	3	4/4/2025	9:39:36	Geochem(3-Beam)		3	No	PPM	146904	1066	36376	267	229165	557	227	15	2073	22	4983	23	34729	97
OREAS 70B 5	Balsmeier 21-32	822196	21	4/4/2025	10:56:40	Geochem(3-Beam)		21	No	PPM	141183	978	35202	249	223186	522	241	15	2024	22	4958	22	34682	93
OREAS 70B 6	Balsmeier 21-32	822196	42	4/4/2025	12:05:32	Geochem(3-Beam)		42	No	PPM	138624	960	35446	246	222115	513	238	14	2111	22	5030	22	34474	91
Average											142253.3		35437.5		224487.2		236.8		2083.2		5016.5		34659.0	
Standard Deviation											2754.2		476.9		2528.7		16.2		39.7		44.7		128.7	
RSD %											1.9		1.3		1.1		6.8		1.9		0.9		0.4	
Accepted Value											136100		38000		227800		250		3080		6170		30800	
Std											4340		1620		4580		30		260		560		1010	
% Difference											4.5		-6.7		-1.5		-5.3		-32.4		-18.7		12.5	
PCC-1 1	Balsmeier 21-32	822196	4	4/3/2025	15:38:49	Geochem(3-Beam)		4	No	PPM	204133	1256	3912	160	151062	500	<LOD	96	<LOD	196	<LOD	233	3756	19
PCC-1 2	Balsmeier 21-32	822196	27	4/3/2025	16:48:51	Geochem(3-Beam)		27	No	PPM	217355	1084	4363	144	170120	490	52	10	<LOD	171	<LOD	202	4116	19
PCC-1 3	Balsmeier 21-32	822196	43	4/3/2025	17:38:08	Geochem(3-Beam)		43	No	PPM	219383	1068	3976	140	169127	483	83	10	<LOD	168	<LOD	194	4095	19
PCC-1 4	Balsmeier 21-32	822196	4	4/4/2025	9:42:49	Geochem(3-Beam)		4	No	PPM	234461	1148	4204	155	180962	535	36	11	<LOD	151	<LOD	182	4291	20
PCC-1 5	Balsmeier 21-32	822196	22	4/4/2025	10:59:38	Geochem(3-Beam)		22	No	PPM	229383	1052	4242	142	178981	497	48	10	<LOD	154	<LOD	184	4341	19
PCC-1 6	Balsmeier 21-32	822196	43	4/4/2025	12:08:31	Geochem(3-Beam)		43	No	PPM	226708	1051	4166	141	177319	494	55	10	<LOD	158	<LOD	186	4285	19
Average											221903.8		4143.8		171261.8				<LOD		<LOD		4147.3	
Standard Deviation											10766.1		169.5		10993.3				<LOD		<LOD		216.3	
RSD %											4.9		4.1		6.4				<LOD		<LOD		5.2	
Accepted Value											261901		3573		194968				20		58		3716	
Std																								
% Difference											-15.3		16.0		-12.2				<LOD		<LOD		11.6	

Note: Accepted values highlighted orange are within 5 ppm of pXRF LOD for said element. Null values either have no reported accepted value for that element, or the accepted value is below the pXRF LOD. 'LE' stands for 'Light Elements,' which is the relative elemental abundances of aggregated elements from Helium up to and including Sodium.

Sample ID	Core	Ti Concent	Ti Error1s	V Concent	V Error1s	Cr Concent	Cr Error1s	Mn Concer	Mn Error1s	Fe Concentra	Fe Error1s	Co Concer	Co Error1s	Ni Concen	Ni Error1s	Cu Concer	Cu Error1s	Zn Concen	Zn Error1s	As Concen	As Error1s	Se Concen	Se Error1s	Rb Concer
BHVO-1 1	Balsmeier 21-32	16502	141	345	35	60	13	1025	17	71808	205	267	33	117	5	162	5	107	3	<LOD	4	<LOD	3	7
BHVO-1 2	Balsmeier 21-32	16506	140	336	36	43	13	1001	17	71589	197	257	33	125	5	153	5	106	3	<LOD	4	<LOD	3	9
BHVO-1 3	Balsmeier 21-32	16480	138	385	35	48	13	1020	17	71547	197	258	33	125	5	152	5	103	3	<LOD	4	<LOD	3	8
BHVO-1 4	Balsmeier 21-32	16702	141	327	35	66	13	1038	17	72158	204	237	33	123	5	169	5	107	3	<LOD	4	<LOD	3	6
BHVO-1 5	Balsmeier 21-32	16325	138	306	35	76	13	991	17	70849	193	223	33	127	5	163	5	108	3	<LOD	4	<LOD	3	8
BHVO-1 6	Balsmeier 21-32	16142	137	357	35	48	13	1018	17	71070	194	271	33	130	5	159	5	101	3	<LOD	4	<LOD	3	8
Average		16442.8		342.7		56.8		1015.5		71503.5		252.2		124.5		159.7		105.3						7.7
Standard Deviation		190.0		27.0		12.7		16.9		478.9		18.5		4.4		6.4		2.7						1.0
RSD %		1.2		7.9		22.4		1.7		0.7		7.3		3.5		4.0		2.6						13.5
Accepted Value		16434.1		313.8		287.6		1308.1		86169.9		44.9		120		137.2		105.1						9.52
Std		71.9		3.2		3.9		8.5		279.8		0.36		1.5		1.6		1.5						0.1
% Difference		0.1		9.2		-80.2		-22.4		-17.0		461.6		3.8		16.4		0.2						-19.5
OREAS 70 B 1	Balsmeier 21-32	1690	68	58	18	942	16	848	14	45404	135	249	23	2199	14	46	4	111	3	106	2	<LOD	2	32
OREAS 70B 2	Balsmeier 21-32	1712	66	<LOD	83	920	16	875	14	45418	129	223	23	2235	14	57	4	115	3	114	2	<LOD	2	31
OREAS 70B 3	Balsmeier 21-32	1601	67	79	18	944	16	907	14	45602	129	213	23	2176	13	69	4	117	3	102	2	<LOD	2	31
OREAS 70B 4	Balsmeier 21-32	1885	66	85	18	946	16	899	14	45794	134	279	23	2264	14	55	4	112	3	117	2	<LOD	2	32
OREAS 70B 5	Balsmeier 21-32	1690	67	75	18	927	16	859	14	45493	129	246	23	2205	13	65	4	113	3	107	2	<LOD	2	33
OREAS 70B 6	Balsmeier 21-32	1662	65	94	18	896	16	899	14	45480	127	245	23	2201	13	51	4	116	3	102	1	<LOD	2	31
Average		1706.7		78.2		929.2		881.2		45531.8		242.5		2213.3		57.2		114.0		108.0				31.7
Standard Deviation		95.4		13.4		19.3		24.2		146.4		23.0		31.2		8.6		2.4		6.2				0.8
RSD %		5.6		17.1		2.1		2.7		0.3		9.5		1.4		15.0		2.1		5.8				2.6
Accepted Value		1760		69		1252		1160		56600		83		2220		52		107		143				34
Std		60		6.8		119.9		40		2340		6.7		80		6		9.5		20				2.9
% Difference		-3.0		13.3		-25.8		-24.0		-19.6		192.2		-0.3		9.9		6.5		-24.5				-6.9
PCC-1 1	Balsmeier 21-32	<LOD	294	54	14	2143	22	746	14	49261	172	251	24	2726	17	<LOD	16	46	2	<LOD	3	<LOD	2	<LOD
PCC-1 2	Balsmeier 21-32	<LOD	262	<LOD	69	2176	22	742	13	49693	156	247	23	2728	16	<LOD	16	46	2	<LOD	3	<LOD	2	<LOD
PCC-1 3	Balsmeier 21-32	<LOD	256	<LOD	68	2200	22	746	13	49208	153	285	23	2706	16	<LOD	16	46	2	<LOD	3	<LOD	2	<LOD
PCC-1 4	Balsmeier 21-32	<LOD	242	<LOD	69	2124	21	744	13	49576	161	293	23	2689	16	12	4	45	2	<LOD	3	<LOD	2	<LOD
PCC-1 5	Balsmeier 21-32	<LOD	242	<LOD	68	2136	21	737	13	49316	151	303	23	2696	15	<LOD	16	44	2	<LOD	3	<LOD	2	<LOD
PCC-1 6	Balsmeier 21-32	<LOD	247	<LOD	69	2151	21	748	13	49451	152	282	23	2692	16	<LOD	15	46	2	<LOD	3	<LOD	2	<LOD
Average		<LOD		54		2155.0		743.8		49417.5		276.8		2706.2		12		45.5						
Standard Deviation		<LOD		<LOD		28.1		3.9		190.2		22.8		17.1		<LOD		0.8						
RSD %		<LOD		<LOD		1.3		0.5		0.4		8.2		0.6		<LOD		1.8						
Accepted Value		60		31		2730		77		57703		112		2380		10		42						
Std																								
% Difference		<LOD		74.2		-21.1		860.5		-14.4		147.2		13.7		20.0		8.3						
Note: Accepted values highlighted in yellow																								
abundances of aggregated elements																								

Sample ID	Core	Rb Error1s	Sr Concentr	Sr Error1s	Y Concentr	Y Error1s	Zr Concentr	Zr Error1s	Nb Concer	Nb Error1s	Mo Concer	Mo Error1s	Ag Concen	Ag Error1s	Cd Concer	Cd Error1s	Sn Concen	Sn Error1s	Sb Concen	Sb Error1s	Ba Concen	Ba Error1s	La Concen	La Error1s
BHVO-1 1	Balsmeier 21-32	1	407	2	27	1	179	2	13	1	<LOD	5	<LOD	96	24	5	<LOD	30	<LOD	39	169	18	<LOD	2030
BHVO-1 2	Balsmeier 21-32	1	405	2	26	1	173	2	13	1	<LOD	5	<LOD	97	21	5	<LOD	30	<LOD	39	145	18	<LOD	2000
BHVO-1 3	Balsmeier 21-32	1	406	2	25	1	178	2	14	1	5	1	<LOD	96	21	5	<LOD	30	<LOD	39	165	18	<LOD	2060
BHVO-1 4	Balsmeier 21-32	1	405	2	28	1	176	2	12	1	<LOD	5	<LOD	96	30	5	<LOD	30	<LOD	39	163	19	<LOD	2031
BHVO-1 5	Balsmeier 21-32	1	403	2	25	1	170	2	13	1	5	1	<LOD	94	17	5	<LOD	30	<LOD	39	192	18	<LOD	2009
BHVO-1 6	Balsmeier 21-32	1	404	2	25	1	171	2	11	1	<LOD	5	<LOD	94	23	5	<LOD	30	<LOD	39	166	18	<LOD	1988
Average			405.0		26.0		174.5		12.7		5						<LOD				166.7			
Standard Deviation			1.4		1.3		3.7		1.0		<LOD						<LOD				15.1			
RSD %			0.3		4.9		2.1		8.2		<LOD						<LOD				9.0			
Accepted Value			399.2		26.23		174.6		18.53		1.061						2.09				134.4			
Std			5		0.31		1.3		0.23		0.059						0.15				2.5			
% Difference			1.5		-0.9		-0.1		-31.6		371.3						<LOD				24.0			
OREAS 70 B 1	Balsmeier 21-32	1	74	1	11	1	63	1	<LOD	3	<LOD	4	<LOD	77	13	4	<LOD	29	<LOD	38	291	17	<LOD	1685
OREAS 70B 2	Balsmeier 21-32	1	72	1	10	1	64	1	<LOD	3	<LOD	5	<LOD	76	<LOD	21	<LOD	29	<LOD	38	273	17	101	23
OREAS 70B 3	Balsmeier 21-32	1	72	1	10	1	66	1	<LOD	3	3	1	<LOD	76	<LOD	21	<LOD	29	<LOD	38	304	18	<LOD	1654
OREAS 70B 4	Balsmeier 21-32	1	72	1	11	1	67	1	2	1	<LOD	4	<LOD	74	<LOD	21	<LOD	28	<LOD	37	294	18	<LOD	1656
OREAS 70B 5	Balsmeier 21-32	1	71	1	8	1	64	1	<LOD	3	3	1	<LOD	76	<LOD	21	19	6	<LOD	38	275	18	<LOD	1656
OREAS 70B 6	Balsmeier 21-32	1	73	1	12	1	65	1	3	1	3	1	<LOD	76	<LOD	21	<LOD	29	<LOD	37	277	17	74	23
Average			72.3		10.3		64.8		2.5												285.7			
Standard Deviation			1.0		1.4		1.5		0.7												12.5			
RSD %			1.4		13.2		2.3		28.3												4.4			
Accepted Value			72		10.7		67		3.27												202			
Std			5.7		0.64		9		0.307												11.1			
% Difference			0.5		-3.4		-3.2		-23.5												41.4			
PCC-1 1	Balsmeier 21-32	2	<LOD	2	<LOD	3	<LOD	4	<LOD	3	<LOD	5	<LOD	80	<LOD	21	19	6	<LOD	38	<LOD	1236	<LOD	1744
PCC-1 2	Balsmeier 21-32	2	<LOD	2	<LOD	3	<LOD	4	<LOD	3	<LOD	4	<LOD	77	<LOD	20	20	6	<LOD	37	<LOD	1208	<LOD	1701
PCC-1 3	Balsmeier 21-32	2	<LOD	2	<LOD	3	<LOD	4	<LOD	3	<LOD	4	<LOD	78	<LOD	20	18	6	<LOD	36	<LOD	1196	<LOD	1671
PCC-1 4	Balsmeier 21-32	2	<LOD	2	<LOD	3	<LOD	4	<LOD	3	<LOD	4	<LOD	79	<LOD	20	20	6	<LOD	36	<LOD	1206	<LOD	1682
PCC-1 5	Balsmeier 21-32	2	<LOD	2	<LOD	3	<LOD	4	<LOD	3	<LOD	4	<LOD	77	<LOD	20	<LOD	28	<LOD	36	<LOD	1185	<LOD	1676
PCC-1 6	Balsmeier 21-32	2	<LOD	2	<LOD	3	<LOD	4	<LOD	3	<LOD	4	<LOD	75	<LOD	20	<LOD	28	<LOD	36	<LOD	1180	<LOD	1657
Average																								
Standard Deviation																								
RSD %																								
Accepted Value																								
Std																								
% Difference																								
Note: Accepted values highlightec abundances of aggregated eleme																								

Sample ID	Core	Ce Concer	Ce Error1s	Pr Concer	Pr Error1s	Nd Concer	Nd Error1s	W Concer	W Error1s	Hg Concer	Hg Error1s	Pb Concer	Pb Error1s	Bi Concer	Bi Error1s	Th Concer	Th Error1s	U Concer	U Error1s	LE Concer	LE Error1s
BHVO-1 1	Balsmeier 21-32	<LOD	2457	<LOD	3982	<LOD	5340	9	3	<LOD	13	7	1	<LOD	45	13	3	<LOD	7	499985	824
BHVO-1 2	Balsmeier 21-32	137	30	<LOD	3899	<LOD	5291	<LOD	10	8	2	7	1	<LOD	45	15	3	<LOD	7	506627	771
BHVO-1 3	Balsmeier 21-32	107	30	<LOD	4051	<LOD	5449	10	3	8	2	6	1	<LOD	45	20	3	<LOD	7	505137	769
BHVO-1 4	Balsmeier 21-32	<LOD	2440	<LOD	3966	<LOD	5345	8	3	10	2	5	1	<LOD	45	21	3	<LOD	7	492533	820
BHVO-1 5	Balsmeier 21-32	<LOD	2433	<LOD	3956	<LOD	5320	9	3	12	2	9	1	<LOD	45	20	3	<LOD	7	503162	763
BHVO-1 6	Balsmeier 21-32	<LOD	2392	<LOD	3903	<LOD	5247	8	3	7	2	7	1	<LOD	45	22	3	<LOD	7	504061	763
Average		122.0										6.8									
Standard Deviation		21.2										1.3									
RSD %		17.4										19.5									
Accepted Value		38.08										2.037									
Std		0.22										0.067									
% Difference		220.4										235.5									
OREAS 70 B 1	Balsmeier 21-32	<LOD	2033	<LOD	3292	<LOD	4439	<LOD	10	<LOD	11	14	1	<LOD	41	11	2	<LOD	6	501927	877
OREAS 70B 2	Balsmeier 21-32	88	28	<LOD	3249	<LOD	4370	<LOD	10	<LOD	11	16	1	<LOD	41	11	2	<LOD	6	505384	818
OREAS 70B 3	Balsmeier 21-32	130	28	167	47	<LOD	4345	<LOD	10	<LOD	11	16	1	<LOD	41	9	2	<LOD	6	504505	812
OREAS 70B 4	Balsmeier 21-32	<LOD	1992	<LOD	3227	<LOD	4335	<LOD	9	<LOD	11	13	1	<LOD	40	8	2	<LOD	6	492610	863
OREAS 70B 5	Balsmeier 21-32	<LOD	1993	<LOD	3242	235	66	6	2	<LOD	11	14	1	<LOD	41	11	2	<LOD	6	506006	816
OREAS 70B 6	Balsmeier 21-32	87	28	<LOD	3235	<LOD	4342	<LOD	10	<LOD	11	14	1	<LOD	41	10	2	<LOD	6	509568	803
Average												14.5				10.0		<LOD			
Standard Deviation												1.2				1.3		<LOD			
RSD %												8.4				12.6		<LOD			
Accepted Value												13.2				6.45		1.87			
Std												1.8				0.578		0.32			
% Difference												9.8				55.0		<LOD			
PCC-1 1	Balsmeier 21-32	102	24	<LOD	3404	<LOD	4538	<LOD	9	<LOD	10	11	1	<LOD	40	14	2	<LOD	6	581766	1097
PCC-1 2	Balsmeier 21-32	<LOD	2046	<LOD	3341	183	59	<LOD	8	<LOD	10	11	1	<LOD	39	10	2	<LOD	6	548141	951
PCC-1 3	Balsmeier 21-32	<LOD	2016	<LOD	3279	<LOD	4376	<LOD	8	<LOD	10	10	1	<LOD	39	8	2	<LOD	6	548109	939
PCC-1 4	Balsmeier 21-32	82	25	<LOD	3290	<LOD	4395	<LOD	8	<LOD	10	9	1	<LOD	39	10	2	<LOD	6	520442	995
PCC-1 5	Balsmeier 21-32	<LOD	2022	<LOD	3281	208	60	<LOD	8	<LOD	10	10	1	<LOD	38	<LOD	9	<LOD	6	527554	922
PCC-1 6	Balsmeier 21-32	<LOD	2000	155	43	<LOD	4311	<LOD	8	<LOD	10	11	1	<LOD	39	8	2	<LOD	6	531923	922
Average																					
Standard Deviation																					
RSD %																					
Accepted Value																					
Std																					
% Difference																					
Note: Accepted values highlightec abundances of aggregated eleme																					









Reading #	Date	Time	Mo Conces	Mo Error1s	Mo User Fa	Mo User Fa	Ag Compo	Ag Compo	Ag Compo	Ag Concer	Ag Error1s	Ag User Fa	Ag User Fa	Cd Compo	Cd Compo	Cd Compo	Cd Concer	Cd Error1s	Cd User Fa	Cd User Fa	Sn Compo	Sn Compo	Sn Compo	Sn Concer	Sn Error1s	Sn User Fa	Sn User Fa	Sb Compo	Sb Compo	Sb Compo	Sb Concer	Sb Error1s	Sb User Fa	Sb User Fa	Ba Compo	Ba Compo	Ba Compo	Ba Concer	Ba Error1s	Ba User Fa	Ba User Fa	La Compo	La Compo	La Compo	La Concer
1	4/3/2025	15:26:58			1	0				<LOD	60	1	0				<LOD	22	1	0				<LOD	31	1	0				<LOD	40	1	0				<LOD	942	1	0				<LOD
2	4/3/2025	15:30:23	<LOD	5	1	0				<LOD	77	1	0				13	4	1	0				<LOD	29	1	0				<LOD	38	1	0				291	17	1	0				<LOD
3	4/3/2025	15:35:49	<LOD	5	1	0				<LOD	80	1	0				<LOD	21	1	0				19	6	1	0				<LOD	38	1	0				<LOD	1236	1	0				<LOD
4	4/3/2025	15:38:49	<LOD	5	1	0				<LOD	96	1	0				24	5	1	0				<LOD	30	1	0				<LOD	39	1	0				169	18	1	0				<LOD
5	4/3/2025	15:41:41	<LOD	6	1	0				<LOD	88	1	0				21	5	1	0				<LOD	39	1	0				<LOD	51	1	0				160	16	1	0				<LOD
6	4/3/2025	15:46:01	<LOD	6	1	0				<LOD	89	1	0				<LOD	27	1	0				<LOD	37	1	0				<LOD	48	1	0				208	16	1	0				<LOD
7	4/3/2025	15:48:38	<LOD	6	1	0				<LOD	93	1	0				<LOD	28	1	0				<LOD	38	1	0				<LOD	50	1	0				243	17	1	0				76
8	4/3/2025	15:51:36	<LOD	5	1	0				<LOD	88	1	0				16	5	1	0				<LOD	36	1	0				<LOD	48	1	0				181	17	1	0				<LOD
9	4/3/2025	15:54:27	<LOD	6	1	0				<LOD	95	1	0				15	5	1	0				<LOD	35	1	0				<LOD	45	1	0				270	16	1	0				<LOD
10	4/3/2025	15:57:20	<LOD	4	1	0				<LOD	90	1	0				<LOD	24	1	0				<LOD	32	1	0				<LOD	42	1	0				236	15	1	0				<LOD
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37	4/3/2025	17:23:52	<LOD	5	1	0				<LOD	88	1	0				<LOD	22	1	0				<LOD	31	1	0				<LOD	40	1	0				178	16	1	0				71
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Reading #	Date	Time	Pb User Fa	Pb User Fa	Bi Compou	Bi Compou	Bi Compou	Bi Concent	Bi Error1s	Bi User Fa	Bi User Fa	Th Compou	Th Compou	Th Compou	Th Concent	Th Error1s	Th User Fa	Th User Fa	U Compou	U Compou	U Compou	U Concent	U Error1s	U User Fa	U User Fa	LE Compou	LE Compou	LE Compou	LE Concent	LE Error1s	LE User Fa	LE User Fa	Sample ID	Hole ID	Sample Ty	Real Time 1	Real Time 2	Real Time 3
1	4/3/2025	15:26:58	1	0						1	0						1	0						1	0											15		
2	4/3/2025	15:30:23	1	0				<LOD	41	1	0				<LOD	10	1	0				<LOD	6	1	0				484415	457	1	0	Si Blank 1	Balsmeier 21-32	Standard	30	60	30
3	4/3/2025	15:35:49	1	0				<LOD	41	1	0				11	2	1	0				<LOD	6	1	0				501927	877	1	0	OREAS 70	Balsmeier 21-32	Standard	30	60	30
4	4/3/2025	15:38:49	1	0				<LOD	40	1	0				14	2	1	0				<LOD	6	1	0				581766	1097	1	0	PCC-1 1	Balsmeier 21-32	Standard	30	60	30
5	4/3/2025	15:41:41	1	0				<LOD	45	1	0				13	3	1	0				<LOD	7	1	0				499985	824	1	0	BHVO-1 1	Balsmeier 21-32	Standard	30	60	30
6	4/3/2025	15:46:01	1	0				<LOD	57	1	0				8	3	1	0				<LOD	9	1	0				618433	828	1	0	170-180	Balsmeier 21-32	Cuttings	30	60	30
7	4/3/2025	15:48:38	1	0				<LOD	58	1	0				17	3	1	0				<LOD	10	1	0				620056	844	1	0	260-300	Balsmeier 21-32	Cuttings	30	60	30
8	4/3/2025	15:51:36	1	0				<LOD	61	1	0				16	3	1	0				<LOD	11	1	0				607094	820	1	0	350-400	Balsmeier 21-32	Cuttings	30	60	30
9	4/3/2025	15:54:27	1	0				<LOD	60	1	0				10	3	1	0				<LOD	11	1	0				619632	847	1	0	450-500	Balsmeier 21-32	Cuttings	30	60	30
10	4/3/2025	15:57:20	1	0				<LOD	54	1	0				15	3	1	0				<LOD	9	1	0				614102	809	1	0	550-600	Balsmeier 21-32	Cuttings	30	60	30
11	4/3/2025	16:00:27	1	0				<LOD	52	1	0				13	3	1	0				6	1	1	0				684134	805	1	0	650-700	Balsmeier 21-32	Cuttings	30	60	30
12	4/3/2025	16:03:22	1	0				<LOD	59	1	0				12	3	1	0				<LOD	10	1	0				576742	804	1	0	750-800	Balsmeier 21-32	Cuttings	30	60	30
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16	4/3/2025	16:15:20	1	0				<LOD	58	1	0				11	3	1	0				14	1	1	0				605513	802	1	0	1150-1200	Balsmeier 21-32	Cuttings	30	60	30
17	4/3/2025	16:18:10	1	0				<LOD	67	1	0				13	3	1	0				<LOD	12	1	0				589145	817	1	0	1275-1300	Balsmeier 21-32	Cuttings	30	60	30
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19	4/3/2025	16:23:56	1	0				<LOD	67	1	0				12	3	1	0				<LOD	12	1	0				585466	853	1	0	1475-1500	Balsmeier 21-32	Cuttings	30	60	30
20	4/3/2025	16:27:04	1	0				<LOD	56	1	0				14	3	1	0				<LOD	9	1	0				622849	751	1	0	1575-1600	Balsmeier 21-32	Cuttings	30	60	30
21	4/3/2025	16:30:07	1	0				<LOD	53	1	0				7	2	1	0				<LOD	8	1	0				631715	791	1	0	1675-1700	Balsmeier 21-32	Cuttings	30	60	30
22	4/3/2025	16:33:08	1	0				<LOD	52	1	0				<LOD	13	1	0				<LOD	8	1	0				649048	924	1	0	1775-1800	Balsmeier 21-32	Cuttings	30	60	30
23	4/3/2025	16:35:59	1	0				<LOD	52	1	0				<LOD	13	1	0				<LOD	8	1	0				691397	981	1	0	1875-1900	Balsmeier 21-32	Cuttings	30	60	30
24	4/3/2025	16:38:49	1	0				<LOD	52	1	0				<LOD	13	1	0				<LOD	8	1	0				677951	945	1	0	1970-1980	Balsmeier 21-32	Cuttings	30	60	30
25	4/3/2025	16:42:13	1	0				<LOD	41	1	0				<LOD	10	1	0				<LOD	6	1	0				482040	456	1	0	Si Blank 2	Balsmeier 21-32	Standard	30	60	30
26	4/3/2025	16:45:33	1	0				<LOD	41	1	0				11	2	1	0				<LOD	6	1	0				505384	818	1	0	OREAS 70	Balsmeier 21-32	Standard	30	60	30
27	4/3/2025	16:48:51	1	0				<LOD	39	1	0				10	2	1	0				<LOD	6	1	0				548141	951	1	0	PCC-1 2	Balsmeier 21-32	Standard	30	60	30
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33	4/3/2025	17:07:01	1	0				<LOD	61	1	0				12	3	1	0				<LOD	10	1	0				658615	848	1	0	2470-2480	Balsmeier 21-32	Cuttings	30	60	30
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35	4/3/2025	17:13:11	1	0				<LOD	36	1	0				31	3	1	0				9	1	1	0				606104	787	1	0	2670-2680	Balsmeier 21-32	Cuttings	30	60	30
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38	4/3/2025	17:23:52	1	0				<LOD	45	1	0				15	3	1	0				<LOD	7	1	0				580879	817	1	0	2870-2880	Balsmeier 21-32	Cuttings	30	60	30
39	4/3/2025	17:26:43	1	0				<LOD	45	1	0				20	3	1	0				<LOD	7	1	0				572793	812	1	0	2970-2980	Balsmeier 21-32	Cuttings	30	60	30
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41	4/3/2025	17:32:42	1	0				<LOD	41	1	0				<LOD	10	1	0				<LOD	6	1	0				482682	455	1	0	Si Blank 3	Balsmeier 21-32	Standard	30	60	30
42	4/3/2025	17:35:21	1	0				<LOD	41	1	0				9	2	1	0				<LOD	6	1	0				504505	812	1	0	OREAS 70	Balsmeier 21-32	Standard	30	60	30
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44	4/3/2025	17:40:48	1	0				<LOD	45	1	0				20	3	1	0				<LOD	7	1	0				505137	769	1	0	BHVO-1 3	Balsmeier 21-32	Standard	30	60	30
1	4/4/2025	9:33:59	1	0						1	0						1	0						1	0											15		
2	4/4/2025	9:36:45	1	0				<LOD	41	1	0				<LOD	10	1	0				<LOD	6	1	0				484925	456	1	0	Si Blank 4	Balsmeier 21-32	Standard	30	60	30
3	4/4/2025	9:39:36	1	0				<LOD	40	1	0				8	2	1	0				<LOD	6	1	0				492610	863	1	0</						

Element	Limit of Detection (ppm)
Ag	2
Al	125
As	1
Ba	10
Bi	2
Ca	20
Cd	2
Ce	30
Co	2
Cr	10
Cu	2
Fe	15
Hg	1
K	15
La	20
Mg	1800
Mn	5
Mo	1
Nb	2
Nd	50
Ni	4
P	20
Pb	2
Pr	35
Rb	1
S	15
Sb	2
Se	1
Si	190
Sn	2
Sr	1
Th	2
Ti	20
U	1
V	5
W	1
Y	1
Zn	1
Zr	1

Our criteria for the "GeoRem preferred values" are primarily certified data											
as well as data from high precision and definitive methods such as ID-TIMS.											
Values with "(" are information values.											
Values were obtained via GeoRem ( <a href="https://georem.mpch-mainz.gwdg.de/">https://georem.mpch-mainz.gwdg.de/</a> )											
USGS BHVO-1: GeoRem preferred Values											
Jochum et al. (Max-Planck-Institut fuer Chemie)											
(2/2016)											
Item	less/more	Value	Uncertainty	Uncertainty	Unit	GeoRem-ID	Comment			Value of element	Uncertainty in ppm
Na2O		2.313	0.022	95%CL	%m/m	GeoRem 86	reference value			17159	163
MgO		7.213	0.032	95%CL	%m/m	GeoRem 86	reference value			43497	193
Al2O3		13.69	0.05	95%CL	%m/m	GeoRem 86	reference value			72456	265
SiO2		49.79	0.12	95%CL	%m/m	GeoRem 86	reference value			232737	561
P2O5		0.2773	0.0024	95%CL	%m/m	GeoRem 86	reference value			1210	10
K2O		0.5256	0.0046	95%CL	%m/m	GeoRem 86	reference value			4363	38
CaO		11.43	0.04	95%CL	%m/m	GeoRem 86	reference value			81690	286
TiO2		2.742	0.012	95%CL	%m/m	GeoRem 86	reference value			16434	72
MnO		0.1689	0.0011	95%CL	%m/m	GeoRem 86	reference value			1308	9
Fe2O3(t)		12.32	0.04	95%CL	%m/m	GeoRem 86	reference value			86170	280
Li		4.68	0.09	95%CL	µg/g	GeoRem 86	reference value				
Be		0.984	0.06	95%CL	µg/g	GeoRem 86	reference value				
B		3			µg/g	GeoRem 86	information value				
F		385			µg/g	GeoRem 86	information value				
S		76	29	95%CL	µg/g	GeoRem 86	information value				
Cl		93			µg/g	GeoRem 86	information value				
Sc		31.42	0.35	95%CL	µg/g	GeoRem 86	reference value				
V		313.8	3.2	95%CL	µg/g	GeoRem 86	reference value				
Cr		287.6	3.9	95%CL	µg/g	GeoRem 86	reference value				
Co		44.9	0.36	95%CL	µg/g	GeoRem 86	reference value				
Ni		120	1.5	95%CL	µg/g	GeoRem 86	reference value				
Cu		137.2	1.6	95%CL	µg/g	GeoRem 86	reference value				
Zn		105.1	1.5	95%CL	µg/g	GeoRem 86	reference value				
Ga		21.32	0.42	95%CL	µg/g	GeoRem 86	reference value				
Ge		1.57	0.13	95%CL	µg/g	GeoRem 86	reference value				
As		0.565	0.078	95%CL	µg/g	GeoRem 86	reference value				
Se		0.09	0.018	95%CL	µg/g	GeoRem 86	information value				
Br		0.2			µg/g	GeoRem 86	information value				
Rb		9.52	0.1	95%CL	µg/g	GeoRem 86	reference value				
Sr		399.2	5	95%CL	µg/g	GeoRem 86	reference value				
Y		26.23	0.31	95%CL	µg/g	GeoRem 86	reference value				
Zr		174.6	1.3	95%CL	µg/g	GeoRem 86	reference value				
Nb		18.53	0.23	95%CL	µg/g	GeoRem 86	reference value				
Mo		1.061	0.059	95%CL	µg/g	GeoRem 86	reference value				
Ru		0.00024			µg/g	GeoRem 86	information value				
Rh		0.00011			µg/g	GeoRem 86	information value				
Pd		0.003	0.004	95%CL	µg/g	GeoRem 86	information value				
Ag		0.071			µg/g	GeoRem 86	information value				
Cd		0.107	0.013	95%CL	µg/g	GeoRem 86	reference value				
In		0.0851	0.0081	95%CL	µg/g	GeoRem 86	information value				
Sn		2.09	0.15	95%CL	µg/g	GeoRem 86	reference value				
Sb		0.155	0.012	95%CL	µg/g	GeoRem 86	reference value				
Te		0.0073	0.0042	95%CL	µg/g	GeoRem 86	information value				
Cs		0.1032	0.0026	95%CL	µg/g	GeoRem 86	reference value				
Ba		134.4	2.5	95%CL	µg/g	GeoRem 86	reference value				
La		15.44	0.1	95%CL	µg/g	GeoRem 86	reference value				
Ce		38.08	0.22	95%CL	µg/g	GeoRem 86	reference value				
Pr		5.419	0.038	95%CL	µg/g	GeoRem 86	reference value				
Nd		24.78	0.26	95%CL	µg/g	GeoRem 86	reference value				
Sm		6.165	0.079	95%CL	µg/g	GeoRem 86	reference value				
Eu		2.053	0.014	95%CL	µg/g	GeoRem 86	reference value				
Gd		6.285	0.146	95%CL	µg/g	GeoRem 86	reference value				
Tb		0.9455	0.0091	95%CL	µg/g	GeoRem 86	reference value				
Dy		5.272	0.034	95%CL	µg/g	GeoRem 86	reference value				
Ho		0.9839	0.008	95%CL	µg/g	GeoRem 86	reference value				
Er		2.501	0.021	95%CL	µg/g	GeoRem 86	reference value				
Tm		0.3289	0.004	95%CL	µg/g	GeoRem 86	reference value				
Yb		1.987	0.015	95%CL	µg/g	GeoRem 86	reference value				
Lu		0.2775	0.0072	95%CL	µg/g	GeoRem 86	reference value				
Hf		4.44	0.11	95%CL	µg/g	GeoRem 86	reference value				
Ta		1.174	0.018	95%CL	µg/g	GeoRem 86	reference value				
W		0.212	0.012	95%CL	µg/g	GeoRem 86	information value				
Re		0.0004	0.00038	95%CL	µg/g	GeoRem 86	information value				
Os		0.000091	0.000015	95%CL	µg/g	GeoRem 86	information value				

Ir	0.00009	0.000013	95%CL	µg/g	GeoReM 86	information value						
Pt	0.0028	0.0011	95%CL	µg/g	GeoReM 86	information value						
Au	0.0022			µg/g	GeoReM 86	information value						
Hg	0.01			µg/g	GeoReM 86	reference value						
Tl	0.0461	0.0039	95%CL	µg/g	GeoReM 86	information value						
Pb	2.037	0.067	95%CL	µg/g	GeoReM 86	reference value						
Bi	0.0121	0.0015	95%CL	µg/g	GeoReM 86	reference value						
Th	1.225	0.017	95%CL	µg/g	GeoReM 86	reference value						
U	0.4182	0.0045	95%CL	µg/g	GeoReM 86	reference value						
d7Li	4.7	0.4	SD	‰LSVEC		mean value						
87Sr/86Sr	0.703477	0.00002	SD			mean value						
143Nd/144Nd	0.512987	0.000023	SD			mean value						
176Hf/177Hf	0.283104	0.000012	SD			mean value						
206Pb/204Pb	18.692	0.004	SD			mean value						
207Pb/204Pb	15.572	0.003	SD			mean value						
208Pb/204Pb	38.355	0.011	SD			mean value						
Download from GeoReM - the Reference Material Database												
Date of Query: Feb 5, 2024												

PCC-1 (peridotite powder) [U.S. Geological Survey, Box 25046, MS 963, , Denver, CO 80225, USA ]		Compiled	Value in ppm
Values were obtained via GeoRem ( <a href="https://georem.mpch-mainz.gwdg.de/">https://georem.mpch-mainz.gwdg.de/</a> )			
H2O-	0.31 %m/m ( compiled: 0.44 %m/m )		
H2O+	4.9 %m/m ( compiled: 4.71 %m/m )		
CO2	0.17 %m/m ( compiled: 0.15 %m/m )		
Na2O	0.03 %(m/m) (: 0 - 0.05 %m/m , 8 values ) ( compiled: 0.03 %m/m )		
MgO	43.43 %(m/m) (: 42.43 - 48.4 %m/m , 11 values ) ( compiled: 43.43 %m/m )	43.4	261901.1
Al2O3	0.6 - 0.72 %m/m 12 values ( compiled: 0.675 %m/m )	0.7	3572.5
SiO2	41.71 %(m/m) (: 40.71 - 44.41 %m/m , 11 values ) ( compiled: 41.71 %m/m )	41.7	194967.9
P2O5	0 - 0.046 %m/m 5 values ( compiled: 0.002 %m/m ) (uncertain : <0.01 %m/m )	0.0	8.7
K2O	0 - 0.03 %m/m 7 values ( compiled: 0.007 %m/m )	0.0	58.1
CaO	0.52 %(m/m) (: 0.48 - 0.561 %m/m , 12 values ) ( compiled: 0.52 %m/m )	0.5	3716.4
TiO2	0.01 %(m/m) (: 0.004 - 0.02 %m/m , 10 values ) ( compiled: 0.01 %m/m ) (uncertain : <0.01 %m/m )	0.0	59.9
MnO	0.12 %(m/m) (: 0.108 - 0.13 %m/m , 12 values ) ( compiled: 0.12 %m/m )	0.1	77.4
Fe2O3	7.94 - 8.91 %m/m 5 values		
Fe2O3(t)	8.25 %(m/m) (: 8.3 - 9.28 %m/m , 3 values ) ( compiled: 8.25 %m/m )	8.3	57703.0
FeO	7.1 - 8.11 %m/m 6 values		
FeO(t)	7.91 %m/m		
LOI	0.48 - 4.91 %m/m 2 values ( compiled: 5.12 %m/m )		
Li	0.9 - 1.19 µg/g 15 values ( compiled: 1.2 - 1.6 µg/g , 2 values )		
Be	0.001 - 0.0023 µg/g 8 values ( compiled: 0.05 µg/g )		
B	1.7 µg/g compiled		
C	420 µg/g compiled		
N	44 µg/g compiled		
F	12 µg/g compiled		
Na	58 µg/g		
P	14 µg/g		
S	13.7 - 17 µg/g 2 values ( compiled: 20 µg/g )		20
Cl	71 µg/g compiled		
K	75 µg/g		
Ca	3800 - 4009.05 µg/g 4 values		
Sc	6.7 - 9.65 µg/g 30 values ( compiled: 8.4 µg/g )		
Ti	23 - 90.008 µg/g 16 values ( compiled: 75 µg/g )		75
V	3 - 35.4 µg/g 25 values ( compiled: 31 µg/g )		31
Cr	1913 - 3550 µg/g 26 values ( compiled: 2730 µg/g )		2730
d53Cr	-0.09 ‰NIST979		
Mn	849 - 953.3 µg/g 2 values		
Fe	57300 - 62200 µg/g 2 values		
Co	95.1 - 152 µg/g 28 values ( compiled: 112 µg/g )		112
Ni	2052 - 2711 µg/g 28 values ( compiled: 2380 µg/g )		2380
Cu	6 - 19.54 µg/g 27 values ( compiled: 10 µg/g )		10
Zn	29.6 - 55 µg/g 29 values ( compiled: 42 µg/g )		42

PCC-1 (peridotite powder) [U.S. Geological Survey, Box 25046, MS 963, , Denver, CO 80225, USA]		Compiled	Value in ppm
Values were obtained via GeoRem ( <a href="https://georem.mpch-mainz.gwdg.de/">https://georem.mpch-mainz.gwdg.de/</a> )			
Ga	0.46 - 1.3 µg/g 21 values ( compiled: 0.64 - 0.7 µg/g , 2 values )		
Ge	0.545 - 1.04 µg/g 3 values ( compiled: 0.94 µg/g )		
As	0.1 - 2.5 µg/g 2 values ( compiled: 0.056 µg/g ) (uncertain : <0.1 - < 0.4 µg/g , 3 values )		
Se	0.138 - 0.3 µg/g 2 values ( compiled: 0.027 µg/g ) (uncertain : <1 µg/g )		
Br	0.35 µg/g ( compiled: 0.44 µg/g )		
Rb	0.016 - 2.2 µg/g 34 values ( compiled: 0.066 µg/g ) (uncertain : <3 - < 5 µg/g , 2 values )		
Sr	0.32 - 3.1 µg/g 38 values ( compiled: 0.38 - 0.4 µg/g , 2 values ) (uncertain : <20 µg/g )		
Y	0.061 - 0.9 µg/g 38 values ( compiled: 0.087 - 0.1 µg/g , 2 values ) (uncertain : <1 µg/g )		
Zr	0.095 - 5.5 µg/g 45 values ( compiled: 0.2 - 10 µg/g , 2 values ) (uncertain : <50 - < 88 µg/g , 2 values )		
Nb	0 - 0.4 µg/g 43 values ( compiled: 0.04 - 1 µg/g , 2 values )		
Mo	0.016 - 6.088 µg/g 14 values ( compiled: 0.02 - 2 µg/g , 2 values )		
Ru	0.01 µg/g compiled		
Rh	0.0014 µg/g compiled		
Pd	0.0054 µg/g compiled		
Ag	0.00367 µg/g ( compiled: 0.008 µg/g ) (uncertain : <0.3 µg/g )		
Cd	0.008829 - 0.039 µg/g 10 values ( compiled: 0.019 - 0.02 µg/g , 2 values )		
In	0.003 - 0.0041 µg/g 7 values ( compiled: 0.0037 µg/g )		
Sn	0.008 - 1.5205 µg/g 14 values ( compiled: 1.6 µg/g )		
Sb	1 - 1.6 µg/g 17 values ( compiled: 1.28 - 1.4 µg/g , 2 values )		
Te	0.0031 µg/g compiled		
I	0.26 µg/g ( compiled: 0.185 µg/g )		
Cs	-2.2 - 0.06 µg/g 22 values ( compiled: 0.0055 µg/g ) (uncertain : <0.1 µg/g )		
Ba	-1.7 - 19 µg/g 35 values ( compiled: 0.9 - 1.2 µg/g , 2 values ) (uncertain : <30 µg/g )		
La	0.02373 - 2.5 µg/g 52 values ( compiled: 0.0304 - 0.052 µg/g , 3 values )		
Ce	-5.4 - 0.2 µg/g 48 values ( compiled: 0.0563 - 0.1 µg/g , 3 values ) (uncertain : <0.8 µg/g )		
Pr	0.0056 - 0.014 µg/g 38 values ( compiled: 0.0072 - 0.013 µg/g , 3 values )		
Nd	-0.2 - 2.4 µg/g 53 values ( compiled: 0.0262 - 0.042 µg/g , 3 values ) (uncertain : <0.046 - < 2 µg/g , 3 values )		
Sm	0.0039 - 0.1056 µg/g 50 values ( compiled: 0.005 - 0.0066 µg/g , 3 values ) (uncertain : ()0.005 µg/g ) (uncertain : <0.01 µg/g )		
Eu	0.0006 - 0.04 µg/g 39 values ( compiled: 0.001 - 0.0018 µg/g , 3 values ) (uncertain : <0.0022 - < 0.07 µg/g , 3 values )		
Gd	0.00445 - 0.07 µg/g 43 values ( compiled: 0.0058 - 0.014 µg/g , 2 values )		
Tb	0.00091 - 0.00166 µg/g 36 values ( compiled: 0.0011 - 0.0015 µg/g , 3 values ) (uncertain : <0.03 - < 0.04 µg/g , 2 values )		
Dy	0.007 - 0.05 µg/g 41 values ( compiled: 0.0089 - 0.011 µg/g , 3 values )		
Ho	0.0023 - 0.02 µg/g 36 values ( compiled: 0.0025 - 0.0029 µg/g , 3 values )		
Er	0.0056 - 0.05 µg/g 40 values ( compiled: 0.0109 - 0.012 µg/g , 3 values )		
Tm	0.00177 - 0.0032 µg/g 30 values ( compiled: 0.0022 - 0.0027 µg/g , 2 values )		
Yb	0.01533 - 0.09 µg/g 45 values ( compiled: 0.0211 - 0.024 µg/g , 3 values ) (uncertain : ()0.025 µg/g ) (uncertain : <0.04 µg/g )		
Lu	0.00233 - 0.08 µg/g 41 values ( compiled: 0.0046 - 0.0057 µg/g , 3 values ) (uncertain : ()0.0056 µg/g )		
Hf	0 - 0.1 µg/g 37 values ( compiled: 0.006 - 0.04 µg/g , 2 values ) (uncertain : <0.05 - < 0.2 µg/g , 2 values )		
Ta	0.0005 - 0.108 µg/g 28 values ( compiled: 0.002 - 0.02 µg/g , 2 values ) (uncertain : <0.07 - < 0.1 µg/g , 2 values )		
W	0.001589 - 0.0847 µg/g 5 values ( compiled: 0.02 µg/g ) (uncertain : <1 µg/g )		
Re	0.000058 µg/g compiled		
Os	0.007 µg/g compiled		

PCC-1 (peridotite powder) [U.S. Geological Survey, Box 25046, MS 963, , Denver, CO 80225, USA]		Compiled	Value in ppm
Values were obtained via GeoRem ( <a href="https://georem.mpch-mainz.gwdg.de/">https://georem.mpch-mainz.gwdg.de/</a> )			
Ir	0.0045 µg/g ( compiled: 0.0048 µg/g ) (uncertain : <0.005 µg/g)		
Pt	0.0079 µg/g ( compiled: 0.008 µg/g )		
Au	0.00116 µg/g ( compiled: 0.0079 µg/g ) (uncertain : <0.001 µg/g)		
Hg	0.0098 µg/g ( compiled: 0.006 µg/g )		
Tl	0.000558 - 0.007 µg/g 10 values ( compiled: 0.002 µg/g )		
Pb	7.1 - 12.18 µg/g 29 values ( compiled: 8.5 - 10 µg/g , 2 values )		
Bi	0.0041 - 0.0054 µg/g 7 values ( compiled: 0.008 µg/g )		
Th	-0.5 - 0.12 µg/g 35 values ( compiled: 0.01 - 0.013 µg/g , 2 values ) (uncertain : <0.04 - < 0.06 µg/g , 2 values )		
U	0.003 - 0.2 µg/g 33 values ( compiled: 0.0043 - 0.0045 µg/g , 2 values ) (uncertain : <0.1 - < 0.2 µg/g , 2 values )		
d7Li	8.85 - 8.9 ‰LSVEC 2 values		
d11B	8.19 ‰SRM951		
d25Mg	-0.26 - -0.095 ‰DSM3 11 values ( : 1.58 ‰ERM-AE143 )		
d26Mg	-0.51 - -0.2 ‰DSM3 13 values ( : 3.077 ‰ERM-AE143 )		
d30Si	-0.29 ‰NBS28		
d44/40Ca	1.13 - 1.29 ‰NIST915a 7 values		
d51V	-1.29 - -1.01 ‰AA 2 values ( : -1.02 ‰ALFAESARV )		
d53Cr	-0.1 - -0.05 ‰NIST979 2 values		
d56/54Fe	0.015 - 0.048 ‰IRMM014 4 values		
d56Fe	-0.02 - 0.052 ‰IRMM014 3 values ( : 0.006 - 0.03 ‰IRMM14 , 5 values ) ( : 0.003 ‰IRMM524a ) ( : -0.06 ‰rocks )		
d57/54Fe	0.111 ‰IRMM014 ( : 0.034 ‰IRMM14 )		
d57/56Fe	0.001 ‰IRMM14		
d57Fe	-0.06 - 0.091 ‰IRMM014 3 values ( : 0.036 - 0.07 ‰IRMM14 , 6 values ) ( : 0.01 ‰IRMM524a ) ( : -0.09 ‰rocks )		
d60/58Ni	0.119 - 0.166 ‰NIST986 5 values		
d60Ni		0.14	
d61/58Ni	0.241 - 0.25 ‰NIST986 3 values		
d62/58Ni	0.273 - 0.342 ‰NIST986 3 values		
d64/58Ni	0.62 ‰NIST986		
d65Cu	-0.011 - 0.17 ‰NIST976 2 values		
d66Zn	-0.09 ‰IRMM3702 ( : 0.21 ‰JMC-Zn-Lyon )		
d72Ge	0.79 ‰ALD		
d73Ge	1.18 ‰ALD		
d74/70Ge	0.66 ‰NIST3120a compiled		
d74Ge	1.41 ‰ALD		
d82/76Se	-1.3 ‰MERCK		
d82/78Se	-0.88 ‰MERCK		
87Sr/86Sr	0.711067 - 0.711174 2 values		
d98/95Mo	-0.14 ‰NIST3134		
e123Sb	-0.5 E-4SPEX-Sb		
143Nd/144	0.512176 - 0.512245 7 values		
176Hf/177	0.283377 - 0.283401 2 values		
d198Pt	-0.324 ‰IRMM010		
206Pb/204	18.928 - 18.947 2 values		

PCC-1 (peridotite powder) [U.S. Geological Survey, Box 25046, MS 963, , Denver, CO 80225, USA]		Compiled	Value in ppm	
Values were obtained via GeoRem ( <a href="https://georem.mpch-mainz.gwdg.de/">https://georem.mpch-mainz.gwdg.de/</a> )				
207Pb/204	15.643 - 15.665 2 values			
208Pb/204	38.4403 - 38.523 2 values			

Table 1. Certified Values and Performance Gates for OREAS 70b												
Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window		
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High	
<b>Borate Fusion XRF</b>												
Al, wt. %	3.81	0.039	3.73	3.88	3.69	3.92	1.03%	2.06%	3.09%	3.62	4.00	
Ca, wt. %	3.07	0.022	3.03	3.12	3.01	3.14	0.72%	1.43%	2.15%	2.92	3.23	
Cr, ppm	1243	44	1156	1331	1112	1375	3.52%	7.05%	10.57%	1181	1306	
Fe, wt. %	5.51	0.086	5.34	5.68	5.25	5.77	1.55%	3.11%	4.66%	5.24	5.79	
K, wt. %	0.585	0.010	0.565	0.605	0.554	0.615	1.73%	3.45%	5.18%	0.555	0.614	
Mg, wt. %	13.54	0.086	13.37	13.71	13.28	13.80	0.63%	1.27%	1.90%	12.87	14.22	
Mn, wt. %	0.115	0.003	0.108	0.121	0.105	0.124	2.78%	5.56%	8.34%	0.109	0.121	
Na, wt. %	0.742	0.016	0.709	0.775	0.692	0.791	2.22%	4.45%	6.67%	0.705	0.779	
Ni, ppm	2231	62	2107	2355	2045	2418	2.78%	5.57%	8.35%	2120	2343	
P, wt. %	0.024	0.002	0.021	0.027	0.019	0.029	6.80%	13.60%	20.40%	0.023	0.025	
Si, wt. %	22.42	0.171	22.08	22.76	21.91	22.93	0.76%	1.53%	2.29%	21.30	23.54	
Ti, wt. %	0.178	0.004	0.170	0.185	0.166	0.189	2.19%	4.39%	6.58%	0.169	0.186	
<b>Borate / Peroxide Fusion ICP</b>												
Al, wt. %	3.80	0.162	3.47	4.12	3.31	4.28	4.28%	8.55%	12.83%	3.61	3.99	
As, ppm	143	20	103	183	84	202	13.83%	27.66%	41.49%	136	150	
Ba, ppm	202	11	180	224	169	235	5.47%	10.93%	16.40%	192	212	
Ca, wt. %	3.08	0.101	2.87	3.28	2.77	3.38	3.30%	6.60%	9.89%	2.92	3.23	
Ce, ppm	27.5	2.62	22.2	32.7	19.6	35.3	9.54%	19.07%	28.61%	26.1	28.8	
Co, ppm	83	6.7	70	97	63	103	8.06%	16.13%	24.19%	79	87	
Cr, ppm	1252	120	1012	1491	892	1611	9.58%	19.16%	28.74%	1189	1314	
Cs, ppm	3.37	0.293	2.79	3.96	2.50	4.25	8.68%	17.36%	26.04%	3.21	3.54	
Cu, ppm	52	6	40	64	34	70	11.51%	23.02%	34.52%	49	54	
Dy, ppm	1.92	0.149	1.62	2.22	1.47	2.37	7.76%	15.52%	23.28%	1.82	2.02	
Er, ppm	1.18	0.107	0.97	1.40	0.86	1.50	9.04%	18.07%	27.11%	1.12	1.24	
Eu, ppm	0.54	0.037	0.46	0.61	0.43	0.65	6.92%	13.83%	20.75%	0.51	0.56	
Fe, wt. %	5.66	0.234	5.20	6.13	4.96	6.37	4.13%	8.27%	12.40%	5.38	5.95	
Ga, ppm	9.71	0.412	8.88	10.53	8.47	10.94	4.25%	8.50%	12.74%	9.22	10.19	
Gd, ppm	1.93	0.23	1.47	2.38	1.25	2.61	11.80%	23.61%	35.41%	1.83	2.02	
Ho, ppm	0.41	0.05	0.31	0.50	0.27	0.55	11.41%	22.82%	34.24%	0.39	0.43	
K, wt. %	0.617	0.056	0.506	0.729	0.450	0.785	9.04%	18.09%	27.13%	0.586	0.648	
La, ppm	15.5	1.7	12.2	18.8	10.5	20.5	10.70%	21.40%	32.09%	14.7	16.3	
Li, ppm	35.3	5.2	24.9	45.7	19.7	50.9	14.73%	29.47%	44.20%	33.6	37.1	
Mg, wt. %	13.61	0.434	12.74	14.48	12.30	14.91	3.19%	6.39%	9.58%	12.93	14.29	
Mn, wt. %	0.116	0.004	0.108	0.124	0.104	0.127	3.31%	6.62%	9.92%	0.110	0.122	
Nb, ppm	3.27	0.307	2.65	3.88	2.34	4.19	9.41%	18.82%	28.23%	3.10	3.43	
Nd, ppm	11.3	1.4	8.5	14.1	7.2	15.5	12.28%	24.56%	36.84%	10.8	11.9	
Ni, ppm	2220	82	2055	2385	1972	2467	3.72%	7.43%	11.15%	2109	2331	
P, wt. %	0.025	0.003	0.019	0.031	0.016	0.034	11.69%	23.38%	35.07%	0.024	0.026	
Pb, ppm	13.2	1.8	9.7	16.7	7.9	18.5	13.41%	26.82%	40.23%	12.5	13.9	
Pr, ppm	3.13	0.35	2.43	3.84	2.07	4.19	11.28%	22.55%	33.83%	2.98	3.29	
Rb, ppm	33.7	2.87	27.9	39.4	25.1	42.3	8.53%	17.06%	25.60%	32.0	35.4	
S, wt. %	0.308	0.026	0.256	0.359	0.230	0.385	8.41%	16.82%	25.23%	0.292	0.323	
Si, wt. %	22.78	0.458	21.86	23.70	21.40	24.15	2.01%	4.02%	6.04%	21.64	23.92	
Sm, ppm	2.00	0.155	1.69	2.31	1.53	2.46	7.74%	15.48%	23.23%	1.90	2.10	
Sr, ppm	72	5.7	61	84	55	89	7.83%	15.66%	23.49%	69	76	
Tb, ppm	0.32	0.03	0.25	0.38	0.22	0.41	10.20%	20.40%	30.59%	0.30	0.33	
Th, ppm	6.45	0.578	5.29	7.60	4.71	8.18	8.97%	17.94%	26.91%	6.12	6.77	
Ti, wt. %	0.176	0.006	0.164	0.189	0.157	0.195	3.54%	7.08%	10.62%	0.167	0.185	
Tm, ppm	0.18	0.02	0.14	0.22	0.12	0.24	10.65%	21.29%	31.94%	0.17	0.19	
U, ppm	1.87	0.32	1.22	2.51	0.90	2.84	17.25%	34.50%	51.74%	1.78	1.96	
V, ppm	69	6.8	56	83	49	89	9.83%	19.66%	29.48%	66	73	
Y, ppm	10.7	0.64	9.4	11.9	8.7	12.6	6.01%	12.01%	18.02%	10.1	11.2	
Yb, ppm	1.16	0.105	0.95	1.37	0.84	1.47	9.11%	18.22%	27.33%	1.10	1.22	
Zn, ppm	107	10	88	126	79	136	8.87%	17.75%	26.62%	102	113	
Zr, ppm	67	9	49	86	40	95	13.73%	27.46%	41.19%	64	71	
<b>4-Acid Digestion</b>												
Ni, wt. %	0.218	0.010	0.198	0.238	0.187	0.248	4.66%	9.32%	13.98%	0.207	0.229	
Co, ppm	78	5.0	68	88	63	93	6.38%	12.77%	19.15%	75	82	
As, ppm	148	8	131	165	123	173	5.66%	11.31%	16.97%	140	155	
Ag, ppm	0.175	0.035	0.105	0.244	0.071	0.279	19.85%	39.71%	59.56%	0.166	0.184	
Al, wt. %	3.87	0.182	3.51	4.24	3.32	4.42	4.71%	9.42%	14.14%	3.68	4.06	
Ba, ppm	202	9	183	220	174	230	4.61%	9.22%	13.84%	192	212	
Be, ppm	1.04	0.19	0.65	1.42	0.46	1.62	18.58%	37.16%	55.74%	0.99	1.09	
Bi, ppm	0.84	0.15	0.54	1.14	0.39	1.29	17.80%	35.60%	53.40%	0.80	0.88	
Ca, wt. %	3.05	0.149	2.76	3.35	2.61	3.50	4.87%	9.75%	14.62%	2.90	3.21	
Cd, ppm	0.36	0.04	0.29	0.43	0.25	0.47	10.19%	20.38%	30.57%	0.34	0.38	

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window		
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High	
Ce, ppm	28.2	1.97	24.3	32.1	22.3	34.1	6.96%	13.93%	20.89%	26.8	29.6	
Cs, ppm	3.44	0.271	2.90	3.98	2.63	4.26	7.88%	15.77%	23.65%	3.27	3.61	
Cu, ppm	52	4.3	44	61	39	65	8.23%	16.46%	24.69%	50	55	
Fe, wt. %	5.52	0.273	4.98	6.07	4.70	6.34	4.94%	9.88%	14.82%	5.25	5.80	
Ga, ppm	10.1	0.89	8.3	11.8	7.4	12.7	8.84%	17.67%	26.51%	9.6	10.6	
Hf, ppm	1.86	0.20	1.46	2.25	1.27	2.44	10.56%	21.12%	31.68%	1.76	1.95	
In, ppm	0.047	0.003	0.040	0.053	0.037	0.056	6.65%	13.29%	19.94%	0.044	0.049	
K, wt. %	0.620	0.029	0.562	0.678	0.533	0.707	4.67%	9.35%	14.02%	0.589	0.651	
La, ppm	15.3	1.41	12.5	18.2	11.1	19.6	9.17%	18.34%	27.51%	14.6	16.1	
Li, ppm	34.4	2.61	29.2	39.6	26.6	42.2	7.58%	15.16%	22.74%	32.7	36.1	
Mg, wt. %	13.40	0.783	11.83	14.97	11.05	15.75	5.84%	11.69%	17.53%	12.73	14.07	
Mn, wt. %	0.115	0.004	0.107	0.123	0.103	0.126	3.40%	6.79%	10.19%	0.109	0.121	
Mo, ppm	3.30	0.53	2.23	4.36	1.70	4.90	16.15%	32.29%	48.44%	3.13	3.46	
Na, wt. %	0.769	0.033	0.702	0.836	0.669	0.869	4.35%	8.70%	13.05%	0.730	0.807	
Nb, ppm	3.68	0.335	3.01	4.35	2.67	4.68	9.11%	18.23%	27.34%	3.49	3.86	
P, wt. %	0.022	0.001	0.020	0.025	0.018	0.027	6.50%	13.00%	19.50%	0.021	0.024	
Pb, ppm	13.7	1.6	10.4	16.9	8.8	18.5	11.86%	23.71%	35.57%	13.0	14.3	
S, wt. %	0.309	0.020	0.270	0.349	0.250	0.369	6.38%	12.75%	19.13%	0.294	0.325	
Sb, ppm	0.56	0.06	0.43	0.69	0.37	0.75	11.29%	22.57%	33.86%	0.53	0.59	
Sc, ppm	12.4	1.08	10.2	14.5	9.1	15.6	8.74%	17.49%	26.23%	11.7	13.0	
Sn, ppm	1.21	0.18	0.85	1.57	0.67	1.75	14.89%	29.79%	44.68%	1.15	1.27	
Sr, ppm	74	6.1	62	86	56	92	8.23%	16.47%	24.70%	70	78	
Ta, ppm	0.30	0.04	0.23	0.37	0.19	0.40	11.86%	23.72%	35.58%	0.28	0.31	
Th, ppm	6.91	0.278	6.35	7.46	6.07	7.74	4.02%	8.05%	12.07%	6.56	7.25	
Ti, wt. %	0.181	0.006	0.169	0.193	0.163	0.199	3.37%	6.74%	10.11%	0.172	0.190	
Tl, ppm	0.33	0.04	0.25	0.41	0.20	0.45	12.61%	25.23%	37.84%	0.31	0.35	
U, ppm	1.72	0.108	1.50	1.93	1.39	2.04	6.27%	12.53%	18.80%	1.63	1.80	
V, ppm	67	2.6	62	72	59	75	3.90%	7.80%	11.70%	63	70	
W, ppm	4.92	0.72	3.48	6.37	2.76	7.09	14.67%	29.33%	44.00%	4.68	5.17	
Y, ppm	9.85	0.520	8.81	10.89	8.29	11.41	5.28%	10.57%	15.85%	9.35	10.34	
Zn, ppm	112	9	94	130	85	139	8.09%	16.18%	24.28%	106	117	
Zr, ppm	66	5.1	56	76	51	81	7.70%	15.39%	23.09%	63	69	
<b>Infrared Combustion</b>												
S, wt. %	0.286	0.020	0.246	0.325	0.227	0.344	6.86%	13.72%	20.58%	0.271	0.300	
<b>Thermogravimetry</b>												
LOI <sup>1000</sup> , wt. %	6.69	0.330	6.03	7.35	5.70	7.68	4.93%	9.85%	14.78%	6.35	7.02	
												
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