Contents

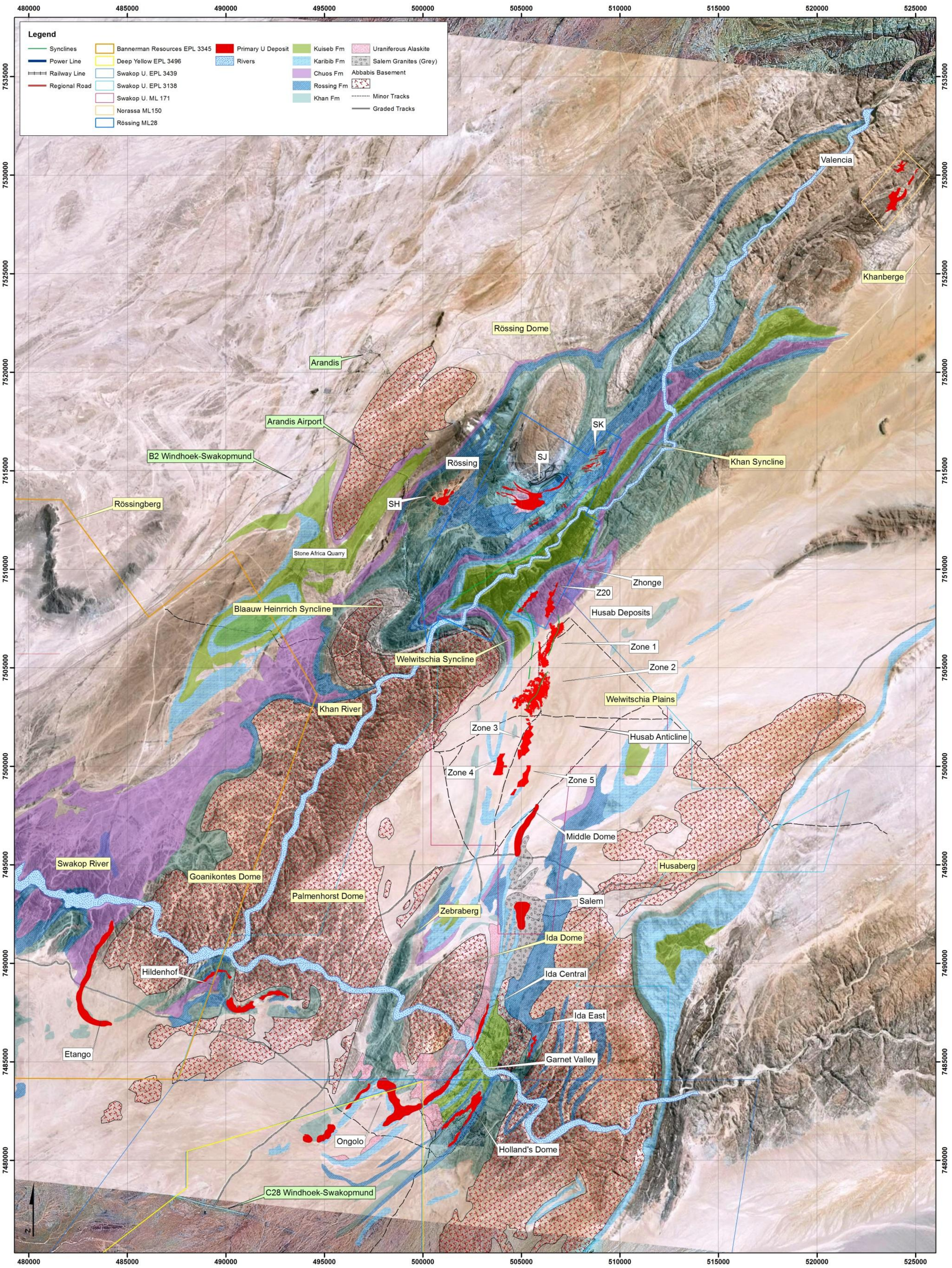
Appendix A Uranium Production Statistics

Country	Nuclear electricity generation 2014		Reactors operable 01-nov-15		Reactors under construction 01-nov-15		Reactors planned Nov-15		Uranium required 2015
Country profile)	Billion kwh	% e	No.	Mwe net	No.	Mwe gross	No.	Mwe gross	Tonnes u
Argentina	5.3	4	3	1627	1	27	2	1950	215
Armenia	2.3	30.7	1	376	0	0	1	1060	88
Bangladesh	0	0	0	0	0	0	2	2400	0
Belarus	0	0	0	0	2	2388	0	0	0
Belgium	32.1	47.5	7	5943	0	0	0	0	1017
Brazil	14.5	2.9	2	1901	1	1405	0	0	326
Bulgaria	15	31.8	2	1926	0	0	1	950	324
Canada	98.6	16.8	19	13553	0	0	2	1500	1784
China	123.8	2.4	29	26239	22	24094	43	49970	8161
Czech rep.	28.6	35.8	6	3904	0	0	2	2400	566
Egypt	0	0	0	0	0	0	2	2400	0
Finland	22.6	34.6	4	2741	1	1700	1	1200	751
France	418	76.9	58	63130	1	1750	0	0	9230
Germany	91.8	15.8	8	10728	0	0	0	0	1889
Hungary	14.8	53.6	4	1889	0	0	2	2400	357
India	33.2	3.5	21	5302	6	4300	22	21300	1579
Indonesia	0	0	0	0	0	0	1	30	0
Iran	3.7	1.5	1	915	0	0	2	2000	176
Japan	0	0	43	40480	3	3036	9	12947	2549
Kazakhstan	0	0	0	0	0	0	2	600	0
Korea dpr	0	0	0	0	0	0	0	0	0
Korea ro s	149.2	30.4	24	21677	4	5600	8	11600	5022
Lithuania	0	0	0	0	0	0	1	1350	0
Mexico	9.3	5.6	2	1600	0	0	0	0	270
Netherlands	3.9	4	1	485	0	0	0	0	103
Pakistan	4.6	4.3	3	725	2	680	2	2300	101
Poland	0	0	0	0	0	0	6	6000	0
Romania	10.8	18.5	2	1310	0	0	2	1440	179
Russia	169.1	18.6	34	25264	9	7968	31	33264	4206
Slovakia	14.4	56.8	4	1816	2	942	0	0	466
Slovenia	6.1	37.2	1	696	0	0	0	0	137
South africa	14.8	6.2	2	1830	0	0	0	0	305
Spain	54.9	20.4	7	7002	0	0	0	0	1274
Sweden	62.3	41.5	9	8849	0	0	0	0	1516
Switzerland	26.5	37.9	5	3333	0	0	0	0	521
Turkey	0	0	0	0	0	0	4	4800	0
Ukraine	83.1	49.4	15	13107	0	0	2	1900	2366
UAE	0	0	0	0	4	5600	0	0	0
UK	57.9	17.2	16	9373	0	0	4	6680	1738
USA	798.6	19.5	99	98990	5	6218	5	6263	18692
Vietnam	0	0	0	0	0	0	4	4800	0
World**	**2,411**	**C 11.5**	**438**	**381,638**	**65**	**68,408**	**165**	**185,504**	**66,883**

Country or area	Production (tU)						
	2008	2009	2010	2011	2012	2013	2014
Argentina	0	0	0	0	0	0	0
Armenia	na	na	na	na	na	na	na
Australia	8430	7982	5900	5983	6991	6350	5001
Belgium	0	0	0	0	0	0	0
Brazil	330	345	148	265	231	198	231
Bulgaria	0	0	0	0	0	0	0
Canada	9000	10,173	9873	9145	8998	9332	9134
China ^	769	750	827	885	1500	1450	1500
Czech Rep	263	258	254	229	228	225	193
Finland	na	na	na	na	na	na	na
France	5	8	7	6	3	0	3
Germany	0	0	0	52	50	27	33
Hungary	0	0	0	0	0	0	0
India^	271	290	400	400	385	400	385
Japan	na	na	na	na	na	na	na
Kazakhstan	8521	14,020	17,803	19,451	21,317	22,567	23,127
Korea, S	na	na	na	na	na	na	na
Lithuania	na	na	na	na	na	na	na
Malawi	0	104	670	846	1101	1132	369
Mexico	na	na	na	na	na	na	na
Namibia	4366	4626	4496	3258	4495	4315	3255
Netherlands	na	na	na	na	na	na	na
Niger	3032	3243	4198	4351	4667	4528	4057
Pakistan^	45	50	45	45	45	41	45
Portugal	0	0	0	0	0	0	0
Romania^	77	75	77	77	90	80	77
Russia^	3521	3564	3562	2993	2872	3135	2990
Slovakia	na	na	na	na	na	na	na
Slovenia	na	na	na	na	na	na	na
South Africa	655	563	583	582	465	540	573
Spain	0	0	0	0	0	0	0
Sweden	na	na	na	na	na	na	na
Switzerland	na	na	na	na	na	na	na
UK	na	na	na	na	na	na	na
Ukraine^	800	840	850	890	960	1075	962
USA	1430	1453	1660	1537	1596	1835	1919
Uzbekistan	2338	2429	2400	3000	2400	2400	2400
Total	43,853	50,772	53,663	53,494	58,344	59,673	56,252

Territory	Resources in known tonnes U at US$130/kg	percentage of world
Australia	1,706,100	29%
Kazakhstan	679,300	12%
Russian Fed	505,900	9%
Canada	493,900	8%
Niger	404,900	7%
Namibia	382,800	6%
South Africa	338,100	6%
Brazil	276,100	5%
USA	207,400	4%
China	199,100	4%
Mongolia	141,500	2%
Ukraine	117,700	2%
Uzbekistan	91,300	2%
Botswana	68,800	1%
Tanzania	58,500	1%
Jordan	33,800	1%
Other	191,500	3%
World total	**5,902,500**	

Appendix B Central Zone Uranium Deposit Locations



Kilometers
5 2.5 0 5
1:120,000

Coordinate System: SUTM33
Projection: Transverse Mercator
Datum: WGS 1984

Author: Guy Freemantle
Date: 24/02/2014

Central Zone Primary Uranium Deposits

Image Credits
Landsat 1984
Google Earth - GeoEye 2012
OrthoPhoto - Valencia Uranium 2007

Deposit Outlines
Rössing: Rio Tinto Plc
Husab: Swakop Uranium Ltd. (Coffey Mining 2013)
Ida Dome: Swakop Uranium Ltd. (Coffey Mining 2009)
Etango: Bannerman Resources Ltd.
Valencia: Forsys Metals
Ongolo: Deep Yellow Ltd.

Geological ShapeFiles
Namibia Geological Survey 2008
Swakop Uranium 2010

EPL and ML ShapeFiles
Namibian Chamber of Mines 2012

Appendix C1 Radiometric mapping

Methodology

Radiometric maps of the Hildenhof and Ida Central anomalies were produced by walking a ground survey during 2007. A ~1.5km x ~750m was walked at Ida Central, covering exposed workings of the old Ida Copper Mine. At Hildenhof a 400m by 400m area was covered.

Data collection at each area consisted of the following:

Walking GPS-guided traverses with a Thermo™ RADEye personal radiation detector. The devise was set to record the mean and maximum total counts per second, every 5 seconds. The total includes radiation produced by Th and K decay.

The GPS was time-synced to the laptop and the RADEye subsequently synchronized to the laptop on a daily basis.

The GPS (Garmin E-trex colour) recorded tracks and data points were set to the maximum capacity of the devise (6 per minute).

Tabulation of the data was facilitated by Microsoft Excel, and data points from both the scintillometer and the GPS were matched as close as possible to each other by time.

Data points used to produce the radiometric maps are presented in the table below.

Golden Software's Surfer v8 was used to produce the finished radiometric maps, in conjunction with Corel Draw (v. 13) and Arc GIS (v. 10).

Data was plotted in UTM- WGS84 Zone 33S.

Appendix C2 Hildenhof radiometric map data points

Hildenhof Ground Radiometric Survey.
Device: Thermo-Fisher RADEye pdm
Data Points: 324
Arrangement: Sorted by Easting, W-E
Coordinate System: UTM WGS84Z33S

Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
489371	7489787	77	489505	7489777	54	489542	7489530	72	489609	7489707	47
489371	7489790	73	489505	7489722	103	489542	7489532	81	489610	7489723	54
489380	7489764	73	489507	7489670	69	489544	7489519	69	489612	7489701	59
489386	7489749	76	489508	7489703	136	489544	7489561	66	489614	7489799	47
489393	7489735	111	489508	7489704	122	489547	7489689	170	489614	7489799	60
489395	7489741	109	489509	7489660	85	489547	7489688	65	489614	7489678	45
489402	7489729	123	489509	7489679	64	489552	7489481	87	489616	7489791	57
489408	7489705	222	489509	7489717	169	489553	7489486	80	489616	7489750	50
489409	7489708	152	489510	7489653	69	489553	7489502	77	489617	7489771	53
489410	7489718	113	489510	7489657	89	489556	7489673	69	489618	7489667	48
489416	7489671	172	489510	7489682	67	489557	7489472	83	489620	7489664	53
489416	7489696	167	489511	7489657	94	489559	7489672	66	489624	7489653	59
489419	7489668	183	489512	7489664	74	489564	7489672	63	489625	7489643	60
489419	7489669	178	489513	7489779	55	489573	7489662	61	489627	7489637	61
489421	7489645	199	489513	7489691	102	489575	7489655	58	489631	7489635	62
489422	7489642	236	489515	7489653	66	489584	7489638	56	489635	7489633	56
489422	7489657	188	489517	7489642	60	489585	7489645	55	489635	7489626	56
489423	7489652	372	489521	7489771	55	489586	7489634	59	489638	7489623	86
489426	7489629	134	489521	7489620	80	489587	7489556	56	489639	7489468	51
489439	7489612	216	489521	7489634	73	489588	7489626	64	489639	7489620	86
489448	7489571	219	489522	7489792	43	489588	7489572	55	489639	7489618	85
489451	7489565	224	489522	7489621	81	489588	7489561	57	489639	7489618	77
489451	7489579	214	489523	7489793	54	489588	7489552	55	489642	7489475	59
489452	7489560	146	489523	7489763	53	489589	7489626	50	489645	7489486	59
489452	7489592	176	489524	7489604	78	489589	7489579	51	489646	7489500	58
489455	7489590	209	489524	7489629	83	489589	7489569	54	489646	7489549	66
489456	7489550	110	489528	7489595	74	489589	7489545	55	489649	7489516	53
489460	7489546	126	489528	7489607	67	489590	7489542	55	489649	7489527	58
489462	7489533	160	489528	7489609	67	489590	7489536	54	489649	7489541	69
489463	7489532	193	489528	7489619	78	489590	7489537	58	489651	7489536	60
489467	7489511	227	489529	7489586	76	489592	7489510	53	489654	7489553	60
489468	7489493	227	489530	7489743	62	489594	7489535	54	489657	7489563	51
489470	7489508	190	489530	7489737	82	489594	7489520	53	489662	7489578	55
489471	7489488	130	489530	7489600	72	489595	7489525	52	489667	7489601	48
489474	7489801	52	489530	7489614	66	489596	7489591	65	489668	7489592	54
489476	7489798	63	489531	7489758	53	489597	7489511	52	489670	7489642	59
489476	7489471	130	489531	7489732	102	489597	7489490	55	489670	7489710	59
489478	7489464	109	489532	7489728	146	489598	7489497	51	489671	7489632	60
489481	7489755	59	489532	7489618	72	489598	7489624	56	489671	7489647	63
489484	7489745	56	489533	7489719	133	489599	7489478	54	489672	7489613	58

489485	7489752	62	489534	7489753	54	489599	7489477	55	489672	7489638	59
Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
489486	7489784	59	489535	7489581	74	489599	7489618	54	489673	7489615	61
489489	7489738	81	489536	7489709	144	489600	7489485	55	489673	7489628	61
489489	7489748	54	489536	7489620	68	489601	7489508	52	489674	7489654	64
489491	7489740	74	489537	7489566	72	489601	7489504	50	489675	7489697	66
489494	7489726	89	489539	7489697	157	489603	7489469	55	489675	7489760	49
489496	7489748	53	489539	7489552	82	489603	7489468	63	489676	7489618	73
489497	7489724	96	489540	7489547	78	489603	7489603	55	489676	7489620	62
489498	7489745	62	489540	7489558	85	489605	7489617	53	489676	7489625	61
489502	7489777	53	489541	7489547	97	489605	7489613	52	489677	7489667	85
489677	7489668	106	489780	7489751	56	489909	7489471	45	489770	7489706	55
489677	7489725	60	489781	7489768	68	489909	7489439	44	489770	7489706	60
489677	7489732	67	489783	7489777	76	489910	7489530	63	489775	7489712	50
489677	7489743	51	489783	7489470	51	489910	7489472	45	489776	7489738	50
489678	7489740	50	489785	7489473	57	489910	7489465	46	489777	7489722	55
489679	7489678	126	489786	7489796	69	489910	7489459	46	489777	7489722	50
489679	7489684	147	489792	7489483	56	489910	7489455	45	489778	7489450	44
489679	7489687	59	489796	7489504	49	489911	7489527	92	489778	7489454	52
489680	7489761	57	489797	7489515	45	489912	7489541	59	489779	7489733	50
489685	7489765	71	489803	7489523	45	489912	7489498	53	489779	7489461	52
489685	7489771	66	489804	7489524	45	489920	7489564	60	489780	7489766	64
489694	7489782	60	489808	7489537	46	489921	7489579	58	489871	7489786	53
489695	7489800	52	489814	7489548	46	489921	7489546	59	489871	7489786	52
489702	7489458	51	489819	7489566	47	489924	7489584	72	489902	7489510	73
489702	7489458	50	489826	7489578	47	489924	7489574	59	489904	7489430	45
489704	7489460	52	489830	7489589	55	489925	7489603	74	489904	7489430	43
489710	7489474	54	489831	7489601	53	489925	7489589	78	489905	7489491	51
489717	7489492	56	489834	7489619	54	489928	7489618	72	489905	7489484	50
489719	7489549	52	489834	7489691	56	489929	7489629	65	489905	7489435	43
489720	7489537	54	489835	7489625	55	489931	7489631	83	489906	7489518	92
489722	7489517	55	489836	7489667	79	489934	7489637	77	489907	7489444	44
489726	7489557	51	489836	7489675	68	489937	7489649	55	489908	7489469	47
489730	7489565	46	489837	7489658	115	489940	7489671	55	489966	7489741	49
489731	7489579	57	489838	7489697	50	489941	7489658	54	489768	7489670	108
489731	7489569	51	489840	7489704	53	489942	7489692	49	489869	7489780	53
489734	7489604	59	489841	7489643	71	489942	7489682	55	489965	7489748	48
489734	7489603	58	489841	7489702	49	489942	7489665	54			
489737	7489595	58	489841	7489709	53	489945	7489697	54			
489741	7489622	72	489842	7489639	55	489947	7489778	49			
489748	7489638	136	489845	7489715	52	489947	7489701	54			
489753	7489642	129	489848	7489718	54	489948	7489772	66			
489756	7489645	122	489850	7489723	52	489951	7489717	53			
489765	7489702	66	489850	7489725	49	489956	7489764	60			
489765	7489692	71	489855	7489750	50	489956	7489758	66			
489767	7489680	58	489855	7489751	50	489957	7489729	51			
489767	7489675	101	489856	7489759	74	489959	7489756	55			
489767	7489658	115	489864	7489769	54	489959	7489749	50			

489768	7489677	109	489867	7489775	54	489960	7489732	51			

Appendix C3 Ida Central radiometric map data points

Ida Central Ground Radiometric Survey.
Device: Thermo-Fisher RADEye pdm
Data Points: 1 243
Arrangement: Sorted by Easting, W-E
Coordinate System: UTM WGS84Z33S

Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
502727	7486938	28	502838	7486875	55	502903	7486931	55	502946	7487100	78
502734	7486951	40	502838	7486911	50	502904	7487050	56	502946	7486961	72
502741	7486965	35	502840	7486881	50	502904	7487225	45	502947	7486960	78
502747	7486973	35	502840	7487065	44	502908	7487059	61	502948	7487137	48
502751	7486979	40	502841	7486893	51	502908	7487325	40	502948	7487426	45
502762	7486989	38	502842	7487167	38	502908	7487327	46	502949	7487105	68
502766	7486995	36	502846	7486900	54	502909	7487165	55	502949	7487042	69
502769	7486998	33	502846	7486934	59	502909	7486941	58	502951	7486911	75
502772	7487006	36	502850	7486914	49	502909	7487327	41	502953	7487452	39
502776	7487010	36	502851	7487085	44	502911	7487233	44	502953	7486940	79
502776	7487011	32	502852	7486955	54	502911	7486950	58	502954	7487249	41
502779	7486905	54	502852	7487228	36	502913	7486952	50	502954	7487456	43
502780	7486889	55	502854	7487179	41	502914	7487173	56	502954	7486920	73
502780	7487021	35	502855	7486935	52	502914	7487324	45	502955	7487472	36
502781	7486889	51	502855	7487230	36	502915	7487073	54	502955	7486944	57
502783	7486917	51	502857	7486971	54	502916	7487237	39	502956	7487049	53
502787	7487030	34	502860	7486953	49	502917	7487179	51	502956	7487051	51
502789	7486922	53	502862	7487188	48	502917	7487178	48	502957	7487057	56
502790	7486942	51	502864	7486973	44	502918	7487117	45	502957	7487310	47
502790	7487043	33	502864	7486987	56	502920	7486960	58	502957	7486973	82
502791	7486938	49	502864	7487104	45	502923	7487259	40	502958	7487120	64
502792	7486933	53	502865	7487194	46	502925	7486974	92	502958	7486975	78
502792	7487047	36	502868	7487009	52	502926	7486863	78	502959	7487155	66
502798	7486958	51	502868	7487018	46	502926	7486852	86	502959	7487140	60
502799	7486960	44	502869	7487002	55	502927	7487285	40	502959	7487062	59
502800	7487069	38	502870	7487196	47	502927	7486851	78	502960	7487135	57
502801	7486977	46	502871	7486987	42	502928	7487199	45	502961	7487127	61
502805	7486986	46	502871	7486985	41	502929	7487200	38	502961	7487491	37
502805	7486994	47	502871	7487249	35	502929	7486981	70	502962	7487508	40
502805	7486994	45	502872	7486996	44	502932	7487084	70	502963	7487189	53
502805	7487083	38	502873	7487002	53	502932	7486873	79	502963	7487184	53
502810	7487096	37	502875	7487045	50	502932	7487313	43	502963	7486983	75
502815	7487116	34	502875	7487048	49	502933	7487310	40	502964	7487177	60
502817	7486996	42	502876	7487259	35	502934	7487322	42	502964	7487071	52
502817	7486996	41	502879	7487123	47	502934	7486996	62	502965	7487148	50
502818	7486996	44	502881	7487023	53	502935	7486881	80	502965	7486984	85
502818	7487120	39	502881	7487205	48	502936	7487333	41	502966	7487521	41
502822	7487005	40	502885	7487029	54	502937	7487344	43	502966	7486845	116
502823	7486885	69	502886	7486882	37	502937	7486884	82	502966	7486849	116

Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
502823	7486884	66	502887	7487072	45	502937	7487001	64	502966	7487073	54
502823	7487012	44	502887	7486876	39	502938	7487221	39	502967	7486841	71
502827	7486885	88	502887	7486878	37	502938	7487345	46	502967	7486996	85
502829	7486887	105	502888	7487032	54	502938	7486887	80	502967	7486990	84
502829	7487040	44	502888	7487209	47	502940	7486891	77	502968	7487205	48
502830	7487143	46	502888	7487275	47	502941	7487367	46	502968	7487534	41
502832	7486863	59	502892	7487142	46	502942	7487022	67	502971	7487003	137
502832	7486863	57	502895	7486908	36	502943	7486891	81	502972	7487215	45
502832	7486862	61	502898	7487297	42	502945	7487396	43	502972	7487537	42
502833	7487151	41	502901	7487153	47	502945	7486901	78	502973	7487080	56
502836	7487156	42	502903	7487092	44	502945	7486892	80	502974	7487274	40
502975	7486872	117	502997	7486906	50	503022	7486948	119	503047	7487278	52
502975	7487303	52	502998	7486909	71	503023	7486955	125	503048	7486884	69
502978	7487226	39	502998	7486909	71	503024	7487520	49	503048	7486898	119
502979	7486896	117	502999	7486940	126	503024	7486828	69	503049	7487702	37
502980	7487265	47	503000	7487183	56	503025	7487148	145	503049	7487084	110
502980	7487261	44	503000	7487286	37	503026	7486979	116	503050	7486891	67
502980	7487544	39	503000	7486878	98	503027	7487243	85	503050	7486965	114
502981	7487360	41	503000	7487120	82	503027	7487246	52	503052	7487570	51
502981	7487356	40	503002	7487593	46	503027	7487426	41	503052	7487094	96
502981	7487298	33	503002	7487031	112	503028	7487656	32	503053	7487573	50
502981	7487274	39	503003	7487396	41	503028	7486958	111	503053	7487295	56
502981	7487272	41	503004	7487483	41	503029	7487151	69	503053	7487191	64
502981	7487549	39	503004	7487385	42	503029	7487092	165	503053	7487086	92
502981	7486925	115	503004	7487291	40	503029	7486953	128	503053	7486904	88
502982	7487316	37	503004	7486923	73	503029	7486887	91	503054	7486908	66
502982	7487239	45	503005	7487363	44	503030	7486888	94	503054	7486908	73
502982	7487301	54	503005	7486928	79	503031	7486833	68	503055	7486977	96
502983	7487370	39	503006	7487309	48	503031	7486834	68	503055	7487110	74
502984	7487092	58	503006	7486896	97	503032	7487534	51	503055	7486905	80
502985	7487332	39	503006	7486931	79	503032	7486957	100	503056	7487477	62
502985	7487559	36	503007	7487489	42	503033	7487428	47	503056	7487718	39
502986	7487298	56	503007	7487380	37	503034	7486838	62	503056	7487103	97
502987	7487387	35	503009	7486818	50	503034	7487098	126	503057	7487578	48
502987	7487165	53	503010	7487133	75	503034	7487098	115	503057	7487721	37
502987	7486935	106	503011	7487498	42	503035	7487429	45	503057	7486907	69
502987	7486935	82	503011	7487205	69	503035	7486990	146	503061	7487315	51
502987	7486929	86	503011	7486824	68	503036	7487102	112	503062	7487209	63
502987	7486929	85	503012	7487339	44	503037	7486843	62	503062	7487253	63
502988	7486839	74	503012	7487044	136	503037	7487083	123	503062	7487253	59
502988	7486838	87	503013	7487338	47	503037	7486890	151	503063	7487581	41
502988	7487015	98	503013	7487619	42	503038	7487074	162	503063	7487120	72
502989	7487568	41	503013	7486943	96	503039	7487679	37	503063	7486960	119
502989	7486850	87	503014	7487412	41	503039	7487016	165	503064	7487490	57
502990	7487395	37	503014	7486826	70	503039	7486994	203	503064	7487243	58
502990	7487394	36	503014	7486918	68	503040	7487272	52	503065	7486917	85
502990	7486847	69	503014	7487138	69	503040	7486849	69	503066	7487332	50
502991	7487435	45	503015	7486947	85	503040	7487013	167	503066	7487226	69
502991	7486934	86	503017	7486969	100	503040	7486965	113	503066	7487240	67

Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
502992	7487428	36	503018	7487225	94	503041	7487551	49	503068	7487336	51
502992	7487424	40	503018	7486922	69	503041	7486851	68	503069	7487745	42
502992	7487416	38	503018	7486968	108	503041	7486998	170	503070	7486927	88
502992	7487571	43	503018	7486959	123	503042	7486861	68	503071	7486989	99
502992	7487102	54	503018	7486958	124	503042	7487168	59	503073	7487509	57
502993	7487576	44	503019	7487052	131	503043	7487553	47	503073	7487132	78
502993	7487104	57	503020	7486945	108	503044	7487446	49	503074	7486974	114
502994	7487453	47	503021	7486962	92	503045	7486872	67	503074	7486935	79
502994	7487024	101	503021	7486963	150	503045	7487176	62	503075	7487640	42
502995	7487296	58	503021	7487057	178	503046	7487453	42	503076	7487595	39
502996	7486872	92	503022	7487638	40	503046	7487452	51	503076	7487642	39
502997	7487468	46	503022	7487147	78	503046	7486873	67	503076	7486943	67
503078	7487631	41	503113	7487287	52	503138	7487751	47	503166	7487475	56
503078	7487758	38	503114	7487107	161	503138	7487055	107	503166	7487475	56
503080	7487355	48	503115	7487807	43	503139	7487688	43	503167	7487481	46
503080	7487145	101	503115	7487812	43	503139	7487846	43	503167	7487481	46
503081	7487607	45	503115	7487114	171	503139	7487165	214	503168	7487366	60
503082	7487000	102	503116	7487659	45	503139	7487024	102	503170	7487733	45
503082	7487151	75	503116	7487581	46	503140	7487589	54	503170	7487077	61
503082	7487151	112	503116	7487299	60	503140	7487058	109	503171	7487662	51
503083	7486951	93	503116	7487022	101	503140	7487198	84	503171	7487912	42
503084	7487375	47	503116	7487204	256	503140	7487029	81	503171	7487922	42
503084	7486995	87	503116	7486995	85	503141	7487182	92	503172	7487371	59
503085	7487532	43	503116	7487299	60	503142	7487692	44	503173	7487830	42
503086	7486998	115	503117	7487813	43	503142	7487593	52	503173	7487497	58
503089	7487398	55	503117	7487316	52	503143	7487399	55	503173	7487497	58
503089	7487012	159	503117	7487089	143	503143	7487063	117	503174	7487168	79
503090	7487662	37	503117	7487316	52	503143	7487283	58	503175	7487940	47
503090	7487769	41	503118	7487489	50	503143	7487399	55	503175	7487943	47
503091	7487169	185	503118	7487213	100	503144	7487284	72	503176	7487142	91
503091	7487169	138	503118	7487104	190	503145	7487081	109	503177	7487144	99
503092	7487009	107	503119	7487328	55	503146	7487094	109	503178	7487208	109
503093	7487621	41	503119	7487123	118	503146	7487036	74	503178	7487299	61
503093	7487023	247	503119	7487328	55	503147	7487863	40	503178	7487319	86
503094	7487779	48	503123	7487825	43	503148	7487416	52	503178	7487098	64
503094	7486964	73	503123	7487221	82	503148	7487416	52	503179	7487681	48
503096	7487175	318	503125	7487726	51	503150	7487293	72	503179	7487383	56
503096	7487039	410	503125	7487352	53	503150	7487256	90	503179	7487119	80
503097	7487421	49	503125	7487135	129	503151	7487710	42	503179	7487112	67
503098	7487554	42	503125	7487352	53	503151	7487612	49	503180	7487853	44
503099	7487050	213	503126	7487829	43	503153	7487617	48	503180	7487260	73
503100	7487786	43	503126	7487040	101	503153	7487781	45	503180	7487321	77
503103	7487443	46	503126	7487243	66	503153	7487432	54	503181	7487232	86
503103	7487678	44	503126	7487232	67	503153	7487432	54	503181	7487388	62
503104	7487191	102	503126	7487008	73	503154	7487301	89	503181	7487283	81
503106	7487643	44	503127	7487671	43	503155	7487883	41	503182	7487746	54
503107	7486984	72	503127	7487518	50	503155	7487048	112	503182	7487161	84
503108	7487702	44	503127	7487246	78	503156	7487885	40	503183	7487236	81

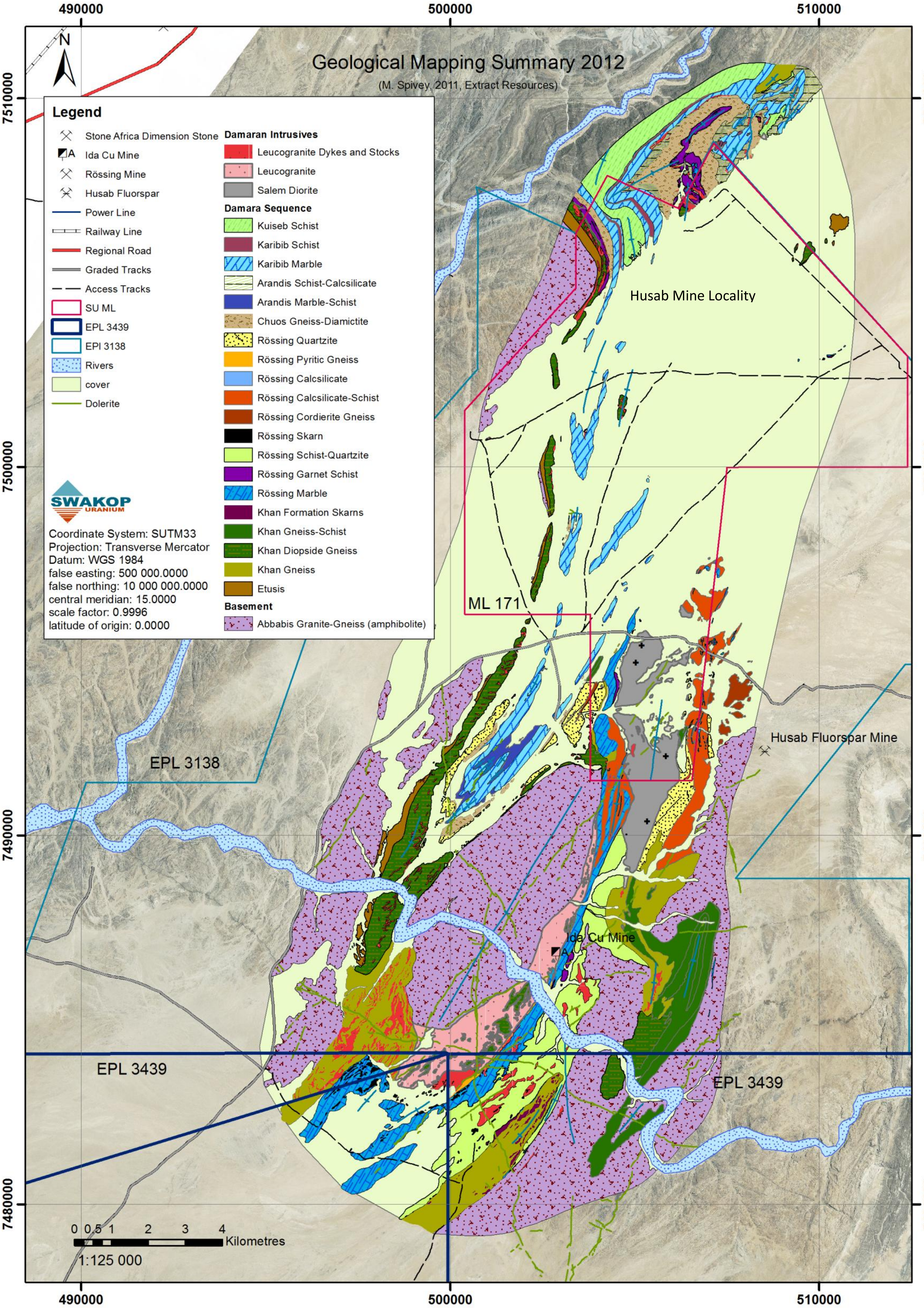
Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
503108	7487797	43	503127	7487228	70	503156	7487110	92	503183	7487243	84
503108	7487802	43	503127	7487101	139	503159	7487889	43	503184	7487525	54
503108	7487194	192	503128	7487833	44	503159	7487455	53	503184	7487280	62
503109	7487064	183	503128	7487230	68	503159	7487131	79	503184	7487322	73
503110	7487464	49	503128	7487224	65	503159	7487455	53	503184	7487525	54
503110	7487588	44	503129	7487543	48	503160	7487344	55	503185	7487166	96
503111	7487568	45	503131	7487151	195	503161	7487268	104	503186	7487703	50
503111	7487282	55	503132	7487837	44	503162	7487641	52	503186	7487875	44
503111	7487282	55	503132	7487262	66	503162	7487061	101	503188	7487298	131
503112	7487273	58	503134	7487558	58	503163	7487322	57	503189	7487414	71
503112	7487273	51	503134	7487216	73	503164	7487894	43	503190	7487328	194
503112	7487273	58	503136	7487564	63	503165	7487146	81	503191	7487319	264
503112	7487273	51	503137	7487380	56	503166	7487730	42	503192	7487550	51
503113	7487287	52	503137	7487380	56	503166	7487806	42	503192	7487175	59
503192	7487550	51	503231	7487255	62	503274	7487495	129	503317	7487602	101
503193	7487419	124	503232	7487332	103	503275	7487437	113	503323	7487567	97
503194	7487731	46	503232	7487503	67	503278	7487328	51	503326	7487621	108
503195	7487759	51	503233	7487335	86	503279	7487834	56	503328	7487685	96
503198	7487893	42	503233	7487334	72	503279	7487451	134	503328	7487480	68
503198	7487328	108	503233	7487514	63	503279	7487458	125	503331	7487643	155
503198	7487334	71	503234	7487321	168	503280	7487508	109	503331	7487488	68
503199	7487892	30	503234	7487334	77	503281	7487836	39	503332	7487587	95
503199	7487577	53	503235	7487658	59	503282	7487764	72	503332	7487588	84
503199	7487252	99	503235	7487334	83	503282	7487764	72	503332	7487637	117
503199	7487577	53	503235	7487658	59	503283	7487473	140	503333	7487694	94
503201	7487340	222	503236	7487830	44	503284	7487335	51	503335	7487594	84
503201	7487429	123	503236	7487378	84	503286	7487347	59	503335	7487644	118
503202	7487279	98	503238	7487363	68	503288	7487341	54	503335	7487503	86
503202	7487228	85	503238	7487363	74	503289	7487360	63	503336	7487718	135
503202	7487228	104	503238	7487266	60	503292	7487380	64	503337	7487724	222
503203	7487757	46	503240	7487808	50	503292	7487370	64	503337	7487721	229
503203	7487435	107	503240	7487386	98	503293	7487390	87	503338	7487710	114
503204	7487227	133	503245	7487281	58	503294	7487782	68	503339	7487670	113
503205	7487229	138	503247	7487361	88	503294	7487495	104	503340	7487664	109
503208	7487598	49	503248	7487846	51	503294	7487782	68	503342	7487765	123
503208	7487200	61	503249	7487368	101	503295	7487526	121	503342	7487747	118
503208	7487598	49	503249	7487412	126	503296	7487404	80	503342	7487731	135
503210	7487778	43	503249	7487406	101	503301	7487787	64	503344	7487769	65
503213	7487778	51	503250	7487416	148	503301	7487509	155	503344	7487516	62
503214	7487343	73	503251	7487683	62	503301	7487535	106	503346	7487613	89
503215	7487248	171	503251	7487683	62	503301	7487418	76	503347	7487680	211
503215	7487300	100	503255	7487433	185	503301	7487787	64	503347	7487530	56
503216	7487355	78	503257	7487448	127	503303	7487518	139	503351	7487649	92
503216	7487219	68	503258	7487297	51	503303	7487550	164	503352	7487629	88
503217	7487627	47	503259	7487821	51	503303	7487432	66	503352	7487654	94
503217	7487356	76	503259	7487862	50	503304	7487794	60	503354	7487548	62
503217	7487453	125	503259	7487701	69	503304	7487632	100	503355	7487725	267
503217	7487627	47	503259	7487378	122	503304	7487423	77	503355	7487715	277
503218	7487795	43	503259	7487701	69	503304	7487794	60	503355	7487700	304

Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
503220	7487630	53	503261	7487475	117	503306	7487567	165	503356	7487549	66
503220	7487461	81	503262	7487460	208	503308	7487800	52	503358	7487746	245
503220	7487235	74	503262	7487459	94	503308	7487798	56	503359	7487735	606
503220	7487630	53	503263	7487382	116	503308	7487800	52	503361	7487562	61
503222	7487633	55	503267	7487388	140	503308	7487798	56	503364	7487677	89
503222	7487633	55	503268	7487829	49	503309	7487537	118	503364	7487764	166
503225	7487269	203	503268	7487881	43	503309	7487539	117	503364	7487594	75
503225	7487488	59	503268	7487881	47	503309	7487572	77	503364	7487594	70
503226	7487811	42	503268	7487724	73	503310	7487547	121	503365	7487761	176
503227	7487797	50	503268	7487724	73	503310	7487650	107	503366	7487760	105
503227	7487362	85	503269	7487312	49	503312	7487452	106	503366	7487575	72
503229	7487497	58	503272	7487418	124	503314	7487587	82	503367	7487601	81
503230	7487360	68	503273	7487742	74	503315	7487667	102	503368	7487691	106
503231	7487296	236	503273	7487742	74	503316	7487466	70	503370	7487593	66
503231	7487327	101	503274	7487404	161	503317	7487558	115	503371	7487601	56
503372	7487611	82	503108	7487702	44	503127	7487246	78	503156	7487885	40
503374	7487607	50	503108	7487797	43	503127	7487228	70	503156	7487110	92
503376	7487707	110	503108	7487802	43	503127	7487101	139	503159	7487889	43
503377	7487725	135	503108	7487194	192	503128	7487833	44	503159	7487455	53
503378	7487613	71	503109	7487064	183	503128	7487230	68	503159	7487131	79
503379	7487620	69	503110	7487464	49	503128	7487224	65	503159	7487455	53
503380	7487621	67	503110	7487588	44	503129	7487543	48	503160	7487344	55
503381	7487733	155	503111	7487568	45	503131	7487151	195	503161	7487268	104
503386	7487640	73	503111	7487282	55	503132	7487837	44	503162	7487641	52
503386	7487736	264	503111	7487282	55	503132	7487262	66	503162	7487061	101
503386	7487763	112	503112	7487273	58	503134	7487558	58	503163	7487322	57
503387	7487738	130	503112	7487273	51	503134	7487216	73	503164	7487894	43
503387	7487631	66	503112	7487273	58	503136	7487564	63	503165	7487146	81
503389	7487761	119	503112	7487273	51	503137	7487380	56	503166	7487730	42
503390	7487747	103	503113	7487287	52	503137	7487380	56	503166	7487806	42
503391	7487635	83	503113	7487287	52	503138	7487751	47	503166	7487475	56
503396	7487656	85	503114	7487107	161	503138	7487055	107	503166	7487475	56
503399	7487668	87	503115	7487807	43	503139	7487688	43	503167	7487481	46
503407	7487684	91	503115	7487812	43	503139	7487846	43	503167	7487481	46
503415	7487707	91	503115	7487114	171	503139	7487165	214	503168	7487366	60
503418	7487724	114	503116	7487659	45	503139	7487024	102	503170	7487733	45
503420	7487731	115	503116	7487581	46	503140	7487589	54	503170	7487077	61
503420	7487756	102	503116	7487299	60	503140	7487058	109	503171	7487662	51
503420	7487756	96	503116	7487022	101	503140	7487198	84	503171	7487912	42
503421	7487753	90	503116	7487204	256	503140	7487029	81	503171	7487922	42
503422	7487746	82	503116	7486995	85	503141	7487182	92	503172	7487371	59
503440	7487662	190	503116	7487299	60	503142	7487692	44	503173	7487830	42
503459	7487691	91	503117	7487813	43	503142	7487593	52	503173	7487497	58
503089	7487398	55	503117	7487316	52	503143	7487399	55	503173	7487497	58
503089	7487012	159	503117	7487089	143	503143	7487063	117	503174	7487168	79
503090	7487662	37	503117	7487316	52	503143	7487283	58	503175	7487940	47
503090	7487769	41	503118	7487489	50	503143	7487399	55	503175	7487943	47
503091	7487169	185	503118	7487213	100	503144	7487284	72	503176	7487142	91
503091	7487169	138	503118	7487104	190	503145	7487081	109	503177	7487144	99

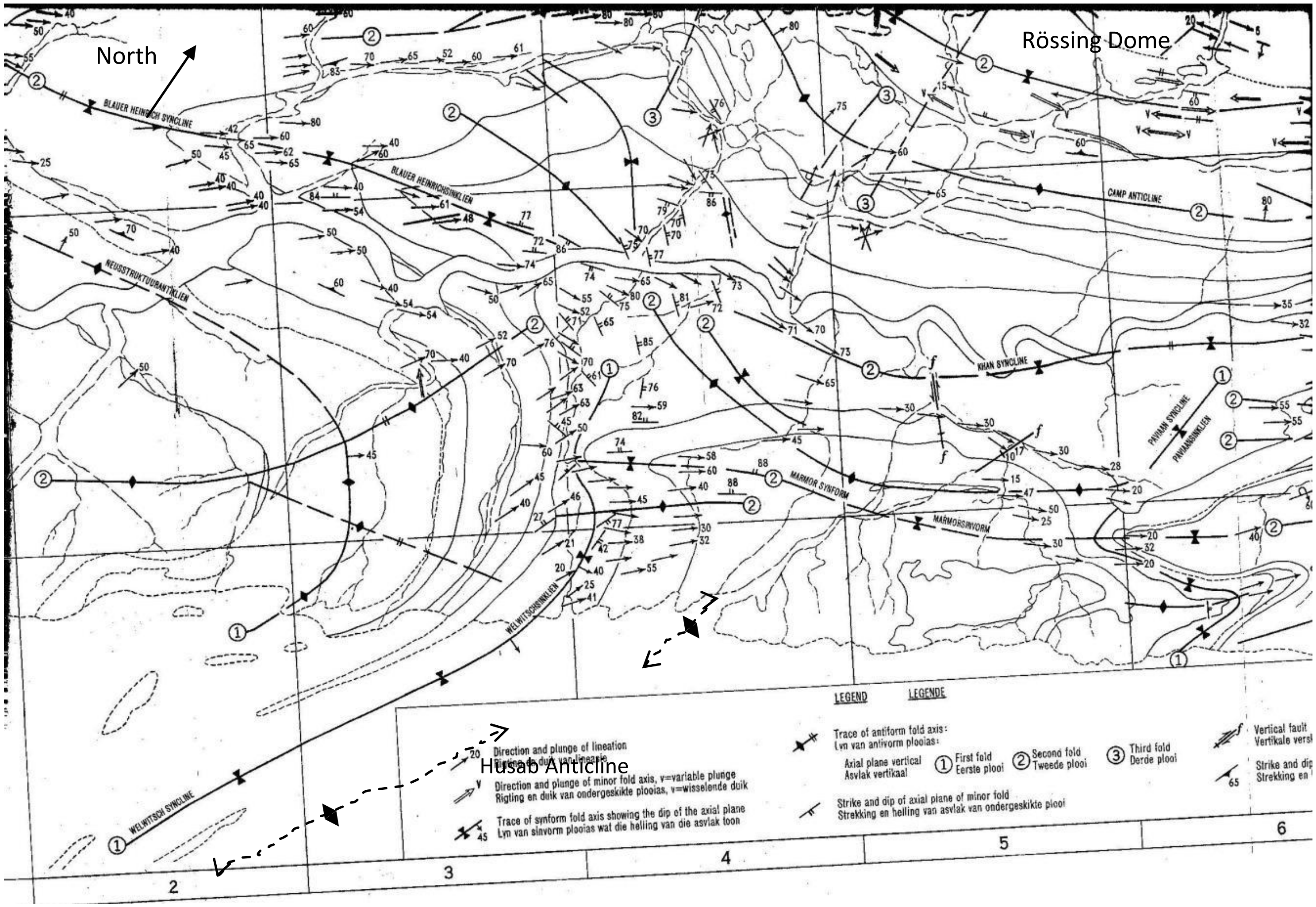
Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
503092	7487009	107	503119	7487328	55	503146	7487094	109	503178	7487208	109
503093	7487621	41	503119	7487123	118	503146	7487036	74	503178	7487299	61
503093	7487023	247	503119	7487328	55	503147	7487863	40	503178	7487319	86
503094	7487779	48	503123	7487825	43	503148	7487416	52	503178	7487098	64
503094	7486964	73	503123	7487221	82	503148	7487416	52	503179	7487681	48
503096	7487175	318	503125	7487726	51	503150	7487293	72	503179	7487383	56
503096	7487039	410	503125	7487352	53	503150	7487256	90	503179	7487119	80
503097	7487421	49	503125	7487135	129	503151	7487710	42	503179	7487112	67
503098	7487554	42	503125	7487352	53	503151	7487612	49	503180	7487853	44
503099	7487050	213	503126	7487829	43	503153	7487617	48	503180	7487260	73
503100	7487786	43	503126	7487040	101	503153	7487781	45	503180	7487321	77
503103	7487443	46	503126	7487243	66	503153	7487432	54	503181	7487232	86
503103	7487678	44	503126	7487232	67	503153	7487432	54	503181	7487388	62
503104	7487191	102	503126	7487008	73	503154	7487301	89	503181	7487283	81
503106	7487643	44	503127	7487671	43	503155	7487883	41	503182	7487746	54
503107	7486984	72	503127	7487518	50	503155	7487048	112	503182	7487161	84
503183	7487236	81	503220	7487630	53	503261	7487475	117	503306	7487567	165
503183	7487243	84	503220	7487461	81	503262	7487460	208	503308	7487800	52
503184	7487525	54	503220	7487235	74	503262	7487459	94	503308	7487798	56
503184	7487280	62	503220	7487630	53	503263	7487382	116	503308	7487800	52
503184	7487322	73	503222	7487633	55	503267	7487388	140	503308	7487798	56
503184	7487525	54	503222	7487633	55	503268	7487829	49	503309	7487537	118
503185	7487166	96	503225	7487269	203	503268	7487881	43	503309	7487539	117
503186	7487703	50	503225	7487488	59	503268	7487881	47	503309	7487572	77
503186	7487875	44	503226	7487811	42	503268	7487724	73	503310	7487547	121
503188	7487298	131	503227	7487797	50	503268	7487724	73	503310	7487650	107
503189	7487414	71	503227	7487362	85	503269	7487312	49	503312	7487452	106
503190	7487328	194	503229	7487497	58	503272	7487418	124	503314	7487587	82
503191	7487319	264	503230	7487360	68	503273	7487742	74	503315	7487667	102
503192	7487550	51	503231	7487296	236	503273	7487742	74	503316	7487466	70
503192	7487175	59	503231	7487327	101	503274	7487404	161	503317	7487558	115
503192	7487550	51	503231	7487255	62	503274	7487495	129	503317	7487602	101
503193	7487419	124	503232	7487332	103	503275	7487437	113	503323	7487567	97
503194	7487731	46	503232	7487503	67	503278	7487328	51	503326	7487621	108
503195	7487759	51	503233	7487335	86	503279	7487834	56	503328	7487685	96
503198	7487893	42	503233	7487334	72	503279	7487451	134	503328	7487480	68
503198	7487328	108	503233	7487514	63	503279	7487458	125	503331	7487643	155
503198	7487334	71	503234	7487321	168	503280	7487508	109	503331	7487488	68
503199	7487892	30	503234	7487334	77	503281	7487836	39	503332	7487587	95
503199	7487577	53	503235	7487658	59	503282	7487764	72	503332	7487588	84
503199	7487252	99	503235	7487334	83	503282	7487764	72	503332	7487637	117
503199	7487577	53	503235	7487658	59	503283	7487473	140	503333	7487694	94
503201	7487340	222	503236	7487830	44	503284	7487335	51	503335	7487594	84
503201	7487429	123	503236	7487378	84	503286	7487347	59	503335	7487644	118
503202	7487279	98	503238	7487363	68	503288	7487341	54	503335	7487503	86
503202	7487228	85	503238	7487363	74	503289	7487360	63	503336	7487718	135
503202	7487228	104	503238	7487266	60	503292	7487380	64	503337	7487724	222
503203	7487757	46	503240	7487808	50	503292	7487370	64	503337	7487721	229

Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s	Xeastings	Ynorthings	CR/s
503203	7487435	107	503240	7487386	98	503293	7487390	87	503338	7487710	114
503204	7487227	133	503245	7487281	58	503294	7487782	68	503339	7487670	113
503205	7487229	138	503247	7487361	88	503294	7487495	104	503340	7487664	109
503208	7487598	49	503248	7487846	51	503294	7487782	68	503342	7487765	123
503208	7487200	61	503249	7487368	101	503295	7487526	121	503342	7487747	118
503208	7487598	49	503249	7487412	126	503296	7487404	80	503342	7487731	135
503210	7487778	43	503249	7487406	101	503301	7487787	64	503344	7487769	65
503213	7487778	51	503250	7487416	148	503301	7487509	155	503344	7487516	62
503214	7487343	73	503251	7487683	62	503301	7487535	106	503346	7487613	89
503215	7487248	171	503251	7487683	62	503301	7487418	76	503347	7487680	211
503215	7487300	100	503255	7487433	185	503301	7487787	64	503347	7487530	56
503216	7487355	78	503257	7487448	127	503303	7487518	139	503351	7487649	92
503216	7487219	68	503258	7487297	51	503303	7487550	164	503352	7487629	88
503217	7487627	47	503259	7487821	51	503303	7487432	66	503352	7487654	94
503217	7487356	76	503259	7487862	50	503304	7487794	60	503354	7487548	62
503217	7487453	125	503259	7487701	69	503304	7487632	100	503355	7487725	267
503217	7487627	47	503259	7487378	122	503304	7487423	77	503355	7487715	277
503218	7487795	43	503259	7487701	69	503304	7487794	60	503355	7487700	304
503356	7487549	66	503367	7487601	81	503381	7487733	155	503418	7487724	114
503358	7487746	245	503368	7487691	106	503386	7487640	73	503420	7487731	115
503359	7487735	606	503370	7487593	66	503386	7487736	264	503420	7487756	102
503361	7487562	61	503371	7487601	56	503386	7487763	112	503420	7487756	96
503364	7487677	89	503372	7487611	82	503387	7487738	130	503421	7487753	90
503364	7487764	166	503374	7487607	50	503387	7487631	66	503422	7487746	82
503364	7487594	75	503376	7487707	110	503389	7487761	119	503440	7487662	190
503364	7487594	70	503377	7487725	135	503390	7487747	103	503459	7487691	91
503365	7487761	176	503378	7487613	71	503391	7487635	83	503407	7487684	91
503366	7487760	105	503379	7487620	69	503396	7487656	85	503415	7487707	91
503366	7487575	72	503380	7487621	67	503399	7487668	87			

Appendix C4 Spivey 2011 geological map

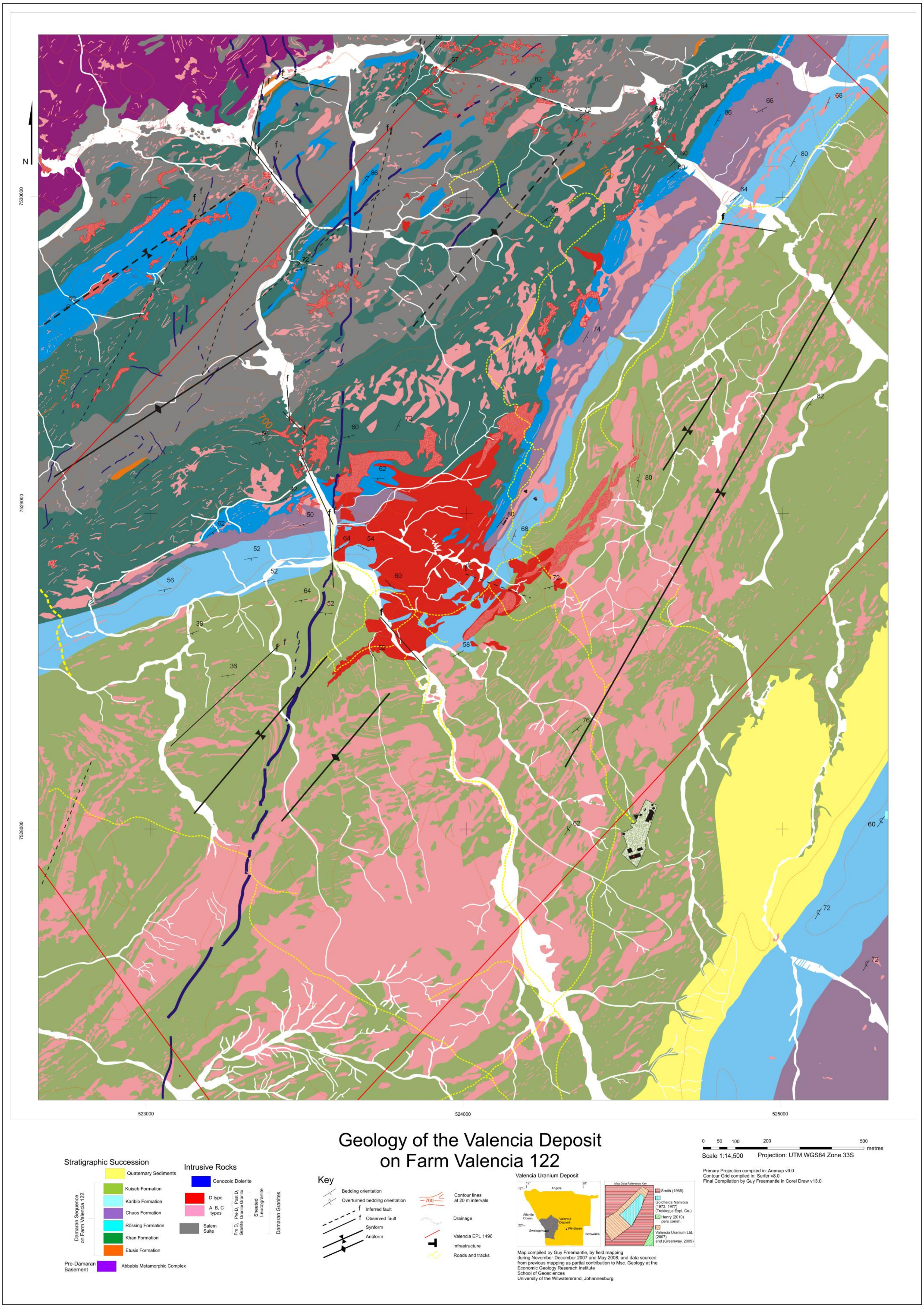


Appendix C5 Smith 1965 Structural geology map



Section of Smith (1965) map of the junction between the Blauer Heinrich, Welwitschia and Khan Synclines. The (2) fold north of the Camp Anticline is the Rössing Mine Synclinorium that wraps around the south end of the Rössing Dome. The Husab Deposits occur on the Husab Anticline, which adjoins the eastern limb of the Welwitschia Syncline. (Smith, 1965 Map section courtesy of Alex Kisters)

Appendix C6 Geological Map of the Valencia Deposit



Appendix C7 Structural data for Kink fold at Valencia

Xeastings	Ynorthings	Name	Strike°	Dip°	Lithology	Mineralogy
523880	7528510	Sch52	66	58	Schist	Bt-Crd-Gnt-Sill
523829	7528527	Sch53	96	48	Schist	Bt-Crd-Gnt-Sill
523740	7528516	Sch54	118	62	Schist	Bt-Crd-Gnt-Sill
523702	7528548	Sch55	146	52	Schist	Bt-Crd-Gnt-Sill
523679	7528587	Sch56	154	36	Schist	Bt-Crd-Gnt-Sill
523670	7528647	Sch57	130	50	Schist	Bt-Crd-Gnt-Sill
523636	7528649	Sch58	118	48	Schist	Bt-Crd-Gnt-Sill
523601	7528656	Sch59	114	50	Schist	Bt-Crd-Gnt-Sill
523554	7528681	Sch60	94	52	Schist	Bt-Crd-Gnt-Sill
523520	7528711	Sch61	104	52	Schist	Bt-Crd-Gnt-Sill
523478	7528721	Sch62	80	64	Schist	Bt-Crd-Gnt-Sill
523493	7528725	Sch63	96	56	Schist	Bt-Crd-Gnt-Sill
523361	7528711	Sch64	88	56	Schist	Bt-Crd-Gnt-Sill
523271	7528679	Sch65	77	60	Schist	Bt-Crd-Gnt-Sill

Appendix C8 Sample Localities

All positions are given in UTM WGS84 Zone 33S. All assay values are determined by XRF, unless otherwise stated, and given in ppm. XRF - X-ray fluorescence, ICP - Inductively-coupled plasma mass spectrometry, HH XRF, hand-held XRF (model is Innovex Delta 3 channel spectrometer).

Goanikontes Core Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
DH012 / 127.72-128.04	428	613	Etango	D	482372	7488695
DH012 / 197.04-197.35	<12	<9	Etango	Grey 3		
DH012 / 198.58-198.77	203	278	Etango	C2ft		
DH012 / 315.67-315.93	24	24	Etango	Ct		
DH012 / 342.47-342.84	219	562	Etango	D		
DH012 / 42.38-42.75	137	378	Etango	E		
DH012 / 66.41-66.79	33	371	Etango	C2m		
DH019 / 100.50-100.93	<12	<9	Etango	F	482708	7488903
DH019 / 13.75-14.15	80	100	Etango	E		
DH019 / 67.09-67.54	52	10	Etango	Cm		
DH019 / 71.74-72.18	331	247	Etango	E		
DH019 / 71.74-72.18B	29	39	Etango	E		
DH019 / 76.39-76.67	18	37	Etango	Cm		
DH022 / 124.79-125.08	18	108	Etango	Cm	482068	7488097
DH022 / 200.42-200.72	64	70	Etango	Cm		
DH022 / 240.79-241.15	67	442	Etango	E		
DH022 / 59.00-59.24	9	6	Etango	Cm		
DH025 / 224.44-224.66	9	6	Etango	C	482188	7488100
DH025 / 235.81-236.14	92	496	Etango	E		
DH025 / 244.44-244.66	9	6	Etango	C		
DH025 / 281.57-281.83	56	175	Etango	E		
DH025 / 334.91-335.25	168	519	Etango	E		
DH025 / 345.31-345.55	39	389	Etango	D		
DH025 / 353.60-354.03	92	922	Etango	D		
DH025 / 43.13-43.49	108	486	Etango	E		
DH025 / 468.68-469.01	108	380	Etango	E		
DH025 / 496.03-496.38	80	310	Etango	E		
DH034 / 17.84-18.23	128	561	Etango	E	482068	7488800
DH034 / 171.05-171.42	170	754	Etango	D		
DH034 / 223.56-223.86	9	49	Etango	C		
DH034 / 226.29-226.63	33	33	Etango	C		
DH034 / 261.71-262.00	10	15	Etango	C2f		
DH034 / 278.82-279.08	119	262	Etango	D+C		
DH034 / 336.95-337.22	47	386	Etango	D+C		
DH034 / 343.10-343.34	145	1333	Etango	E		
DH034 / 38.96-39.21	39	176	Etango	E		
DH034 / 380.14-380.42	98	162	Etango	D		
DH034 / 461.80-462.17	138	1031	Etango	E		

Goanikontes Surface Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
CZ 14-1	43	248	Etango	E	484274	7491908
GOAG 01	10	10	Etango	C	484014	7493767
GOAG 02	9	6	Etango	Cm	484202	7494336

Hildenhof SurfaceSamples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
HILG 01	102	847	Hildenhof	E	489183	7489477
HILG 02	9	6	Hildenhof	Grey 1	489186	7489596
HILG 06	123	<9	Hildenhof	Red	488879	7489594
HILG 07	18	85	Hildenhof	E	489381	7489705
HILG 08a	9	40	Hildenhof	E	489405	7489653
HILG 08b	9	54	Hildenhof	E	489405	7489653
HILG 10	14	6	Hildenhof	Grey 3	489451	7489551
HILG 12	27	186	Hildenhof	D	489467	7489461
HILG 13	46	1967	Hildenhof	E	489174	7489376
HILG 13A	40	380	Hildenhof	E	489174	7489376
HILG 15	9	95	Hildenhof	E	489311	7489368
HILG 16	26	<9	Hildenhof	Grey 2	489261	7489309
HILG 19	81	623	Hildenhof	E	489457	7489682
HILG 20	43	32	Hildenhof	Grey 3	489427	7489645
HILG 21	211	1339	Hildenhof	E	489250	7489485
HILG 24	<12	<9	Hildenhof	C	489108	7489572
HILG 25	<12	15	Hildenhof	C	489053	7489499
HILG 26	<12	<9	Hildenhof	C	488934	7489439
HILG 27	12	<9	Hildenhof	C2f	488964	7489657
HILG 28	13	9	Hildenhof	Grey 3	489620	7489448
HILG 29	51	77	Hildenhof	E weak	489298	7489785
HILG 29A	23	67	Hildenhof	E weak	489298	7489785
HILG 30	25	<9	Hildenhof	Red	489624	7489621
HILG 31	9	6	Hildenhof	C	489489	7489713
HILG 32	14	21	Hildenhof	E weak	489036	7489712
HILG 33	<12	<9	Hildenhof	Pegamtite	488843	7489447
HILG 33A	<12	13	Hildenhof	Pegamtite	488843	7489447
HILG 34	12	53	Hildenhof	E weak	489543	7489921
HILG 35	31	137	Hildenhof	D	489776	7489140
HILM 03	<12	<9	Hildenhof	Calc-silicate	489281	7489269

Husab Core Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings	Geochem
RDD001 180-181	15.0	361.3	Zone 1	Alaskite	506120	7506000	ICP+XRF
RDD004 154-155B		319.0	Zone 1	Peg. Alaskite	506307	7505700	ICP
RDD004 154-155A	10.0	10.0		SLG - C type			XRF
RDD005 280-281	42.0	439.0	Zone 2	Alaskite	505900	7503800	XRF
RDD006 119-120	53.0	362.0	Zone 2	Alaskite	505800	7503400	XRF
RD006 171-172m	229.4	2439.0		Alaskite			XRF
RDD006 245-246	46.0	338.0		Alaskite			XRF
RDD008 284-285A	32.0	90.0	Zone 1	Alaskite	507160	7507200	XRF
RDD008 284-285B	384.0	1357.0		Calcsilicate			XRF
RDD060 288-289	76.51	449.91	Zone 1	Alaskite	506300	7505100	XRF
RDD072 268-269	423.34	929.3	Zone 2	Alaskite	506020	7504000	XRF
RDD078	113.32	1627.13	Zone 1	Alaskite	506300	7505200	XRF
RDD102 317-318	199.23	1656.34	Zone 2	Alaskite	505900	7503900	XRF
RDD141 244-245m	28.72	205.58	Zone 1	Alaskite	507050	7506950	XRF
RDD145 412-413		1194.1	Zone 1	Alaskite	506350	7505150	ICP
RDD157 343-344	137.2	786.8	Zone 2	Alaskite	506150	7503550	XRF
RDD193 261-262		710.5	Zone 1	Alaskite-metased.	505970	7505250	ICP
RDD193 264-265		1016.5		Alaskite			ICP
RDD193 265-266		1467.0		Alaskite			ICP
RDD193 267-268		945.1		Alaskite			ICP
RDD193 279-280		480.6		Alaskite			ICP
RDD193 290-291		878.8		Alaskite			ICP
RDD193 307-308		429.7		Alaskite			ICP
RDD193 315-316		325.5		Quartz-alaskite			ICP
RDD219 335-336	278.8	1923.1	Zone 1	Alaskite	506950	7507250	XRF
RDD307 465-466		206631.3	Zone 1	Alaskite	507250	7507300	ICP
RDD351 256-257		2403.1	Zone 1	Alaskite	506730	7506400	ICP
RDD351 257-258		2018.5		Quartz-alaskite			ICP
RDD351 263-264		5166.3		Alaskite			ICP
RDD351 268-269		189.5		Alaskite			ICP
RDD351 271-272		7137.9		Alaskite			ICP
RDD351 302-303		2208.0		Alaskite			ICP
RDD351 328-329		55.5		C-type			ICP
RDD373 63-64	145.2	464.4	Zone 1	Refractory Alaskite	506526	7506402	ICP+HH XRF
RDD373 93-94		561.6		Refractory Alaskite			ICP+HH XRF
RDD373 116-117		359.1		Refractory Alaskite			ICP+HH XRF
RDD373 117-118		262.6		Refractory Alaskite			ICP+HH XRF
RDD373 124-125	536.1	430.5		Refractory Alaskite			ICP+HH XRF

Ida Core Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
HDD 027 104.36-104.70	15	303	Ida Central	E	502838	7486231
HDD 027 122.90-123.22	9	91	Ida Central	E		
HDD027 142.01-142.31	I/S	I/S	Ida Central	Cm		
HDD 027 89.47-89.95	<12	119	Ida Central	E		

Ida Surface Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
HU 04	<12	1371	Husab Mine	Fluorite	509000	7493271
IDAG 01A	<12	<9	Ida Central	A	502993	7486813
IDAG 01B	<12	<9	Ida Central	A	502993	7486813
IDAG 02	9	6	Ida Central	C2f	502770	7486581
IDAG 03	<12	155	Ida Central	E weak	502843	7486654
IDAG 04a	10	31	Ida Central	Barren Halo	502840	7486655
IDAG 05	74	624	Ida Central	E	503068	7486918
IDAG 07	16	<9	Ida Central	C	503061	7487030

IDAG 08	73	128	Ida Central	C2f	503061	7487030
IDAG 09	<12	12	Ida Central	A	503114	7487076
IDAG 10	9	31	Ida Central	E weak	503114	7487076
IDAG 10A	13	45	Ida Central	E weak	503114	7487076
Sample	**Th**	**U**	**Area**	**Type**	**Xeastings**	**Ynorthings**
IDAG 15	<12	<9	Ida Central	C2f	501743	7486862
IDAG 16	111	1087	Ida Central	D	503115	7487082
IDAG 16b	114	1101	Ida Central	D	503115	7487082
IDAG 19	<12	18	Ida Central	C	503133	7487154
IDAG 21	126	398	Ida Central	D	503580	7487462
IDAG 22	<12	<9	Ida Central	Ct	503485	7487332
IDAG 23	<12	<9	Ida Central	C	502758	7485887
IDAG 24	<12	<9	Ida Central	C2f	502908	7487167
IDAG 29	85	155	Ida Central	E weak	503644	7487798
IDAG 30	9	7	Ida Central	C2f diopside	503468	7488955
IDAG 46	369	428	Ida Central	E	503369	7487757
IDAG 46-2	448	446	Ida Central	E	503369	7487757
IDAM 14	49	329	Ida Central	Quartz pod	503202	7487237

Sample	Th	U	Area	Type	Xeastings	Ynorthings
CZ 7-1	14	92	Garnet Valley	D	501315	7484263
IDAG 34	60	269	Garnet Valley	E	500559	7487162
IDAG 64	91	1086	Garnet Valley	D	501850	7484922
IDAG 67	9	7	Garnet Valley	C	501589	7484806
IDAG 77	10	8	Garnet Valley	Cm	500627	7484307
IDAG 96	46	46	Garnet Valley	D	501059	7483972
IDAG 97	9	6	Garnet Valley	C	501059	7483972

Sample	Th	U	Area	Type	Xeastings	Ynorthings
IDAG 101	9	6	Holland's Dome	C2f	502408	7483035
IDAG 102	40	27	Holland's Dome	E weak	502387	7483018
IDAG 103	28	30	Holland's Dome	Aplitic	501926	7482130
IDAG 104	9	8	Holland's Dome	C	501636	7484521
IDAG 43	101	883	Holland's Dome	D	502399	7483026
IDAG 44	49	32	Holland's Dome	D	502111	7482527
IDAG 44-2	38	29	Holland's Dome	D	502111	7482527
IDAG 68	9	412	Holland's Dome	Cm/skarn xenolith	501533	7484471
IDAG 70	9	8	Holland's Dome	C2f	502290	7482272
IDAG 71	81	98	Holland's Dome	D weak	502447	7482637
IDAG 71b	70	100	Holland's Dome	D weak	502447	7482637
IDAG 73	9	6	Holland's Dome	C2f	501803	7481603
IDAG 79	156	1389	Holland's Dome	D	502400	7482622
IDAG 80a	9	13	Holland's Dome	C enhanced	502642	7482948
IDAG 80b	9	31	Holland's Dome	D	502642	7482948
IDAG 80c	9	57	Holland's Dome	C2fm	502642	7482948
IDAG 80d	9	16	Holland's Dome	Duplicated of 80b	502642	7482948
IDAG 91	17	6	Holland's Dome	C	501557	7481789
IDAG 92	32	6	Holland's Dome	Aplitic	501555	7481794
IDAG 93	9	6	Holland's Dome	C	502020	7482245
IDAG 98	42	13	Holland's Dome	Aplitic	502572	7483012
IDAG 99	9	6	Holland's Dome	C	502573	7483023
IDAM 02	9	22	Holland's Dome	Calc-silicate	503155	7487031
IDAM 04	<12	<9	Holland's Dome	Calc-silicate	503586	7487850
IDAM 09	<12	140	Holland's Dome	Calc-silicate min	502494	7482573

IDAM 10	199	4762	Holland's Dome	Garnet Skarn	502464	7482625
IDAM 11	78	1605	Holland's Dome	Garnet Skarn	502464	7482625
IDAM 80a	9	687	Holland's Dome	Calc-silicate	502642	7482948

Valencia Core Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
Va26 111/ 108.39-108.76	9	73	Valencia	C	523709	7528408
VA26 111/ 157.49-157.82	31	486	Valencia	E		
Va26 111/ 297.42-297.77	73	60	Valencia	C		
Va26 113/ 155.97-156.23	16	182	Valencia	E	523762	7528688
Va26 113/ 225.64-225.89	30	326	Valencia	E		
Va26 113/ 81.84-82.22	106	559	Valencia	D		
Va26 113/116.12-116.39	88	281	Valencia	E		
Va26 118/ 107.69-108.12	79	754	Valencia	E	523815	7528553
Va26 118/ 175.18-175.46	42	76	Valencia	C		
Va26 118/ 175.18-175.46B	I/S??	I/S??	Valencia	C		
Va26 118/ 345.09-345.47	18	105	Valencia	E		
Va26 118/ 137.68-137.96	20	61	Valencia	C		
Va26 118/ 25.25-25.53	56	452	Valencia	D		
Va26 134/ 226.67-227.15	65	795	Valencia	E	524218	7528837
Va26 139/ 104.50-104.78	115	977	Valencia	D	524088	7528841
Va26 139/ 315.25-315.48	11	11	Valencia	C2f		
Va26 139/ 46.56-47.00	48	806	Valencia	D		
Va26 139/ 89.59-89.95	95	446	Valencia	D		
Va26 141/ 200.07-200.56	17	382	Valencia	Qtz rich granitoid	524337	7528800
Va26 141/ 247.82-248.16	25	214	Valencia	D		
Va26 141/ 259.57-260.00	9	138	Valencia	E		
Va26 141/ 261.69-262.00	14	315	Valencia	Qtz rich granitoid		
Va26 141/ 290.75-291.84	29	260	Valencia	D		
Va26 141/ 301.29-301.60	18	101	Valencia	E		
Va26 141/ 61.22-61.59	9	34	Valencia	Grey 2		
Va26 141/ 89.82-90.75	9	42	Valencia	Ct		

Valencia Surface samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
VALG 01	9	7	Valencia	B	524768	7530557
VALG 02	20	7	Valencia	Ct	524768	7530557
VALG 03	30	196	Valencia	D	525149	7529581
VALG 05a	921	46	Valencia	Cm/skarn xenolith	524027	7529094
VALG 05b	441	30	Valencia	Cm/skarn xenolith	522219	7529544
VALG 06	9	7	Valencia	Cm	523502	7529135
VALG 07	9	7	Valencia	F	523502	7529135
VALG 09	34	32	Valencia	D	523481	7529290
VALG 11	43	257	Valencia	D	524002	7528840
VALG 13	9	6	Valencia	B	523904	7528727
VALG 13b	9	6	Valencia	B	524947	7530406
VALG 14	9	6	Valencia	A	524421	7528089
VALG 15	88	139	Valencia	D	524204	7528767
VALG 15b	66	96	Valencia	D	524260	7528859
VALG 16	94	552	Valencia	D	523912	7528728
VALG 17	9	6	Valencia	Ct	523925	7528720
VALG 18	9	6	Valencia	A	524444	7529277
VALG 19	9	6	Valencia	Cm	524624	7530240
VALG 20	97	38	Valencia	D	524163	7529109

VALG 21	14	7	Valencia	A	524365	7528560
VALG 22	9	6	Valencia	B	524215	7527761
VALG 23	20	6	Valencia	A	524089	7527846
VALG 24	41	29	Valencia	D	523776	7528622
Sample	**Th**	**U**	**Area**	**Type**	**Xeastings**	**Ynorthings**
VALG 25	9	8	Valencia	Grey 3	523772	7528609
VALG 26	45	564	Valencia	D	523820	7528629
VALG 27	9	6	Valencia	Cm	522060	7528836
VALG 28	9	6	Valencia	F	522166	7529189
VALG 29	17	6	Valencia	Cm	522173	7529189
LVA 1	96	23	Valencia	D	523981	7529088

Valencia Joly Zone Core Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
J04 / 132.68-132.96	42	21	Joly Zone	C2fm	523948	7529985
J04 / 42.53-43.00	18	7	Joly Zone	Salem 2		
J04 / 86.49-86.78	70	49	Joly Zone	C2f		
J04 / 96.06-96.57	16	6	Joly Zone	Salem 2		

Valencia Jolly Zone Surface Samples

Sample	Th	U	Area	Type	Xeastings	Ynorthings
VALB 01	155	28	Joly Zone	Salem 2 sheared	523092	7530183
VALB 02	142	21	Joly Zone	Salem 2 sheared	523092	7530183
VALB 03	18	271	Joly Zone	Salem 2	523092	7530183
VALG 04	27	8	Joly Zone	Ct	524927	7529966
VALG 08	22	85	Joly Zone	Mineralised Apophysis	523502	7529135
VALG 10	9	7	Joly Zone	Cm	524356	7530253
VALG 12	93	62	Joly Zone	D	523942	7530102
Vs 04	9	6	Joly Zone	Salem 1	524619	7530313
Vs 05	17	6	Joly Zone	Salem 2	524549	7530330
Vs 06	12	6	Joly Zone	Salem 2	523922	7529970

Appendix D1 Thin Section Petrography Summary

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
CZ14-1	Microcline	Visible U-secondaries in some fractures	Irregular edges, chains, embayed crystals, 120º junctions, large crystals are amoeboidal, interstitial to microcline.	Albite, scarce, sericitised grains often rimmed with quartz.	Dominantly tartan twinned microcline, 0.2-5 mm, dominant rock forming mineral, embayed irregular edges with quartz	Disseminated, fine, < 0.5 mm	Skeletal and bladed grains, often cloudy in appearance, some chloritised.	Zircon clusters, xenotime, metamict U-phases throughout.	FeO stains around some opaques, often with minor U-secondaries.	Common, < 1mm across, often accompanied by minor U-secondaries.
DH012 42.38-42.75	Plagioclase (oligoclase)	Pleochroic halo in biotite.	Euhedral polycrystalline 1-4 mm veinlets with strong strain, anhedral globules in microcline.	Euhedral ~5 mm oligoclase grains dominate minor anhedral, sercitic grains.	Coarse >5 mm with qtz inclusions.	Chloritised, scarce.	Bladed and minor skeletal grains.	Cleavage II muscovite on microcline.	Chlorite.	Magnetite.
DH012 66.41-66.79	Microcline	Graphic texture, vermicular qtz in Kspar, clustering of 0.2 mm plag.	Rune like <2 mm grains, subtle strain, inclusions in plag.	Abundant, tends to be clustered, minor myrmekite at Kspar contact, pericline twinning, ~0.2 mm.	Mainly tartan twinned, surrounded by microcline-perthite in places, graphic qtz.	Chloritised, halos, sparse, ≤1 mm.	Skeletal.	Muscovite.	Chlorite.	Magnetite.
DH012 127.72-128.04	Plagioclase (oligoclase)	Plagioclase ~ quartz, muscovite.	Sub-rounded, amoeboid, highly irregular grain boundaries, occurs as veinlets throughout sample.	Large grains >5 mm, subhedral, embayed boundaries with microcline, minor sericite.	Very minor, disseminated between plagioclase and quartz, anhedral grains.	Minor, fine and disseminated, <1-2 mm.	Bladed and skeletal.	Muscovite, chlorite.	Biotite-chlorite, minor clays.	Magnetite in biotite.
DH012 197.04-197.35	Microcline	1.5 mm magnetite-ilmenite surrounding euhedral qtz. Sub-solidus formation.	Variable sizes, rounded <0.2 mm inclusions, >1 mm globular strained grains, distinctly fine to coarse euhedral grains.	Skeletal, albite-oligoclase, some with rims, has qtz inclusions.	<2.5 mm grains, mostly anhedral, minimal perthite.	Disseminated, <0.5 mm, deep green chlorite, subtle foliation.	Bladed and skeletal in subtle alignment.	Muscovite blades <1 mm.	Chlorite, sericite.	Magnetite-ilmenite.
DH012 198.58-198.77	Plagioclase	Tourmaline		Large euhedral grains, >5 mm, smaller grains are anhedral.						

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
DH012 315.67-315.93	Microcline	Prominently zoned plagioclase.	Individual strained grains, rare chains or clusters, 1-3 mm, anhedral to subhedral.	Oligoclase, up to 4 mm, most embayed, prominent zonation with twinning and sericitised cores.	Coarse >4 mm, euhedral, qtz inclusions.			Muscovite.	Sericitisation of plag. Cores.	
DH012 342.47-342.84	Microcline	Zircon, xenotime.	Anhedral, globular, stains and clusters, inclusions.	Albite, scarce, sub-hedral, straight edged, large grains are embayed, sericite patches, ≤4 mm.	Minor perthite, amoeboid, some euhedral grains, embayed edges.	Fine, clustered, halos around inclusions.	Bladed and skeletal, chloritised.	Muscovite, xenotime, zircon.	U secondaries, sericite of plagioclase, chlorite.	Uraninite-magnetite.
DH019 13.75-14.15	Plagioclase	Prominent sericitisation of plag.	Polycrystalline veinlets, euhedral clusters, 1-2 mm, some strain extinction.	Oligoclase, large 2-8 mm grains, many euhedral.		Minor fine chloritised, halos present in some.	Some skeletal, mainly bladed.			
DH019 67.09-67.54A and B oxidised and unaltered	Microcline	Two generation of qtz, secondary U.	Globular, fine inclusions in Kspar, second generation in chains and veinlets of semi-hedral 1-2 mm grains with Kspar inclusions.	Scarce, oligoclase, large euhedral grains >4 mm with An<10, smaller zoned inclusions in Kspar with An>10.	5 mm grains, semi-hedral, finer grains included in late qtz, subordinate microcline-perthite.	minimal	skeletal and very fine		Secondary U.	Minimal magnetite <0.01 mm.
DH019 71.74-72.18A	Microcline-perthite	Radial cracks in magnetite/ilmenite around zircon inclusion, prominent chlorite.	Clusters and chains, highly irregular grain boundaries, globular inclusions.	Large grains, sericitised grains have embayed edges, most sub-hedral >1 mm and euhedral >4 mm, albite rims at K-spar contacts.	Perthite dominant in a strong fabric, sub-hedral and anhedral grains with embayed edges, 1-10 mm.	All are chloritised, minor radioactive inclusions.	Bladed with ragged edges.	Pitchblende, zircon clusters in large quartz, xenotime.	Chlorite	Prominent anhedral and interstitial Ilmenite-magnetite.
DH019 71.74-72.18B	Microcline perthite~plagioclase	Prominent rimmed plag.	Main mineral, surrounds Fspars, strained, qtz, plag. and Kspar inclusions, >2 mm.	Oligoclase-albite, 1-3 mm, euhedral and embayed grains, albite rimmed with zoned twinning in most, contain small round plag inclusions	Dominant feldspar, contains qtz inclusions, sub- to euhedral 1-3 mm, tartan microcline is minor.	Skeletal, <1 mm blades, many chloritised.	Most are skeletal.	Zircon	Chlorite, sericite, albite rimming.	

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
DH019 76.39-76.67	Microcline-microcline-perthite	Secondary U, prominent myrmekite.	Euhedral to subhedral, 1-3 mm grains, strain in some.	Oligoclase-albite, skeletal, sericitised, ragged and embayed contacts with Kspar -associated myrmekite, up to 3mm.	Tartan, albite rimmed with plagioclase contacts, euhedral-anhedral grains, <1 mm to >3 mm, minor plag. inclusions.	Minor fine and chloritised.	Skeletal.	Haematite.	Sericite, chlorite, haematite.	Magnetite
DH019 100.50-100.93	Microcline-perthite	Epidote-chlorite filled fractures.	Euhedral, polycrystalline veinlets up to 4-5 mm, older strained semi-hedral overgrown by unstrained euhedral large grains		Up to 10 mm, sub-euhedral, inclusions of strained rounded qtz. Form ground mass of fine grained Kspar.	Large mm-scale blades	Most skeletal.	Zircon.	Chlorite-epidote - hydrothermal products.	Magnetite associated with larger biotite grains.
DH019 146.72-147.00	Microcline	Granite-gneiss contact, high% magnetite blebs	Disseminated and clustered, <0.5 mm grains, subtle strain.	Myrmekite is scarce but recognisable plag. is not present in gneiss, plag is ≤2 mm in granite.	Sub- euhedral, minor rounded grains, fine mass of 0.05 mm, all tartan twinned, larger grains in granite. Coarse >2 mm in granite.	<1mm mostly chloritised, prominent in gneiss, coarse but scarce in granite.	Bladed with some skeletal grains.		Minor haematite and chlorite.	Magnetite, highest concentration at contact margin, fine and disseminated in gneiss, coarse and globular in granite, ilmenite present.
DH022 59.00-59.24	Microcline	Large uraninite with magnetite, tourmaline-quartz nest.	Irregular shape and size, clusters and chains, euhedral grain boundaries, globular inclusions in feldspars.	Oligoclase, scarce, zoned, sub-rounded	Highly irregular shape and size <5 mm, clustered and intergrown, perthitic exsolution, minor sericite.	Large grains, >3 mm, with halos.	Skeletal and embayed, chloritised.	Zircon, muscovite, tourmaline (entrained)	FeO-U secondaries in fractures throughout.	Magnetite-ilmenite, pitchblende-coffinite
DH025 235.81-236.14	Microcline-perthite	Monazite	Globular and anhedral grains.	Oligoclase, skeletal, fractures filled with sericite.	Large perthite (5 mm) sericite patches, Na rims,	Fine, <1-2 mm. disseminated.	Skeletal blades, chloritised.	Monazite, zircon	Chlorite and sericite, U secondaries are sparse with uraninite-magnetite-ilmenite.	Magnetite-ilmenite, uraninite.
DH025 334.99-335.45	Microcline	Magnetite clusters with secondary U halos, xenotime.	Very large, embayed throughout slide, many feldspar inclusions, straight quartz-quartz edges.		Tartan twinned microcline throughout, minor perthite, as inclusions and interstitial clusters, <0.5 mm to <3 mm.			Skeletal muscovite, also in clusters of bladed grains, 0.1 mm zircons in quartz.	FeO and secondary U halos around magnetite-ilmenite grains and in fractures throughout.	Large clustered magnetite-ilmenite grains (<2 mm) with U secondaries.

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
DH025 353.60-354.03	Microcline	Biotite with mould of zircon, weathered out U and Fe oxides with surrounding cracks.	Large, subhedral clustered crystals, extensive II cracks, smaller crystals are anhedral and enclose magnetites and Kspar.	Scarce, up to 4 mm across, albite-oligoclase.	Anhedral, large > 20 mm grains present.	<4 mm laths with magnetite II to cleavage, quartz growth between sheets, altering to chlorite.	Bladed, skeletal.	Zircon inclusions in biotite, weathered U oxides.	FeO-U secondaries in halos and cracks.	Magnetite, uraninite.
DH025 496.03-496.38	Microcline	Magnetite >3 mm, significant sericitisation, especially of plagioclase.	Euhedral and embayed grains in chain of 2-5 grains, euhedral inclusions in feldspars.	Scarce, highly altered, ub-hedral, 2-8 mm in size, albite rims.	Variable size, 0.5-10 mm, anhedral and sub-hedral with embayed edges and biotite-chlorite inclusions.	Variable, 0.2-2 mm, chloritised.	One grain has conjugate shear bands buckling sheets, entrained from metasediment. Most are bladed with ragged edges.	Zircon±xenotime.	Chlorite, sericite, epidote, U secondaries in fractures, no haematite staining, predominantly sericite and chlorite.	Amorphous U phases, haematite in fracture and on rims of magnetite-ilmenite.
HILG 01	Microcline	Large biotite laths	Polycrystalline veinlets, chains and beads, round inclusions in microcline,							
HILG 06	Microcline-perthite		Irregular grain boundaries, commonly in clusters of about 5 crystals	not common	Irregular grain boundaries, matrix	Bladed	Interstitial ad aligned in a fabric.		minor clays	
HILG 07	Microcline	Zircon in biotite.	Small globular inclusions in feldspars, myrmekite, larger euhedral to sub-hedral grains.	Minimal, strained twins with sericitised cores.	Sub-hedral with quartz rims, rims around quartz inclusions. ≤2 mm and >0.5 mm.	Good cleavage, sparse, fine, zircon inclusions, chloritised.	Bladed with ragged edges, some skeletal	Zircon	Biotite-chlorite.	Sphene/magnetite.
HILG 12	Microcline-perthite	2 plagioclase populations. Albite and oligoclase present.	Large sub-hedral grains, globular inclusions in feldspars, myrmekite is common.	2 populations 1 skeletal, 1 euhedral, ave. ≥3 mm interstitial or surrounded by microcline, all are rimmed and have slightly deformed twins.	Completely surrounds skeletal plagioclase and also surrounds euhedral plagioclase with rimmed or embayed boundaries.	Chloritisation, scarce.	Bladed	Clays.	Extensive chloritisation of biotite.	
HILG 13	Microcline-perthite	Zircon with halo and cracks in biotite.	Subhedral, singular and chains.	not present	up to 2.5 mm, biotite and quartz inclusions	Bladed with straight edges, as well as ragged edges	Some skeletal grains with dendritic oxides.	U secondaries on many grain-boundaries.	High % of clay and limonite, chloritisation of biotite.	

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
HILG 15	Plagioclase	Cleavage parallel quartz inclusions in plagioclase.		Oligoclase, up to 8 mm, some with raged and embayed edges.			Red-brown,	Muscovite.		
HILG 16	Plagioclase	Biotite with halos	Fine, globular and in chains	Euhedral to sub-hedral, Oligoclase, rimmed	Minor, some intergrowth with quartz	Two populations, red (halos) and green (chloritised)	Mostly bladed and skeletal, especially chloritised variety		Sericite of plagioclase, chlorite, minor haematite	magnetite
HILG 19	Microcline	Clusters of accessories, often with U secondaries.	Subhedral, often in chains.	Minimal, single highly strained large grain.	Tartan twinned microcline is dominant.	Good cleavage, FeO in cleavage, 0.1 mm halos, some fine grains with accessory clusters.	Bladed (magmatic), well cleaved, fluorite is common, often with U-secondaries.	Zircon (radioactive), monazite, secondary U veneers on some grains and in fractures,	FeO stains throughout, biotite-chlorite, large halos of secondary U surrounds some clusters of accessories	Minor magnetite in biotite cleavage.
HILG 21	Microcline-perthite.	Fluorite and tourmaline with biotite, radioactive inclusions in quartz.	Subhedral, myrmekite, and sub-rounded crystals within plagioclase/Kspar.	Scarce, up to 3 mm across, interstitial to quartz and Kspar, albite.	Euhedral grains > 20 mm, dominant mineral, strained. Graphic texture on mm scale.	Good cleavage with FeO, minor zircon inclusions,	Well cleaved, FeO II cleavage, > 2 mm across, ragged and skeletal, altering to chlorite.	Zircon, fluorite, tourmaline, monazite	Biotite-chlorite	Magnetite in biotite.
HILG 24	Microcline-perthite	Graphic growth in K-feldspar, also embayed grains.	amoeboid shapes	not common, 0.5 - 1 mm	interstitial to orthoclase	Tabular and bladed up to 1 mm long	Tabular and bladed up to 1 mm long, between grains.			
HILG 25	Microcline-perthite	Embayed with feldspar, also round fine grains within feldspar.	Irregular boundaries, fine along feldspar edges	fairly common	large grains up to 5 mm	Bladed, 1 mm long	Some skeletal with jagged b-axes.		clays throughout	
HILG 28	Plagioclase	Some chains cut larger grains.	irregular boundaries, clusters and chains	0.5 - 5 mm	matrix with orthoclase	Tabular	Bladed		microclinisation and minor clays	
HILG 29	Microcline-perthite	Fill embayed feldspars, round grains in feldspar.	Clustered, fairly straight edged,	prominent, up to 5 mm,	> 5 mm	Irregular and embayed, radiation halos in some	Ragged and skeletal, interstitial to feldspars.		minor clays on most feldspars	
HILG 30	Microcline-perthite	Round grains within feldspars.	mostly single rounded crystals, some clusters 5-10 crystals, irregular shapes between feldspars,	scarce	Grains up to 2.5 mm, in a matrix	tabular, 2 populations	Amoeboid and straight edged.		between larger grains and along cleavages	

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
HILG 32	Microcline-perthite		large crystals with smaller interstitial crystals filling embayed boundaries	possible, but altered	as a matrix of grains, some up to 5 mm across	large grains	Jagged edged and straight edged tabular grains.		clays II to cleavages	
HILG 33	Plagioclase		Dominant mineral, many > 5 mm, some > 10 mm. irregular grain boundaries.	large 5 mm grains, minor clays on surfaces	Microcline, minor, some grains > 5 mm, irregular and embayed boundaries	brown, < .05 mm	Clusters of jagged edged grains.		Most on orthoclase, clays	
HILG 35	Plagioclase	Euhedral quartz throughout, multiple generations of quartz	Dominant mineral, large and small grains, polycrystalline clusters, veinlets cross-cut all minerals, small grains are included in larger grains, rounded feldspar inclusions.	Large >5 mm grains, smaller grains have deformed twins, most are euhedral, smaller grains are anhedral.	Microcline <2 mm, irregular size and distribution.	Good cleavage with FeO, few halos, chloritised, single 2 mm grain.	Bladed	Zircon	Chlorite, sericite.	
IDAG 01A	Plagioclase		mostly euhedral	very common, fine-grained 1mm ave.., even grain boundaries	similar to plagioclase	tabular bladed crystals, some with black halos	Ragged edges, rounded edges, no preferred orientation.	silliminite in an interstitial mass of crystals, 1.5 mm across	Chlorite is present between feldspar grains	
IDAG 01B	Microcline-perthite	Chains of 5-10 grains, semi II to each other.	Minor, mostly singular crystals, minor clusters of 3-5 crystals,	Minor, <1 mm		None in slide			Most orthoclase is altered to clays	
IDAG 02	Microcline-perthite	Myrmekite	Globular and sub-hedral, rimming of feldspars.	Mostly sericitised, albite twinned, rims other feldspars with myrmekite texture	Dominant, with perthite	none in slide		minor muscovite		
IDAG 03	Microcline-perthite and Microcline-perthite		Mostly large crystals, irregular shape, interstitially between feldspars	Minor, large grains < 5mm	matrix with orthoclase	None in slide				
IDAG 04	Microcline-perthite	Embayed boundaries, some with straight edges.	Large crystals, interstitial to feldspars	Minor, some grains >5 mm	Major wrt orthoclase, altered	None in slide		muscovite included within grains and in clusters, possible after biotite		

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
IDAG 05	Plagioclase	Small round grains within plagioclase.	Major constituent, rounded edges, amoeboid shapes	Oligoclase, large grains > 5 mm, irregular edges with quartz, straighter edges with other feldspars		Scarce, bladed	Ragged edges.		Persistent along fractures	
IDAG 07	Microcline-perthite and Microcline		Mostly singular crystals, amoeboid and rounded crystals	Minor, 1.5 mm, altered, subhedral	matrix with orthoclase	none				
IDAG 08	Microcline-perthite and Microcline	Fine quartz in chains	Many fractured crystals, amoeboid and embayed shapes and boundaries,	Oligoclase, minor grains up to 5 mm, overgrowth of new Kspar, rounded grain boundaries.	Interstitial to quartz, major with microcline perthite	None in slide.		Skeletal muscovite up to 2 mm long. U bearing silicates with uranophane in radiating cracks (zircon clusters).	Sericite/clays throughout feldspars, II to cleavages.	Sub-hedral ilmenite with magnetite exsolution, possibly uraninite.
IDAG 09	Plagioclase		Single globular inclusions and beaded chains, anhedral crystals	Large (> 4 mm) and fine (< 1 mm) euhedral, 30 % of slide, 120º junctions with quartz. Albite	Common, with perthite.	Brown green	Straight edged, bladed, with minor FeO inclusions along cleavage.	U bearing silicates with radial cracks.	Clays and muscovite,	
IDAG 10	Microcline-perthite	Distinctly inhomogeneous mix of textures and grain sizes - metamorphosed pre D3	Some polycrystalline crystals, distinctly irregular shapes, strongly angular edges, most in chains, 120º junctions are common	Minor, up to 5mm, have quartz inclusions	Matrix of microcline perthite, 0.2 mm	None in slide		Very fine, <0.1 mm, interstitial with fine feldspars.		
IDAG 15	Plagioclase	Mix of fine and coarse grain sizes, distinctly 2 grain sizes	Single and clustered crystals, polycrystalline crystals with feldspar core, micrographic growth in plagioclase	Range from 0.2 to 5 mm	Singular and polycrystalline aggregates, irregular grains between quartz, orthoclase and plagioclase	Mostly tabular grains, straight edged, ragged on b-axes	Small % are skeletal.			
IDAG 16		Halos in biotite.				Good cleavage with FeO,				

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
IDAG 19	Microcline-perthite		Rounded and embayed crystals, chains and singular crystals, minor clusters	Very minor, 2-3 grains	Semi matrix, microcline perthite dominant around orthoclase and quartz, some grains > 5mm	None in slide				
IDAG 21	Plagioclase (albite)	Radial cracks in quartz, fluorite.	Anhedral chains. 50 % of slide, minor feldspar inclusions 1 mm.	Dominant feldspar, Euhedral grains > 2- 3 mm Albite	very scarce	Biot			Muscovite and clays in cleavages and fractures	
IDAG 22	Plagioclase and/or Microcline-perthite	Distinctly irregular shaped, angular, extensive quartz grains.	Extensive chains, interstitial to feldspars, also rounded and amoeboid crystals between and within feldspars, 0.5-1 mm wide, mm in extent, 0.25 - 0.5 mm in single crystals	Range from <0.2 to >5 mm, Singular grains, some clusters of 2-3 grains as well.	Irregular shapes, surround some plagioclase grains, have quartz inclusions	None in slide		muscovite between some grains,	Plagioclase to epidote	
IDAG 23	Microcline-perthite	Appears to be quartz dominated.	Matrix of fine crystals, mix of straight and rounded grain boundaries, a few 120º junctions, myrmekite with plagioclase, round quartz inclusions within quartz and feldspars, 0.25 - 1 mm	Oligoclase, highly altered, mostly large grains, twinning shows strain.	Dominant, irregular shaped grains, tartan twinning present, many with quartz inclusions, 0.5 - 1.5 mm	Tabular, small % are skeletal,				
IDAG 24	Plagioclase		Mostly fine and clustered, amoeboid shaped and sub-rounded, single crystals within feldspars, < 0.5 mm.	Fine, with quartz, about 0.75 mm, minor 5 mm grains present,	Irregular shaped grains, tartan twinning present.	Orange brown - light tan pleochroic, cloudy texture in some, good cleavage with FeO,			Microclinisation and alteration.	

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
IDAG 29	Plagioclase	Allanite, visible U secondaries.	Coarse and fine, fines straight edged, 120º junctions large crystals have straight but irregular edges, some are clustered, fines 0.5 - 1 mm, large crystals > 5 mm.	Oligoclase, fine with quartz, as well as coarse grained, many grains are elongate and euhedral	Irregular shaped grains, tartan twinning present, many with quartz inclusions, 0.5 - 1.5 mm size average.	Large 5 mm + books, small grains < 0.25 mm, variety of shapes, embayed, tabular, bladed, small % are skeletal, dark brown-tan/orange pleochroic.		Allanite?.. Numerous sites of uranophane in cracks surrounding weathered holes, minor skeletal muscovite and clays.	Chloritisation of biotite, U secondaries in fractures, sericitisation of plagioclase, microclinisation.	Magnetite with biotite.
IDAG 34	Plagioclase	2 quartz populations	Sub-rounded in chains and small clusters, straight edges between crystals, crystals are fractured, some look polycrystalline. Large crystals have irregular boundaries and are embayed on some.	Range of grain sizes from <0.5 - >5 mm, quartz inclusions, subhedral smaller grains, large grains have irregular boundaries	Microcline-perthite Interstitial, but continuous, also within larger feldspars	Up to 2.5 mm, tabular	Small % amoeboidal and skeletal.		Extensive chloritisation of biotite.	
IDAG 43	Microcline-perthite	Uranophane in radiating cracks.	Chains and clusters, between feldspars, some quartz-quartz intergrowth, irregular grain boundaries.	Oligoclase up to 3 mm, sub-rounded, minor clusters.	Mostly clusters and extensive interstitial masses to the quartz-plagioclase grains, > 5mm and 1-3 mm ave..	Prevalent in subtle fabric, tabular and bladed, clustered, with very fine (0.005 mm halos).	Interstitial, some ragged and skeletal grains are also present.		Sericite growth on most plagioclase, chlorite after biotite.	U bearing phases- uraninite with uranophane in radiating cracks.
IDAG 44	Microcline-perthite	High % accessories.	Mainly polycrystalline aggregates of angular euhedral quartz. Extensive in mm scale,	Scarce, inclusions in quartz, altered cores	Interstitial matrix, clusters and chains of grains, 2-3 mm, accessory inclusions are common, > 5 mm, orthoclase in mostly singular grains, 2-4 mm in size, irregular boundaries, often between quartz and microcline.	None in slide			Quartz rims around altered feldspars, as well as around older quartz.	

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
IDAG 46	Microcline-perthite	many accessories, within semi II cracks.	Extensive massive crystals, rounded grain boundaries, 2 generations, irregular and interstitial to regular sub hedral large crystals, polycrystalline veinlets > 5 mm long.		Mostly singular grains, between and within quartz grains, 0.2-2 mm, sub rounded, minor orthoclase, highly altered, sub-hedral with 5 mm ave. grain size.	None in slide		high % II to cracks, cracks surround some clusters of accessories.		
HDD027 89.47-89.95	Plagioclase		Amoeboid, embayed, clustered, also highly irregularly shaped crystals.	Albite, subhedral, amoeboid and embayed shapes, 1-4 mm, globular quartz inclusions, lenticular strain present.	Microcline perthite, irregular, singular quartz inclusions	Ragged and skeletal, with FeO inclusions.				Minor FeO in biotite.
HDD 027 104.36-104.70	Plagioclase	Quartz-tourmaline intergrowth.	Irregular shaped large crystals, beaded chains and clusters of smaller crystals - also irregularly shaped, minor rounded quartz.	Albite, embayed ,<4 mm, altering to sericite, some are rimmed with subhedral shapes.	Scarce, irregular and interstitial to other minerals.	Large 1 cm well cleaved, chloritised with ragged edges.		Tourmaline intergrown with quartz, fine ragged muscovite.		
HDD027 122.90-123.22	Microcline-perthite	Fe-Cu Sulph.s, wollastonite, cross-cutting U mineralisation .	Small, globular, anhedral to sub-hedral, inclusions, euhedral with embayed edges. Entrained grains are in a fabric with biotite.	Large, euhedral >10 mm grain, sericite in patches throughout. Smaller plag inclusions <0.5-1 mm in larger plagioclase grain.	Strong perthite fabric II to foliation of entrained opaques and mafics, cross cut by sericite and clays.	1-2 mm blades, disseminated and entrained laths.	Skeletal, all chloritised.	Muscovite, wollastonite, epidote, diopside.	Secondary U on Qtz-Fspar boundaries, cleavage fractures, cross-cuts perthite and new micas, surrounds opaques	Magnetite ilmenite, entrained Cu Sulph.s.
HDD027 142.01-142.31	Microcline/ plagioclase	Large 8 mm euhedral plagioclase in pegmatoidal vein.	Anhedral to globular <2 mm, myrmekite, 10 mm euhedral grain in pegmatoidal vein.	Oligoclase, anhedral, rimmed at biot contacts, ~1 mm, large grains with qtz inclusions.	1-2 mm microcline, anhedral shapes, minimal proportion in pegmatoidal vein.	2 varieties; anhedral red-red-brown with halos, light green in subtle foliation with chlorite and magn.	In streaks, ~1-2 mm, some as inclusions in microcline, in streaks along vein edges.	Zircon, skeletal muscovite	Saussurite in large plag. Minor sericite, chlorite after biot. Biotite after titanite.	Magnetite with biot.

Sample	Dominant Feldspar/s	Special Features	Quartz	Extinction	Plagioclase	K-Feldspar	Biotite	Accessories	Alteration	Ore Minerals
RDD001 180-181	NA	Zircon inclusions in biotite with halos	≤ 1 mm in clusters and > 10-20 mm chains, uniform extinction, subhedral shapes with straight and rounded edges, some crystals are polycrystalline.	Mostly uniform, some minor strain present.	Fine, strongly altered in a highly sericitised matrix.	Microcline perthite, with plagioclase	Variable textures. 1. Large > 1-2 mm laths, strong cleavage in most with prominent FeO between sheets also altering to chlorite. 2. Wavy laths intergrown with feldspars-growth II to cleavage. 3. Fine biotite in matrix < 0.05 mm. 4. Laths with prominent magnetite II to cleavage.	Zircon, muscovite.	Sericite on feldspars, chlorite on biotite, haematite on magnetite and as cloudy stains in matrix and larger quartz/feldspars.	Prominent magnetite with biotite laths, magnetite ilmenite.
RDD004 154-155A Aplitic granite	Microcline is a minor constituent	Radiation halos in some biotite.	Fine, ≤5 mm, irregularly shaped, smaller crystals tend to be globular and interstitial to feldspars. >60% of slide	Larger grains all display strain, smaller grains tend to be uniform.	Oligoclase, interstitial to quartz, severely sericitised, 1-5 mm grains in clusters all with albite e twinning.	Microcline-perthite is interstitial to quartz.	Chestnut brown - green, good cleavage with FeO, radiation halos in some, most altered to chlorite with anomalous interference colours.	Zircon, muscovite.	FeO staining on some feldspars and quartz.	
RDD004 154-155B Quartz rich granitoid	Microcline is a minor constituent of the slide.	Sphene, zircon clusters.	Large crystals ≤10 mm, prominent fluid inclusion trails some with fine mica inclusions, irregular and embayed boundaries. Smaller crystals <4 mm have irregular boundaries, extensive irregular shaped interstitial quartz between larger crystals.	Smaller grains tend to show stronger strain extinction.	Scarce thin strips within an between large quartz.	Present as minor growth with biotite.	Large 10-20 mm clusters of <4 mm grains. 1. Olive green brown-dark brown pleochroism - anomalous chlorite interference colours throughout (deep blue), elongate halos, halos around zircon inclusions.	Zircon prevalent as accessories in biotite and clusters in quartz and feldspar.	Sericite on some feldspar, FeO staining sparse throughout.	Mag-haematite with biotite. Large >4 mm pyrite, 1 x 0.25 mm chalcopyrite.

Sample	Dominant Feldspar/s	Special Features	Quartz	Extinction	Plagioclase	K-Feldspar	Biotite	Accessories	Alteration	Ore Minerals
RDD005 280-281	Microcline		Large crystals > 5 mm, irregular and straight edged, embayed with microcline, minor microcline-perthite and minor plagioclases. Subtle strain in larger crystals, prominent strain less common, crystals are clustered and in chains. >60% of slide, <2 mm inclusions of feldspar.	Subtle strain in most.	Oligoclase, < 4 mm elongate grains interstitial to other feldspars and quartz, minor.	Dominant feldspar, microclnisation on some grains, perthitic exsolution on some grains, 2 prominent muscovite inclusions (0.2 mm)		Muscovite	FeO staining on some feldspars.	
RDD006 119-120	Microcline-perthite	Secondary fluorite II to biotite cleavage.	Large, singular > 10 mm crystals, straight boundaries. Chains of ≤15 mm in length have quartz with irregular boundaries and display uniformly different extinction to larger crystals. >60% of slide.	Subtle strain in large grains, strong in interstitial chains.	Albite-oligoclase, scarce and altered to sericite.	Tartan twinned variety interstitial and included in quartz. Microcline-perthite with albite exsolution, straight boundaries with large quartz, some with micaceous rims, large grains have coarse and fine perthitic exsolution. Fine inclusions in biotite clusters.	Singular dark brown-dark green pleochroic grains with zircon and/or radiation halos. Dark brown singular cloudy textured grains, clustered, with prominent halos. Majority are ragged edged and often skeletal, >50% are chloritised with anomalous interference colours. FeO along all cleavages, halos in >90% of grains.	Zoned and radioactive zircons in most biotite and clustered in some quartz, elongate <2 mm fluorite II to biotite cleavages, muscovite.	FeO on feldspars and in biotite, microclinisation on some feldspars, muscovite, chloritisation.	Minor magnetite with biotite.
RDD006 145-146m	Plagioclase (oligoclase)	Plagioclase dominated, abundant zircons up to 0.5 mm.	Large, >5mm-10 mm, euhedral boundaries with most feldspars, minor amoeboid inclusions <1 mm.	Strain in some grains.	Main phase, oligoclase, most have euhedral boundaries, though some partially consumed grains are present. Up to 6 mm with quartz inclusions. Highly variable sericitisation, embayed grains most altered with albite rims.	Minor phase, up to 3 mm, some highly clay altered, single euhedral 3 mm grain included in quartz.	Red brown, prominent halos and zircon inclusions. Most blades, moderately skeletal, prominent undulose extinction.	Abundant zoned zircons, up to 0.5 mm, with inclusions and radiating cracks. Minor skeletal muscovite.	Clay and sericite on feldspar, weak chloritisation of biotite.	Very fine pyrite associated with zircon and biotite. raninite-uranophane-zircon clusters with secondary Fe.
RDD006 171-172	Microcline-perthite-perthite	Abundant accessory inclusions and clusters with radiation cracks.	Anhedral, jagged edges, 5-10 mm, some rimmed with feldspar, overgrowing biotite, in large chains >10 mm between feldspars.	Uniform, slight strain.	Albite-oligoclase, scarce, highly altered to sericite, rimmed by quartz, inclusions in K-feldspar	Microcline-perthite dominant, with perthite, tartan twinning is cross cut by perthite.	Large, > 10 mm, often skeletal, chestnut brown, FeO inclusions and small halos, brown-tan pleochroism, secondary fluorite inclusions.	Zircon, apatite, monazite, secondary cleavage II purple fluorite inclusions in biotite.	Minor muscovite and extensive sericite in feldspar especially in microcline cleavage.	Magnetite-ilmenite, magnetite with uraninite?- has radiation cracks-weathered our U-oxide/silicates.

Sample	Dominant Feldspar/s	Special Features	Quartz	Extinction	Plagioclase	K-Feldspar	Biotite	Accessories	Alteration	Ore Minerals
RDD006 245-246	Microcline-perthite	Radioactive inclusions in zircons and in purple fluorite.	> 50% of section, large crystals > 5 mm, with 0.2-0.5 mm feldspar inclusions. Predominantly straight edges and euhedral shapes, minor irregularly shaped crystals.	Subtle strain in irregularly shaped grains.	Oligoclase, most are sericitised throughout.	Albite gashes are common and perp. To perthite, 0.3-0.5 mm pericline and Carlsbad twinned inclusions, globular quartz inclusions are common, tartan twinned microcline is sub-ordinate.	Variable. 1. Yellow-red brown pleochroism, strong cleavage with FeO, skeletal and ragged grains altered to chlorite. 2. Light-chocolate brown pleochroism, remnant cleavage, partially chloritised littered with radiation halos, prominent 0.1-0.5 mm purple fluorite inclusions.	Fluorite, zircon clusters in quartz, single inclusions in biotite, muscovite.	Chlorite, sericite, haematite and other FeO staining of large feldspars.	Fine magnetite with biotite, pleochroic inclusions and fluorspar in some biotite, secondary U halos around metamict primary phases
RDD008 284-285A Granite	Microcline-perthite	Myrmekitic texture.	Rune shaped crystals with rounded and angular boundaries, 30% of slide. Amoeboid and globular shaped crystals included in feldspars.	Strong strain extinction in smaller grains.	2 large grains, one rimmed, sericitised throughout.	Microcline-perthite, microclinisation in most.	Fine and disseminated with FeO inclusions.	Muscovite inclusions ≤0.5 mm in quartz and feldspar.	Microclinisation of most feldspars, sericite, muscovite in feldspars.	
RDD008 284-285B Calc-silicate	Microcline-perthite.	Zoned zircon inclusions in quartz.	1. Large crystals ≤10 mm, straight and irregular boundaries, mica inclusions. 2. Irregularly shaped, ≤1-5 mm, consumed inclusions in larger quartz, often with quartz/plagioclase rim, mostly elongate and interstitial. Clasts of polycrystalline quartz with muscovite <0.2 mm.	Subtle strain in large grains, strong strain in smaller irregular grains.	Albite-oligoclase, scarce, sub-hedral, embayed boundaries with quartz.	Microcline-perthite, long 15-20 mm chains of >5 mm chains, variable amounts of perthite, rounded, irregular boundaries with quartz rims, globular quartz inclusions are common.	Inclusions in microcline, FeO on cleavages, brown cloudy varieties with large 0.1 mm halos, skeletal grains are chloritised.	Zircon in quartz, calcite, muscovite. Calcite veining, cutting and cross-cut by quartz/feldspar, with fragments of quartz/feldspar	Chloritisation, haematite veinlets, quartz rims, sericite, FeO staining, in some veins.	Pyrrhotite-pentlandite, pyrite are all present in fine grained, <1-2 mm, sparse quantities.
RDD060 289m	Microcline	Graphic quartz-Kfeldspar intergrowth.	2 generations; 1 inclusions in Kfeldspar, <0.75 mm, rounded. 2 large >5 mm grains, predominantly euhedral grains, with some embayed Kfeldspar boundaries. Large grains contain microcline inclusions with albite rims. Micrographic textures.	Strain in some.	Scarce, oligoclase, 1mm - 4 mm, strongly sericitised cores, ragged edged with albite rims on most, single myrmekite edged grain, completely sericitised amoeboid <0.75 mm inclusions in microcline.	Tartan twinned, up to 6 mm, euhedral and embayed boundaries, remnant plagioclase twinning, weakly developed mesoperthite on all grains.	Red-brown, partially chloritised, undulose extinction in some, abundant halos, ~1 mm bladed grains, some skeletal.	Zircons in clusters, all zoned with inclusions. Skeletal muscovite <1 mm.	Sericite and clays on most feldspars, mesoperthite.	Uranophane along grain boundaries, fractures and cleavages, particularly in radiating cracks surrounding zircons. Gummite masses up to 0.5 mm in some feldspars and associated with zircons.

Sample	Dominant Feldspar/s	Special Features	Quartz	Extinction	Plagioclase	K-Feldspar	Biotite	Accessories	Alteration	Ore Minerals
RDD072 268-269m_ gneiss	Potassic	Contact zone with schist, uranophane present at this zone.	120° junctions, <0.75 ave. dominant phase. Majority are euhedral.	Uniform	Scarce, <0.5 mm, sericitised, anhedral singular grains surrounded by quartz/biotite.	Scarce, <1 mm, altered to clays, predominantly tartan twinned and altering to clays.	Abundant, wrapped around single and clustered quartz, almost entirely chloritised, <1 mm blades, minority are skeletal and all contain pleochroic halos.	Zircon associated with biotite, cordierite.	Clays and sericite on feldspars, chlorite.	Uranophane on grain boundaries and cleavages, especially near contact.
RDD072 268-269m_ granite	Plagioclase	Contact zone with schist, with uranophane. Micro-fault shows displacement of contact.	1.5mm - 10 mm grains, mostly euhedral.	Strain near contact with schist.	Minor, 1mm - 4 mm grains with intense sericitisation, included in quartz - amoeboid in shape with sericitic cores.	Scarce, minor <1 mm tartan twinned grains.	Scarce, 2-3 mm grains, well chloritised, skeletal grains.	Cordierite. Zircon - scarce.	Sericite on plagioclase.	Uranophane on grain boundaries and cleavages, especially near contact.
RDD078 362-363m	Microcline-perthite	Myrmekite throughout.	Most is subhedral <2-3 mm, vermicular grains up to 5 mm in between larger K-feldspar.	Strain in most grains.	Probably oligoclase, interstitial to K-feldspar and strongly sericitised, <0.5 mm.	Microcline-perthite is the dominant mineral in the sample, extensive mesoperthite II cleavage, singular grains up to 15 mm. Tartan microcline is <1.5 mm and anhedral.	Large 5-10 mm blades, weakly skeletal textured with strong brown-tan pleochroism, clustered.	Zircons associated and included in biotite.	Extensive mesoperthite, saussurite in some plagioclase, clays in fractures.	0.05 mm chalcopyrite in K-feldspar, fairly abundant euhedral to subhedral <1mm pyrite. Subhedral pyrite, <0.3 mm, with jarosite halos, associated with pyrite in biotite clusters, compound uraninite up to 0.5 mm cross-cut biot. cleavage.

Sample	Dominant Feldspar/s	Special Features	Quartz	Extinction	Plagioclase	K-Feldspar	Biotite	Accessories	Alteration	Ore Minerals
RDD102 317-318m	Microcline	Boltwoodite in mm-scale breccia veins, multiple generation fractures.	At least three generations; 1 rounded <0.05 mm - 0.2 mm inclusions in feldspar. 2 interstitial subrounded 0.1mm - 2 mm grains in chains and beads. 3 very fine new quartz in quartz-feldspar breccia veins.	Strain is intense in the first two generations, not discernable in very fine quartz.	Oligoclase, ~1.5 mm, scarce, anhedral with variable sericite and albite rims. Occur interstitial to K feldspar and quartz in chains.	Tartan microcline up to 18 mm is dominant, microcline perthite is smaller and less abundant. Microclinisation is present on many grains, mesoperthite and microperthite are both present in variable proportions with scarce patches of skeletal albite.	Dark green-brown pleochroism, anhedral and ragged edged grains, >3 mm with some deformed cleavage.	Zircon associated with biotite, fluorite in biotite	Sericite on plagioclase, clays, chlorite and fine quartz in fractures, albite and mesoperthite, chloritisation of biotite.	Boltwoodite in mm-scale fractures and in minor subordinate fractures, minor associated pitchblende and gummite. Uranophane in at least 3 generations of fracture veinlets, and in cleavages. Uraninite (<1 mm) is surrounded by gummite and/or jarosite halos. Amorphous gummite fills uraninite inclusion mould in biotite.
RDD141 244-245m	Microcline	Deformed plagioclase twin planes.	~10 mm rune-shaped clusters of 1.5 mm - 4 mm euhedral grains in microcline, individual quartz inclusions in plagioclase and Kfeldspars.	Strain in most grains.	Oligoclase, large >6 mm, most euhedral, some near completely sericitised, smaller grains <4 mm are anhedral and interstitial to larger quartz. Minor <1 mm euhedral grains. Brittle-deformed twinning.	Tartan-twinned up to 9 mm, twinning is deformed, mesoperthite and minor microclinisation patches are present, surround semi-hedral 2-3 mm quartz, skeletal and embayed edges have albite rims.		3 mm skeletal muscovites, zircons in feldspars and interstitial spaces.	Clays in numerous fracture sets, cross-cut hydrothermal alteration minerals and textures - chlorite, sericite, mesoperthite and myrmekite.	
RDD145 412-413m	Microcline	Sparse uraninite/pitchblende.	2 generations: 1st amoeboid inclusions in feldspars, < 1.5 mm. 2nd Larger, >6 mm, with euhedral edges as well as embayed intergrowth with K feldspars, surrounds 1mm-3 mm microcline grains.	Strain in some grains.	Oligoclase, most are <2 mm inclusions in K-feldspar, rimmed with sercitic cores.	Tartan twinned, up to 11 mm, embayed and euhedral boundaries with quartz, extensive mesoperthite.	Variably chloritised blades, some >4 mm, partially skeletal blades, small biotite in microcline has a clay halo.	Minor skeletal muscovite.	Clay in fractures cross-cutting all minerals and alteration. Mesoperthite and sericite on feldspars.	Minor uraninite, very sparsely disseminated, <0.1 mm. Magnetite with altered biotite.
RDD157 343-344m	Microcline	Abundant zircon with secondary U in fractures.	2 generations; younger sub- to euhedral grains dominant, 1-12 mm, older single <4 mm grains occur as infrequent rounded inclusions in K-feldspar.	Strain in rounded inclusions.	Oligoclase, mostly skeletal, subhedral, <2 mm, highly sericitised, scarce with albite rims in grains included in K-feldspar.	Tartan microcline forms a matrix around subhedral quartz, 0.5mm - 2mm wide. Anhedral grains up to 4 mm are included/surrounded by later generation quartz.	Chloritised throughout with magnetite in cleavage, tan-olive green to grass green pleochroism, 1-5 mm blades in clusters, some are skeletal.	Abundant zircon clusters, associated with biotite, most <0.75 mm. Cleavage II fluorite in biotite.	Sericite on plagioclase, minor mesoperthite on Kfeldspar, chlorite on biotite.	Uraninite <0.2 mm associated with biotite, 1 mm botroidal masses of pitchblende also with biotite. Magnetite with biotite.

RDD193 315-316m	Plagioclase-albite, minor orthoclase	Pristine, primary alaskite with minor oxidation	Dominant mineral, , rune shapes, inclusions in plagioclase, and large clusters	Weak strain	Coarse, > 1 - 2 mm, albite twinned	Microcline-perthite, orthoclase	Scarce, 0.2mm disseminated grains.		Sericite along plagioclase fractures,	mm-scale, euhedral pyrite, fine chalcopyrite, hydrothermal pyrite veins
Sample	**Dominant Feldspar/s**	**Special Features**	**Quartz**	**Extinction**	**Plagioclase**	**K-Feldspar**	**Biotite**	**Accessories**	**Alteration**	**Ore Minerals**
RDD219 335-336m	Microcline	Calc-silicate - quartz dominant with calcite and abundant skarn minerals. Abundant uraninite.	Dominant mineral, forms a matrix of fine 0.5-6 mm grains, many euhedral.	Strain in a large proportion of grains.	Not significantly present.	Tartan twinned, strained twinning, <1 mm anhedral grains with clay alteration.		Zoned zircons, monazite, xenotime and apatite in clusters. Euhedral >1 mm titanite in prominent clusters, 2-3 mm diopside clusters.	Calcite fill in voids, clay alteration of feldspars, haematisation of Fe phases, epidote. Fe and uranophane in radiating cracks.	Abundant uraninite, clustered and included in feldspar, titanite, diopside and quartz, also interstitial to larger minerals, halos of jarosite and pyrite with uranophane, 0.3 mm - 0.5 mm, subrounded.
RDD351 327-328m	Microcline-perthite	Appears to be a C type with secondary U	1mm clusters and chains,	weakly strained	Minor primary crystals, embayed edges, sericitised, <1 mm	Microcline-perthite equal propo to qtz, minor tartan microcline	Skeletal, fine	Zircon, muscovite.	Sericite, new fine Kspar, calcite vein and fracture-fill, fine Fe stains ofn microfractures	Pyrite, Titanite, Fe-oxides, coffinite, uranophane
RDD373 63-64 Alaskite	Microcline	Coarse refractory phases. Quartz replacement of feldspars, prominent Fe staining throughout	Mix of coarse (>1 mm) anhedral crystals, cross cut by fine-grained vein quartz	Predominantly uniform, large grains show some strain	Primary, anhedral, subordinate to K-feldspar, albite twinned, sericitised	Microcline perthite, minor tartan twinned grains	All altered to chlorite, skeletal blades, clusters (mm-scale) and fine disseminated blades throughout	Fluorite in biot. zoned zircon (in biot), clinopyroxene-apatite-biot clusters.	Haematite in fractures, chlorite after biot. clays replacing Kspar, new fine microcline	mm-Scale brannerite, coarse mm-scale skeletal pyrite, mobilised U and Fe in biotite cleavage
RDD373 93-94 Alaskite	Microcline	Dominantly Tartan microcline, with intense microclinisation, Clusters of mafics hosting refractory minerals. Prominent sulphides - pyrite in 3 generations, disseminated chalcopirite	Anhedral coarse grains, replace feldspars, old quartz inclusions in Kspar	Prominent strain in large grains	Coarse grains, >10 mm, embayed edges replaced by quartz, sericite and minor saussurite	Tartan microcline dominant with intense microclinisation. Microcline perthite exists near mafic clusters.	Coarse, complete replacement by chlorite with prominent FeO development along cleavage, mm-scale blades, opaque inclusions, clustered with mafics	Zircon, apatite, monazite, rutile	Fluorspar, epidote and chlorite vein/fracture fill, flu. cuts chlor. cuts epi. cuts py.. Youngest veins are calcite and fine quartz micro breccias.	Prominent pyrite, euhedral framboids II to biot. Cleavage. Late veins cut most primary minerals. Pyrite fills in corroded uraninite casts

Sample	Dominant Feldspar/s	Special Features	Quartz	Extinction	Plagioclase	K-Feldspar	Biotite	Accessories	Alteration	Ore Minerals
RDD373 115-116 Alaskite	Microcline - Tartan twinned	Intense microclinisation, sulphides, coarse titanite. **No** betafite	4 generations; old inclusions in feldspars, coarse primary quartz, myrmekite, late fine quartz vein and replacement textures. Entrained polycrystalline quartz clusters	Coarse grains show internal strain.	Bimodal, fine grains in chains/clusters, or as inclusions in Kspar. All altered by sericite, myrmekite, albite twinned. Coarse plagioclase retianed shape with some quartz invasion at edges	Tartan dominant, with new fine microcline alteration textures on all observed grains. Prominant Fe discoloration of fine microcline. Very coarse (>5 mm)	Blades with jagged edges, FeO and chloritisation of most. Occur in nests with other mafics.	Zircon, apatite, monazite, fluorite	Fluorspar veins cut chlorite and epidote. Intense microclinisation, sericitisation of plag. Chrloite replacement of biot. Fine clays replace Kspar.	Pyrite, early framboids, later veins and fracture/void-cast fill throughout - cust by fluorspar. Magnetite
RDD373 116-117 Alaskite	Microcline - Tartan twinned	Intense microclinisation, millimetric betafite, sulphides, coarse titanite	4 generations; old inclusions in feldspars, coarse primary quartz, myrmekite, late fine quartz vein and replacement textures. Entrained polycrystalline quartz clusters	Coarse grains show internal strain.	Bimodal, fine grains in chains/clusters, or as inclusions in Kspar. All altered by sericite, myrmekite, albite twinned. Coarse plagioclase retianed shape with some quartz invasion at edges	Tartan dominant, with new fine microcline alteration textures on all observed grains. Prominant Fe discoloration of fine microcline. Very coarse (>5 mm)	Blades with jagged edges, FeO and chloritisation of most. Occur in nests with other mafics.	Zircon, apatite, monazite, fluorite	Fluorspar veins cut chlorite and epidote. Intense microclinisation, sericitisation of plag. Chrloite replacement of biot. Fine clays replace Kspar.	Pyrite, early framboids, later veins and fracture/void-cast fill throughout - cust by fluorspar. Magnetite
RDD373 117-118 Pegmatite	Microcline	Coarse oligoclase grains >10 mm, fine refractories	Anhedral, subordinate to feldspars, singular and small chains	Strained	Bimodal; large grains, cross-cut by albite veins, small grains interstitial to larger K-spar, albite rimmed with myrmekite development.	Large grains >15 mm, anhedral edges, secondary subsolidus textures	Fine skeletal blades in clusters, chloritised with radioactive inclusions	Very sparse opaques and zircons.	Microclinisation, preferentially on tartan type, abite viens, chloritisation of mica	Pyrite, magnetite both minor. Secondary U and Fe in biotite cleavage
RDD373 124-125 Alaskite	Microcline - orthoclase	Coarse brannerite, thorite, rutile-titanite abundant, uranophane veins, brittle deformation of plagioclase twins. Entrained calcite	Coarse, fractured as with other rock forming minerals, fine inclusions in Kspar, coarse grains with irregular edges, late fine vein quartz with other alteration	Strain in some large grains	Coarse grains, >5 mm, embayed edges replaced by quartz, sericite on most, brittle displacement of twin planes, albite exsolution along microfractures	Predominantly microcline perthite, alteration covers any diagnostic features, prominent clay development at fracture junction in weathered grains	Most blades are fine-grained, ~1 mm, and chloritised. Occur inchains and clustered books between quartz and feldspar	Zircon, apatite, monazite (abundant) rutile, titanite, thorite	Sericite, potassic alteration to clays, fine quartz veins, calcite veins, chloritisation, secondary U fracture fill. Alteration is extensive	Brannerite, magnetite, haematite, uraninite. Hydrothermal pyrite halos around reduced U phases.

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
VALB 01	Microcline	Bladed biotite in strong fabric.	30 % of slide, Globular inclusions and interstitials, amoeboid shapes, clusters with 120° junctions, FeO inclusions	Albite, rimmed with new quartz and/or plag, clustered 0.05-0.1 mm grains, 10 % of slide, rims around Kspar, many strain extinction grains with lenticular twinning	Microcline and microcline-perthite (20% of slide), 0.1 - > 5mm grains, strain extinction common	Blades in chains and beaded chains, strong fabric alignment, olive green, chocolate brown	Bladed grains with straight edges, some minor skeletal grains.	Minor apatite, zircon is very common with biotite chains, often included in biotite, 0.1 mm in size.	Biotite-chlorite, plagioclase-sericite, magnetite-haematite	Magnetite, botroidal haematite, ilmenite in magnetite, in beads aligned with biotite
VALB 03	Microcline-perthite-perthite	Sheared, with biot aligned with fabric, weathered U oxide with radiation cracks.	Small single globular crystals, large sub-hedral crystals in chains > 10 mm. Beaded chains of smaller crystals	Oligoclase, Strain extinction in some,	Dominant, with beaded globular quartz chains	Light to dark brown blades in chains aligned with fabric	Some skeletal, with chlorite and FeO oxides along cleavage.			Magnetite-ilmenite with biotite.
VALG 01	Microcline-perthite	7 mm garnet.	Globular, amoeboidal crystals, large straight edged clusters, large embayed crystals are dominant.	Albite, globular 1-2 mm grains with rims.	Many have quartz inclusions, strain extinction throughout, perthite exsolution throughout.	Fine, 0.05 mm grains, sparse and disseminated, Fe oxides along cleavages.	Skeletal and ragged.	Garnet 1x7 mm grain. (almandine from literature)		2x 0.05 mm grains, 1 x cluster in biotite
VALG 02	Microcline-perthite	Fibrolite beds and trains.	30-40 % of slide, Globular embayed quartz in feldspar , interstitial chains of straight edged quartz, graphic	Albite and oligoclase, zoned and rimmed, rounded as inclusions in feldspar, euhedral grains uncommon, as globular remnants in K-feldspar, 0.5 mm grain size, often with strain extinction.	Microcline-perthite, muscovite in cleavage, perthite in K direction.			Large beds of fibrolite, also in trains and wisps in K feldspar, interstitial stringers.		
VALG 04	Plagioclase (albite)	Zircon inclusions in biotite with halos.	Large, embayed and straight edged crystals, muscovite inclusions, zircon inclusions.	> 50% of slide, albite dominated, some embayed with quartz inclusions.	Microcline, minor microcline perthite, < 20 % of slide, albite gashes perp. to cleavage.	Large 1-2 mm grains in clusters, Fe oxides in cleavage, with zircon inclu. and halos	Bladed with straight edges.	Zircon clusters II to biot cleavage, in small trains, as single inclusions in quartz.		3x1.5 mm magnetite-ilmenite grains.

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
VALG 05	Microcline-perthite	Zircon clusters in quartz with radiating fluid inclusion trails.	Beaded chains, interstitial chains of ragged and embayed crystals, 0.05-0.2 mm veinlets, 3-4 mm clusters.	Oligoclase 0.2 - 1 mm, with 5-10 mm interstitial chains of pericline twins with strain extinction. 2-4 mm zoned grains with quartz inclusions and micrographic intergrowth.	Microcline-perthite with prominent perthite in the K direction. Remnant ragged and embayed plagioclase inclusions.				Sericite in most plagioclases.	1 x 3 mm magnetite-ilmenite grain
VALG 06	Microcline-perthite-perthite	Plagioclase replacing microcline? See Judith	Intergrown and embayed clusters, euhedral edges with feldspar.	Oligoclase, Sub II to foliation veinlets in microcline-perthite	Microcline with veinlets of perthite, muscovite rims	none in slide				
VALG 07	Microcline-perthite-perthite	Microclinisation	Globular and sub-hedral, rimming of feldspars, large crystals have feldspar inclusions.	Oligoclase, scarce, sericitised, with Kspar and quartz rims	Microcline-perthite	Ragged	Fine and skeletal, altering to chlorite.			Magnetite-ilmenite is common and ≤ 1 mm, weathered out.
VALG 08	Microcline-perthite	Zircon inclusions in biotite, scarce, single uraninite.	Graphic, in patches		Microcline-perthite, large euhedral >20 mm grains, Tartan twinned grains >15 mm.	Good cleavages with FeO, some cloudy grains, minor halos present.	Bladed and skeletal grains up to 4 mm long.	Apatite, zircons, uraninite, FeO mins.	Extensive FeO staining, haematite.	Magnetite with biotite, large pyrite with haematite rim.
VALG 10	Microcline-perthite-perthite	Pericline twinning	Myrmekite in plagioclase, Interstitial singular crystals, sub-hedral inclusions in feldspar, rims around feldspar, ± 1 mm or smaller.	Oligoclase - Andesine, surrounded by microcline-perthite	Microcline-perthite, > 85 % of slide, minor tartan twinning.	Bladed, light chestnut brown to rust red, strong cleavage with FeO,			Biotite-chlorite	FeO (magnetite) fine in biotite.
VALG 11	Microcline	Secondary U in fractures.	Interstitial chains, with embayed edges, > 10 mm long, polycrystalline crystals with interstitial clays.	Oligoclase	Tartan twinned microcline is dominant	Cloudy texture with halos, red-brown colour, well cleaved with FeO,		Muscovite, minor zircon inclusions, common in large feldspars and quartz, often zoned.	Biotite-chlorite	Magnetite in biotite, some U bearing opaques with halos and surrounding secondaries.

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
VALG 12	Microcline-perthite	Orange high relief accessory 4 mm across, allanite.	Irregular shapes, straight edges, interstitial chains, minor globular inclusions in feldspar.	Minimal, 0.5-2 mm < 2% of slide.	Microcline perthite dominated, with skeletal laths of muscovite, micrographic textures common, tartan is minor, perthite exsolution more persistent.	High relief accessory, orange in colour, good cleavage and angular shape, may be a monazite, with undulose extinction				
VALG 15	Microcline-perthite	Prolific U-secondaries.	Subtle graphic texture, highly irregular grains, polycrystalline quartz fragments, >10 mm veinlets.	Albite, scarce, lensoid twinning, subhedral.	Microcline-perthite dominant, subhedral, embayed with quartz, many globular quartz inclusions.	Chloritised, scarce.	Ragged and bladed grains, found throughout, fine grains.	Zircon, apatite, monazite, U-secondaries		
VALG 16	Microcline-perthite	Pyrite-chalcopyrite	Anhedral, amoeboid, globular inclusions, embayed crystals, singular and in chains and veinlets, interstitial to large feldspars.	Albite, sub-hedral grains, altering to sericite.	Microcline-perthite-dominant mineral, subhedral, perthitic exsolution, strain, finer microcline <1.5 mm, sparse throughout.	Chloritised with FeO inclusions and associated zircons, clustered.	Ragged, skeletal and bladed grains.	Skeletal muscovite.		Pyrite-chalcopyrite blebs and clusters, minor magnetite and haematite.
VALG 20	Microcline	Radioactive inclusions in biotite.	Large, subhedral, embayed edges, twinned with similar sized/shaped quartz.	Albite, scarce, ,5 mm, skeletal, subhedral, many globular quartz inclusions.	Matrix of microcline and microcline-perthite, <4 mm, prominent exsolution in some grains.	Chloritised, many with radioactive inclusions, poorly cleaved.	Most are skeletal, bladed and ragged edged grains present.	Skeletal muscovite, zircon, U-secondaries.		
VALG 22	Plagioclase	Garnet 2-5 mm disseminated throughout.	Fine, globular grains, <0.05 mm, most is anhedral, some have distinctive embayed boundaries.	Oligoclase, 1-5 mm anhedral grains with strained twinning,	up top 5 mm, with quartz and skeletal plag. inclusions, scarce myrmekite at edges.			Garnet, some wrapped by skeletal muscovite, streaks of up to 5 mm muscovite.	Sericite.	
VALG 23	Microcline-perthite	Equigranular texture throughout with subtle foliation, 1-2 mm grains.	Anhedral, highly variable strain.	Oligoclase, skeletal and rounded, rimmed with sericite cores and myrmekite on edges, <0.75 mm.	Microperthite is cut by mesoperthite (albite).	Sparse, halos and chlorite, <0.5 mm.	Skeletal grains in a subtle fabric.	>1 mm muscovite, in streaks II to main foliation.	Chlorite, sericite.	

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
VALG 24	Plagioclase	Abundant U-secondaries.	Large grainsize and finer globular quartz	Large 20 mm grain, and smaller 2-4 mm grains, subhedral, irregular boundaries.	Scarce, irregular, < 4 mm.			Zircon in clusters, muscovite <0.1 mm, 3 magnetites <2 mm, abundant U-secondaries.		magnetite (3).
VALG 26	Microcline	Preponderance of U-secondaries, polycrystalline quartz fragments.	Clustered crystals, subhedral shapes, also highly irregularly shaped crystals, subtle graphic texture.	Albite, <5 mm long grains with globular quartz inclusions, Kspar overgrowth, smaller <1 mm grains throughout, myrmekite common.	Microcline dominant, irregular embayed shapes, globular quartz inclusions.	Chloritised with FeO inclusions.	Ragged and skeletal.	Zircon, muscovite, U-secondaries on joint/fracture/crystal planes		
Va26-111 157.49-157.82	Microcline-perthite-perthite	Accessory Tourmaline.	Subhedral and angular, large 2 cm long chains and clusters	Albite	Perthite in cleavage in both twin directions	Scarce	Single skeletal grain.	Tourmaline one grain, blue-green pleochroism	Muscovite in perthite	3 x 0.2 mm pyrites - euhedral
Va26 113 89.82-90.25 (Va26 141 89.93-90.35)	Plagioclase (oligoclase)	Massive tourmaline, zoned, 1/4 of slide.	Large crystals intergrown with tourmaline, finer quartz also intergrown with tourmaline.	Large >17.5 mm grain, euhedral, globular quartz inclusions, oligoclase.				Muscovite inclusions in plagioclase, tourmaline.		
Va26 141 261.69-262.00	Microcline	Muscovite is large, tourmaline, myrmekite, uraninite	Dominant mineral, amoeboid, chains and clusters, myrmekite is common	Oligoclase	Microcline, strained massive grains, >5-6 mm, perthite in 2 directions cleavage II, many microclinised grains throughout	Abundant clusters <5 mm grains, some surround quartz, chloritised	Bladed and skeletal biotites, clustering and wrapping of quartz is common	Large muscovites >3 mm, uraninite, tourmaline ~05 mm	Sericite, microclinisation and chlorite	Pyrite, magnetite, uraninite
Va26 141 301.29-301.60	Microcline	Uraninite visible	Globular inclusions in feldspars, subtle micrographic texture, large grains amoeboid edges, beaded and clustered smaller grains	Albite, small 1-2 mm grains, irregular shapes, strained twinning, zonation and sericitisation	Microcline and microcline perthite, smaller embayed grains as well as larger >4 mm grains, 1-4 mm microcline perthite throughout.	Fine, disseminated throughout, radioactive inclusions in most, 1-2 mm across	Skeletal and embayed, often chloritised	Uraninite	Sericite, chlorite, microclinisation	0.05 mm pyrite, disseminated throughout

Sample	Dominant Feldspars	Special Features	Quartz	Plagioclase	K-feldspar	Biotite	Biotite texture	Accessories	Alteration	Opaques
Va26 141 259.51-260	Microcline-perthite	Tourmaline, uraninite	Dominant mineral, grown around feldspars, earlier quartz is fine, anhedral and interstitial to feldspars	Oligoclase-albite, prominent feldspar, amoeboid shape within K feldspars, altered, large grains >5 mm are subtly twinned	2-4 mm grains with prominent perthite exsolution in 2 directions - cleavage II, large microclines grow around plagioclase	Sparse, prominent FeO streaks in cleavage	Skeletal and embayed, often chloritised	Uraninite	Chlorite, sericite, FeO	Magnetite, pyrite, uraninite fine often with biotite
J04 132.68-132.96	Plagioclase - Oligoclase	Strain extinction in plagioclase.	Elongate, sub-hedral, interstitial to feldspars, rims on plagioclase, micaceous inclusions.	Oligoclase, strain extinction, 50 % of slide, sericitised cores, and streaks oblique to twinning, > 5mm	Perthite in K direction (cleavage) 20 % of slide, strain-exsolution	Scarce, 1 bladed grain	FeO in cleavage.		Sericite in cores and in streaks across plagioclase, persistent fractures in qtz with FeO stains throughout.	5 x 3-4 mm grains, oxidised and pock-marked.
J04 42.53-43.00	Microcline-perthite-perthite	Lenticular twins in plagioclase, strain extinction in microcline.	Long ≥ 10 mm clusters and chains, with interstitial biotite, small globular inclusions	Albite, large singular grains, sub-hedral > 4mm.	1 x 14 mm megacryst	> 10 % of slide, red brown, altering to chlorite,	Some skeletal grains with quartz inclusions.	Muscovite in perthite direction of microcline.	Muscovite and sericite in feldspars	
J04 96.06-96.59	Microcline-perthite-perthite	Biotite wrapped around some feldspar clusters.	Embayed and irregular shaped, chains, globular inclusions in feldspar, clusters are common	Albite, 1- >5 mm grains, some surrounded by biotite,	Perthitic, 1-2 mm biotite inclusions	throughout, in a foliation wrapping feldspars, Fe-oxides along cleavages, chlorite alteration	Ragged on some edges, embayed.		Sericite replacing plagioclase, muscovite in perthite direction of microcline	Magnetite-ilmenite is common, weathered, >1-2 mm

Appendix D2 Ore petrography notes

The identification features highlighted below are derived from observations of a few thin sections; to reduce the time spent observing the extensive collection of thin sections the descriptions below were applied to systematic thin section observation.

- Uraninite - The identification of uraninite is by primarily by its cubic, or subhedral shape, while the best supporting diagnostic features are the radiating fractures in the surrounding minerals and the pleochroic halos that form in hosting biotite.
- Coffinite - Most common in replacement texture of uraninite, relatively dull reflectance.
- Thorite - The amorphous texture and pale yellow-tan colour identifies the silicate. Radial fractures in the host minerals surround it often contains opaque inclusions.
- Uranophane and Boltwoodite - The minerals are similar in colour and crystal habit. The fine - grained nature and often-varied crystal development of the secondary U minerals limits confident differentiation by traditional optical techniques. Berning (1986) claims a 40 % distribution of U in β-uranophane at the Rössing SJ deposit (after Hiemstra, 1969). Townend (2009) identifies the distinctive yellow secondary minerals in Husab samples as boltwoodite, and confirm such by XRD analyses. In contrast, SGS identify the yellow secondary minerals of samples in this study as uranophane, by SEM and QEMSCAN. The following conventions therefore apply; Husab yellow secondary phases are labelled as uranophane/boltwoodite, secondary phases at all other deposits will assume similarity to Rössing and are labelled uranophane.
- Brannerite - two colours and textures are identified, altered brannerite is semi - translucent and brown read in colour with irregular coarse texture. Pristine brannerite is opaque and has straight edges and less pronounced fracture.
- Betafite - Large crystals tend to have corroded edges and are light brown yellow in colour and semi - translucent.

Appendix E1 Analytical Facilities and Apparatus

XRF

Bernard Price Institute:

Panalytical

Setpoint Laboratories:

Thermo - Fischer

SGS:

Panalytical – used as a quality check for QEMSCAN samples.

XRD

Bernard Price Institute:

Siemens XRD

Hand Held XRF

Innovex Delta Gold 3 Channel X-Ray Fluorescence Spectrometer

Utilised on uranium ore intervals of hole RDD373 at Husab, Zone 1. Hole contains intervals of significant refractory U mineralisation.

ICP-MS

Bernard Price Institute:

VG 354 with 5 collectors – for REE Analyses

Elements Analysed

Major elements: SiO_2, Al_2O_3, K_2O, Na_2O, CaO, Fe_2O_3, TiO_2, MgO, MnO and P_2O_5.

Trace elements: Ag, As, Ba, Bi, Cd, Ce, Co, Cr, Cu, Eu, Ga, La, Mo, Nb, Ni, Pb, Rb, Sb, Sc, Se, Sn, Sr, Ta, Th, V, U, W, Y, Yb, Zn and Zr.

Comprehensive lists of the samples and the respective machines each set was analysed on, major and trace elements, standards and detection limits are Appendix 4.7.

Appendix E2 Methodology for Whole Rock Geochemical Analyses (XRF)

Samples from surface were scrubbed to remove as much dust and weathering products as possible, weathered rinds were removed and samples scrubbed to remove remaining weathered material.

Core samples were scrubbed to remove dust prior to crushing. The off – cuts from thin section preparation are not included in the geochemical sample preparation.

All samples were jaw-crushed, core samples entirely, and large surface samples (> 2kg) were split by hammer to manageable fragments, with excess portions discarded.

The crushed material was coned and quartered to reduce sample size, the first split completed on fresh paper by means of aluminium divider plate. Crushed samples (~1 kg) were milled in a carbon-steel ring and pot on a timed gyratory swing mill for 1 minute.

Milled portion was bagged and ~200 g aliquots for lab submission were scooped from the centre of the bag volume.

Pressed pellets and fusion beads were prepared at the BPI facility for samples analysed at BPI. Sample powders were sent to Setpoint Laboratories where pellets and beads were prepared in-house.

Appendix E3 Methodology for Hand Held XRF

The XRF was tested in a number of different sample applications. These included diamond drill core and pressed pellets of 10m leach test composites. All assays were conducted at 0 m spacing; the detector and source are held as close to the flat surface of core/pellet samples as is possible.

Core Samples

All mineralised intersections in RDD373 as recognised by standard resource assay were targeted for XRF scanning. The intention was to produce a closely-spaced chemical profile of the mineralisation in the hole. Spot analyses per metre-section are spaced between 10 cm and 15 cm. The slightly-variable sample spacing is influenced primarily by rock texture and the presence of prominent alteration features.

Pressed Pellets

The detector window was placed flush on the pressed pellets at Gecko laboratories. The results are compared with existing ICP-MS head and tail U - assays of the leach test pulps. The data are therefore ideal for accuracy and precision testing of the Delta XRF device.

Objectives

Five principle elements constitute the focus of this first assessment, these are, but not limited to;

- U- occurring in process-able minerals (uraninite, pitchblende, uranophane) as well as refractory minerals (betafite, brannerite);
- Th- occurring with uranium in uraninite and monazite, and as a principle constituent of thorite;
- Nb- occurring in betafite, and has been shown as a reliable indicator of the refractory phase in geochemical studies;
- Cu- used as an broad indicator of sulphide presence, sulphides do have a limited association with U mineralisation; and
- Ti- common in a number of minerals, but also occurs in betafite and is a principle constituent of brannerite.

Appendix E4 Methodology for ICP-MS Analyses

Sample Dissolution

- 50 mg of powdered material was dissolved in a mixture (3 ml) of 3:2 Hf and HNO3 in a Teflon high pressure vessel. The vessel was placed in a CEM Mars Express Microwave digester and taken to 235°C and a pressure of 35 bars for 40 minutes using the pre-programmed heating, digestion and cooling stages.
- The contents were then transferred to a 15 ml Savilex beaker and dried down at 70°C to remove SiO2 as SiF4. Fluorides were decomposed by the adding 3 ml of concentrated HNO3, capped for 24 hours and held at 70°C and then dried down. This stage was carried out twice.
- Finally 100 µl of conc. HNO3 was added to the sample ready for dilution prior to analysis.

Preparation Prior to Analysis

The sample contained in 100µl of nitric acid was diluted to 50 ml with the internal standard solution giving a dilution factor of 100 times. The solution was then transferred to 15 ml centrifuge tubes and placed in the autos ampler.

Appendix E5 XRF Laboratory Calibration Standards and Detection Limits

Geochemical data was provided by XRF analyses conducted on six batches of pressed pellets and fused discs. Three facilities provided the analyses: The Panalytical™ machine at the Bernard Price Institute, University of the Witwatersrand; Setpoint Laboratories at Isando and SGS,

Johannesburg. XRF data provided by SGS was part of in-house quality control for QEMSCAN analyses conducted on a selection of samples.

XRF Laboratory Calibration Standards and Detection Limits

Table 4.1 BPI calibration standards Batch 1.

Sample	%SiO2	%TiO2	%Al2O3	%Fe2O3	%MnO	%MgO	%CaO	%Na2O	%K2O	%P2O5	%LOI	%TOTAL
AGV-2 (ref)	59.30	1.05	16.91	6.69	0.10	1.79	5.20	4.19	2.88	0.48	1.59	100.18
AGV-2	58.95	1.07	16.83	6.68	0.10	1.81	5.10	4.09	2.88	0.48	1.35	99.34

AN-G (ref)	46.30	0.22	29.80	3.36	0.04	1.80	15.90	1.63	0.13	0.01	0.65	99.84
AN-G	46.84	0.25	29.78	3.32	0.05	1.84	15.63	1.53	0.13	0.02	0.80	100.19
NIM D (ref)	38.96	0.02	0.30	17.00	0.22	43.51	0.28	0.04	0.01	0.00	-0.93	99.41
NIM D	39.69	0.07	0.46	17.09	0.22	43.47	0.36	0.19	0.00	0.02	-0.76	100.81
NIM P (ref)	51.10	0.20	4.18	12.70	0.22	25.33	2.66	0.37	0.09	0.02	-0.84	96.03
NIM P	52.14	0.24	4.22	12.90	0.23	25.56	2.67	0.99	0.16	0.05	-0.56	98.60

Table 4.2 BPI Detection limits for trace elements Batch 1.

Rb	Sr	Y	Zr	Nb	Co	Ni	Cu	Zn	TiO2	V	Cr	Ba
(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(%)	(ppm)	(ppm)	(ppm)
3	3	3	8	3	6	6	6	6	0.01	12	12	20
Pb	**Ga**	**La**	**Ce**	**Sc**	**Th**	**As**	**U**					
(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)					
9	10	12	12	10	12	12	9					

Table 4.3 Setpoint calibration standards for Batch 2.

	As	Co	Cu	Nb	Ni	Pb	Rb	Sr	Ta	ThO2	U3O8	Y	Zn	Zr	V
SARM 1	29	<3	11	54	7	39	337	14	18	54	19	134	62	298	<4
SARM 2	20	8	14	<3	11	<3	538	66	<18	<10	<7	<3	19	4	-
NCSDC 73334	515	537	503	510	507	503	<4	494	<18	<10	<7	502	578	501	520
NCSDC 73310	114	9	1252	14	16	300	273	25	<18	26	<7	30	517	232	46

Table 4.3 continued

	Ba	La	Ce	Ga	Sc
SARM 2	2181	<2	20	-	-
NCSDC 73334	4939	493	495	-	-
NCSDC 73310	193	26	79	-	-
SARM 1	-	-	-	25	-

Table 4.4 Setpoint Major Element detection limits

The image part with relationship ID rId53 was not found in the file.

Table 4.5 BPI calibration standards Batch 3.

Sample #	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	L.O.I	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
AC-E	70.35	0.11	14.70	2.53	0.06	0.03	0.34	6.54	4.49	0.01	0.37	99.53
AC-E	70.25	0.11	14.44	2.58	0.06	0.01	0.28	6.76	4.71	0.01	0.40	99.61
AGV-2	59.30	1.05	16.91	6.69	0.10	1.79	5.20	4.19	2.88	0.48	1.59	100.18
AGV-2	60.36	1.06	16.86	6.82	0.10	1.69	5.30	4.21	2.97	0.49	1.35	101.21
AN-G	46.30	0.22	29.80	3.36	0.04	1.80	15.90	1.63	0.13	0.01	0.65	99.84
AN-G	47.09	0.21	29.17	3.25	0.04	1.66	15.85	1.63	0.12	0.01	0.80	99..83
FK-N	65.02	0.02	18.61	0.09	0.00	0.01	0.01	2.58	12.81	0.02	0.54	99.71
FK-N	64.97	0.01	18.54	0.10	0.00	0.08	0.07	2.47	12.82	0.01	0.54	99.61
NIM-G	76.31	0.09	12.18	2.02	0.02	0.06	0.79	3.41	5.03	0.01	0.45	100.37
NIM-G	75.86	0.09	12.17	1.91	0.02	0.02	0.73	3.50	4.92	0.00	0.80	100.02
NIM-S	63.63	0.05	17.34	1.40	0.01	0.46	0.68	0.43	15.35	0.12	0.28	99.75
NIM-S	63.62	0.04	17.10	1.34	0.01	0.44	0.62	0.20	15.41	0.13	0.34	99.25

Table 4.6 BPI detection limits for Batch 3.

Rb	Sr	Y	Zr	Nb	Co	Ni	Cu	Zn	TiO2	V	Cr	Ba
(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(%)	(ppm)	(ppm)	(ppm)
3	3	3	8	3	6	6	6	6	0.01	12	12	20
Pb	**Ga**	**La**	**Ce**	**Sc**	**Th**	**As**	**U**					
(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)					
9	10	12	12	10	12	12	9					

Table 4.7 Setpoint calibration standards for trace elements Batch 4.

Element	Bi	Co	Cu	Nb	Ni	Mo	Pb	Rb	Se	Sr	Ta	ThO2	U3O8
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
NCSDC 73310	9	<3	1248	12	17	11	287	266	<3	23	<18	26	9
NCSDC 73310	15	<3	1246	12	16	11	285	261	<3	24	<18	20	11
NCSDC 73310	13	8	1244	11	18	11	288	264	<3	23	<18	24	7
NCSDC 73334	46	480	493	494	501	46	485	<4	<3	493	36	10	7
NCSDC 73334	50	502	498	493	501	46	487	<4	<3	494	24	10	7
NCSDC 73334	50	518	488	488	494	46	482	<4	<3	490	26	10	7
SARM 1	7	<3	9	50	7	<4	36	324	<3	10	25	53	19
SARM 1	7	<3	10	51	6	5	37	324	<3	12	33	59	20
SARM 1	5	<3	4	52	5	5	40	325	<3	12	19	60	23
SARM 2	4	<3	16	<3	22	<4	8	512	<3	62	22	10	7
SARM 2	3	<3	16	<3	20	<4	11	516	<3	61	<18	10	7
SARM 2	7	<3	18	<3	19	<4	11	516	<3	62	<18	10	7

Element	W	Y	Yb	Zn	Zr	Ag	Cd	Sb	Sn	Ba	La	Ce	Eu
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
NCSDC 73310	35	27	<8	499	234	4	10	26	51	206	34	52	<2
NCSDC 73310	40	30	<8	496	236	7	10	21	60	207	26	56	<2
NCSDC 73310	39	28	<8	501	234	<4	10	22	52	204	34	70	<2
NCSDC 73334	56	502	48	555	508	<4	10	61	10	5349	501	488	3
NCSDC 73334	46	502	48	557	506	<4	10	41	44	5350	509	504	5
NCSDC 73334	47	500	44	547	502	<4	10	70	10	5392	520	518	<2
SARM 1	10	133	13	51	299	5	10	10	10	-	-	-	-

SARM 1	10	132	12	52	301	<4	10	10	10	-	-	-	-
SARM 1	12	132	9	52	297	<4	10	10	10	-	-	-	-
SARM 2	10	<3	<8	14	9	<4	10	10	10	2396	15	11	<2
SARM 2	10	<3	<8	15	9	<4	10	10	10	2391	20	19	<2
SARM 2	10	<3	<8	13	7	<4	10	10	10	2410	17	13	<2

Appendix E6 ICP-MS Calibration Standards and Conditions

Calibration standards were made up as follows:

- Spectrascan (Tekno Lab As) individual certified standards at 1000 ppm made up to 10 ppm for the elements Li P Ti Ga Rb Sr Zr Nb Sn Cs Hf Ta W Pb U;
- Alfa Aesar Certified standard solution 42602 (10 ppm) for the elements V Cr Co Ni Cu Zn As Ba Pb at 10 ppm; and
- Perkin Elmer certified standard solution (Multielement Calibration Standard 2) for the elements for elements REE, Sc and Th at 10 ppm.

Internal Standards

Four internal standards were used to cover the mass range and are as follows:

Element	**Rh**	**In**	**Re**	**Bi**
Mass	103	115	187	209

Concentration is 25 ppb (for Rh and Re) and 50 ppb (for In and Bi) and used to monitor instrumental drift during the analytical run. The stock solution of the internal standards was added to both calibration standards and the samples immediately prior to analysis.

Instrumental Conditions

Instrument used the Perkin Elmer Sciex ELAN DRC-e with standard cross-flow nebulizer using ultra-pure Ar gas for the plasma.

Measurements were made for 42 elements using mass numbers as follows:

Element	**Li**	P	Sc	Ti	V	Cr	Co	Ni	Cu	Zn	Ga	As	Rb
Mass	**7**	31	45	49	51	52	59	60	63	66	71	75	85
Element	**Sr**	Y	Zr	Nb	Ba	Sn	Cs	La	Ce	Pr	Nd	Sm	Eu
Mass	**88**	89	90	93	138	118	133	139	140	141	142	152	153
Element	**Gd**	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Pb	Th
Mass	**158**	159	164	165	166	169	174	175	180	181	184	208	232
Element	**U**												
Mass	**238**												

Detection limits for elements up mass 66 is 0.01 ppm

Detection limits for elements form mass 66 to mass 89 is 0.001 ppm

Detection limits above mas 89 is 0.0005 ppm

Ar gas flow rate was 0.7 – 0.8 l/min giving less than 3% oxides.

Controls and CRMs

Three CRMs were run with every batch of samples. These are BCR-1, BHVO-1 and BIR-1. However, this did not allow for correction of some mineral phases in unknown samples which may not have dissolved. Generally, comparison was made with XRF analyses of Zr to monitor effectiveness of the dissolution.

	BCR-1 Mean	Standard Error	Standard Deviation	Minimum	Maximum	BCR-1 Rec	Diff	% Diff	Typical Conc. SD	Typical Conc. RSD
Li	13.989	0.143	0.555	13.291	15.280	12.9	-1.1	-8.4	0.77	7.533
P	1599.250	10.847	42.010	1490.209	1650.719	1571	-28.3	-1.8	55.08	3.953
Sc	32.041	0.635	2.461	29.079	35.640	32.6	0.6	1.7	1.7	6.722
Ti	13394.679	35.542	137.652	13196.937	13613.344	13428	33.3	0.2	593.85	5.056
V	418.488	1.991	7.712	409.417	429.625	407	-11.5	-2.8	17.62	4.755
Cr	10.682	0.211	0.816	9.952	13.176	16	5.3	33.2	0.43	4.724
Co	36.840	0.093	0.360	36.234	37.369	37	0.2	0.4	1.4	4.159
Ni	13.986	0.363	1.405	12.064	17.720	13	-1.0	-7.6	0.12	0.848
Cu	20.685	0.285	1.103	18.959	22.392	19	-1.7	-8.9	0.21	1.08
Zn	128.000	126.217	488.836	121.186	2016.716	130	2.0	1.5	5.6	3.117
Ga	21.851	0.092	0.357	21.075	22.391	22	0.1	0.7	0.72	3.542
As	0.419	0.027	0.105	0.257	0.512	0.65	0.2	35.5	0.05	3.254
Rb	48.782	1.064	3.529	47.200	56.499	47.2	-1.6	-3.4	0.75	1.7
Sr	341.421	2.033	7.873	326.483	354.116	330	-11.4	-3.5	6.1	1.974

	BCR-1 Mean	Standard Error	Standard Deviation	Minimum	Maximum	BCR-1 Rec	Diff	% Diff	Typical Conc. SD	Typical Conc. RSD
Y	35.055	1.120	4.336	28.621	40.217	38	2.9	7.7	0.65	2.119
Zr	198.764	1.189	4.604	194.172	207.381	190	-8.8	-4.6	1.87	1.065
Nb	13.095	0.089	0.344	12.595	13.499	14	0.9	6.5	0.11	0.984
Ba	668.111	8.051	31.180	616.401	710.574	681	12.9	1.9	15.15	2.446
Sn	2.377	0.040	0.156	2.004	2.599	2.7	0.3	11.9	0.02	0.8
Cs	1.309	0.028	0.109	1.127	1.548	0.96	-0.3	-36.3	0	0.014
La	22.583	0.709	2.746	18.617	25.610	24.9	2.3	9.3	0.11	0.478
Ce	54.612	0.184	0.713	52.979	55.310	53.7	-0.9	-1.7	0.09	0.16
Pr	6.322	0.187	0.726	5.257	7.117	6.8	0.5	7.0	0.01	0.227
Nd	26.135	0.829	3.209	21.244	29.611	28.8	2.7	9.3	0.12	0.428
Sm	6.285	0.170	0.660	5.374	7.085	6.59	0.3	4.6	0.13	1.985
Eu	1.944	0.049	0.191	1.705	2.206	1.95	0.0	0.3	0.01	0.639
Gd	6.446	0.149	0.578	5.625	7.123	6.68	0.2	3.5	0.03	0.443
Tb	0.986	0.028	0.107	0.830	1.112	1.05	0.1	6.1	0.01	0.493
Dy	5.768	0.186	0.720	4.660	6.539	6.34	0.6	9.0	0.06	1.039
Ho	1.192	0.034	0.132	0.996	1.346	1.26	0.1	5.4	0.02	2.037
Er	3.229	0.104	0.402	2.614	3.651	3.63	0.4	11.0	0.05	1.375
Tm	0.496	0.015	0.059	0.407	0.565	0.56	0.1	11.4	0.01	2.937
Yb	3.114	0.098	0.380	2.533	3.545	3.38	0.3	7.9	0.07	2.175
Lu	0.482	0.013	0.052	0.407	0.547	0.51	0.0	5.5	0	0.873
Hf	5.066	0.023	0.090	4.961	5.203	4.95	-0.1	-2.3	0.12	2.62
Ta	0.821	0.004	0.015	0.780	0.837	0.81	0.0	-1.3	0.02	2.07
W	0.453	0.009	0.034	0.360	0.491	0.44	0.0	-3.0	0.01	2.043
Pb	14.116	0.485	1.877	8.239	17.196	13.6	-0.5	-3.8	0.13	0.99
Th	5.171	0.166	0.645	4.206	5.852	5.98	0.8	13.5	0.06	1.001
U	1.709	0.005	0.020	1.663	1.741	1.75	0.0	2.3	0.01	0.31

							avg	0.60%		

	BCR-1 Mean	Standard Error	Standard Deviation	Minimum	Maximum	BCR-1 Rec	Diff	% Diff	Typical Conc. SD	Typical Conc. RSD
Li	4.259	0.110	0.366	3.164	4.469	4.6	0.34	7.40	0.08	2.98
P	1080.114	107.405	356.221	9.082	1262.571	1191	110.89	9.31	3.42	0.354
Sc	32.290	1.079	3.577	29.384	41.660	31.8	-0.49	-1.54	0.11	0.617
Ti	15380.657	954.683	3166.324	5847.006	16540.954	16246	865.34	5.33	60.8	0.466
V	313.578	2.619	8.686	301.159	336.920	317	3.42	1.08	0.13	0.05
Cr	303.814	10.239	33.960	289.000	388.905	289	-14.81	-5.13	0.86	0.393
Co	46.159	0.929	3.082	44.577	55.352	45	-1.16	-2.58	0.95	2.504
Ni	149.674	24.604	81.602	111.280	390.066	121	-28.67	-23.70	1.7	1.649

	BCR-1 Mean	Standard Error	Standard Deviation	Minimum	Maximum	BCR-1 Rec	Diff	% Diff	Typical Conc. SD	Typical Conc. RSD
Cu	127.907	1.603	5.317	118.781	136.306	136	8.09	5.95	0.02	0.017
Zn	100.910	6.138	20.357	54.249	113.257	105	4.09	3.89	0.55	0.375
Ga	20.510	0.569	1.888	14.884	21.575	21	0.49	2.33	0.01	0.049
As	0.567	0.035	0.115	0.242	0.693	0.4	-0.17	-41.73	0.07	4.425
Rb	7.699	0.755	2.503	0.270	9.159	11	3.30	30.01	0.12	1.777
Sr	363.321	26.081	86.500	103.872	407.453	403	39.68	9.85	0.48	0.157
Y	27.237	1.263	4.188	16.366	32.863	27.6	0.36	1.32	0.01	0.074
Zr	159.509	14.429	47.855	15.240	175.236	179	19.49	10.89	0.26	0.173
Nb	18.255	1.772	5.875	0.550	20.402	19	0.74	3.92	0.05	0.298
Ba	126.704	12.053	39.977	6.788	146.900	139	12.30	8.85	1.62	1.331
Sn	2.284	0.175	0.580	0.789	3.219	2.1	-0.18	-8.75	0.01	0.489
Cs	0.097	0.009	0.030	0.006	0.113	0.13	0.03	25.77	0	1.932
La	14.996	1.472	4.881	0.656	18.458	15.8	0.80	5.09	0.02	0.139
Ce	35.134	3.321	11.015	1.952	39.554	39	3.87	9.91	0.16	0.426
Pr	5.321	0.507	1.680	0.389	6.569	5.7	0.38	6.65	0.02	0.335
Nd	23.983	2.215	7.348	2.369	29.232	25.2	1.22	4.83	0.36	1.542
Sm	5.751	0.486	1.613	1.069	7.051	6.2	0.45	7.24	0.02	0.286
Eu	1.866	0.147	0.488	0.481	2.326	2.06	0.19	9.40	0.02	1.146
Gd	5.949	0.453	1.503	1.564	7.102	6.4	0.45	7.04	0.04	0.642
Tb	0.918	0.062	0.205	0.332	1.103	0.96	0.04	4.40	0.01	0.648
Dy	5.125	0.294	0.976	2.403	6.149	5.2	0.07	1.43	0.05	1.034
Ho	0.962	0.045	0.150	0.564	1.138	0.99	0.03	2.87	0	0.282
Er	2.458	0.108	0.358	1.521	2.896	2.4	-0.06	-2.42	0.01	0.403
Tm	0.340	0.012	0.041	0.248	0.401	0.33	-0.01	-3.13	0.01	3.534
Yb	2.035	0.060	0.199	1.625	2.379	2.02	-0.01	-0.74	0.01	0.592
Lu	0.290	0.007	0.025	0.248	0.336	0.29	0.00	0.14	0	2.034

Hf	3.989	0.341	1.130	0.584	4.370	4.38	0.39	8.92	0.05	1.38
Ta	1.117	0.108	0.358	0.039	1.281	1.23	0.11	9.17	0.03	3.241
W	0.247	0.024	0.080	0.018	0.343	0.27	0.02	8.52	0.01	4.712
Pb	2.964	0.454	1.504	2.336	7.441	2.6	-0.36	-13.99	0.02	0.911
Th	1.068	0.106	0.353	0.025	1.305	1.08	0.01	1.07	0.01	0.971
U	0.390	0.038	0.125	0.012	0.430	0.42	0.03	7.18	0.01	1.519
							avg	2.9		

	BCR-1 Mean	**Standard Error**	**Standard Deviation**	**Minimum**	**Maximum**	**BCR-1 Rec**	**Diff**	**% Diff**	**Typical Conc. SD**	**Typical Conc. RSD**
Li	2.842	0.050	0.186	2.652	3.164	3.4	0.56	16.42	0.09	5.223
P	74.713	7.567	28.314	9.082	94.347	100	25.29	25.29	1.33	1.905
Sc	39.629	0.799	2.988	33.917	43.310	44	4.37	9.93	0.56	2.278
Ti	5691.338	44.644	167.042	5281.524	5870.061				17.98	0.395
V	325.508	2.143	8.017	307.994	336.920	313	-12.51	-4.00	0.67	0.252
Cr	393.305	7.071	26.458	366.831	477.595	382	-11.30	-2.96	2.21	0.741
Co	54.149	0.223	0.834	52.474	55.352	51.4	-2.75	-5.35	0.13	0.295
Ni	171.580	3.453	12.919	129.822	180.937	166	-5.58	-3.36	0.09	0.056
Cu	113.809	1.395	5.219	105.434	120.537	126	12.19	9.68	1.08	1.032
Zn	69.564	2.911	10.893	38.861	83.244	71	1.44	2.02	0.79	0.71
Ga	14.683	0.072	0.270	14.260	15.271				0.12	0.968
As	0.309	0.018	0.068	0.220	0.456	0.4	0.09	22.82	0.19	18.198
Rb	0.263	0.013	0.048	0.194	0.346	0.25	-0.01	-5.30	0.04	15.046
Sr	101.659	1.251	4.680	94.827	110.815	108	6.34	5.87	0.59	0.683
Y	16.084	0.308	1.154	14.763	18.708	16	-0.08	-0.52	0.09	0.748
Zr	14.857	0.062	0.230	14.480	15.240	15.5	0.64	4.15	0.07	0.549

	BCR-1 Mean	Standard Error	Standard Deviation	Minimum	Maximum	BCR-1 Rec	Diff	% Diff	Typical Conc. SD	Typical Conc. RSD
Nb	0.577	0.004	0.015	0.550	0.597	0.6	0.02	3.90	0.01	1.277
Ba	6.945	0.162	0.608	6.324	8.824	7	0.05	0.78	0.06	1.048
Sn	0.899	0.050	0.188	0.649	1.400	0.65	-0.25	-38.35	0.03	3.512
Cs	0.004	0.001	0.002	0.001	0.006				0	19.674
La	0.710	0.022	0.083	0.597	0.843	0.62	-0.09	-14.49	0.02	2.438
Ce	1.918	0.019	0.073	1.813	2.106	1.95	0.03	1.62	0.01	0.41
Pr	0.383	0.007	0.027	0.348	0.445	0.38	0.00	-0.67	0.01	2.05
Nd	2.381	0.044	0.165	2.198	2.767	2.5	0.12	4.77	0.01	0.514
Sm	1.047	0.019	0.072	0.964	1.217	1.1	0.05	4.83	0.01	0.789
Eu	0.464	0.010	0.037	0.419	0.552	0.54	0.08	14.08	0.01	3.026
Gd	1.552	0.031	0.116	1.414	1.809	1.85	0.30	16.12	0	0.303
Tb	0.330	0.007	0.025	0.305	0.391	0.36	0.03	8.33	0	1.402
Dy	2.398	0.045	0.169	2.230	2.791	2.5	0.10	4.06	0.01	0.569
Ho	0.548	0.010	0.038	0.505	0.631	0.57	0.02	3.89	0.01	1.727
Er	1.531	0.033	0.122	1.411	1.801	1.7	0.17	9.94	0.01	0.411
Tm	0.246	0.005	0.020	0.222	0.291	0.26	0.01	5.57	0	0.027
Yb	1.594	0.031	0.116	1.476	1.858	1.65	0.06	3.40	0.02	1.517
Lu	0.241	0.005	0.018	0.221	0.281	0.26	0.02	7.14	0	1.432
Hf	0.572	0.002	0.008	0.562	0.584	0.6	0.03	4.68	0	0.387
Ta	0.040	0.000	0.002	0.036	0.042	0.04	0.00	0.17	0	6.057
W	0.020	0.005	0.018	-0.002	0.061	0.007	-0.01	-185.90	0.01	103.812
Pb	4.439	0.898	3.360	3.059	15.995	3	-1.44	-47.98	0.01	0.438
Th	0.029	0.001	0.004	0.022	0.039	0.03	0.00	2.01	0	3.274
U	0.012	0.001	0.003	0.007	0.021	0.01	0.00	-23.09	0	4.819
							Avg	-3.8		

Appendix E7 XRF Accuracy and Precision Testing

Analyses were done in four separate batches; two at BPI and two at Setpoint 1 at SGS (for QEMSCAN quality control). Each set had a control of a single sample of known composition, The material is sourced form a lab reject pulp form the Rössing Mine, sample R2800E2-70.95. Fourteen samples were duplicated and represent high and low grade material, as well as fresh core material and surface samples.

The results of duplicates and controls are illustrated in Appendix 4. Major elements correlate well in three of the six oxides illustrated in Figure 4.4a; Si shows the greatest deviation and differences of up to 5 wt% occur between the same samples at the two facilities, the perfect correlation in Fe, K and Ca however reassures accuracy and precision. The trace element correlations (Figure 4.4b) are near perfect in 4 of 6 elements, Ce has the greatest deviation followed by Th. Major and trace element comparisons of the duplicated samples are presented in Figures 4.4c and 4.4d.

Uranium content of samples was found to have poor correlation between observed cps in the field (by handheld scintillometer) and actual uranium content determined by XRF (Figure 4.3). The scintillometer is a RADEYE™ manufactured by Thermo. The scatter of the data points can be attributed to a number of factors:

1. U, Th and K contribute to the radiation character of a surface sample
2. The SLGs have variable K content
3. U^{6+} solubility and therefore mobility is greater than Th^{4+}

Samples with high cps in the field but low U ppm are therefore samples that have a combination of high K contribution and high Th relative to U.

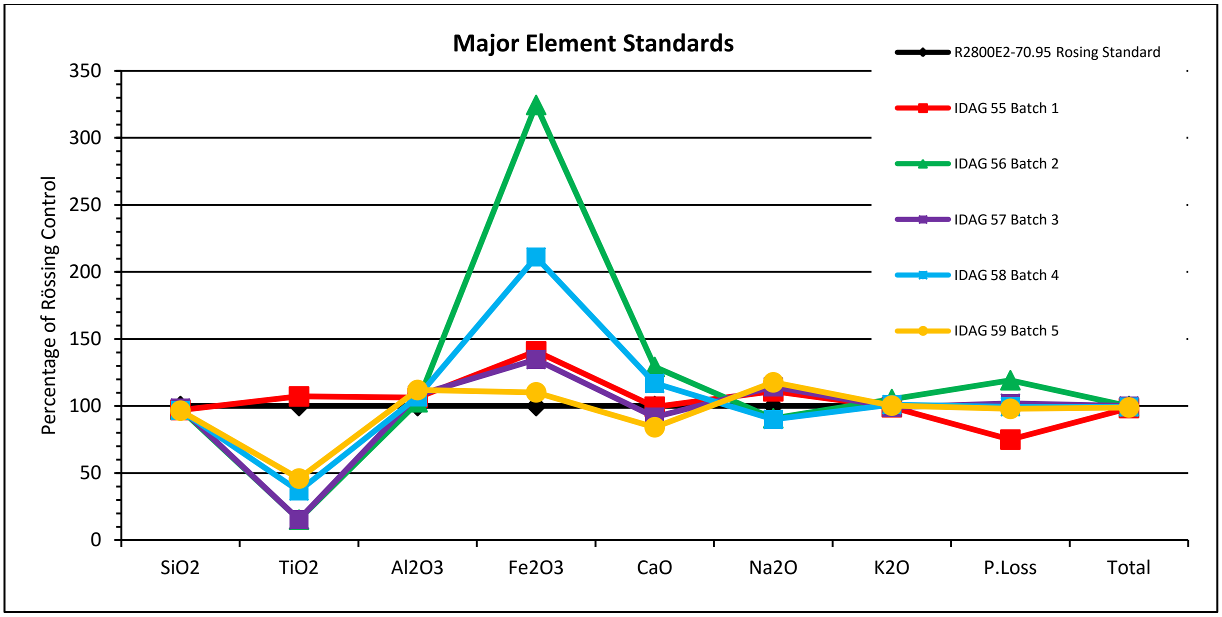


Figure 4.1a Major element correlation between control samples and the original Rössing data. Rössing data and sample powder provided by Nex and Kinnaird (2002).

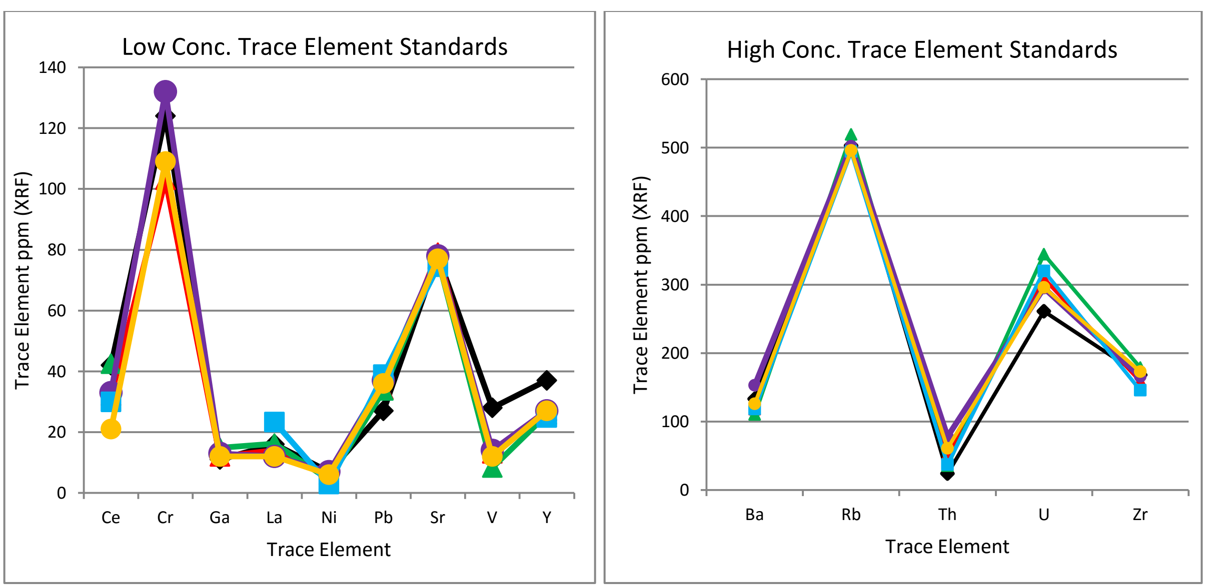


Figure 4.1b Trace elements concentrations in the control samples. Th and U vary by ~60 and ~100 ppm respectively. Incompatible elements and elements in high concentration show the greatest variations. Th has a difference in the highest and lowest concentrations by a factor 4. Rössing data and sample powder provided by Nex and Kinnaird (2002).

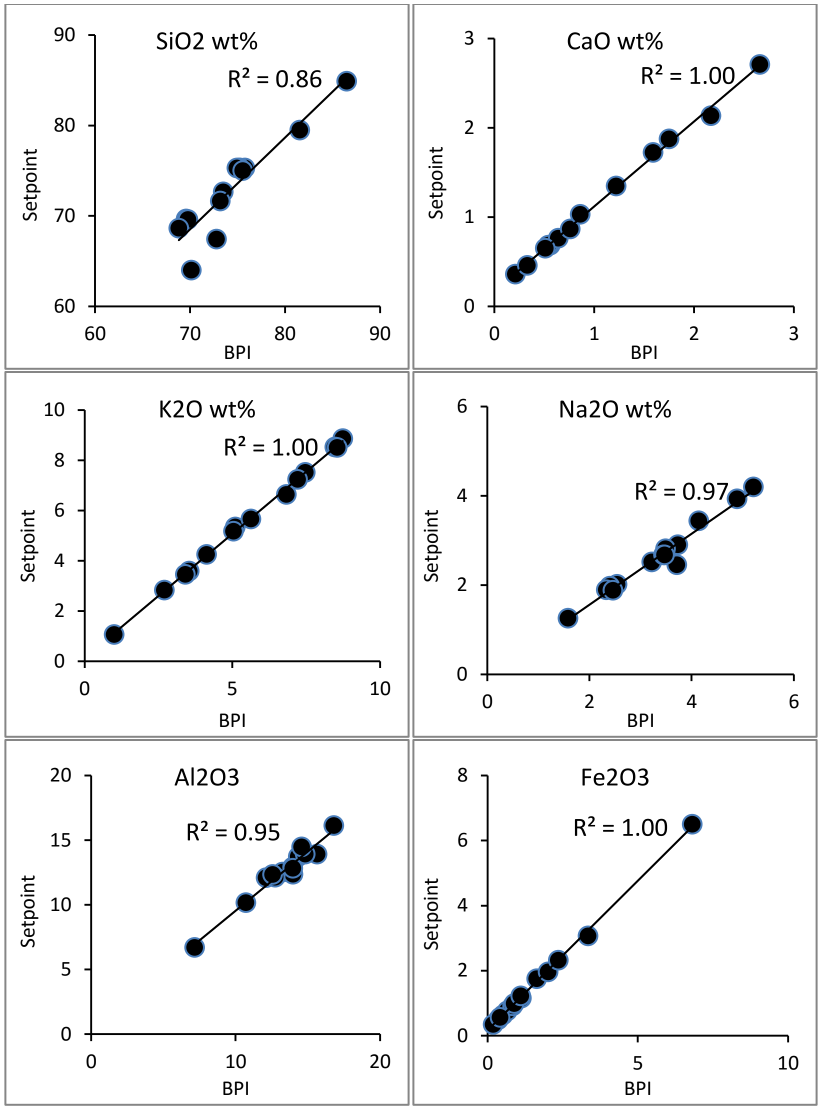


Figure 4.2a Major element correlation between duplicated samples. Setpoint samples were submitted as a part of a 128 sample batch in 2008 to Setpoint Laboratories, Isando. The BPI samples were submitted to the facility at the Bernard Price Institute as controls.

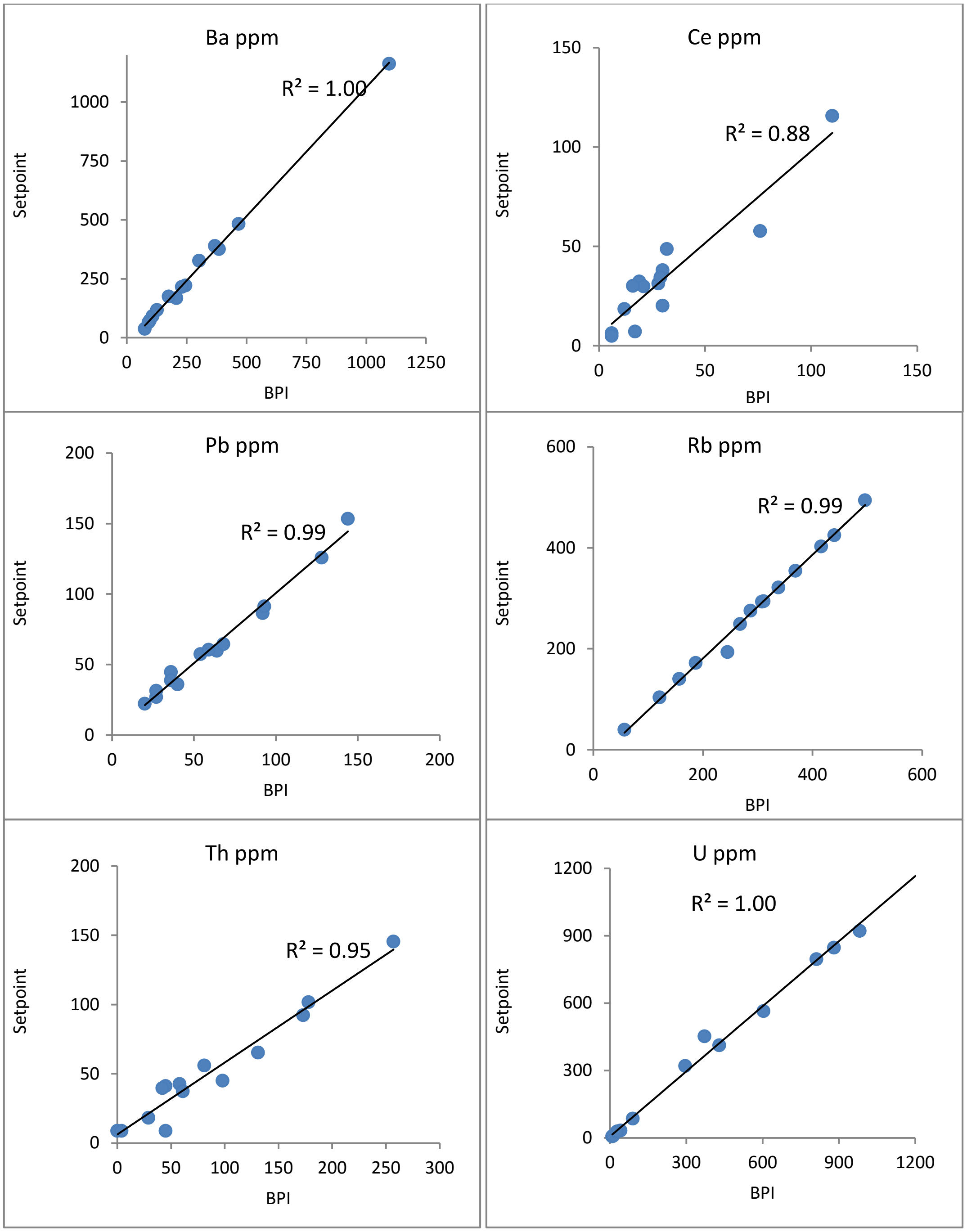


Figure 4.2b Trace element correlation between duplicated samples. Mobile elements such as Ce show poor correlation, yet Pb, Rb, U and Th show very near perfect correlation between sample sets.

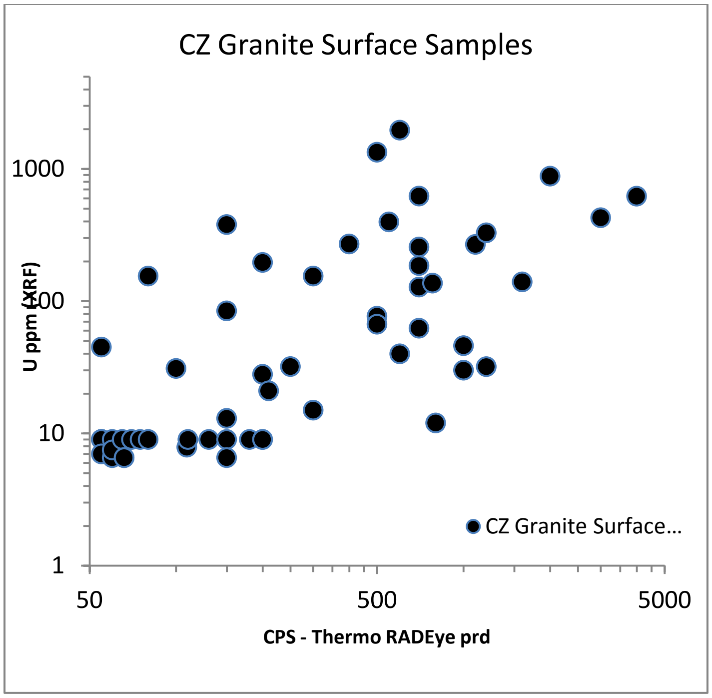


Figure 4.3 Log_{10}-Log_{10} plot of U concentration in ppm vs. Counts per second by handheld scintillometer. There is scatter in the data at all concentrations of U (ppm) which is attributed, amongst other attributes, to a loss of U in the surface environment relative to Th and K which both contribute to the radiometric signature of each surface sample.

Appendix E8 Hand Held XRF Accuracy and Precision Testing

Device

The InnovX Delta Premium™ handheld XRF (form here on referred to as Delta XRF or XRF) is able to detect elements, with variable accuracy, ranging form Mg to U. This excludes the rare-earth elements, because of the limited power of the source. Rare earth elements require 50KV[1]. The elements are grouped into packages that are detected by three beam strengths (electron voltages) over user-defined time periods. Single spots provide chemical assays using a ~25 mm^2 silicon-drift detector. Data sets are recorded in numerical order and stored in CSV file format. The three electron beams of different energy levels are emitted consecutively, each for a user-defined period. Individual beams activate elements, which emit X-rays that are detected in specified packages or suites. The detection error limit of each element is recorded in the data output and are scan-specific. Average error deviation for uranium in the RDD373 scans, for example, is ± 8 ppm. The rental device was calibrated to detect 35 of the more common elements. Given the many unknowns and the inhomogeneity of the sample set, the general "Soil" setting was preferred. Figure 1.3 illustrates the

[1] Stuart Bateman, pers. comm. 2011

element suite for the soil setting. Given time and specifications the device may be calibrated to suit the client's requirements.

Hand Held XRF Scan time comparison

The recommendations by InnovX technicians were for a 90s scan, 30s per beam. This time frame limited the machine to less 30 spots per hour, as samples require setting up in isolation out of the trays, cleaning and alignment. A decision was made by Guy Freemantle to change the scan time to 45s, 15s per beam. Repeats of 45s and 90s scans were conducted on 8 metre-long sections of RDD373 core. A total of 173 analyses comprise this comparative test. The readings taken along each metre of core were averaged for each time limit. The results of the comparison are summarised as follows:

Uranium (Figure 3.1) 90s vs. 45s analyses values are comparable in most intervals, though significant discrepancies occur beyond the machine's ~10 ppm error margin in the 156 m average. Uranium occurs in inhomogeneous distribution in the alaskites and occasionally in the metasediments. Nb (Figure 3.2) showed a weak correlation in three of the averages, only one of which corresponded with a discrepancy in the U comparison. Cu (Figure 3.3) showed a strong disparity in the 145m interval, corresponding with U and Nb. Th (Figure 3.4) shows a good correlation, and prominent disparity at the 145m and 156m intervals, following the trend of U. Th, U, Nb and to a certain extent Cu are limited to a small number of mineral phases within the granitic rocks of the Damara, and therefore Husab deposit. The small scan area of the device may result in minerals containing these elements being 'missed' during routine scanning. Ti is common to number of accessory phases. It is also common to some U- and Nb-bearing phases and may even occur in sufficiently metamorphosed biotite. Considering this, the poor correlation between some of the intervals in the two sets of Ti averages is also expected (Figure 3.5). Summary of intervals where results show the greatest discrepancy:

- U concentration @ 145m, 156m and 200m
- Nb concentration@ 145m and 205m
- Cu concentration@ 145m and 205m
- Th concentration@ 145m, 156m and 201m
- Ti concentration@ 144m, 145m and 156m

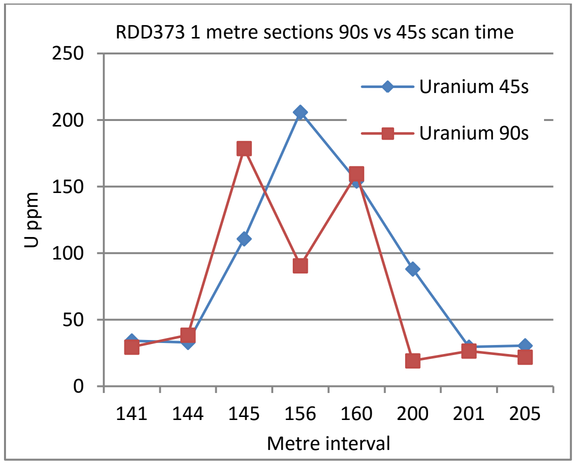


Figure 4.4a Uranium concentrations in ppm of RDD373 metre section averages. Each spot that contributes to the metre average is scanned for 90 seconds and for 45 seconds for a scan-time comparison.

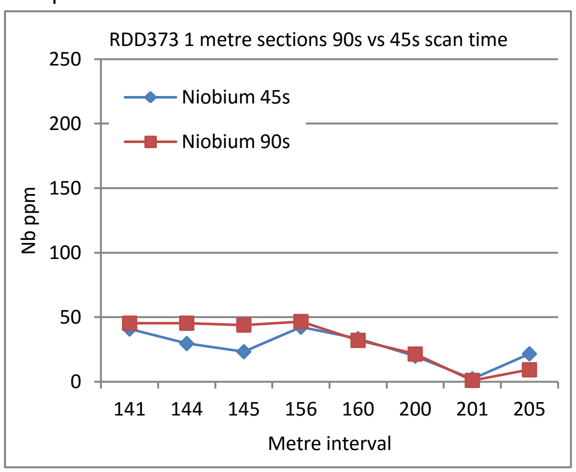


Figure 4.4b Niobium concentration in ppm of RDD373 metre sections. Correlation is acceptable in some sections but there are discrepancies of over 20 ppm in others.

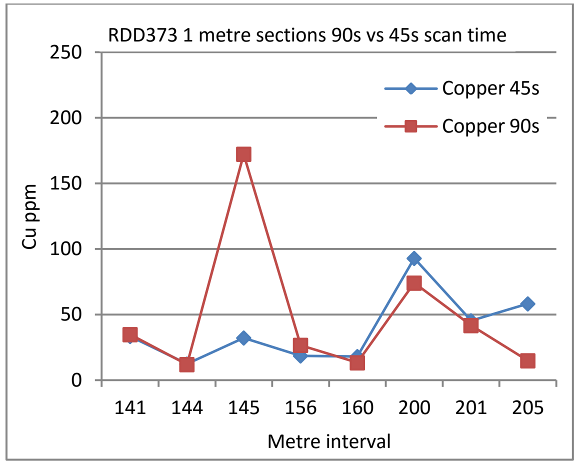


Figure 4.4c Copper concentration in ppm of RDD373 metre sections. Correlation is acceptable in all but the 145m section, but there is discrepancy of over 20 ppm in the 205m section as well.

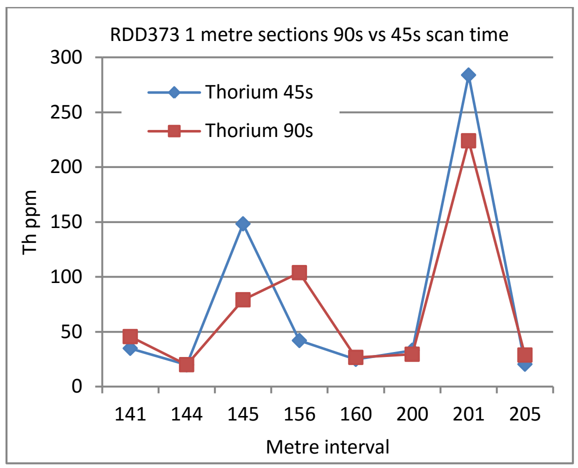


Figure 4.4d Thorium shows a good correlation over all the averaged intervals. There is a notable discrepancy in the 145m, 156m and 201m intervals.

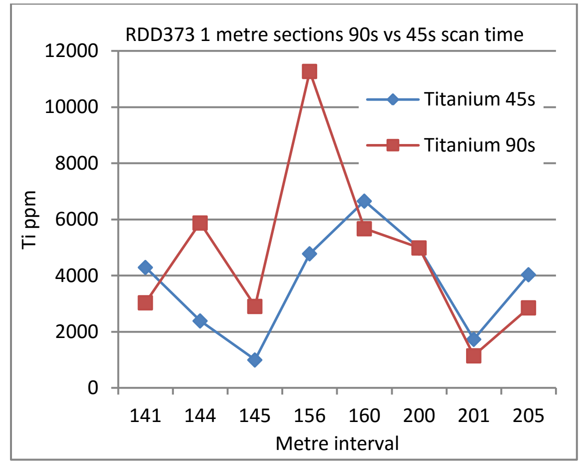


Figure 4.4e Ti abundance in RDD373 sections, compared for 90s and 45s scan times. Ti is common to a number of accessory phases and may be incorporated into common minerals such as biotite. correlation is within acceptable limits/error, though there is a significant disparity in the 156m averages.

Hand Held XRF Scan time results discussion

Inhomogeneity in the rock and the distribution and fine nature of host minerals, and the relatively small size of the sampling area contribute to the disparity between the metre-averaged sample intervals. The 145th metre interval is particularly inhomogeneous in texture and contains a variety of accessory phases including; Ca-pyroxene; alteration phases such as epidote and sericite; and occurs within a zone of skarn-like contact metamorphism. In reality, repeatability can be achieved only if the exact same spot is scanned. An increase in the number of analyses will also improve the comparison between the two scan time limits. The results are also affected by temperature and calibration conditions[2].

Hand Held XRF accuracy comparison vs. ICP-MS assay

Bottle-roll leach testing of approximately fifty six 10 metre composites is currently underway at Gecko Laboratories, Swakopmund, under the supervision of Mr Johan Van Heerden[3]. The 10m composites comprise 1kg of 10 equal-weight representatives of Genalysis laboratory rejects[4]. Part of Gecko Laboratories leach testing study involves a cross-check of head and tail sample assays by XRF analyses of composite-representative pressed pellets. The XRF analyses are to be conducted in-house at Gecko and will include multiple elements.

Pressed pellets were available for 22 composites, and these were scanned by Guy Freemantle using the Delta XRF as part of field testing. The results are compared to ICP-MS head and tail assays by Bureau Veritas. In addition calculated ICP-MS head assays by Genalysis are included for comparison[5].

The Bureau Veritas and Genalysis head grade results do not compare systematically, disparities of over 100ppm U occur in the head grade comparison (Figure 8.1). Important considerations include the differences between the samples. The Bureau Veritas sample consists of a representative of 10 homogenised laboratory rejects. The Genalysis head grade is calculated form 10 individual assays of 1m sections.

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[2] Stuart Bateman, InnovX, pers comm., 2011.
[3] Mr Van Heerden is a Managing Director of Gecko and is recommended by Murray Hill for is experience at the Rössing Uranium Mine.
[4] The laboratory rejects are ~75µm powders of 1m samples (RC chip and NQ core) produced for resource and exploration assays at Genalysis, Perth. Gecko portions-off representatives to produce a ~1kg composite form each reject.
[5] Head assays are calculated by averaging ten 1 metre ICP-MS assays of the intervals that make up each individual composite

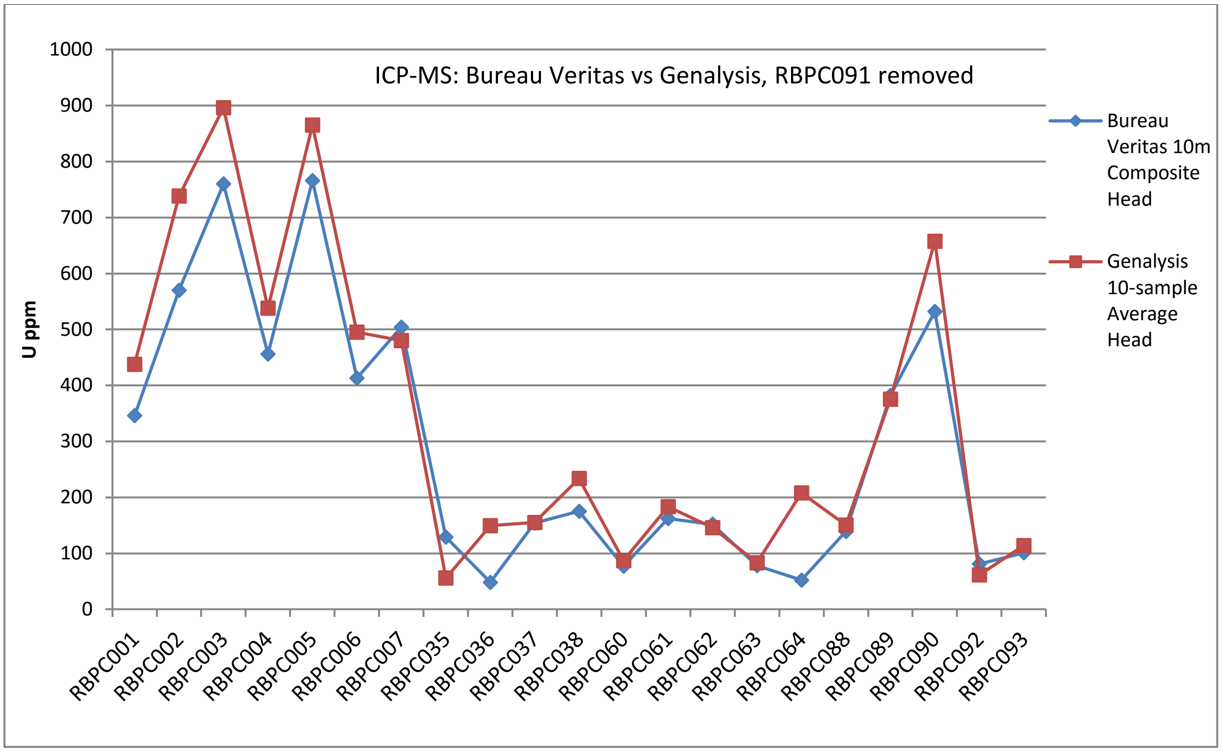


Figure 8.1 Bureau Veritas vs Genalysis ICP-MS head-grade assays. The results form each lab comprise 10m composites compiled in two different ways. The Bureau Veritas head grade consists of a representative of an homogenised 10m composite. The Genalysis sample consists of an average value of 10 individual 1m assays. RBPC091 has been removed because it is of sufficiently high grade to distort the trend visible in the above diagram.

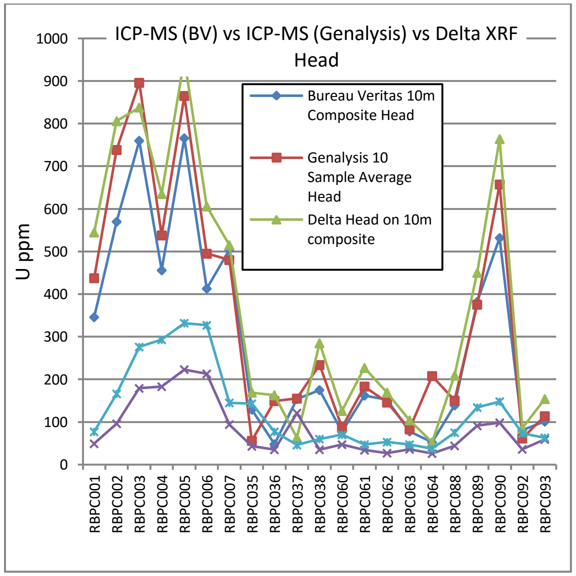
Head grade comparisons between the ICP-MS and the handheld XRF are satisfactory considering the nature of the sampling and the capabilities of the portable device. XRF U-analyses are elevated overall compared to the ICP-MS results. The pressed pellets and Bureau Veritas samples are prepared form the same homogenised material and it is expected that the results of these data should match more closely than with the Genalysis assays.

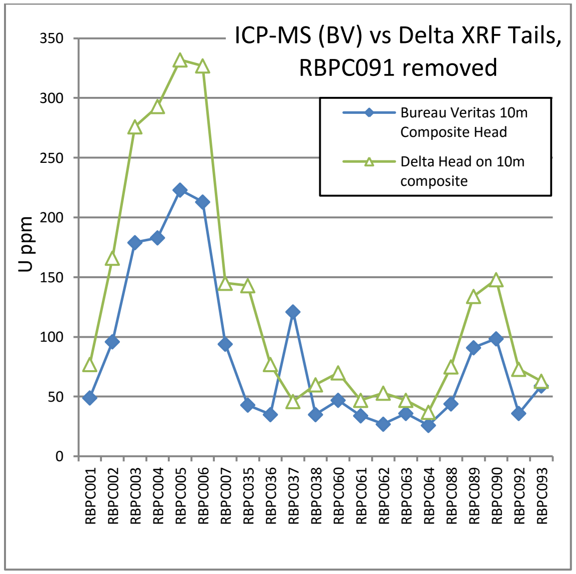
The average of the 10 assays that make up the Genalysis RBPC064 head grade is ~150ppm higher than the Bureau Veritas (52ppm U) and Delta XRF (52 ppm) assays (Figure 7.2). Conversely the Genalysis U ppm average for RBPC035 is 73ppm and 113ppm lower than Bureau Veritas and the Delta XRF analyses respectively (Figure 8.2).

The tails of the leach samples (Figure 8.3) consist of two data sets, one is ICP-MS performed by Bureau Veritas, Swakopmund, the other is handheld XRF (Delta) performed on pressed pellets of the same material. There are two significant inconsistencies in the comparison; Uranium in RBPC037 is under estimated by the XRF and over-estimated for RBPC035, relative to the ICP-MS analysis. Considering that the Bureau Veritas and Genalysis head assays of RBPC037 overlap favourably, the accuracy of the XRF may be in question for the tails assay. The average discrepancy between ICP-MS and the XRF is that U by XRF is ~58% higher than the ICP-MS. Higher U concentrations tend to translate into greater disparity between ICP-MS and XRF tails analyses.

Recoveries calculated form the ICP-MS data and the XRF assays generally overlap although significant disparity exists between 6 of the composites (Figure 8.4).

Figure 8.5 illustrates the disparity between the tail assays of ICP-MS (BV) and the Delta XRF. XRF and ICP-MS tail assays of high head grade samples show a great variance. Tail assays of head grade samples <300ppm U show no systematic behaviour in the difference between XRF and ICP-MS assay. However, apart form two outliers, samples with head assays >300ppm U show a systematic increase in XRF and ICP-MS difference with increased grade. The anomalously high RBPC091 sample has been removed in order not to skew the data. The difference between XRF and ICP-MS tails ranges form 5% to 40% of the ICP-MS tails assay. The disparity between the assays of the two methods is compiled form 21 samples. In a larger set of samples an accurate correction factor may be calculated and once applied one would expect a closer match between the two methods.





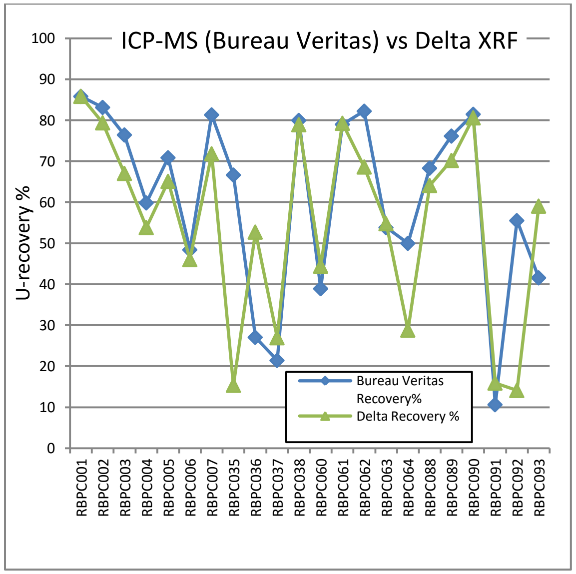


Figure 8.2 Head and tails comparison of Bureau Veritas ICP-MS data and the pressed pellet scans of the Delta handheld XRF. The majority of head grade assays correspond acceptably, major disparity occurs in RBPC036, RBPC037 and RBPC064 where one of the assays diverges form the trend. The Delta XRF tails assays are consistently higher than the Bureau Veritas assays but are consistent in their deviation.

Figure 8.3 ICP-MS vs XRF tails assays. The XRF data are consistently higher than the ICP-MS analyses, except in one sample, RBPC037. Handheld XRF significantly underestimates the U content of the head grade in RBPC037, Figure 5.2 illustrates a favourable overlap for the two sets of ICP-MS assays.

Figure 8.4 Recovery calculations form head and tail assays comparison between ICP-MS and XRF. Notable disparities occur in the RBPC035, RBPC036, RBPC062, RBPC064, RBPC092 and RBPC093. Recovery values in the high-grade sample (RBPC091) match, while lower-grade samples tend to show greater disparity (RBPC035- 129ppm U).

Hand Held XRF Precision Assessment

Handheld XRF precision was tested on a single pressed pellet. The pellet (RBPC002) was scanned on three spots, ~5mm apart. Assuming homogeneity in the pellet, the precision of the XRF device produced 3 results within the range of the particular error value given by the device. The results of the assessment are summarised in Table 8.1. The device is precise with repeated results within acceptable range of the spectrometer's quoted error range. However, the conventional XRF assay of the same pellet returned a result of 570 ppm U, which is closer to the geological head calculated by averaging the 10 individual samples that comprise the RBPC002 composite.

The discrepancy between the Gecko Laboratory XRF result and the geological head is a separate issue and has been addressed. Table 8.1 Comparison between the handheld XRF, geological head and conventional XRF assays. The same pellet, RPCB002, was scanned on three adjacent spots. The error variance given by the device was ±17ppm. Given a mean of 822ppm between the three, they are within acceptable range of the mean ±error.

Pellet	Scan	U ppm	Machine Error	Average ± scan
RBPC002 Head	1	806	±17	-16
	2	843	±17	+21
	3	817	±17	-5
Average		822		
Conventional XRF		570		
Geological Head (Ave. ICP-MS)		626.14		

Appendix E9 ICP-MS Accuracy and Precision Testing

All REE data was obtained form the Bernard Price Institute (BPI) at the University of the Witwatersrand, Johannesburg. The laboratory employs a VG 354 Mass Spectrometer with 5 collectors. The samples are selected form the pool of hand and core specimens obtained form Etango, Husab, Ida Dome and Valencia areas. The Etango and Valencia samples are all sourced form the suite of whole – rock geochemical samples. The surface samples form the Ida Dome area too, are sourced form the suite of whole – rock geochemical samples. Additional core specimens form the Husab and Holland's Dome core collections do not have whole – rock geochemistry, but do have ICP-MS assay data for uranium, being Swakop Uranium Resource drilling and sampling program samples. The plots that follow compare the BPI and Setpoint XRF analyses with the ICP-MS analyses obtained at the BPI facility. Linear regressions for Uranium and Zirconium show R^2 = 0.988 and 0.8693, respectively. The acceptable correlation between the analyses for these two elements addresses a concern for zircon crystals to behave as refractories and retain Zr and U during sample preparation. Elements generally correspond well in concentrations above 10 ppm, while low elemental concentrations serve to illustrate the limitations of XRF.

The Husab and Ida Dome area samples are all assayed for U by a conventional 4 - acid digest and ICP-MS. Linear regression shows a low R^2 = 0.6941, which is attributed to two outliers. Removing the two outliers increases the correlation to R^2 = 0.9664.

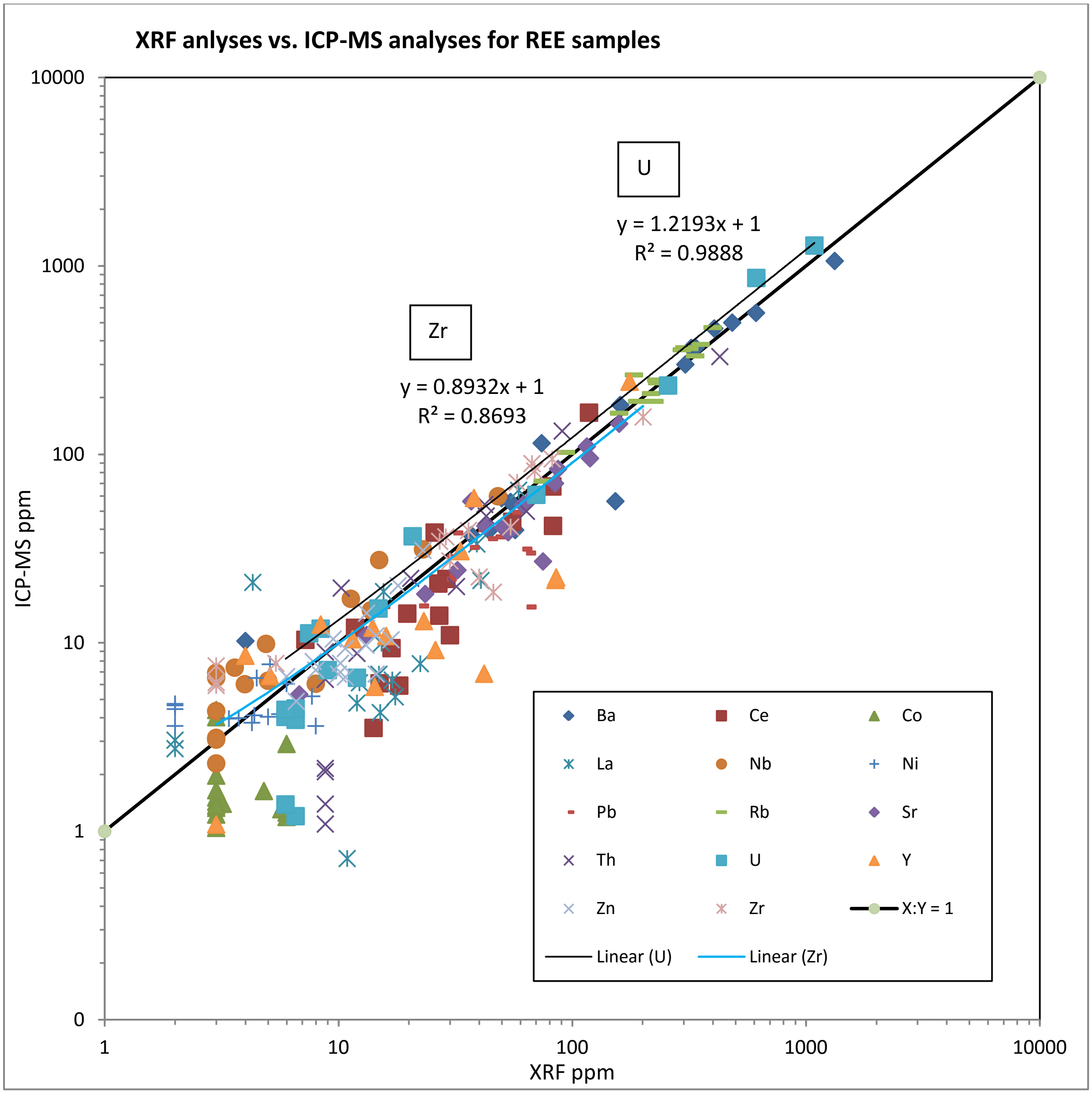
Two samples were each submitted in two separate sample submission batches to the BPI ICP-MS facility. The first set of samples were submitted with their sample label as identification (VALG06 and VALG22) and later submitted with their field waypoint labels as identification (GRA34b and GRA83) so as to be treated as independent of one another. The four analyses of the two samples and their duplicates show a discrepancy in each Rare Earth Element of less than ~10 ppm.

The XRF data is sourced form two laboratories, the Bernard Price Institute and the Setpoint Laboratory in Isando, Ekhuruleni. A collection of 5 samples, 2 with XRF data form the BPI facility and 3 with data form the Setpoint facility serve to compare the individual laboratory's XRF performance against that of the BPI ICP-MS. The results are tabled below and the five samples results plot with the ICP-MS data.

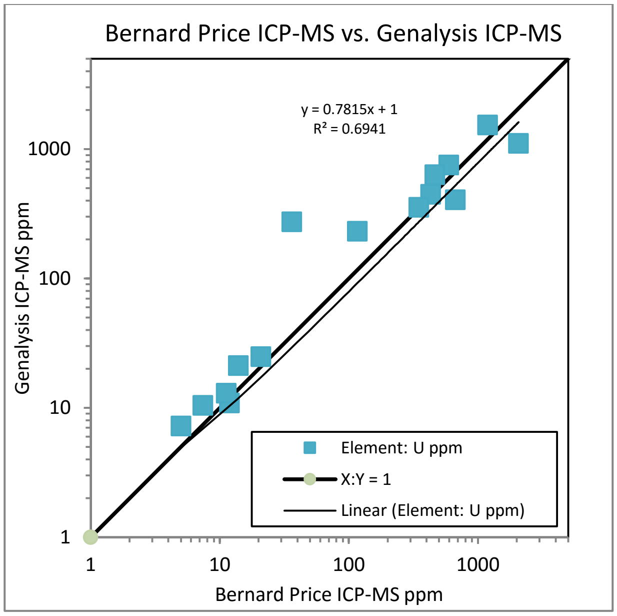
As such the following comparisons are presented:

1. BPI ICP-MS vs. BPI XRF (Panalytical);
2. BPI ICP-MS vs. Genalysis ICP-MS (Uranium only – Perth Laboratory);
3. BPI ICP-MS vs BPI ICP-MS (repeat samples); and
4. Setpoint XRF vs. BPI XRF vs. BPI ICP-MS

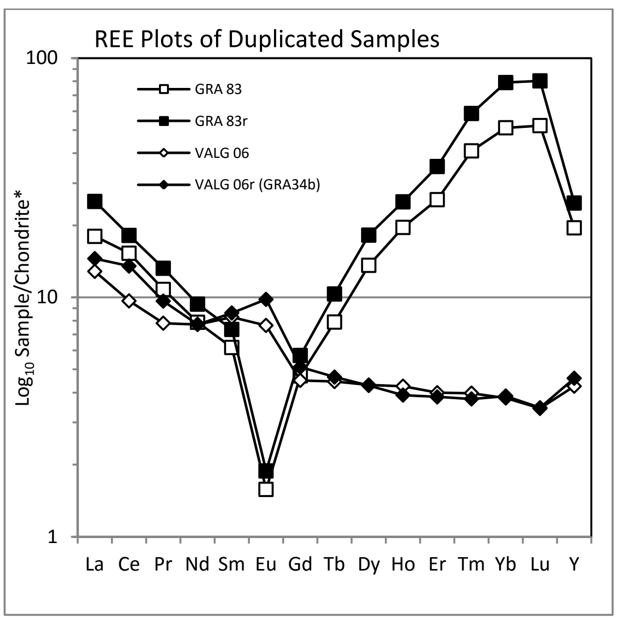
1. BPI ICP-MS vs. BPI XRF.



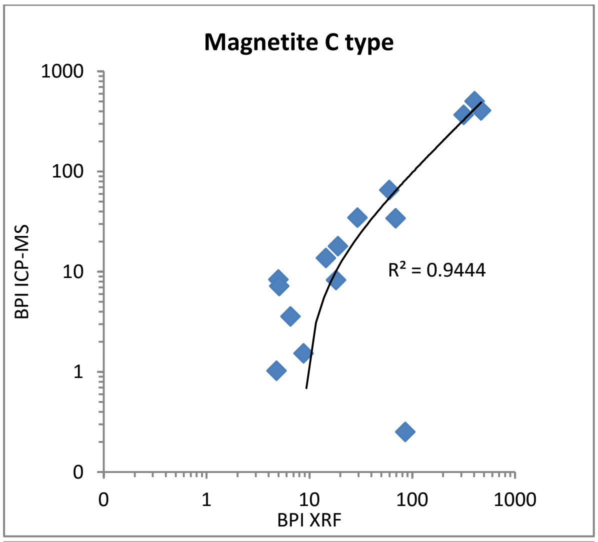
2. BPI ICP-MS vs. Genalysis ICP-MS.

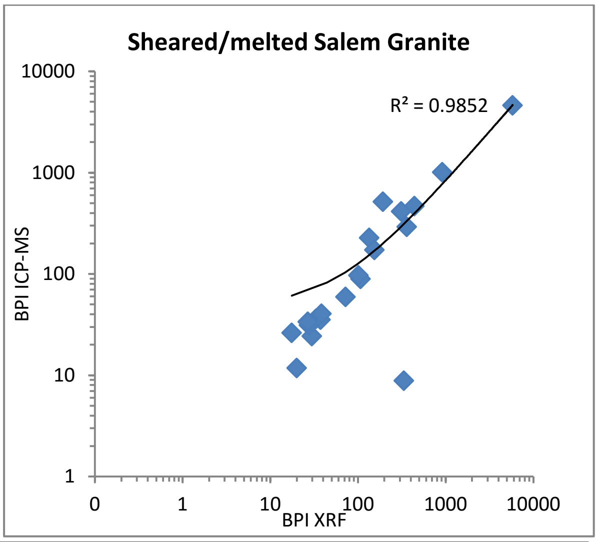


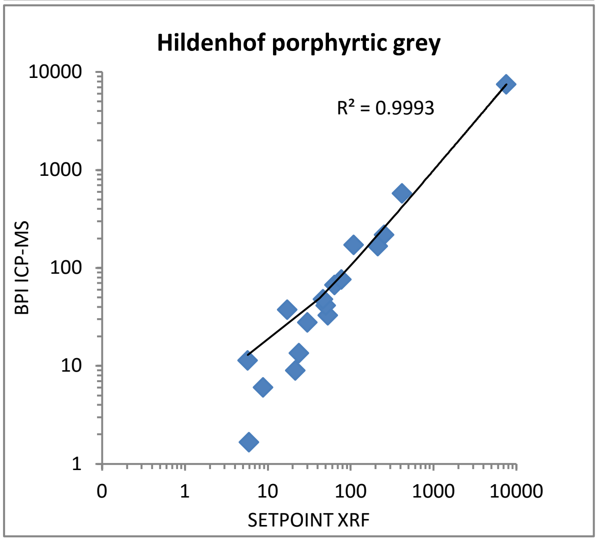
3. BPI ICP-MS repeated sample submissions.

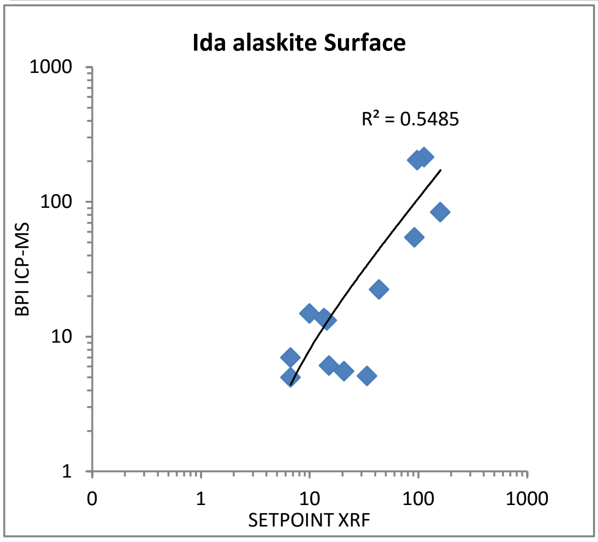


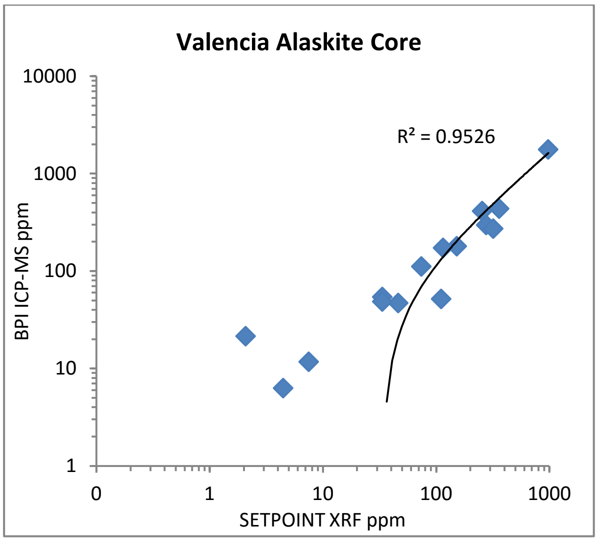
Magnetite C type			Sheared/melted Salem Granite			Hildenhof porphyrtic grey			Ida alaskite Surface			Valencia Alaskite Core		
	ICP-MS	**XRF**		**ICP-MS**	**XRF**		**ICP-MS**	**XRF**		**ICP-MS**	**XRF**		**ICP-MS**	**XRF**
	BPI	**BPI**		**BPI**	**BPI**		**BPI**	**Setpoint**		**BPI**	**Setpoint**		**BPI**	**Setpoint**
Ba	504.735	405	Ba	1013.151	919	Ba	217.298	254	Ba	13.171	14	Ba	179.645	152
Ce	8.281	18	Ce	415.768	312	Ce	32.763	53	Ce	6.095	15	Ce	111.373	74
Co	1.029	5	Co	11.827	20	Co	37.391	17	Co	1.587	<3	Co	0.926	<3
Cu	3.098	<4	Cu	35.482	38	Cu	41.273	50	Cu	4.833	<4	Cu	11.243	<4
Ga	18.037	19	Ga	26.309	18	Ga	16.574		Ga	8.358		Ga	15.542	
La	3.440	<2	La	227.943	135	La	13.465	24	La	5.534	21	La	54.143	34
Nb	2.979	<3	Nb	36.228	33	Nb	11.346	6	Nb	5.144	<3	Nb	6.282	4
Ni	8.382	5	Ni	24.435	30	Ni	66.832	64	Ni	27.501	<2	Ni	21.434	2
P	408.124	468	P	518.273	193	P	575.387	418	P	22.361	44	P	412.467	255
Pb	34.759	29	Pb	40.635	39	Pb	8.961	22	Pb	5.104	34	Pb	51.693	111
Rb	368.800	317	Rb	292.763	362	Rb	47.819	46	Rb	6.988	7	Rb	296.776	277
Sc	0.252	86	Sc	8.865	335	Sc	25.745		Sc	0.680		Sc	3.198	
Sr	34.245	69	Sr	89.669	108	Sr	166.455	213	Sr	83.767	160	Sr	46.951	46
Ta	0.977	<18	Ta	2.138	<18	Ta	0.758	<18	Ta	0.654	<18	Ta	0.438	<18
Th	1.536	9	Th	173.242	155	Th	6.020	9	Th	13.694	14	Th	172.744	115
Ti	65.537	59.934	Ti	4629.795	5822.348	Ti	7462.105	7560.734	Ti	214.541	113.3352	Ti	272.376	319.7479
U	3.586	7	U	31.345	28	U	1.660	6	U	54.461	92	U	1768.733	977
V	2.413	<4	V	97.138	102	V	199.930		V	2.902		V	1.400	
Y	7.212	5	Y	33.839	27	Y	27.719	30	Y	14.834	10	Y	48.624	34
Zn	13.745	15	Zn	59.555	72	Zn	76.066	78	Zn	4.977	7	Zn	11.706	8
Zr	6.738	<3	Zr	469.289	442	Zr	171.475	109	Zr	203.529	98	Zr	436.690	361


Magnetite C type
1000
100
10
1
0
BPI ICP-MS
R² = 0.9444
0
1
10
100
1000
BPI XRF


Sheared/melted Salem Granite
10000
1000
100
10
1
BPI ICP-MS
R² = 0.9852
0
1
10
100
1000
10000
BPI XRF


Hildenhof porphyrtic grey
10000
1000
100
10
1
BPI ICP-MS
R² = 0.9993
0
1
10
100
1000
10000
SETPOINT XRF


Ida alaskite Surface
1000
100
10
1
BPI ICP-MS
R² = 0.5485
0
1
10
100
1000
SETPOINT XRF


Valencia Alaskite Core
10000
1000
100
10
1
BPI ICP-MS ppm
R² = 0.9526
0
1
10
100
1000
SETPOINT XRF ppm

Appendix E10 XRF Laboratory Major and Trace Element Data

Batch 1

Major Elements

Sample	%SiO2	%TiO2	%Al2O3	%Fe2O3	%MnO	%MgO	%CaO	%Na2O	%K2O	%P2O5	%LOI	%TOTAL
HILG6	69.66	0.53	13.52	3.24	0.03	0.59	1.50	3.60	5.21	0.21	0.71	98.80
HILG6	69.54	0.53	13.63	3.25	0.03	0.53	1.50	3.71	5.36	0.22	0.71	99.01
HILG13	75.98	0.16	11.94	1.42	0.01	0.16	0.51	2.09	7.52	0.34	0.42	100.55
HILG24	73.05	0.11	13.39	0.70	0.01	0.16	0.96	2.32	7.42	0.08	0.41	98.61
HILG25	69.84	0.13	14.24	0.73	0.02	0.22	0.79	2.36	9.28	0.38	0.51	98.50
HILG27	74.00	0.11	13.83	0.52	0.00	0.12	1.06	3.90	4.76	0.04	0.38	98.72
HILG28	73.21	0.26	14.15	1.88	0.04	0.43	1.68	2.68	6.06	0.09	0.14	100.62
HILG29	72.31	0.13	14.17	0.62	0.02	0.25	0.80	3.21	7.01	0.07	0.66	99.25
HILG29	72.12	0.13	14.04	0.60	0.02	0.20	0.79	3.29	6.93	0.06	0.66	98.84
HILG29A	73.82	0.15	13.55	0.70	0.02	0.35	0.52	2.59	7.49	0.06	0.68	99.93
HILG30	73.73	0.22	13.51	1.51	0.02	0.22	0.87	2.68	7.25	0.09	0.51	100.61
HILG32	72.65	0.18	13.56	0.70	0.02	0.14	0.92	2.52	7.44	0.10	0.30	98.53
HILG33	78.29	0.04	11.99	0.32	0.00	0.00	2.98	4.03	0.75	0.04	0.38	98.82
HILG33A	76.83	0.06	13.19	0.40	0.01	0.07	3.20	4.11	0.73	0.02	0.23	98.85
HILG52	71.93	0.12	13.81	0.74	0.02	0.33	0.76	2.31	9.01	0.37	0.37	99.77
HILM 03a	51.37	0.24	3.56	6.21	0.35	11.84	23.31	0.21	0.29	0.24	0.67	98.29
IDAG1A	74.78	0.07	14.51	0.54	0.01	0.14	0.68	4.61	5.37	0.09	0.28	101.08
IDAG1B	74.90	0.06	13.53	0.54	0.01	0.02	0.80	4.73	4.60	0.07	0.26	99.52
IDAG1B	75.02	0.07	13.40	0.53	0.01	0.06	0.77	4.70	4.52	0.07	0.26	99.41
IDAG3	80.06	0.04	10.88	0.46	0.01	0.02	1.66	3.74	1.97	0.03	0.49	99.36
IDAG4a	81.34	0.05	9.56	0.51	0.01	0.00	1.58	3.60	1.05	0.02	0.93	98.65
IDAG5	80.28	0.05	9.84	0.44	0.00	0.00	1.37	4.86	0.51	0.02	-0.09	97.28
IDAG7	77.97	0.04	13.22	0.41	0.01	0.04	0.61	3.09	6.71	0.07	-3.46	98.71
IDAG8	75.22	0.13	13.07	1.08	0.01	0.01	1.78	5.11	2.38	0.02	0.29	99.10
IDAG10A	76.89	0.06	12.20	0.46	0.00	0.00	0.62	3.97	4.20	0.05	0.45	98.90
IDAG15	72.82	0.15	13.77	0.95	0.02	0.18	0.56	3.88	5.99	0.08	0.41	98.81
IDAG19	77.11	0.05	11.61	0.43	0.01	0.00	0.37	1.89	7.27	0.07	0.00	98.81
IDAG22	75.35	0.07	14.58	0.33	0.01	0.00	0.97	3.54	5.94	0.12	0.17	101.08
IDAG23	74.14	0.08	13.44	0.57	0.02	0.08	0.97	3.67	5.67	0.07	0.39	99.10
IDAG24	73.04	0.05	14.83	0.39	0.01	0.03	1.21	3.22	7.11	0.05	0.13	100.07
IDAG29	77.12	0.27	10.84	1.77	0.03	0.42	2.04	2.46	3.36	0.05	0.05	98.41
IDAG34	73.51	0.13	14.10	0.74	0.02	0.24	1.19	4.12	4.57	0.08	0.08	98.78
IDAG43	79.39	0.11	10.77	0.88	0.02	0.35	2.04	3.94	0.86	0.02	0.24	98.62
IDAG44	74.63	0.05	13.35	0.34	0.02	0.00	1.08	3.02	6.34	0.19	-0.09	98.93
IDAG46	87.23	0.12	5.33	2.24	0.03	0.27	2.08	1.83	0.88	0.06	0.78	100.85
IDAG55	75.63	0.07	12.09	0.23	0.01	0.11	0.39	2.32	7.38	0.08	0.36	98.67
IDAM14	96.77	0.05	0.42	0.92	0.01	0.00	0.09	0.13	0.18	0.02	0.05	98.64
IDAM4	49.84	0.62	12.63	8.85	0.39	3.54	20.05	1.48	0.32	0.25	0.36	98.33
IDAM9	54.71	0.04	23.89	1.46	0.05	0.42	10.59	5.53	0.85	0.19	0.75	98.48
NAM01A	67.40	0.20	16.32	1.55	0.02	0.30	0.66	4.03	8.74	0.41	1.36	100.99

Trace elements

Sample #	Rb	Sr	Y	Zr	Nb	Co	Ni	Cu	Zn	TiO2	V	Cr	Ba
HILG 06	253	99	37	390	16	8	6	11	18	0.43	28	18	661
HILG 13	364	110	36	72	30	<6	7	14	12	0.11	12	<12	377
HILG 24	267	124	9	100	5	6	<6	8	12	0.07	<12	<12	597
HILG 25	384	93	31	67	8	7	<6	<6	15	0.09	<12	<12	505
HILG 27	240	98	7	56	4	<6	<6	1	13	0.08	<12	17	350
HILG 28	245	116	9	144	10	8	6	21	25	0.21	17	<12	652
HILG 29	326	142	15	57	7	<6	<6	<6	16	0.09	12	20	312
HILG 29A	335	118	10	110	8	6	<6	<6	16	0.12	12	<12	295
HILG 30	303	76	16	104	7	6	<6	<6	17	0.15	13	<12	243
HILG 32	367	121	12	58	14	<6	<6	7	19	0.13	<12	<12	283
HILG 33	42	171	6	22	2	<6	<6	<6	12	0.01	<12	<12	96
HILG 33A	36	171	5	25	4	<6	<6	<6	13	0.02	<12	14	87
HILG 52	384	94	35	68	9	7	<6	<6	16	0.09	<12	<12	500
HILM 03A	23	395	14	83	10	10	20	<6	201	0.16	34	21	55
IDAG 01A	279	35	20	30	9	6	<6	<6	10	0.04	<12	15	74
IDAG 01B	231	37	26	40	8	6	<6	<6	10	0.03	<12	<12	74
IDAG 03	90	71	7	195	<3	<6	<6	109	17	0.01	<12	14	115
IDAG 04A	47	49	8	55	<3	<6	<6	<6	9	0.01	<12	24	47
IDAG 05	26	36	44	70	8	<6	<6	4	9	0.02	<12	<12	26
IDAG 07	299	54	8	73	<3	<6	<6	6	9	0.01	<12	<12	229
IDAG 08	108	53	8	118	6	<6	<6	6	9	0.10	<12	<12	94
IDAG 10A	196	55	48	71	4	<6	<6	33	9	0.03	<12	<12	193
IDAG 15	221	195	33	37	9	6	<6	<6	15	0.10	<12	<12	615
IDAG 19	344	102	8	120	3	6	7	1041	11	0.01	<12	<12	609
IDAG 22	309	99	9	30	7	<6	<6	<6	15	0.04	<12	<12	199
IDAG 23	321	360	11	57	10	6	10	<6	14	0.05	<12	<12	596
IDAG 24	330	132	5	14	3	6	<6	<6	8	0.02	<12	<12	683
IDAG 29	194	65	19	182	24	<6	6	9	27	0.34	26	12	188
IDAG 34	178	129	36	63	12	<6	7	<6	12	0.08	<12	<12	456
IDAG 43	65	65	23	77	12	<6	11	21	13	0.08	15	20	70
IDAG 44	295	104	19	25	<3	<6	<6	6	10	0.01	<12	<12	431
IDAG 46	70	28	155	607	14	13	16	2028	17	0.09	37	18	30
IDAG 55	504	79	27	159	8	<6	<6	5	13	0.03	13	103	118
IDAM 14	17	7	13	38	5	<6	<6	29	9	0.02	<12	13	24
IDAM 04	23	400	25	154	46	17	48	7	132	0.51	74	69	138
IDAM 09	34	217	21	22	5	<6	<6	<6	34	0.01	<12	<12	30
NAM 01	444	87	11	84	8	7	<6	6	1325	0.16	<12	<12	108

Sample #	Pb	Ga	La	Ce	Sc	Th	As	U
HILG06	24	17	120	203	<10	123	<12	<9
HILG 13	62	14	25	41	<10	46	<12	1967
HILG 24	35	13	<12	23	<10	<12	<12	<9
HILG 25	41	14	17	37	<10	<12	<12	15
HILG 27	25	14	34	56	<10	12	<12	<9
HILG 28	32	17	21	55	<10	13	<12	9
HILG 29	31	14	132	161	<10	51	<12	77
HILG 29A	32	13	13	36	<10	23	<12	67
HILG 30	35	14	44	50	<10	25	<12	<9
HILG 32	35	16	32	45	<10	14	<12	21
HILG 33	18	16	19	26	<10	<12	<12	<9
HILG 33A	19	17	12	25	<10	<12	<12	13
HILG 52	42	14	18	43	<10	<12	<12	13
HILM 03A	<9	<10	17	31	33	<12	<12	<9
IDAG 01A	38	19	30	19	<10	<12	<12	<9
IDAG 01B	40	17	17	27	<10	<12	<12	<9
IDAG 03	21	15	<12	15	<10	<12	<12	155
IDAG 04A	12	13	376	20	<10	10	<12	31
IDAG 05	48	14	22	32	<10	74	<12	624
IDAG 07	28	15	<12	23	<10	16	<12	<9
IDAG 08	26	18	27	27	<10	73	<12	128
IDAG 10A	68	14	15	34	<10	13	<12	45
IDAG 15	27	16	<12	30	<10	<12	<12	<9
IDAG 19	31	12	<12	23	<10	<12	<12	18
IDAG 22	45	18	<12	24	<10	<12	<12	<9
IDAG 23	60	15	16	29	<10	<12	<12	<9
IDAG 24	16	15	<12	27	<10	<12	<12	<9
IDAG 29	30	16	43	128	<10	85	<12	155
IDAG 34	40	16	58	97	<10	60	<12	269
IDAG 43	43	17	<12	30	<10	101	<12	883
IDAG 44	48	16	12	37	<10	49	<12	32
IDAG 46	139	<10	24	56	<10	369	<12	428
IDAG 55	34	12	14	32	<10	52	<12	309
IDAM 04	<9	23	22	43	32	<12	<12	<9
IDAM 09	29	38	39	68	18	<12	<12	140
IDAM 14	53	<10	<12	22	<10	49	<12	329
NAM 01	128	23	20	31	<10	<12	<12	<9

Batch 2

Major Elements

Element	Fe2O3	MnO	Cr2O3	V2O5	TiO2	CaO	K2O	P2O5	SiO2	AL2O3	MgO	Na2O	CL	S	LOI
HILG 08	1.39	0.02	<0.01	<0.01	0.16	1.16	6.16	0.07	70.7	14.2	0.6	2.8	0.03	<0.01	0.69
HILG 19	5.11	0.06	<0.01	<0.01	0.74	2.90	9.09	2.50	56.6	15.4	2.5	2.2	0.07	0.09	1.33
HILG 35	1.76	0.03	<0.01	<0.01	0.25	3.78	2.59	0.60	72.2	14.4	1.1	3.1	0.02	<0.01	0.86
IDAG 30	0.59	<0.01	<0.01	<0.01	<0.01	1.23	8.92	0.07	72.0	15.1	<0.1	1.4	<0.01	<0.01	0.48
IDAG 56	0.53	<0.01	0.02	<0.01	<0.01	0.51	7.83	0.08	76.2	11.7	0.7	1.9	<0.01	<0.01	0.57
VALB 01	6.38	0.06	<0.01	0.02	0.97	0.85	5.83	0.04	65.0	13.8	2.9	2.8	0.01	<0.01	0.94
VALB 03	6.26	0.10	<0.01	0.02	1.12	2.75	3.91	0.28	63.6	14.1	2.9	2.9	0.01	<0.01	0.72
VALG 01	1.30	0.07	<0.01	<0.01	0.05	0.58	6.16	0.11	74.0	14.7	<0.1	3.0	<0.01	<0.01	0.45
VALG 02	0.68	0.02	<0.01	<0.01	<0.01	0.54	7.78	0.35	72.4	15.0	<0.1	3.0	<0.01	<0.01	0.53
VALG 03	0.73	<0.01	<0.01	<0.01	0.02	1.10	8.31	0.32	75.0	13.8	<0.1	1.4	<0.01	<0.01	0.69
VALG 04	0.92	0.01	<0.01	<0.01	0.05	0.64	5.64	0.10	73.8	14.8	<0.1	3.9	<0.01	<0.01	0.60
VALG 05a	13.8	0.12	<0.01	<0.01	0.12	5.21	6.00	4.19	55.4	12.3	0.3	2.5	<0.01	<0.01	0.18
VALG 05b	6.03	0.11	<0.01	<0.01	0.03	1.75	6.60	1.45	70.6	12.0	<0.1	2.1	<0.01	<0.01	0.21
VALG 06	1.51	0.02	<0.01	<0.01	<0.01	0.88	8.30	0.11	71.9	14.9	<0.1	2.4	<0.01	<0.01	0.47
VALG 07	3.69	0.03	<0.01	<0.01	0.04	1.26	9.75	0.34	65.9	15.3	0.3	2.0	<0.01	<0.01	1.07
VALG 08	2.05	0.03	<0.01	<0.01	0.27	0.85	8.81	0.16	70.5	14.4	0.8	1.8	<0.01	<0.01	0.71
VALG 09	0.93	0.02	<0.01	<0.01	0.03	0.91	4.48	0.08	76.2	14.0	<0.1	3.6	<0.01	<0.01	0.57
VALG 10	0.93	0.01	<0.01	<0.01	0.03	0.32	8.30	0.14	72.3	14.7	<0.1	2.3	<0.01	<0.01	0.51
VALG 11	1.00	0.01	<0.01	<0.01	0.04	1.07	4.35	0.05	75.5	13.8	<0.1	3.6	<0.01	<0.01	0.71
VALG 12	0.71	0.01	<0.01	<0.01	<0.01	1.26	5.74	0.06	74.8	13.9	<0.1	2.8	<0.01	<0.01	0.54

Trace Elements

Element	As	Co	Cu	Nb	Ni	Pb	Rb	Sr	Ta	ThO_2	U_3O_8	Y	Zn	Zr	V	Ba	La	Ce	Ga	Sc
HILG 08	17	5	6	6	6	33	254	77	<18	10	42	7	17	<3	7	255	10	<5	17	27
HILG 19	19	12	84	34	11	137	476	108	<18	92	665	181	40	256	55	381	32	117	17	242
HILG 35	13	4	<4	13	4	40	138	112	<18	35	147	48	23	28	9	159	12	39	21	<10
IDAG 30	24	<3	<4	<3	6	17	501	79	<18	10	7	2	10	22	<4	348	6	20	15	108
IDAG 56	20	<3	<4	<3	4	34	519	77	<18	40	368	26	13	179	8	110	16	43	15	39
VALB 01	18	20	38	33	30	39	362	108	<18	176	30	27	72	442	102	919	135	312	18	335
VALB 03	8	13	15	27	22	22	272	181	<18	21	289	26	96	314	125	626	64	112	17	94
VALG 01	8	<3	<4	11	3	47	159	24	<18	10	7	14	13	29	<4	50	<2	15	16	58
VALG 02	18	3	5	4	6	37	336	53	<18	23	8	85	10	82	<4	305	16	26	16	24
VALG 03	14	<3	<4	5	4	49	388	104	<18	35	210	30	13	259	<4	285	6	31	15	<10
VALG 04	13	<3	6	10	5	33	254	55	<18	31	8	120	11	175	<4	292	18	38	18	232
VALG 05a	16	7	<4	<3	18	57	276	37	<18	1048	49	375	162	403	14	103	434	970	17	108
VALG 05b	13	<3	<4	<3	9	47	290	34	<18	502	32	133	66	384	<4	92	223	454	17	<10
VALG 06	13	5	<4	<3	5	29	317	69	<18	10	7	5	15	<3	<4	405	<2	18	19	86
VALG 07	20	<3	<4	<3	8	30	354	51	<18	10	7	14	17	<3	11	337	12	20	14	94
VALG 08	13	<3	<4	8	10	63	351	165	<18	25	90	11	30	55	30	1128	7	21	13	113
VALG 09	7	<3	<4	5	<2	47	220	32	<18	38	34	21	14	105	<4	61	5	38	16	72
VALG 10	13	5	<4	<3	7	36	317	98	<18	10	7	9	12	34	<4	862	4	10	15	73
VALG 11	16	<3	<4	5	<2	62	217	32	<18	49	274	12	15	69	<4	55	4	55	17	75
VALG 12	12	8	24	<3	6	87	180	74	<18	106	67	44	10	536	39	179	52	131	15	69

Batch 3

Major Elements

Sample #	SiO2	TiO2	Al2O3	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	L.O.I	Total
DH019 / 100.50-100.93	74.73	0.02	13.27	0.36	0.01	0.06	0.47	1.84	9.02	0.09	0.81	100.68
DH012 / 127.72-128.04	77.57	0.09	11.72	0.71	0.03	0.29	3.21	3.55	1.18	0.33	0.86	99.54
DH019 / 13.75-14.15	74.91	0.05	14.27	0.74	0.02	0.31	1.97	2.95	5.17	0.03	0.37	100.79
DH012 / 197.04-197.35	74.22	0.06	13.82	0.75	0.01	0.06	1.02	2.20	7.85	0.00	0.44	100.43
DH012 / 315.67-315.93	72.89	0.05	14.31	0.53	0.02	0.18	1.49	2.33	7.37	0.05	0.80	100.02
DH012 / 342.47-342.84	75.94	0.08	13.03	1.12	0.02	0.28	2.10	2.85	4.60	0.09	0.79	100.90
DH012 / 42.38-42.75	73.87	0.08	13.71	1.03	0.03	0.24	1.33	2.97	6.27	0.04	0.76	100.33
DH019 / 67.09-67.54	77.34	0.01	12.00	0.91	0.01	0.08	0.50	2.27	6.87	0.03	0.68	100.70
DH019 / 71.74-72.18	75.53	0.14	11.84	2.58	0.03	0.13	2.02	3.27	3.65	0.08	0.75	100.02
DH019 / 76.39-76.67	71.68	0.03	13.80	3.17	0.04	0.05	1.57	2.74	6.17	0.10	0.56	99.91
HDD027 -89.95	74.24	0.01	13.88	0.73	0.01	0.06	0.95	5.16	3.71	0.04	1.97	100.76
HILG 12	73.49	0.07	14.11	0.68	0.01	0.13	0.38	2.32	8.71	0.08	0.42	100.40
HILG 13A	69.28	0.27	13.78	1.55	0.03	0.46	1.28	2.53	8.32	0.85	0.66	99.01
HILG 16	68.93	0.60	15.16	3.94	0.07	1.08	2.62	3.93	3.08	0.14	0.60	100.15
HILG 21	70.48	0.30	15.06	2.31	0.03	0.48	0.44	2.31	9.17	0.18	0.60	101.36
HILG 26	72.83	0.09	13.59	0.76	0.01	0.10	0.44	2.33	8.54	0.13	0.52	99.34
HU 04	24.34	0.01	0.46	1.24	0.00	0.00	32.15	0.18	0.09	0.00	3.87	62.34
IDAG 09	73.46	0.05	14.44	0.65	0.01	0.07	1.03	5.08	5.11	0.06	0.48	100.44
IDAG 21	78.48	0.05	13.22	0.74	0.01	0.07	2.35	4.34	1.91	0.02	0.47	101.66
IDAG 44-2	74.39	0.02	13.38	0.26	0.01	0.00	1.04	3.18	6.24	0.17	0.23	98.92
IDAG 46-2	91.45	0.08	5.24	2.07	0.04	0.16	0.53	1.80	0.69	0.02	0.74	102.82
IDAG 57	76.81	0.01	12.32	0.22	0.00	0.15	0.36	2.39	7.38	0.07	0.49	100.20

Trace Elements

Sample #	Rb	Sr	Y	Zr	Nb	Co	Ni	Cu	Zn	TiO2	V	Cr	Ba
DH019 / 100.50-100.93	416	105	10	28	<3	<6	<6	<6	9	0.02	<12	<12	675
DH012 / 127.72-128.04	94	87	176	46	23	<6	6	15	18	0.11	15	<12	57
DH019 / 13.75-14.15	249	88	22	66	3	7	11	7	11	0.07	14	<12	262
DH012 / 197.04-197.35	216	187	5	64	5	<6	6	34	14	0.06	18	<12	1322
DHO12 / 315.67-315.93	303	103	15	34	4	<6	8	<6	15	0.05	<12	<12	489
DH012 / 342.42-324.84	198	90	57	314	12	<6	8	<6	14	0.09	15	<12	253
DH012 / 42.38-42.75	341	64	181	271	17	<6	7	<6	12	0.09	13	<12	160
DH019 /67.09-67.54	319	94	16	77	<3	<6	9	<6	8	0.02	16	<12	474
DH019 /71.74-72.18	168	88	63	433	9	7	13	7	12	0.12	23	<12	261
DH019 /76.39-76.67	288	113	24	253	3	7	6	<6	17	0.04	21	<12	495
HDD027 -89.95	152	43	26	48	5	<6	6	41	8	0.04	12	<12	151
HILG 12	394	63	12	28	7	8	6	<6	9	0.10	10	<12	318
HILG 13A	471	109	15	79	21	<6	13	18	21	0.29	30	17	521
HILG 16	243	143	28	196	23	12	9	<6	50	0.70	61	14	521
HILG 21	421	74	92	26	32	6	6	<6	20	0.31	31	<12	357
HILG 26	379	73	17	109	5	<6	10	<6	10	0.10	16	<12	559
HU 04	55	1365	50	24	28	17	18	173	119	0.02	<12	25	149958
IDAG 09	252	75	42	36	5	6	8	<6	<6	0.05	<12	<12	153
IADG 21	116	88	41	156	7	6	11	9	9	0.07	<12	<12	181
IDAG 44-2	301	104	18	23	<3	<6	6	6	6	0.01	<12	<12	478
IDAG 46-2	74	26	176	668	15	14	14	2167	17	0.10	38	13	49
IDAG 57	502	78	27	166	7	<6	7	<6	9	0.03	14	132	153

Sample name (1-20)	Pb	Ga	La	Ce	Sc	Th	As	U
DH019 / 100.50-100.93	32	12	<12	24	<10	<12	<12	<9
DH012 / 127.72-128.04	64	17	59	118	<10	428	<12	613
DH019 / 13.75-14.15	40	16	<12	42	<10	80	<12	100
DH012 / 197.04-197.35	39	14	<12	28	<10	<12	<12	<9
DHO12 / 315.67-315.93	34	15	32	82	<10	24	<12	24
DH012 / 342.42-324.84	73	16	<12	35	<10	219	<12	562
DH012 / 42.38-42.75	52	16	44	92	<10	137	<12	378
DH019 /67.09-67.54	31	13	<12	40	<10	52	<12	10
DH019 /71.74-72.18	37	16	85	187	<10	331	<12	247
DH019 /76.39-76.67	28	17	12	29	<10	18	<12	37
HDD027 -89.95	47	19	<12	30	<10	<12	<12	119
HILG 12	60	16	<12	32	<10	27	<12	186
HILG 13A	47	18	<12	22	<10	40	<12	380
HILG 16	24	20	47	90	<10	26	<12	<9
HILG 21	147	15	23	62	<10	211	<12	1339
HILG 26	38	13	<12	28	<10	<12	<12	<9
HU 04	3304	7	<12	<12	112	<12	<12	1371
IDAG 09	44	18	<12	30	<10	<12	<12	12
IADG 21	56	17	53	119	<10	126	<12	398
IDAG 44-2	50	16	12	35	<10	38	<12	29
IDAG 46-2	143	9	<12	43	<10	448	<12	446
IDAG 57	37	13	<12	33	<10	78	<12	295

Batch 4

Major Elements

Element	MnO	Cr2O3	V2O5	TiO2	CaO	K2O	P2O5	SiO2	AL2O3	Fe2O3	MgO	Na2O	CL	S	LOI
CZ 14-1	0.02	<0.01	<0.01	0.14	0.71	7.35	0.02	68.7	12.7	1.29	1.2	2.2	0.01	<0.01	0.64
CZ 7-1	<0.01	<0.01	<0.01	0.02	2.51	0.61	<0.01	77.9	12.9	0.47	1.1	4.4	0.02	<0.01	0.61
DH012 / 198.58-198.77	0.03	<0.01	<0.01	0.11	1.88	3.82	0.06	74.5	11.5	1.87	1.2	2.3	<0.01	<0.01	0.77
DH012 / 66.41-66.79	0.03	<0.01	<0.01	0.07	1.17	7.16	0.02	73.5	13.8	1.00	1.4	2.3	0.01	<0.01	0.47
DH019 / 71.74-72.18B	0.02	<0.01	<0.01	0.15	2.57	5.54	0.37	71.9	14.0	1.46	1.4	2.0	<0.01	<0.01	0.64
DH022 / 124.79-125.08	0.02	<0.01	<0.01	0.04	2.42	6.86	0.02	66.6	18.4	0.69	1.4	2.9	<0.01	<0.01	0.67
DH022 / 200.42-200.72	0.02	<0.01	<0.01	0.07	0.63	7.87	0.02	73.1	13.7	0.93	1.6	1.8	<0.01	<0.01	0.50
DH022 / 240.79-241.15	0.04	<0.01	<0.01	0.08	0.89	7.41	0.01	73.2	13.4	1.13	1.4	1.7	<0.01	<0.01	0.38
DH022 / 59.00-59.24	0.02	<0.01	<0.01	0.03	0.43	8.85	0.03	73.7	13.0	1.01	1.1	1.7	<0.01	<0.01	0.38
DH034 - 461.80-462.17	0.02	<0.01	<0.01	0.05	1.64	7.27	0.11	70.8	14.6	0.79	1.3	2.3	<0.01	<0.01	0.69
DH034 / 17.84-18.23	0.02	<0.01	<0.01	0.08	1.49	5.23	0.04	73.9	12.8	1.87	1.2	2.7	<0.01	<0.01	0.79
DH034 / 171.05-171.42	0.02	<0.01	<0.01	0.06	2.02	5.40	0.06	71.6	14.2	0.71	1.3	2.8	<0.01	<0.01	0.80
DH034 / 223.56-223.86	0.02	<0.01	<0.01	0.08	0.53	8.97	0.05	74.2	13.1	0.89	1.4	1.4	<0.01	<0.01	0.51
DH034 / 226.29-226.63	0.02	<0.01	<0.01	0.12	0.91	9.57	0.21	69.1	14.8	1.19	1.5	1.9	<0.01	<0.01	0.69
DH034 / 261.71-262.00	0.01	<0.01	<0.01	0.03	1.68	6.25	0.06	72.2	14.2	0.58	1.3	2.3	<0.01	<0.01	0.88
DH034 / 278.82-279.08	0.02	<0.01	<0.01	0.13	1.13	7.04	0.04	73.5	13.2	1.20	1.5	1.9	<0.01	<0.01	0.67
DH034 / 336.95-337.22	0.02	<0.01	<0.01	0.06	1.43	6.38	0.05	73.9	12.7	0.75	1.4	2.0	<0.01	<0.01	0.74
DH034 / 343.10-343.34	0.04	<0.01	<0.01	0.23	1.72	5.35	0.23	72.7	12.1	1.75	2.0	2.0	0.01	<0.01	0.97
DH034 / 38.96-39.21	0.03	<0.01	<0.01	0.06	0.74	9.32	0.06	71.8	13.6	1.01	1.2	1.3	<0.01	<0.01	0.75
DH034 / 380.14-380.42	0.02	<0.01	<0.01	0.08	1.74	5.81	0.03	74.8	13.4	0.76	1.3	2.1	<0.01	<0.01	0.67
DH25 / 224.44-224.66	<0.01	<0.01	<0.01	0.05	0.65	8.11	<0.01	74.4	11.9	0.74	1.0	1.4	<0.01	<0.01	0.30
DH25 / 235.81-236.14	0.02	<0.01	<0.01	0.05	0.75	8.35	0.03	74.6	12.4	1.26	1.1	1.3	<0.01	<0.01	0.44
DH25 / 244.44-244.66	<0.01	<0.01	<0.01	0.05	0.67	8.79	<0.01	75.0	12.9	0.69	1.0	1.4	<0.01	<0.01	0.29
DH25 / 281.57-281.83	0.02	<0.01	<0.01	0.07	1.14	7.06	0.03	74.5	13.0	0.90	1.2	1.8	<0.01	<0.01	0.43
DH25 / 334.91-335.25	0.03	<0.01	<0.01	0.09	0.95	7.10	0.03	74.1	11.4	1.62	1.2	1.5	<0.01	<0.01	0.62
DH25 / 345.31-345.55	0.03	<0.01	<0.01	0.16	1.71	8.06	0.03	68.9	15.7	1.45	1.6	1.9	0.01	<0.01	0.70
DH25 / 353.60-354.03	0.01	<0.01	<0.01	0.03	1.35	2.84	0.07	84.9	6.7	0.64	1.0	1.3	<0.01	<0.01	0.28
DH25 / 43.13-43.49	0.02	<0.01	<0.01	0.17	1.07	5.12	0.03	76.8	11.4	1.74	1.1	2.4	<0.01	<0.01	0.63
DH25 / 468.68-469.01	0.02	<0.01	<0.01	0.09	1.26	5.83	0.04	75.6	11.5	1.92	1.2	1.7	<0.01	<0.01	0.38
DH25 / 496.03-496.38	0.03	<0.01	<0.01	0.10	1.14	5.71	0.02	71.7	13.3	1.77	1.4	2.2	<0.01	<0.01	0.91

Element	MnO	Cr2O3	V2O5	TiO2	CaO	K2O	P2O5	SiO2	AL2O3	Fe2O3	MgO	Na2O	CL	S	LOI
GOAG 01	0.06	<0.01	<0.01	0.04	0.96	5.44	0.03	71.2	13.8	0.76	1.2	3.7	0.01	0.10	0.68
GOAG 02	0.02	<0.01	<0.01	0.04	1.62	4.02	<0.01	77.1	11.2	1.60	1.1	2.2	0.05	<0.01	1.11
Gra 71a	0.13	<0.01	<0.01	0.03	0.60	2.53	0.16	74.6	13.8	0.87	1.1	4.8	<0.01	<0.01	0.48
Gra 71b	0.19	<0.01	<0.01	0.03	0.51	2.58	0.17	75.9	13.4	1.06	1.1	4.2	<0.01	<0.01	0.54
Gra 72	<0.01	<0.01	<0.01	0.04	0.20	7.48	0.08	76.1	11.3	0.57	1.1	1.8	<0.01	<0.01	0.26
Gra 73	0.02	<0.01	<0.01	0.07	1.08	4.49	0.05	75.4	12.8	0.79	1.2	3.3	<0.01	<0.01	0.57
Gra 73b	0.01	<0.01	<0.01	0.06	0.68	5.67	0.07	77.9	11.4	0.76	1.1	2.3	<0.01	<0.01	0.47
Gra 74	0.02	<0.01	<0.01	0.14	1.06	4.38	0.09	75.2	12.7	1.67	1.3	3.1	<0.01	0.01	0.82
Gra 75	<0.01	<0.01	<0.01	<0.01	0.18	8.88	0.21	72.2	14.6	0.35	1.0	2.5	<0.01	<0.01	0.26
Gra 76	0.01	<0.01	<0.01	0.08	0.64	7.15	0.06	75.1	13.3	0.70	1.2	2.1	<0.01	<0.01	0.34
Gra 77	0.01	<0.01	<0.01	0.02	0.69	8.86	0.05	69.7	16.1	0.76	1.2	2.5	<0.01	<0.01	0.45
Gra 78	0.16	<0.01	0.03	2.02	6.50	2.00	0.35	54.2	16.5	10.35	4.7	2.9	0.02	<0.01	0.64
Gra 79	0.10	<0.01	<0.01	0.85	3.28	3.37	0.26	65.3	16.0	5.34	2.7	2.6	0.02	<0.01	0.41
Gra 80	0.03	<0.01	<0.01	0.19	0.61	6.51	0.17	74.5	12.9	1.39	1.4	2.3	<0.01	<0.01	0.50
Gra 81	0.08	<0.01	<0.01	0.79	2.71	2.15	0.20	66.8	15.1	4.74	2.6	3.2	0.03	<0.01	0.72
Gra 82	0.02	<0.01	<0.01	0.12	0.99	5.80	0.13	73.7	13.9	1.03	1.3	2.8	<0.01	<0.01	0.48
Gra 83	0.51	<0.01	<0.01	0.03	0.56	5.21	0.10	73.6	13.9	2.54	1.2	3.0	<0.01	<0.01	0.32
Gra 84	0.02	<0.01	<0.01	0.12	0.73	5.49	0.10	73.7	13.6	1.18	1.2	3.1	<0.01	<0.01	0.44
Gra 86	0.01	<0.01	<0.01	0.02	0.68	3.59	0.04	79.5	10.2	0.49	1.0	2.9	<0.01	<0.01	0.23
Gra 87	0.01	<0.01	<0.01	0.09	0.61	6.51	0.03	72.8	12.6	0.79	1.1	2.7	<0.01	<0.01	0.68
Gra 88	0.01	<0.01	<0.01	0.09	0.76	5.67	0.04	75.3	12.5	0.92	1.2	2.8	<0.01	<0.01	0.51
Gra 89	0.01	<0.01	<0.01	0.04	0.24	8.51	0.05	73.6	13.1	1.45	1.1	2.1	<0.01	<0.01	0.18
Gra 90	<0.01	<0.01	<0.01	0.02	0.30	9.71	0.06	72.2	14.2	0.42	1.1	1.8	<0.01	<0.01	0.20
Gra 91	0.03	<0.01	<0.01	0.19	0.93	8.44	0.30	69.3	14.1	2.33	1.6	2.0	<0.01	<0.01	0.49
HDD027 / 104.36-104.70	0.03	0.01	<0.01	0.07	1.12	6.36	0.40	76.0	12.7	0.95	1.3	1.9	<0.01	<0.01	0.36
HDD027 / 122.90-123.22	0.02	0.01	0.01	0.03	0.80	6.49	0.06	71.7	14.4	0.65	1.2	3.9	<0.01	<0.01	0.46
HDD027 / 142.01-142.31	0.01	<0.01	<0.01	0.04	1.88	3.68	0.03	73.5	14.9	0.68	1.2	3.2	<0.01	<0.01	0.55
HILG 01	0.03	<0.01	<0.01	0.33	0.65	8.53	0.27	69.6	12.9	1.96	1.7	2.0	0.03	<0.01	0.48
HILG 02	0.15	0.02	0.03	1.26	9.46	1.07	0.10	50.6	15.8	9.62	7.4	1.9	0.01	0.23	1.29
HILG 07	0.01	<0.01	<0.01	0.15	0.36	8.51	0.03	67.4	12.4	1.16	1.3	1.9	0.01	<0.01	0.61
HILG 08	0.02	<0.01	<0.01	0.15	1.37	6.00	0.09	73.7	14.1	1.15	1.4	2.8	0.03	<0.01	0.56
HILG 10	0.04	<0.01	<0.01	0.46	2.54	6.04	0.10	68.7	15.2	2.89	1.8	2.0	0.03	<0.01	0.68
HILG 15	0.03	<0.01	<0.01	0.27	0.77	5.79	0.02	74.3	11.2	2.13	1.6	2.0	0.03	<0.01	0.59
HILG 20	0.04	<0.01	<0.01	0.44	2.14	5.18	0.24	64.0	13.9	2.32	1.9	2.5	0.03	<0.01	0.75
HILG 31	0.01	<0.01	<0.01	0.09	0.88	9.11	0.15	70.2	14.8	0.91	1.2	2.2	0.01	<0.01	0.52
HILG 34	0.02	<0.01	<0.01	0.15	0.82	7.94	0.02	74.1	13.0	1.04	1.4	1.7	0.02	0.09	0.59
IDAG 02	0.01	<0.01	<0.01	0.01	0.77	8.97	0.04	73.1	13.8	0.71	1.2	2.0	<0.01	<0.01	0.21
IDAG 10	<0.01	<0.01	<0.01	0.02	0.66	3.21	<0.01	79.1	11.3	0.58	1.1	3.7	0.02	<0.01	0.60
IDAG 101	0.01	<0.01	<0.01	0.04	1.83	5.23	0.04	74.2	13.8	0.83	1.3	2.5	<0.01	<0.01	0.56
IDAG 102	0.02	<0.01	<0.01	0.08	2.71	1.07	<0.01	75.3	12.8	0.99	1.3	4.2	<0.01	<0.01	0.49
IDAG 103	0.02	<0.01	<0.01	0.34	2.12	3.97	0.09	71.0	14.8	2.04	1.7	3.5	0.03	0.09	0.98
IDAG 104	<0.01	<0.01	<0.01	0.05	0.70	4.77	0.06	73.8	13.4	0.71	1.1	3.7	0.01	<0.01	0.47
IDAG 16	0.02	<0.01	<0.01	0.06	0.56	6.98	0.13	74.5	11.3	0.71	1.4	2.0	0.01	<0.01	0.40
IDAG 16B	0.01	<0.01	<0.01	0.09	0.50	6.59	0.11	76.6	11.2	0.90	1.4	2.2	0.01	<0.01	0.53
IDAG 58	<0.01	0.02	<0.01	0.02	0.46	7.52	0.05	75.3	12.1	0.34	1.2	1.9	0.01	<0.01	0.48
IDAG 64	0.01	<0.01	<0.01	0.03	1.16	1.52	<0.01	80.5	10.7	0.48	1.1	3.9	0.01	<0.01	0.53
Element	**MnO**	**Cr2O3**	**V2O5**	**TiO2**	**CaO**	**K2O**	**P2O5**	**SiO2**	**AL2O3**	**Fe2O3**	**MgO**	**Na2O**	**CL**	**S**	**LOI**
IDAG 67	<0.01	<0.01	<0.01	0.03	1.47	7.22	0.10	72.7	14.3	0.49	1.1	2.1	<0.01	<0.01	0.20
IDAG 68	0.02	<0.01	0.01	0.18	1.88	3.46	0.12	68.6	13.7	6.50	1.1	3.9	<0.01	<0.01	0.46

IDAG 70	<0.01	<0.01	<0.01	0.03	0.87	7.24	0.08	71.6	13.9	0.56	1.2	2.7	0.03	<0.01	0.39
IDAG 71	0.01	<0.01	<0.01	0.10	1.54	3.89	0.07	75.7	13.2	0.88	1.3	3.3	0.02	<0.01	0.57
IDAG 71b	0.01	<0.01	<0.01	0.08	1.88	0.68	0.03	80.2	10.8	0.71	1.2	3.9	0.02	<0.01	0.49
IDAG 73	<0.01	<0.01	<0.01	0.03	1.16	5.92	0.05	76.5	12.5	0.52	1.2	2.4	<0.01	<0.01	0.50
IDAG 77	<0.01	<0.01	<0.01	0.01	0.31	8.07	0.02	73.2	12.7	0.39	1.1	2.5	<0.01	<0.01	0.13
IDAG 79	0.01	<0.01	<0.01	0.02	1.43	0.80	0.02	80.5	10.1	0.55	1.1	4.0	<0.01	<0.01	0.40
IDAG 80a	<0.01	<0.01	<0.01	0.02	3.20	0.88	0.18	74.1	14.0	0.86	1.0	4.7	0.06	<0.01	0.61
IDAG 80b	0.01	<0.01	<0.01	0.07	2.68	1.79	0.03	75.8	13.8	1.25	1.2	4.0	0.01	<0.01	0.24
IDAG 80c	<0.01	<0.01	<0.01	0.01	0.97	7.46	0.09	73.9	14.0	0.51	1.0	2.4	0.01	<0.01	0.23
IDAG 80d	0.01	<0.01	<0.01	0.04	3.02	0.85	0.13	76.0	13.4	1.21	1.1	4.0	0.07	0.02	0.55
IDAG 91	0.02	<0.01	<0.01	0.04	0.98	7.78	0.29	72.8	13.7	0.71	1.3	2.4	0.03	0.01	0.55
IDAG 92	0.02	<0.01	<0.01	0.30	1.97	4.56	0.10	69.4	14.5	2.43	1.5	3.7	<0.01	<0.01	0.71
IDAG 93	<0.01	<0.01	<0.01	0.06	0.95	4.70	0.01	75.9	12.9	0.65	1.1	3.4	<0.01	<0.01	0.32
IDAG 96	<0.01	<0.01	<0.01	0.01	0.48	7.09	<0.01	74.5	12.4	0.40	1.0	2.4	<0.01	<0.01	0.24
IDAG 97	<0.01	<0.01	<0.01	0.02	2.53	0.91	0.04	76.5	13.6	0.48	1.1	4.5	0.01	<0.01	0.45
IDAG 98	0.04	<0.01	<0.01	0.51	2.19	4.15	0.15	68.0	15.2	3.53	2.0	3.7	0.01	<0.01	0.54
IDAG 99	<0.01	<0.01	<0.01	<0.01	0.98	7.08	0.08	71.4	14.9	0.45	1.1	3.1	<0.01	<0.01	0.27
IDAM 02	0.21	0.01	0.02	0.94	10.51	2.20	0.17	53.2	17.4	5.36	6.3	2.1	0.04	<0.01	1.33
IDAM 10	0.55	<0.01	<0.01	0.06	21.05	0.19	1.20	45.3	7.1	16.99	4.6	1.0	0.11	0.05	0.20
IDAM 11	0.71	<0.01	0.01	0.22	25.41	0.10	0.42	41.3	6.1	22.61	2.6	0.6	0.07	<0.01	0.58
IDAM 80a	0.08	<0.01	<0.01	<0.01	12.22	0.71	0.12	52.2	21.4	3.19	2.4	3.9	0.28	0.35	1.48
J04 / 132.68-132.96	0.03	<0.01	<0.01	0.11	1.53	5.77	0.12	66.8	14.8	4.46	1.2	3.3	0.01	<0.01	0.53
J04 / 42.53-43.00	0.07	<0.01	<0.01	0.68	2.34	3.56	0.19	65.0	15.5	4.53	2.5	3.2	0.03	<0.01	1.30
J04 / 86.49-86.78	0.06	<0.01	<0.01	0.55	1.81	8.02	0.76	65.8	14.9	3.49	2.2	2.2	0.02	<0.01	0.81
J04 / 96.06-96.57	0.07	<0.01	<0.01	0.81	2.93	2.93	0.20	67.2	15.6	5.26	2.6	3.4	0.03	<0.01	0.64
LVA 1	0.02	<0.01	<0.01	0.11	0.98	5.16	0.06	74.2	13.6	1.09	1.2	3.3	<0.01	<0.01	0.63
Va26 111/ 108.39-108.76	0.02	<0.01	<0.01	0.13	1.70	4.04	0.12	73.9	13.5	1.27	1.4	3.7	<0.01	<0.01	0.69
VA26 111/ 157.49-157.82	<0.01	<0.01	<0.01	0.02	0.76	2.32	0.02	83.9	7.8	0.58	1.0	2.6	0.01	<0.01	0.36
Va26 111/ 297.42-297.77	0.07	<0.01	<0.01	0.51	1.12	5.96	0.10	67.1	15.6	3.68	2.1	2.8	0.01	<0.01	1.51
Va26 113/ 155.97-156.23	0.01	<0.01	<0.01	0.06	1.03	3.27	0.03	78.4	9.9	0.96	1.2	2.9	<0.01	<0.01	0.47
Va26 113/ 225.64-225.89	0.03	<0.01	<0.01	0.16	1.15	3.34	0.07	77.5	11.2	1.36	1.4	3.0	0.01	<0.01	1.10
Va26 113/ 81.84-82.22	0.02	<0.01	<0.01	0.11	1.15	4.46	0.07	74.9	13.4	0.99	1.2	3.6	<0.01	<0.01	0.73
Va26 113/116.12-116.39	0.02	<0.01	<0.01	0.16	1.21	4.68	0.07	71.6	14.4	1.48	1.3	3.7	0.01	<0.01	0.81
Va26 118/ 107.69-108.12	0.02	<0.01	<0.01	0.19	1.09	4.54	0.13	73.5	12.7	1.59	1.5	3.2	0.03	<0.01	0.73
Va26 118/ 175.18-175.46	0.01	<0.01	<0.01	0.09	0.77	5.90	0.09	75.4	12.5	0.98	1.2	3.0	0.02	<0.01	0.64
Va26 118/ 175.18-175.46B	0.02	0.02	0.01	0.10	0.79	6.11	0.10	73.9	13.0	0.92	1.2	2.3	0.02	<0.01	0.54
Va26 118/ 345.09-345.47	0.01	<0.01	<0.01	0.07	0.89	6.60	0.27	73.8	13.1	0.85	1.2	2.8	0.02	<0.01	0.67

Element	MnO	Cr2O3	V2O5	TiO2	CaO	K2O	P2O5	SiO2	AL2O3	Fe2O3	MgO	Na2O	CL	S	LOI
Va26 118/137.68-137.96	0.01	<0.01	<0.01	0.09	0.72	5.96	0.07	73.9	13.4	1.02	1.2	3.0	0.03	<0.01	0.98
Va26 118/25.25-25.53	0.02	<0.01	<0.01	0.14	1.03	4.26	0.05	75.0	12.4	1.22	1.4	3.4	0.03	<0.01	0.79
Va26 134/ 226.67-227.15	0.05	<0.01	<0.01	0.44	1.25	6.64	0.38	68.7	14.5	3.07	1.9	2.7	0.03	<0.01	0.70
Va26 139/ 315.25-315.48	0.03	<0.01	<0.01	0.13	1.14	5.22	0.07	75.2	12.5	1.97	1.1	3.2	0.02	<0.01	-0.08
Va26 139/ 46.56-47.00	0.03	<0.01	<0.01	0.19	1.25	8.40	0.60	70.9	13.7	1.47	1.5	1.9	0.02	0.16	0.91
Va26 139/89.59-89.95	0.02	<0.01	<0.01	0.12	0.66	6.53	0.08	73.7	13.5	1.08	1.2	2.7	0.01	<0.01	0.49
Va26 141/ 200.07-200.56	0.01	<0.01	<0.01	0.04	0.67	1.08	0.02	86.4	7.2	0.64	1.1	2.7	0.01	<0.01	0.53
Va26 141/ 247.82-248.16	<0.01	<0.01	<0.01	0.06	0.63	5.87	0.06	75.4	12.2	0.66	1.1	2.6	<0.01	<0.01	0.49
Va26 141/ 259.57-260.00	<0.01	<0.01	<0.01	0.03	0.68	2.67	0.03	85.1	7.5	0.58	1.0	2.1	<0.01	<0.01	0.33
Va26 141/ 261.69-262.00	<0.01	<0.01	<0.01	0.04	1.13	3.67	0.04	78.3	12.1	0.53	1.1	3.4	0.01	<0.01	0.56
Va26 141/ 290.75-291.84	0.02	<0.01	<0.01	0.19	0.52	7.33	0.08	75.5	11.7	1.36	1.3	1.6	0.01	<0.01	0.59
Va26 141/ 301.29-301.60	0.02	<0.01	<0.01	0.16	0.67	6.65	0.07	75.9	13.1	1.00	1.3	2.2	0.01	<0.01	0.43
Va26 141/ 61.22-61.59	0.03	<0.01	<0.01	0.21	2.05	3.55	0.19	74.4	14.4	1.51	1.5	3.3	0.02	<0.01	0.44
Va26 141/ 89.82-90.75	0.01	<0.01	<0.01	0.03	0.40	5.93	0.10	74.3	10.5	0.63	1.2	2.1	0.02	<0.01	0.57
Va6 139/ 104.50-104.78	0.01	<0.01	<0.01	0.05	0.77	5.53	0.06	76.3	12.6	0.79	1.1	3.1	0.01	<0.01	0.46
Valb 02	0.06	<0.01	0.01	0.71	0.66	5.66	0.13	68.6	12.4	6.02	2.5	2.0	0.01	<0.01	0.56

Trace Elements

Element	As	Bi	Co	Cu	Nb	Ni	Mo	Pb	Rb	Se	Sr	Ta	ThO2	U3O8
CZ 14-1	17	9	<3	<4	20	4	<4	56	361	4	37	<18	49	292
CZ 7-1	6	4	<3	<4	<3	<2	<4	34	7	<3	160	<18	16	109
DH012 / 198.58-198.77	12	3	<3	<4	<3	3	<4	34	165	<3	85	<18	231	328
DH012 / 66.41-66.79	23	5	<3	16	11	4	<4	69	224	<3	71	<18	38	437
DH019 / 71.74-72.18B	13	7	<3	6	4	5	<4	42	340	<3	65	24	33	46
DH022 / 124.79-125.08	<3	4	<3	4	60	4	<4	53	330	<3	90	22	20	128
DH022 / 200.42-200.72	7	5	<3	7	4	4	<4	56	399	<3	62	26	73	83
DH022 / 240.79-241.15	13	9	<3	14	16	5	<4	80	484	4	82	19	76	521
DH022 / 59.00-59.24	10	2	<3	5	<3	2	<4	38	438	<3	53	26	10	7
DH034 - 461.80-462.17	17	2	5	<4	3	5	<4	116	314	<3	82	<18	157	1216
DH034 / 17.84-18.23	16	5	7	<4	3	8	<4	57	266	<3	48	25	146	661
DH034 / 171.05-171.42	18	4	<3	6	20	6	<4	93	281	<3	119	40	193	889

Element	As	Bi	Co	Cu	Nb	Ni	Mo	Pb	Rb	Se	Sr	Ta	ThO2	U3O8
DH034 / 223.56-223.86	10	5	<3	<4	6	4	<4	47	403	<3	82	25	10	58
DH034 / 226.29-226.63	18	5	<3	<4	5	<2	<4	45	359	<3	62	18	38	39
DH034 / 261.71-262.00	12	5	<3	<4	<3	<2	<4	31	302	<3	84	21	12	18
DH034 / 278.82-279.08	16	10	<3	<4	9	5	<4	60	343	<3	79	<18	135	309
DH034 / 336.95-337.22	12	5	<3	<4	10	3	<4	61	298	<3	88	<18	53	455
DH034 / 343.10-343.34	20	5	4	<4	26	12	<4	126	322	<3	64	<18	166	1572
DH034 / 38.96-39.21	18	6	<3	<4	<3	5	<4	66	412	<3	64	<18	44	208
DH034 / 380.14-380.42	13	7	<3	24	7	3	<4	45	277	3	107	19	112	192
DH25 / 224.44-224.66	8	3	<3	<4	<3	<2	<4	52	293	<3	97	21	10	7
DH25 / 235.81-236.14	18	6	4	<4	<3	6	<4	84	330	<3	86	26	104	585
DH25 / 244.44-244.66	11	7	<3	<4	<3	3	<4	46	274	<3	93	27	10	7
DH25 / 281.57-281.83	14	6	8	<4	<3	6	<4	54	296	<3	75	28	63	207
DH25 / 334.91-335.25	15	4	<3	<4	<3	5	<4	91	281	<3	95	24	191	612
DH25 / 345.31-345.55	8	4	6	<4	11	7	<4	91	312	<3	110	<18	45	459
DH25 / 353.60-354.03	14	4	5	<4	<3	2	<4	87	104	<3	65	<18	105	1087
DH25 / 43.13-43.49	10	5	<3	<4	10	5	<4	66	215	<3	45	28	123	573
DH25 / 468.68-469.01	17	6	7	<4	<3	6	<4	67	215	<3	75	27	123	448
DH25 / 496.03-496.38	7	3	<3	<4	<3	6	<4	53	285	<3	91	25	92	365
GOAG 01	17	10	10	<4	12	<2	16	79	212	5	19	21	11	12
GOAG 02	19	9	<3	<4	<3	<2	<4	38	131	4	80	<18	10	7
Gra 71a	19	4	<3	6	48	<2	<4	15	184	<3	7	22	10	7
Gra 71b	16	5	<3	5	81	<2	<4	24	194	<3	7	26	10	7
Gra 72	17	5	<3	8	<3	3	<4	47	317	<3	64	26	10	7
Gra 73	15	5	<3	<4	5	<2	10	84	212	3	31	19	100	164
Gra 73b	17	4	<3	<4	4	<2	<4	60	273	3	29	<18	76	114
Gra 74	19	8	<3	65	15	2	5	58	246	4	29	20	106	651
Gra 75	14	8	<3	<4	<3	<2	<4	43	526	<3	26	<18	10	7
Gra 76	16	8	<3	4	5	2	<4	50	248	<3	54	<18	10	7
Gra 77	18	7	<3	<4	<3	<2	<4	27	276	<3	142	21	10	7
Gra 78	14	7	15	38	17	39	<4	22	118	<3	322	33	10	7
Gra 79	16	5	24	20	17	17	<4	22	207	<3	180	21	20	7
Gra 80	12	5	<3	<4	18	<2	24	89	324	<3	57	25	110	44
Gra 81	15	9	<3	8	36	10	<4	18	250	3	137	<18	14	7
Gra 82	25	8	<3	<4	16	4	<4	43	269	<3	71	<18	15	8
Gra 83	12	5	3	<4	15	4	<4	32	229	<3	13	<18	10	7
Gra 84	17	10	<3	6	28	<2	<4	42	308	<3	21	<18	23	7
Gra 86	10	6	<3	<4	<3	<2	9	60	172	<3	24	19	47	34
Gra 87	15	8	<3	<4	4	<2	5	45	346	<3	23	<18	10	9

Element	As	Bi	Co	Cu	Nb	Ni	Mo	Pb	Rb	Se	Sr	Ta	ThO2	U3O8
Gra 88	16	7	<3	<4	9	2	12	65	294	<3	28	25	51	665
Gra 89	12	6	<3	<4	<3	4	<4	26	325	<3	29	21	10	7
Gra 90	16	7	<3	<4	<3	<2	<4	27	315	<3	59	<18	10	7
Gra 91	12	7	<3	<4	<3	2	<4	30	286	<3	59	20	20	7
HDD027 / 104.36-104.70	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??
HDD027 / 122.90-123.22	5	6	<3	<4	5	<2	7	43	256	<3	80	19	10	107
HDD027 / 142.01-142.31	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??
HILG 01	16	8	<3	9	20	4	47	154	425	5	76	<18	116	999
HILG 02	5	8	17	50	6	64	<4	22	46	<3	213	<18	10	7
HILG 07	13	6	<3	8	6	4	<4	58	355	<3	67	18	21	100
HILG 08	15	9	<3	13	4	5	16	47	232	4	72	<18	10	63
HILG 10	14	10	<3	<4	15	5	<4	35	226	3	186	21	16	7
HILG 15	16	9	<3	16	13	5	<4	41	278	4	53	<18	10	112
HILG 20	12	7	<3	10	18	11	<4	45	194	6	78	<18	49	38
HILG 31	11	5	<3	6	4	4	<4	53	337	<3	95	21	10	7
HILG 34	9	6	<3	9	10	4	<4	47	321	<3	95	34	14	62
IDAG 02	10	8	<3	<4	<3	2	<4	22	402	<3	123	<18	10	7
IDAG 10	16	7	<3	24	<3	<2	<4	56	142	3	44	<18	10	36
IDAG 101	8	8	<3	<4	<3	4	<4	31	111	<3	206	<18	10	7
IDAG 102	10	4	3	8	<3	6	<4	36	40	<3	74	<18	45	32
IDAG 103	10	4	<3	5	28	11	<4	35	169	<3	112	24	32	36
IDAG 104	15	5	<3	<4	11	<2	<4	43	208	<3	26	<18	10	10
IDAG 16	21	8	<3	112	<3	5	<4	149	267	<3	55	<18	126	1282
IDAG 16	14	6	9	29	4	4	<4	163	258	4	52	<18	130	1299
IDAG 58	14	7	7	9	<3	3	<4	39	494	4	74	29	43	377
IDAG 64	20	6	<3	<4	<3	<2	<4	64	75	4	43	<18	103	1281
IDAG 67	14	7	7	<4	13	<2	<4	10	290	4	94	23	10	9
IDAG 68	10	5	<3	6	<3	7	<4	32	141	<3	65	22	10	486
IDAG 70	15	8	6	11	<3	4	<4	22	294	4	116	24	10	10
IDAG 71	10	5	8	5	3	6	<4	73	162	<3	95	19	93	116
IDAG 71b	16	7	<3	<4	4	<2	<4	52	35	<3	77	22	79	118
IDAG 73	16	4	<3	<4	<3	<2	<4	10	242	<3	67	22	10	7
IDAG 77	6	6	<3	<4	<3	<2	<4	38	325	<3	62	21	12	9
IDAG 79	13	5	<3	<4	<3	<2	<4	80	50	<3	41	18	178	1638
IDAG 80a	4	3	<3	<4	<3	<2	<4	14	19	<3	83	22	10	15
IDAG 80b	11	7	<3	<4	4	<2	<4	23	64	<3	71	<18	10	36
IDAG 80c	14	7	7	<4	<3	<2	<4	39	305	<3	85	19	10	67
IDAG 80d	18	4	6	<4	<3	<2	<4	21	17	<3	79	24	10	19
IDAG 91	15	6	<3	6	<3	7	<4	48	305	3	77	<18	19	7
IDAG 92	11	4	<3	<4	14	4	<4	23	190	<3	119	<18	36	7
IDAG 93	16	6	<3	<4	<3	<2	<4	23	155	<3	33	18	10	7
IDAG 96	13	3	<3	<4	<3	<2	<4	31	302	<3	134	21	53	54
IDAG 97	13	7	<3	<4	<3	<2	<4	14	24	<3	71	<18	10	7
IDAG 98	3	6	<3	6	20	10	<4	39	203	<3	174	<18	48	15
IDAG 99	14	5	<3	<4	<3	<2	<4	19	272	<3	82	<18	10	7
Element	**As**	**Bi**	**Co**	**Cu**	**Nb**	**Ni**	**Mo**	**Pb**	**Rb**	**Se**	**Sr**	**Ta**	**ThO2**	**U3O8**
IDAM 02	11	6	21	11	13	54	5	13	157	<3	379	30	10	25
IDAM 10	39	6	47	5	9	31	<4	329	59	4	61	23	227	5616

IDAM 11	31	7	81	14	12	33	<4	164	16	<3	32	58	89	1893
IDAM 80a	19	6	8	<4	<3	4	<4	66	13	<3	143	<18	10	811
J04 / 132.68-132.96	7	7	<3	8	<3	5	<4	29	225	<3	159	<18	48	25
J04 / 42.53-43.00	12	6	<3	<4	15	12	<4	23	296	<3	191	20	21	8
J04 / 86.49-86.78	18	4	<3	6	20	13	<4	43	407	<3	111	27	80	58
J04 / 96.06-96.57	17	8	<3	40	21	15	<4	12	202	<3	143	23	18	7
LVA 1	16	6	<3	<4	8	<2	11	84	260	<3	29	23	110	27
Va26 111/ 108.39-108.76	9	7	5	<4	17	4	6	29	184	<3	81	19	10	86
VA26 111/ 157.49-157.82	18	8	<3	<4	<3	<2	47	55	107	<3	22	<18	35	573
Va26 111/ 297.42-297.77	13	8	10	<4	66	5	<4	41	391	<3	36	26	84	71
Va26 113/ 155.97-156.23	9	4	<3	<4	4	2	<4	32	134	<3	35	19	19	215
Va26 113/ 225.64-225.89	12	7	<3	<4	16	<2	<4	45	182	<3	32	23	34	385
Va26 113/ 81.84-82.22	15	6	<3	<4	10	<2	10	70	229	<3	27	26	120	660
Va26 113/116.12-116.39	15	8	<3	<4	13	<2	<4	44	242	<3	32	18	101	332
Va26 118/ 107.69-108.12	7	4	9	<4	22	3	172	86	272	<3	31	23	90	889
Va26 118/ 175.18-175.46	12	10	<3	<4	8	3	<4	41	292	<3	34	31	48	89
Va26 118/ 175.18-175.46B	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??
Va26 118/ 345.09-345.47	19	6	<3	<4	6	<2	<4	49	307	3	39	20	20	123
Va26 118/137.68-137.96	9	4	<3	16	9	<2	<4	38	293	<3	32	19	23	72
Va26 118/25.25-25.53	14	4	<3	<4	14	3	26	61	249	<3	30	<18	64	533
Va26 134/ 226.67-227.15	15	5	<3	4	48	5	146	91	403	<3	48	33	74	938
Va26 139/ 315.25-315.48	5	6	<3	<4	6	<2	<4	24	231	<3	60	19	13	13
Va26 139/ 46.56-47.00	21	6	<3	<4	27	5	159	91	432	3	51	30	54	951
Va26 139/89.59-89.95	15	5	<3	<4	11	4	24	70	341	<3	46	19	109	526
Va26 141/ 200.07-200.56	15	5	<3	<4	<3	<2	20	37	50	<3	48	<18	19	450
Va26 141/ 247.82-248.16	12	5	<3	<4	<3	<2	10	51	266	<3	66	29	29	253
Va26 141/ 259.57-260.00	12	6	<3	<4	<3	<2	12	26	108	<3	40	23	10	163
Va26 141/ 261.69-262.00	12	5	<3	<4	<3	<2	19	48	147	<3	69	<18	16	371

Element	As	Bi	Co	Cu	Nb	Ni	Mo	Pb	Rb	Se	Sr	Ta	ThO2	U3O8
Va26 141/ 290.75-291.84	10	5	<3	<4	19	3	40	55	442	<3	72	21	33	307
Va26 141/ 301.29-301.60	15	7	5	<4	11	<2	20	44	276	<3	49	21	21	119
Va26 141/ 61.22-61.59	11	4	<3	<4	25	2	8	29	176	<3	89	19	10	40
Va26 141/ 89.82-90.75	13	5	<3	<4	4	<2	<4	35	281	<3	19	22	10	49
Va6 139/ 104.50-104.78	20	3	<3	<4	4	2	<4	111	277	<3	46	<18	131	1153
Valb 02	8	3	8	22	20	15	<4	38	335	<3	99	26	161	24

Element	W	Y	Yb	Zn	Zr	Ag	Cd	Sb	Sn	Ba	La	Ce	Eu
CZ 14-1	10	74	11	13	60	<4	10	10	10	122	21	46	<2
CZ 7-1	10	10	<8	7	98	<4	10	10	10	14	21	15	<2
DH012 / 198.58-198.77	10	50	<8	6	362	<4	10	10	10	259	74	142	<2
DH012 / 66.41-66.79	11	90	10	12	26	<4	10	10	10	256	22	41	<2
DH019 / 71.74-72.18B	10	97	<8	9	10	<4	10	10	10	219	26	34	<2
DH022 / 124.79-125.08	10	59	<8	8	49	<4	10	10	10	192	19	33	<2
DH022 / 200.42-200.72	10	85	<8	8	30	<4	10	10	10	160	39	82	<2
DH022 / 240.79-241.15	10	71	<8	16	142	<4	10	10	10	354	33	63	<2
DH022 / 59.00-59.24	10	6	<8	9	<3	7	10	10	10	228	3	6	<2
DH034 - 461.80-462.17	10	74	9	10	183	<4	10	10	11	209	19	38	<2
DH034 / 17.84-18.23	11	271	36	10	343	<4	10	10	10	71	43	89	<2
DH034 / 171.05-171.42	15	274	24	11	251	<4	10	10	10	154	69	124	<2
DH034 / 223.56-223.86	10	12	<8	11	24	<4	10	10	10	341	9	7	<2
DH034 / 226.29-226.63	10	74	<8	10	19	<4	10	10	10	161	22	44	<2
DH034 / 261.71-262.00	10	23	<8	10	67	<4	10	10	10	323	15	29	<2
DH034 / 278.82-279.08	10	33	<8	12	23	<4	10	10	10	238	53	118	<2
DH034 / 336.95-337.22	10	55	<8	10	128	<4	10	10	10	235	29	32	<2
DH034 / 343.10-343.34	10	242	27	20	155	<4	10	10	10	222	44	58	<2
DH034 / 38.96-39.21	10	57	<8	10	50	<4	10	10	10	288	18	50	<2
DH034 / 380.14-380.42	10	51	<8	13	59	<4	10	10	10	204	52	87	<2
DH25 / 224.44-224.66	10	4	<8	6	42	7	10	10	10	472	11	24	<2
DH25 / 235.81-236.14	10	172	23	9	187	<4	10	10	10	346	32	54	<2
DH25 / 244.44-244.66	10	6	<8	5	50	<4	10	10	10	435	17	6	<2
DH25 / 281.57-281.83	10	223	26	7	150	8	10	10	10	303	30	57	<2

Element	W	Y	Yb	Zn	Zr	Ag	Cd	Sb	Sn	Ba	La	Ce	Eu
DH25 / 334.91-335.25	10	65	10	12	90	<4	10	10	10	424	66	131	<2
DH25 / 345.31-345.55	10	73	<8	16	<3	<4	10	10	10	428	22	32	<2
DH25 / 353.60-354.03	10	72	<8	5	<3	<4	10	10	13	169	19	32	<2
DH25 / 43.13-43.49	10	210	24	7	328	<4	10	10	10	100	38	63	<2
DH25 / 468.68-469.01	10	235	25	20	87	<4	10	10	10	245	57	112	<2
DH25 / 496.03-496.38	10	194	21	14	53	<4	10	10	10	215	32	80	<2
GOAG 01	10	28	<8	8	9	<4	10	10	10	26	17	13	<2
GOAG 02	10	4	<8	14	181	<4	10	10	10	174	13	14	<2
Gra 71a	10	<3	<8	11	<3	<4	10	10	10	<4	11	14	<2
Gra 71b	10	3	<8	10	14	<4	10	10	10	11	9	8	<2
Gra 72	10	4	<8	11	75	<4	10	10	10	366	7	18	<2
Gra 73	10	24	<8	14	241	<4	10	10	10	70	33	76	<2
Gra 73b	10	20	<8	12	69	<4	10	10	10	95	30	74	<2
Gra 74	10	26	<8	26	201	<4	10	10	10	76	57	95	<2
Gra 75	10	<3	<8	7	<3	<4	10	10	10	81	12	11	<2
Gra 76	10	29	<8	12	61	<4	10	10	10	325	4	<5	<2
Gra 77	10	<3	<8	10	<3	<4	10	10	10	1163	8	6	<2
Gra 78	10	31	<8	95	237	6	25	10	10	771	37	71	<2
Gra 79	10	26	<8	75	276	<4	10	10	10	661	71	129	<2
Gra 80	10	35	<8	19	69	<4	10	10	10	186	36	73	<2
Gra 81	10	12	<8	60	271	5	10	10	10	239	45	68	<2
Gra 82	10	31	<8	18	63	<4	10	10	10	376	9	17	<2
Gra 83	10	33	<8	11	27	<4	10	10	10	44	15	17	6
Gra 84	10	32	<8	16	69	<4	10	10	10	79	15	42	<2
Gra 86	10	8	<8	5	127	<4	10	10	10	74	10	5	<2
Gra 87	10	16	<8	11	9	<4	10	10	10	73	22	23	<2
Gra 88	10	10	<8	11	86	<4	10	10	10	93	16	31	<2
Gra 89	10	3	<8	6	9	<4	10	10	10	250	13	12	<2
Gra 90	10	4	<8	11	<3	<4	10	10	10	430	13	12	<2
Gra 91	10	17	<8	21	173	<4	10	10	10	379	38	78	<2
HDD027 / 104.36-104.70	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??
HDD027 / 122.90-123.22	10	9	<8	6	4	<4	10	10	10	268	18	15	<2
HDD027 / 142.01-142.31	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??
HILG 01	10	39	<8	23	<3	<4	10	10	10	390	19	20	<2
HILG 02	10	30	<8	78	109	6	20	10	10	254	24	53	<2
HILG 07	10	10	<8	16	10	<4	10	10	10	377	25	19	<2
HILG 08	10	9	<8	13	<3	<4	10	10	10	258	12	17	<2
HILG 10	10	14	<8	36	178	<4	10	10	10	987	37	60	<2
HILG 15	10	4	<8	21	<3	6	10	10	10	219	12	12	<2
HILG 20	10	25	<8	25	231	<4	10	10	10	327	49	116	<2
HILG 31	10	14	<8	11	15	<4	10	10	10	745	21	25	<2
HILG 34	10	11	<8	14	132	<4	10	10	10	562	32	49	<2
IDAG 02	10	<3	<8	7	<3	<4	10	10	10	742	16	17	<2

Element	W	Y	Yb	Zn	Zr	Ag	Cd	Sb	Sn	Ba	La	Ce	Eu
IDAG 10	10	34	<8	7	51	<4	10	10	10	150	18	20	<2
IDAG 101	10	28	<8	6	16	<4	10	10	10	1210	10	20	<2
IDAG 102	10	16	<8	11	443	<4	10	10	10	38	15	30	<2
IDAG 103	10	32	<8	18	216	<4	10	10	10	532	63	123	<2
IDAG 104	10	8	<8	<4	12	<4	10	10	10	45	14	8	<2
IDAG 16	10	80	<8	15	22	<4	10	10	10	247	18	32	<2
IDAG 16	10	78	9	9	41	<4	10	10	14	240	17	43	<2
IDAG 58	12	25	<8	11	146	<4	10	10	10	118	23	30	<2
IDAG 64	10	38	<8	7	58	<4	10	10	10	37	22	27	<2
IDAG 67	10	10	<8	6	16	<4	10	10	10	353	18	10	<2
IDAG 68	10	15	<8	24	32	<4	10	10	10	176	25	38	<2
IDAG 70	10	8	<8	8	5	<4	10	10	10	484	18	7	<2
IDAG 71	10	52	<8	14	<3	<4	10	10	10	241	24	40	<2
IDAG 71b	12	43	<8	10	5	<4	10	10	10	44	24	29	<2
IDAG 73	10	15	<8	7	19	<4	10	10	10	207	22	<5	<2
IDAG 77	10	10	<8	6	104	<4	10	10	10	316	12	20	<2
IDAG 79	10	61	<8	6	126	<4	10	10	16	12	33	58	<2
IDAG 80a	10	19	<8	8	<3	<4	10	10	10	11	26	23	<2
IDAG 80b	10	11	<8	9	44	<4	10	10	10	39	14	6	<2
IDAG 80c	10	7	<8	5	<3	<4	10	10	10	277	9	10	<2
IDAG 80d	10	18	<8	7	<3	<4	10	10	10	11	22	33	<2
IDAG 91	10	76	<8	11	29	<4	10	10	10	435	22	42	<2
IDAG 92	10	16	<8	13	201	<4	10	10	10	611	41	83	<2
IDAG 93	10	16	<8	5	38	<4	10	10	10	84	26	22	<2
IDAG 96	10	21	<8	5	90	<4	10	10	10	491	17	20	<2
IDAG 97	10	4	<8	7	<3	<4	10	10	10	28	13	16	<2
IDAG 98	10	21	<8	43	278	<4	10	10	10	865	67	149	<2
IDAG 99	10	6	<8	6	5	<4	10	10	10	265	20	19	<2
IDAM 02	10	42	<8	60	178	<4	13	10	10	470	42	102	<2
IDAM 10	12	262	33	131	55	<4	57	10	68	<4	1615	3051	18
IDAM 11	18	897	158	66	87	<4	59	10	82	12	357	832	13
IDAM 80a	10	47	<8	34	12	<4	10	10	10	6	13	44	<2
J04 / 132.68-132.96	10	4	<8	23	55	<4	10	10	10	1327	15	12	<2
J04 / 42.53-43.00	10	34	<8	52	204	5	10	10	10	742	44	96	<2
J04 / 86.49-86.78	10	41	<8	40	184	<4	10	10	10	922	66	129	<2
J04 / 96.06-96.57	10	14	<8	68	258	<4	10	10	10	498	44	96	<2
LVA 1	10	33	<8	13	99	<4	10	10	10	75	28	71	<2
Va26 111/ 108.39-108.76	10	12	<8	18	14	<4	10	10	10	237	12	<5	<2
VA26 111/ 157.49-157.82	10	122	13	69	12	<4	10	10	10	116	34	81	<2
Va26 111/ 297.42-297.77	10	6	<8	<4	114	<4	10	10	10	49	10	10	<2
Va26 113/ 155.97-156.23	10	4	<8	11	100	<4	10	10	10	150	15	5	<2
Va26 113/ 225.64-225.89	10	21	<8	24	242	<4	10	10	13	78	10	21	<2

Element	W	Y	Yb	Zn	Zr	Ag	Cd	Sb	Sn	Ba	La	Ce	Eu
Va26 113/ 81.84-82.22	10	38	<8	17	327	<4	10	10	15	65	49	79	<2
Va26 113/116.12-116.39	10	27	<8	19	92	<4	10	10	10	102	44	84	<2
Va26 118/ 107.69-108.12	10	38	<8	22	117	<4	10	10	10	94	22	36	<2
Va26 118/ 175.18-175.46	12	15	<8	18	28	<4	10	10	10	122	30	54	<2
Va26 118/ 175.18-175.46B	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??	I/S??
Va26 118/ 345.09-345.47	10	23	<8	18	54	<4	10	10	10	158	10	33	<2
Va26 118/137.68-137.96	10	14	<8	16	86	<4	10	10	10	90	17	31	<2
Va26 118/25.25-25.53	10	80	<8	21	235	<4	10	10	10	66	20	49	<2
Va26 134/ 226.67-227.15	10	43	<8	45	17	<4	10	10	12	216	25	35	<2
Va26 139/ 315.25-315.48	10	10	<8	16	104	<4	10	10	10	338	19	40	<2
Va26 139/ 46.56-47.00	13	49	<8	10	87	<4	10	10	10	373	13	35	<2
Va26 139/89.59-89.95	10	88	<8	12	103	<4	10	10	10	175	39	82	<2
Va26 141/ 200.07-200.56	10	9	<8	<4	150	<4	10	10	10	39	18	13	<2
Va26 141/ 247.82-248.16	10	38	<8	7	64	<4	10	10	10	180	19	24	<2
Va26 141/ 259.57-260.00	10	4	<8	<4	43	<4	10	10	10	111	10	15	<2
Va26 141/ 261.69-262.00	10	4	<8	7	102	<4	10	10	10	141	15	11	<2
Va26 141/ 290.75-291.84	10	53	<8	18	71	<4	10	10	10	107	23	22	<2
Va26 141/ 301.29-301.60	10	45	<8	10	98	<4	10	10	10	139	7	27	<2
Va26 141/ 61.22-61.59	10	16	<8	24	101	<4	10	10	10	267	22	13	<2
Va26 141/ 89.82-90.75	10	7	<8	8	10	<4	10	10	10	59	9	16	<2
Va6 139/ 104.50-104.78	10	34	<8	8	361	<4	10	10	10	152	34	74	<2
Valb 02	10	37	<8	55	317	<4	10	10	10	1160	189	356	<2

Major element averages for the CZ deposits. * indicates single sample analysis, highest values highlighted in pink.

CZ Granitoid	Grey ave. n=	Salem ave. n=	Goanikontes SLG ave. n=	Hildenhof SLG ave.n=	Ida SLG ave. n=	Valencia ave. n=	Rössing ave. n=	Rössing South ave. n=	Skarn Xenolith ave. n=	Skarn ave. n=
%SiO2	68.10	66.06	73.68	71.33	76.57	74.37	78.27	**82.89**	64.90	46.53
%TiO2	0.43	**0.84**	0.08	0.20	0.06	0.10	0.07	0.20	0.11	0.27
%Al2O3	14.52	**14.79**	13.06	13.68	12.43	13.04	10.74	8.12	12.70	11.57
%Fe2O3	3.02	**5.24**	1.18	1.36	0.71	1.28	0.61	1.69	**8.77**	8.24
%MnO	0.04	0.08	0.02	0.02	0.01	0.03	0.01	0.03	**0.08**	**0.29**
%MgO	1.90	**2.56**	1.05	0.77	0.62	1.06	0.12	0.72	0.50	**3.97**
%CaO	**2.63**	2.49	1.34	1.04	1.29	0.85	0.40	0.76	2.94	**19.41**
%Na2O	2.89	2.82	2.18	2.46	**3.30**	2.80	3.27	1.75	2.82	1.88
%K2O	4.85	4.18	6.45	**7.47**	4.33	5.82	4.64	3.28	5.35	0.59
%P2O5	0.10	0.20	0.07	**0.30**	0.07	0.13	0.01	0.03	**1.92**	0.32
%LOI	0.68	0.71	0.64	0.59	0.30	0.56	0.71	**0.94**	0.28	**1.15**
%TOTAL	**99.17**	**99.96**	**99.74**	**99.23**	**99.69**	**100.03**	**98.85**	**100.42**	**100.38**	**94.23**

Trace element averages for the CZ deposits. * indicates single sample analysis, highest values highlighted in pink.

	Grey n=11	Salem n=9	Goanikontes SLG n=40	Hildenhof SLG n=20	Ida SLG n=52	Valencia n=55	Rössing n=14	Husab n=16	Skarn Xenolith n=3	Skarn n=4
Ag	6	9	7	14	**24**	13	0	<4*	14	0
As	10	13	14	13	13	14	<12	**23***	10	25
Ba	614	**701**	267	391	243	234	116	348*	123	21524
Bi	**7**	6	5	**7**	6	6	0	6*	5	6
Cd	11	**12**	10	10	10	10	0	<10*	10	**35**
Ce	78	**127**	60	44	31	39	22	35*	487	**596**
Co	12	**16**	6	7	7	6	6	<10	7	**29**
Cr	14	0	<12	18	16	0	**177**	0	0	38
Cu	21	26	10	15	**249**	13	9	27	6	42
Eu	0	0	<2	<2	0	6	0	<5*	0	16
Ga	17	16	15	15	16	16	15	0	17	**23**
La	41	**66**	33	28	30	20	19	11*	227	**301**
Mo	5	8	16	31	7	39	0	**206***	0	5
Nb	14	22	12	13	8	16	13	**61***	0	18
Ni	14	17	6	6	**19**	4	6	13	11	**30**
Pb	34	29	59	58	46	49	32	**194***	45	**651**
Rb	208	257	291	338	189	268	309	**394***	236	48
Sb	10	10	10	10	10	10	0	<10*	10	10
Sc	0	181	<10	**134**	108	87	<10	35*	108	49
Se	4	3	4	5	4	3	0	0	0	4
Sn	10	10	10	10	10	10	0	0	10	43
Sr	135	**161**	80	94	83	49	102	69*	45	**374**
Ta	23	24	**25**	24	21	23	0	21*	22	**37**
Th	24	42	89	41	58	38	26	**103**	**457**	74
U	14	47	308	**352**	217	183	189	**662**	163	**1431**
V	32	**85**	17	20	26	25	50	0	14	54
W	10	10	10	10	10	10	0	16	10	13
Y	20	23	**89**	29	30	29	13	42*	**175**	170
Yb	0	0	21	<8	9	13	0	0	0	96
Zn	31	63	11	17	10	16	27	44	84	**97**
Zr	163	**247**	126	75	91	113	116	131	**273**	77

Appendix E11 Handheld XRF Data

Abridged Raw Data from the Innovex Delta Hand Held XRF survey of RDD373 mineralised intervals. The digital appendices contain the full output from the device.

Mode	Hole	Metre	U	U +/-	Nb	Nb +/-	Th	Th +/-	P	P +/-	S	S +/-	Cl	Cl +/-	Ti	Ti +/-
Soil 3 Beam	RDD373	54	33	3	5	1	26	3	6362	1209	10960	521	0		1007	22
Soil 3 Beam	RDD373	54.1	45	5	19	1	12	3	0		0		1337	185	6824	90
Soil 3 Beam	RDD373	54.2	25	6	24	1	44	3	0		0		783	157	4106	57
Soil 3 Beam	RDD373	54.3	15	5	3	1	75	3	0		0		455	131	1450	27
Soil 3 Beam	RDD373	54.4	29	3	0		23	2	3445	813	0		288	65	104	7
Soil 3 Beam	RDD373	54.5	6	2	0		7	2	0		815	181	513	69	132	7
Soil 3 Beam	RDD373	54.6	23	3	0		0		3276	981	4825	356	1029	99	238	12
Soil 3 Beam	RDD373	54.7	169	7	48	1	206	6	0		10818	669	906	166	7103	90
Soil 3 Beam	RDD373	54.8	43	4	5	1	25	3	4043	1234	5328	422	555	106	954	23
Soil 3 Beam	RDD373	54.9	10	3	4	1	25	2	0		1724	242	249	72	547	15
Soil 3 Beam	RDD373	55	13	3	0		0		0		0		1132	115	1094	22
Soil 3 Beam	RDD373	55.1	0		0		14	2	0		0		559	112	1024	24
Soil 3 Beam	RDD373	55.2	15	5	14	1	45	3	0		0		0		5500	70
Soil 3 Beam	RDD373	55.3	0		0		13	2	0		0		401	102	1315	26
Soil 3 Beam	RDD373	55.4	0		4	1	15	3	0		0		0		1099	33
Soil 3 Beam	RDD373	55.5	0		22	1	46	4	0		0		0		5636	74
Soil 3 Beam	RDD373	55.6	18	4	13	1	27	3	0		0		460	119	3345	46
Soil 3 Beam	RDD373	55.7	21	5	15	1	30	3	0		0		770	145	3223	47
Soil 3 Beam	RDD373	55.8	59	6	45	1	52	4	0		0		0		8571	105
Soil 3 Beam	RDD373	55.9	35	4	6	1	0		0		3152	873	861	255	2558	64
Soil 3 Beam	RDD373	56	17	4	0		15	2	0		0		0		359	15
Soil 3 Beam	RDD373	56.1	91	5	18	1	45	3	0		0		0		4767	66
Soil 3 Beam	RDD373	56.2	57	4	9	1	10	2	5867	1116	0		0		1209	23
Soil 3 Beam	RDD373	56.3	32	5	5	1	0		0		0		0		840	21
Soil 3 Beam	RDD373	56.4	29	4	4	1	16	2	0		1939	383	0		501	19
Soil 3 Beam	RDD373	56.5	0		0		12	2	0		0		0		766	19
Soil 3 Beam	RDD373	56.6	38	5	9	1	8	3	0		1199	363	418	126	1195	24
Soil 3 Beam	RDD373	56.7	366	10	39	1	51	5	0		0		0		12370	154
Soil 3 Beam	RDD373	56.8	274	8	38	1	43	4	0		0		0		12202	156
Soil 3 Beam	RDD373	56.9	1644	20	32	1	56	6	0		0		0		6548	86
Soil 3 Beam	RDD373	57	348	8	5	1	325	6	4998	1017	907	251	0		2084	31
Soil 3 Beam	RDD373	57.1	88	5	0		34	3	3657	1085	0		0		540	14
Soil 3 Beam	RDD373	57.2	76	4	17	1	83	4	0		3810	432	402	128	4796	63
Soil 3 Beam	RDD373	57.3	134	7	34	1	46	4	0		4379	624	909	204	10914	138
Soil 3 Beam	RDD373	57.4	112	5	3	1	354	6	5884	1065	3213	327	1109	108	1844	30
Soil 3 Beam	RDD373	57.5	0		0		10	2	3956	1044	1083	250	439	85	830	18
Soil 3 Beam	RDD373	57.6	0		4	1	12	2	3888	1142	1442	289	559	97	684	18
Soil 3 Beam	RDD373	57.7	0		0		19	2	0		2276	286	533	90	871	19
Soil 3 Beam	RDD373	57.8	18	3	0		25	2	0		964	229	644	85	299	11
Soil 3 Beam	RDD373	57.9	11	3	5	1	8	2	0		1443	288	414	95	1229	24
Soil 3 Beam	RDD373	58	0		0		14	2	0		828	254	314	85	266	11
Soil 3 Beam	RDD373	58.1	0		3	1	0		0		2035	296	476	90	579	16
Soil 3 Beam	RDD373	58.2	0		7	1	0		4768	1131	987	275	426	94	625	18
Soil 3 Beam	RDD373	58.3	0		0		10	2	0		2295	311	623	96	517	16
Soil 3 Beam	RDD373	58.4	0		3	1	0		0		879	278	358	94	540	16
Soil 3 Beam	RDD373	58.5	0		10	1	9	2	0		3328	338	517	94	945	21
Soil 3 Beam	RDD373	58.6	14	3	6	1	10	2	4183	1032	2776	309	793	98	907	20
Soil 3 Beam	RDD373	58.7	0		7	1	0		4450	1184	4018	374	1176	117	1103	22
Soil 3 Beam	RDD373	58.8	11	3	9	1	23	2	5036	1245	2741	349	580	105	1402	26
Soil 3 Beam	RDD373	58.9	0		6	1	6	2	3052	942	2994	295	901	92	449	13
Soil 3 Beam	RDD373	59	16	3	0		74	3	3887	993	0		442	78	262	10
Soil 3 Beam	RDD373	59.1	0		5	1	0		3288	927	819	220	427	81	575	15
Soil 3 Beam	RDD373	59.2	0		0		68	3	0		1041	308	844	116	958	21
Soil 3 Beam	RDD373	59.3	0		8	1	13	2	0		0		0		1224	23
Soil 3 Beam	RDD373	59.4	0		5	1	21	2	0		1838	330	484	109	1530	29
Soil 3 Beam	RDD373	59.5	0		0		0		3657	1143	0		329	99	711	17
Soil 3 Beam	RDD373	59.6	0		8	1	15	2	0		0		431	94	1179	23
Soil 3 Beam	RDD373	59.7	244	36	0		71	19							3230	631
Soil 3 Beam	RDD373	59.8	289	9	10	1	47	4							2593	134
Soil 3 Beam	RDD373	59.9	288	7	7	1	48	4	0		1994	372	417	123	2929	42
Soil 3 Beam	RDD373	60	1987	20	0		179	6	4328	979	4059	330	342	82	827	19
Soil 3 Beam	RDD373	60.1	649	13	27	1	55	5	0		2964	587	1494	211	6678	91
Soil 3 Beam	RDD373	60.2	79	8	48	1	63	5	0		4720	596	1379	197	6826	89
Soil 3 Beam	RDD373	60.3	96	7	66	1	65	5	0		7284	614	824	178	6377	80
Soil 3 Beam	RDD373	60.4	88	8	57	1	91	5	0		6630	571	637	161	4897	65
Soil 3 Beam	RDD373	60.5	348	10	66	2	39	5	0		6617	867	1535	277	10359	158
Soil 3 Beam	RDD373	60.6	86	6	0		11	3	0		0		0		755	18

Mode	Hole	Metre	U	U +/-	Nb	Nb +/-	Th	Th +/-	P	P +/-	S	S +/-	Cl	Cl +/-	Ti	Ti +/-
Soil 3 Beam	RDD373	60.7	85	5	5	1	68	3	0		1049	266	424	94	1407	26
Soil 3 Beam	RDD373	60.8	440	9	5	1	105	4	0		2428	345	656	111	1467	27
Soil 3 Beam	RDD373	60.9	432	9	6	1	71	4	0		1813	392	0		1228	24
Soil 3 Beam	RDD373	61	215	8	77	2	23	5	0		2150	560	1000	207	11019	133
Soil 3 Beam	RDD373	61.1	153	7	53	1	18	4	6749	1935	0		914	203	8280	108
Soil 3 Beam	RDD373	61.2	193	8	59	1	18	4	0		0		781	197	8558	108
Soil 3 Beam	RDD373	61.3	338	9	49	1	16	4	5693	1546	3797	484	732	157	5546	70
Soil 3 Beam	RDD373	61.4	160	6	32	1	20	3	0		3286	430	0		668	20
Soil 3 Beam	RDD373	61.5	76	6	0		9	2	0		5411	510	0		613	17
Soil 3 Beam	RDD373	61.6	44	5	0		29	3	0		5185	490	0		495	15
Soil 3 Beam	RDD373	61.7	97	6	0		116	4	0		3101	441	435	136	523	15
Soil 3 Beam	RDD373	61.8	233	8	15	1	68	4	0		0		0		2863	46
Soil 3 Beam	RDD373	61.9	2413	26	15	1	354	8	0		3378	429	727	140	3819	48
Soil 3 Beam	RDD373	62	1143	17	57	2	262	8	0		1764	508	0		8960	111
Soil 3 Beam	RDD373	62.1	496	10	0		71	4	0		1423	389	0		736	19
Soil 3 Beam	RDD373	62.2	764	12	13	1	49	4	0		3095	448	0		2642	41
Soil 3 Beam	RDD373	62.3	155	7	11	1	206	5	0		3414	496	770	160	2411	39
Soil 3 Beam	RDD373	62.4	373	10	93	2	0		0		6954	740	1170	237	13905	171
Soil 3 Beam	RDD373	62.5	276	9	37	1	0		0		9507	1143	0		4918	88
Soil 3 Beam	RDD373	62.6	103	7	26	1	21	4	0		100937	2283	1044	269	4193	75
Soil 3 Beam	RDD373	62.7	199	8	17	1	0		0		127545	3038	1436	365	2336	67
Soil 3 Beam	RDD373	62.8	54	5	73	1	29	4	6844	1658	12455	688	579	164	7775	93
Soil 3 Beam	RDD373	62.9	22	5	53	1	34	4	0		10221	637	669	165	7571	89
Soil 3 Beam	RDD373	63	368	9	47	1	19	4	5764	1777	21176	857	515	169	7872	95
Soil 3 Beam	RDD373	63.1	107	6	51	1	32	4	0		2811	427	509	134	5534	69
Soil 3 Beam	RDD373	63.2	28	4	89	2	40	4	0		22309	880	620	172	8730	104
Soil 3 Beam	RDD373	63.3	600	14	67	2	21	6	0		5572	934	1218	297	8626	152
Soil 3 Beam	RDD373	63.4	88	7	53	2	221	7	0		16368	956	2115	263	15376	191
Soil 3 Beam	RDD373	63.5	101	6	72	2	17	4	0		15263	959	880	235	9820	138
Soil 3 Beam	RDD373	63.6	46	5	71	1	24	4	6006	1581	7096	571	0		6778	84
Soil 3 Beam	RDD373	63.7	89	6	81	2	29	4	0		10716	661	0		7903	95
Soil 3 Beam	RDD373	63.8	25	4	34	1	17	3	5471	1512	5364	513	468	148	4197	57
Soil 3 Beam	RDD373	63.9	96	6	80	1	30	4	0		1583	415	907	157	6839	84
Soil 3 Beam	RDD373	64	59	5	62	1	30	4	0		8710	656	1184	188	8106	101
Soil 3 Beam	RDD373	64.1	29	4	69	1	30	4	0		9832	613	671	156	6279	77
Soil 3 Beam	RDD373	64.2	21	4	55	1	25	4	0		21264	807	782	156	4707	62
Soil 3 Beam	RDD373	64.3	44	5	98	2	31	4	0		17647	779	1072	175	7784	92
Soil 3 Beam	RDD373	64.4	41	5	72	2	16	4	0		28419	1043	0		7471	98
Soil 3 Beam	RDD373	64.5	46	5	54	1	13	4	0		19358	891	713	188	6567	89
Soil 3 Beam	RDD373	64.6	42	5	74	1	33	4	0		10957	655	0		7024	84
Soil 3 Beam	RDD373	64.7	39	5	66	1	20	4	0		25392	945	826	180	6885	88
Soil 3 Beam	RDD373	64.8	37	5	81	2	27	4	0		27497	977	1049	188	8160	99
Soil 3 Beam	RDD373	64.9	564	13	70	2	0		0		13060	1159	0		7564	136
Soil 3 Beam	RDD373	65	444	10	32	1	0		0		76109	1806	0		5470	81
Soil 3 Beam	RDD373	65.1	1047	17	0		0		0		31657	1904	0		291	32
Soil 3 Beam	RDD373	65.2	482	11	4	1	0		0		11520	1802	0		163	33
Soil 3 Beam	RDD373	65.3	20	5	57	1	25	4	0		27361	921	526	158	5204	68
Soil 3 Beam	RDD373	65.4	174	7	91	2	25	5	5813	1842	22439	917	0		7561	95
Soil 3 Beam	RDD373	65.5	46	4	0		0		0		1911	314	580	104	288	13
Soil 3 Beam	RDD373	65.6	135	7	156	2	115	6	6881	2083	48155	1371	875	215	9969	126
Soil 3 Beam	RDD373	65.7	22	4	53	1	26	4	7452	1996	56476	1487	1161	205	5831	84
Soil 3 Beam	RDD373	65.8	215	8	67	1	28	4	0		31160	1042	1002	190	6697	86
Soil 3 Beam	RDD373	65.9	74	6	57	1	24	4	0		30938	1019	1086	184	6241	80
Soil 3 Beam	RDD373	66	78	5	34	1	23	3	6679	1406	12604	612	754	131	3820	52
Soil 3 Beam	RDD373	66.1	37	5	53	1	28	4	0		23647	851	564	154	5161	66
Soil 3 Beam	RDD373	66.2	318	8	234	2	0		0		0		0		17962	187
Soil 3 Beam	RDD373	66.3	120	6	0		42	3	0		0		0		375	14
Soil 3 Beam	RDD373	66.4	46	4	0		36	3	0		0		0		234	10
Soil 3 Beam	RDD373	66.5	10	3	9	1	0		0		0		352	111	665	20
Soil 3 Beam	RDD373	66.6	22	3	5	1	11	2	0		0		0		416	13
Soil 3 Beam	RDD373	66.7	0		0		7	2	0		0		354	81	473	14
Soil 3 Beam	RDD373	66.8	0		0		0		4255	1207	2235	317	425	93	343	12
Soil 3 Beam	RDD373	66.9	30	4	11	1	32	3	0		0		363	85	588	16
Soil 3 Beam	RDD373	67	39	4	19	1	19	3	0		884	284	778	104	1099	22
Soil 3 Beam	RDD373	67.1	13	3	8	1	13	2	0		0		597	104	1339	25
Soil 3 Beam	RDD373	67.2	15	3	8	1	14	2	0		0		408	104	674	18
Soil 3 Beam	RDD373	67.3	101	5	27	1	18	3	0		0		347	106	2314	36
Soil 3 Beam	RDD373	67.4	18	4	40	1	65	4	0		1408	353	1235	138	5040	61
Soil 3 Beam	RDD373	67.5	48	5	37	1	46	4	0		0		1302	201	10117	125
Soil 3 Beam	RDD373	67.6	836	13	3	1	18	4	0		7479	554	638	147	621	17
Soil 3 Beam	RDD373	67.7	63	6	42	1	216	5	0		5644	573	792	172	4914	65
Soil 3 Beam	RDD373	67.8	891	18	26	2	85	7	32030	5371	412895	8087	0		4083	107
Soil 3 Beam	RDD373	67.9	770	12	9	1	0		0		4235	469	0		1173	25
Soil 3 Beam	RDD373	68	57	6	206	3	65	9	0		13202	1162	0		24809	377

Mode	Hole	Metre	U	U +/-	Nb	Nb +/-	Th	Th +/-	P	P +/-	S	S +/-	Cl	Cl +/-	Ti	Ti +/-
Soil 3 Beam	RDD373	68.1	158	6	4	1	25	3	0		7303	453	346	96	257	13
Soil 3 Beam	RDD373	68.2	1496	20	10	1	42	5	7887	2106	57907	1498	0		5728	84
Soil 3 Beam	RDD373	68.3	54	5	0		43	3	0		3902	464	440	138	567	17
Soil 3 Beam	RDD373	68.4	20	5	0		49	3	0		3533	436	0		486	15
Soil 3 Beam	RDD373	68.5	22	4	9	1	34	3	0		3234	430	695	135	1213	25
Soil 3 Beam	RDD373	68.6	31	4	22	1	29	3	0		17957	770	613	152	4302	60
Soil 3 Beam	RDD373	68.7	64	5	18	1	18	3	0		4299	475	472	140	2333	38
Soil 3 Beam	RDD373	68.8	63	5	4	1	8	2	0		0		821	128	706	18
Soil 3 Beam	RDD373	68.9	36	4	12	1	51	3	0		3874	432	708	132	2220	37
Soil 3 Beam	RDD373	69	15	4	20	1	31	3	0		5217	483	866	144	3303	47
Soil 3 Beam	RDD373	69.1	588	11	6	1	59	4	0		2485	425	538	139	2662	41
Soil 3 Beam	RDD373	69.2	0		7	1	53	3	0		0		946	126	1061	22
Soil 3 Beam	RDD373	69.3	59	5	8	1	48	3	0		3616	464	446	141	2145	36
Soil 3 Beam	RDD373	69.4	0		11	1	33	3	0		11273	596	931	140	1608	30
Soil 3 Beam	RDD373	69.5	0		5	1	0		0		13242	583	519	111	942	22
Soil 3 Beam	RDD373	69.6	0		12	1	14	3	0		30622	1718	2141	363	3398	105
Soil 3 Beam	RDD373	69.7	0		0		33	3	0		0		0		1077	23
Soil 3 Beam	RDD373	69.8	0		0		19	2	0		2941	448	587	136	281	11
Soil 3 Beam	RDD373	69.9	96	4	0		36	3	0		0		325	94	141	8
Soil 3 Beam	RDD373	70	1824	20	16	1	82	6	0		3085	435	0		1968	33
Soil 3 Beam	RDD373	70.1	1221	16	9	1	169	6	0		0		0		1125	25
Soil 3 Beam	RDD373	70.2	40	5	13	1	33	3	0		2376	315	0		592	17
Soil 3 Beam	RDD373	70.3	205	7	6	1	227	5	0		919	280	314	93	1155	22
Soil 3 Beam	RDD373	70.4	211	5	3	1	27	3	3265	885	822	206	427	74	275	10
Soil 3 Beam	RDD373	70.5	189	6	6	1	63	3	0		2648	348	341	101	821	19
Soil 3 Beam	RDD373	70.6	586	10	4	1	71	4	0		1502	320	526	108	686	18
Soil 3 Beam	RDD373	70.7	319	8	0		0		0		31611	909	433	141	311	12
Soil 3 Beam	RDD373	70.8	492	9	0		12	3	0		0		0		309	11
Soil 3 Beam	RDD373	70.9	47	4	0		32	2	0		0		604	96	391	12
Soil 3 Beam	RDD373	71	57	3	0		0		0		0		449	69	113	6
Soil 3 Beam	RDD373	71.1	74	3	0		0		2497	771	0		434	67	102	6
Soil 3 Beam	RDD373	71.2	1635	17	14	1	98	5	0		2444	293	492	89	1213	24
Soil 3 Beam	RDD373	71.3	1063	14	0		362	7	0		998	237	536	85	282	12
Soil 3 Beam	RDD373	71.4	0		0		0		0		1203	344	2839	156	256	11
Soil 3 Beam	RDD373	71.5	0		0		17	2	0		0		440	115	393	13
Soil 3 Beam	RDD373	71.6	224	7	63	1	337	7	0		2867	536	767	182	9032	113
Soil 3 Beam	RDD373	71.7	19	5	0		0		0		0		377	109	287	11
Soil 3 Beam	RDD373	71.8	141	6	4	1	309	6	0		0		409	112	2258	34
Soil 3 Beam	RDD373	71.9	10	3	0		0		3522	1091	1226	288	423	99	303	11
Soil 3 Beam	RDD373	72	78	5	27	1	265	5	0		0		0		6585	78
Soil 3 Beam	RDD373	72.1	82	6	7	1	289	6	0		0		699	144	1110	24
Soil 3 Beam	RDD373	72.2	27	4	0		32	3	0		0		527	125	513	15
Soil 3 Beam	RDD373	72.3	21	5	0		61	3	0		1479	399	412	130	381	13
Soil 3 Beam	RDD373	72.4	158	7	129	2	81	5	0		0		0		13386	186
Soil 3 Beam	RDD373	72.5	304	8	86	2	269	6	0		1665	474	0		12331	139
Soil 3 Beam	RDD373	72.6	26	4	0		35	3	0		165826	2933	1375	327	504	26
Soil 3 Beam	RDD373	72.7	30	4	0		7	2	0		1990	401	509	131	431	14
Soil 3 Beam	RDD373	72.8	92	5	11	1	138	4	0		1223	288	458	101	1478	27
Soil 3 Beam	RDD373	72.9	25	5	0		26	2	0		3211	413	454	123	297	11
Soil 3 Beam	RDD373	73	0		0		18	2	0		0		576	134	356	13
Soil 3 Beam	RDD373	73.1	24	5	0		20	2	0		0		0		247	10
Soil 3 Beam	RDD373	73.2	19	4	0		24	2	0		0		0		290	12
Soil 3 Beam	RDD373	73.3	385	9	7	1	61	4	0		1318	427	0		1814	32
Soil 3 Beam	RDD373	73.4	61	4	0		7	2	0		5695	422	625	109	391	14
Soil 3 Beam	RDD373	73.5	112	6	16	1	22	3	0		0		758	123	1095	23
Soil 3 Beam	RDD373	73.6	25	5	0		64	3	0		4354	454	642	134	430	14
Soil 3 Beam	RDD373	73.7	48	5	0		158	4	0		4368	437	0		393	13
Soil 3 Beam	RDD373	73.8	12	3	0		0		3762	1080	5737	385	332	86	136	8
Soil 3 Beam	RDD373	73.9	42	5	0		18	3	0		2776	442	535	141	957	22
Soil 3 Beam	RDD373	74	21	4	0		0		0		5029	416	378	109	251	10
Soil 3 Beam	RDD373	74.1	18	5	0		51	3	0		5579	458	0		292	11
Soil 3 Beam	RDD373	74.2	49	5	0		42	3	0		1148	367	576	129	340	12
Soil 3 Beam	RDD373	74.3	51	5	0		13	2	0		2870	433	0		545	16
Soil 3 Beam	RDD373	74.4	42	3	0		9	2	0		4849	365	425	91	208	9
Soil 3 Beam	RDD373	74.5	449	8	9	1	24	3	0		1196	250	0		1173	22
Soil 3 Beam	RDD373	74.6	25	3	0		47	2	3288	1069	4000	341	0		485	15
Soil 3 Beam	RDD373	74.7	43	3	0		7	2	0		1185	256	355	83	102	7
Soil 3 Beam	RDD373	74.8	267	6	0		54	3	0		0		0		71	6
Soil 3 Beam	RDD373	74.9	220	33	0		53	16							0	
Soil 3 Beam	RDD373	75	444	9	16	1	110	5	0		3413	453	0		4465	58
Soil 3 Beam	RDD373	75.1	14	5	0		0		0		4361	483	1259	154	452	14
Soil 3 Beam	RDD373	75.2	1322	16	45	1	256	6	0		0		728	163	7336	90
Soil 3 Beam	RDD373	75.3	140	5	0		8	2	0		892	270	362	90	887	19
Soil 3 Beam	RDD373	75.4	1242	15	48	1	62	5	0		0		573	128	3829	52

Mode	Hole	Metre	U	U +/-	Nb	Nb +/-	Th	Th +/-	P	P +/-	S	S +/-	Cl	Cl +/-	Ti	Ti +/-
Soil 3 Beam	RDD373	75.5	351	8	0		31	3	0		0		597	132	1136	23
Soil 3 Beam	RDD373	75.6	0		0		11	2	0		0		369	83	176	9
Soil 3 Beam	RDD373	75.7	406	9	60	1	333	7	0		2493	429	1057	150	4543	59
Soil 3 Beam	RDD373	75.8	41	5	0		17	2	0		0		506	128	413	13
Soil 3 Beam	RDD373	75.9	0		0		0		0		2704	416	873	138	544	15
Soil 3 Beam	RDD373	76	9	3	2	1	10	2	0		2195	303	545	95	270	10
Soil 3 Beam	RDD373	76.1	955	13	29	1	280	6	0		3304	364	745	110	1768	30
Soil 3 Beam	RDD373	76.2	198	6	9	1	46	3	0		0		460	116	1963	32
Soil 3 Beam	RDD373	76.3	87	5	0		71	3	0		9215	506	610	117	379	12
Soil 3 Beam	RDD373	76.4	15	4	0		10	2	0		3734	403	1000	126	307	11
Soil 3 Beam	RDD373	76.5	450	11	333	3	0		0		4142	711	0		27847	332
Soil 3 Beam	RDD373	76.6	0		0		0		3577	870	1534	227	678	80	186	8
Soil 3 Beam	RDD373	76.7	8	3	0		0		0		1117	275	424	90	328	11
Soil 3 Beam	RDD373	76.8	0		0		0		0		2713	549	915	173	448	17
Soil 3 Beam	RDD373	76.9	32	5	0		0		0		1460	410	761	142	535	16
Soil 3 Beam	RDD373	77	179	6	67	1	0		0		3872	456	1355	158	8825	97
Soil 3 Beam	RDD373	77.1	193	8	121	2	73	5	0		2201	589	930	201	9325	107
Soil 3 Beam	RDD373	77.2	154	7	260	3	0		0		18802	992	908	238	16346	180
Soil 3 Beam	RDD373	77.3	39	7	0		0		0		37672	989	0		315	14
Soil 3 Beam	RDD373	77.4	69	6	4	1	0		0		7592	526	0		571	16
Soil 3 Beam	RDD373	77.5	132	5	0		63	3	0		4804	388	409	100	345	12
Soil 3 Beam	RDD373	77.6	0		0		0		0		2941	313	266	85	201	9
Soil 3 Beam	RDD373	77.7	0		0		0		0		3684	462	0		469	14
Soil 3 Beam	RDD373	77.8	196	8	111	2	886	13	0		0		555	178	5813	76
Soil 3 Beam	RDD373	77.9	46	6	18	1	42	3	0		0		0		1890	35
Soil 3 Beam	RDD373	78	180	8	183	2	0		0		4628	624	0		10836	129
Soil 3 Beam	RDD373	78.1	187	5	6	1	101	3	4283	931	2659	277	543	82	528	15
Soil 3 Beam	RDD373	78.2	0		0		0		0		22770	699	763	103	135	8
Soil 3 Beam	RDD373	78.3	218	8	11	1	1698	19	9696	1550	0		554	127	1177	23
Soil 3 Beam	RDD373	78.4	20	5	0		0		0		0		733	145	415	14
Soil 3 Beam	RDD373	78.5	817	14	96	2	1563	18	13143	2003	6816	609	1217	182	7535	90
Soil 3 Beam	RDD373	78.6	74	5	0		227	5	0		858	260	613	92	363	13
Soil 3 Beam	RDD373	78.7	1567	21	96	2	756	12	0		6194	840	2738	307	20932	282
Soil 3 Beam	RDD373	78.8	981	13	55	1	150	5	0		1930	412	788	142	4973	65
Soil 3 Beam	RDD373	78.9	973	16	55	2	1257	16	7512	2054	12376	783	2161	221	11009	135
Soil 3 Beam	RDD373	79	0		28	2	76	5	0		7435	769	1034	217	5544	99
Soil 3 Beam	RDD373	79.1	0		33	2	59	5	0		14476	1083	1774	269	4010	87
Soil 3 Beam	RDD373	79.2	61	7	40	2	16	4	0		0		822	166	834	28
Soil 3 Beam	RDD373	79.3	63	7	156	3	99	7	0		7256	696	1180	192	4923	85
Soil 3 Beam	RDD373	79.4	41	9	14	2	28	5	0		67773	2577	0		1782	69
Soil 3 Beam	RDD373	79.5	0		21	2	0		0		5870	1205	1286	338	2470	80
Soil 3 Beam	RDD373	79.6	41	9	26	2	41	5	0		6706	913	931	249	1689	49
Soil 3 Beam	RDD373	79.7	123	7	32	2	17	5	0		6519	648	459	149	594	28
Soil 3 Beam	RDD373	79.8	0		124	3	0		0		20101	1305	934	259	4478	102
Soil 3 Beam	RDD373	79.9	0		0		19	4	0		0		0		2864	67
Soil 3 Beam	RDD373	80	79	8	0		16	5	0		0		0		5317	105
Soil 3 Beam	RDD373	80.1	0		38	2	24	6	0		0		0		18829	508
Soil 3 Beam	RDD373	80.2	67	8	18	2	43	5	0		0		1129	355	6638	168
Soil 3 Beam	RDD373	80.3	0		106	2	21	6	0		16588	965	0		2417	53
Soil 3 Beam	RDD373	80.4	107	6	0		0		4219	1397	4627	492	0		195	15
Soil 3 Beam	RDD373	80.5	147	7	0		14	4	0		8416	682	0		241	21
Soil 3 Beam	RDD373	80.6	487	17	118	3	44	10	0		72347	2703	0		8534	182
Soil 3 Beam	RDD373	80.7	0		50	2	84	6	0		88154	2855	0		3826	99
Soil 3 Beam	RDD373	80.8	0		21	1	31	4	0		3925	526	0		1091	35
Soil 3 Beam	RDD373	80.9	546	13	0		139	6	0		8775	624	0		314	18
Soil 3 Beam	RDD373	81	38	5	114	2	242	8	0		39087	1578	869	234	6133	114
Soil 3 Beam	RDD373	81.1	33	5	5	1	0		0		0		774	134	205	17
Soil 3 Beam	RDD373	81.2	0		4	1	0		0		0		427	81	154	9
Soil 3 Beam	RDD373	81.3	69	5	20	1	34	4	0		37450	1047	1090	149	242	18
Soil 3 Beam	RDD373	81.4	0		104	2	17	5	0		52539	1384	1298	197	2802	51
Soil 3 Beam	RDD373	81.5	115	5	5	1	0		6669	1408	34044	916	2151	146	297	15
Soil 3 Beam	RDD373	81.6	0		0		0		0		1837	349	552	116	409	14
Soil 3 Beam	RDD373	81.7	32	3	0		14	2	0		1795	308	3364	151	217	12
Soil 3 Beam	RDD373	81.8	22	4	56	1	74	4	9139	2561	144720	2825	0		5234	89
Soil 3 Beam	RDD373	81.9	1565	31	61	3	169	10	0		72903	2743	0		4115	111
Soil 3 Beam	RDD373	82	0		32	2	37	5	0		11302	1023	0		3956	86
Soil 3 Beam	RDD373	82.1	157	10	22	2	35	5	0		31606	1544	0		4357	93
Soil 3 Beam	RDD373	82.2	22	4	0		0		0		2454	425	0		923	29
Soil 3 Beam	RDD373	82.3	0		10	1	0		0		0		0		450	21
Soil 3 Beam	RDD373	82.4	155	10	47	2	27	6	0		22204	1526	0		7301	160
Soil 3 Beam	RDD373	82.5	0		9	1	25	5	0		88322	2649	0		2128	66
Soil 3 Beam	RDD373	82.6	0		7	1	0		0		10171	863	0		4055	84
Soil 3 Beam	RDD373	82.7	0		21	2	19	5	11853	3864	95865	3178	0		6121	142
Soil 3 Beam	RDD373	82.8	0		30	2	21	5	0		34780	1678	815	271	6299	131

Mode	Hole	Metre	U	U +/-	Nb	Nb +/-	Th	Th +/-	P	P +/-	S	S +/-	Cl	Cl +/-	Ti	Ti +/-
Soil 3 Beam	RDD373	82.9	0		48	2	20	5	0		31902	1575	0		8807	163
Soil 3 Beam	RDD373	83	634	22	182	4	548	19	0		66458	3530	0		42895	1061
Soil 3 Beam	RDD373	83.1	0		18	2	83	6	0		10205	989	0		6186	117
Soil 3 Beam	RDD373	83.2	0		21	2	36	5	0		9115	907	0		4550	93
Soil 3 Beam	RDD373	83.3	0		10	1	8	2	0		6061	448	0		2701	41
Soil 3 Beam	RDD373	83.4	45	6	53	1	40	4	0		36342	1234	0		6633	94
Soil 3 Beam	RDD373	83.5	0		74	2	30	5	11901	3214	155041	3424	0		10898	180
Soil 3 Beam	RDD373	83.6	0		69	2	0		0		30821	1240	0		15714	210
Soil 3 Beam	RDD373	83.7	300	9	150	2	159	7	0		36981	1529	0		25766	370
Soil 3 Beam	RDD373	83.8	0		20	1	87	4	0		7597	660	0		6435	87
Soil 3 Beam	RDD373	83.9	0		64	1	180	6	0		2113	557	600	196	9182	120
Soil 3 Beam	RDD373	84	0		0		47	6							0	
Soil 3 Beam	RDD373	84.1	1088	27	122	3	0		0		77752	3227	0		20580	436
Soil 3 Beam	RDD373	84.2	56	4	0		0		0		3165	499	0		688	24
Soil 3 Beam	RDD373	84.3	81	7	9	1	13	4	0		3309	517	0		1054	32
Soil 3 Beam	RDD373	84.4	0		0		10	3	0		1717	368	458	119	299	15
Soil 3 Beam	RDD373	84.5	53	7	95	2	0		0		0		1407	283	12934	218
Soil 3 Beam	RDD373	84.6	0		0		14	4	0		0		0		1381	37
Soil 3 Beam	RDD373	84.7	0		31	2	129	7	0		0		0		8453	146
Soil 3 Beam	RDD373	84.8	0		0		0		0		3572	1006	1359	300	1617	60
Soil 3 Beam	RDD373	84.9	1776	35	106	3	89	10	0		0		3267	492	25906	519
Soil 3 Beam	RDD373	85	1751	26	0		77	7	0		0		427	131	656	23
Soil 3 Beam	RDD373	85.1	1566	24	0		81	7	0		0		749	179	653	24
Soil 3 Beam	RDD373	85.2	964	19	8	1	24	6	0		0		1169	190	1905	44
Soil 3 Beam	RDD373	85.3	2850	38	10	2	202	9	0		0		1082	207	2259	49
Soil 3 Beam	RDD373	85.4	0		50	2	169	8	0		0		1189	269	9079	156
Soil 3 Beam	RDD373	85.5	0		21	2	38	5	0		3649	734	822	240	6130	115
Soil 3 Beam	RDD373	85.6	0		16	2	62	6	0		0		1766	311	9506	172
Soil 3 Beam	RDD373	85.7	0		77	2	36	6	0		0		1539	319	11840	205
Soil 3 Beam	RDD373	85.8	69	6	0		0		0		0		871	174	1052	33
Soil 3 Beam	RDD373	85.9	0		0		0		37712	8612	769310	19827	0		341	89
Soil 3 Beam	RDD373	86	47	8	24	2	53	5	0		2610	771	950	250	3064	66
Soil 3 Beam	RDD373	86.1	37	8	34	2	47	6	0		45220	2026	1124	330	7716	158
Soil 3 Beam	RDD373	86.2	0		0		0		5750	1416	0		979	135	256	14
Soil 3 Beam	RDD373	86.3	0		0		18	4	0		2443	687	683	222	1260	37
Soil 3 Beam	RDD373	86.4	147	12	0		1740	31	9384	2841	2416	784	0		3276	81
Soil 3 Beam	RDD373	86.5	0		0		0		0		0		0		430	19
Soil 3 Beam	RDD373	86.6	40	6	0		34	4	0		0		855	168	376	18
Soil 3 Beam	RDD373	86.7	0		0		0		0		0		717	182	382	18
Soil 3 Beam	RDD373	86.8	0		0		0		0		0		0		491	20
Soil 3 Beam	RDD373	86.9	0		0		0		0		0		0		731	26
Soil 3 Beam	RDD373	87	25	4	9	1	0		0		8295	665	5425	261	2240	48
Soil 3 Beam	RDD373	87.1	27	4	10	1	29	4	0		0		0		4170	78
Soil 3 Beam	RDD373	87.2	17	5	6	1	10	3	0		0		911	158	1158	32
Soil 3 Beam	RDD373	87.3	0		0		25	4	0		0		702	176	890	29
Soil 3 Beam	RDD373	87.4	28	5	0		0		0		1664	427	3144	210	1181	32
Soil 3 Beam	RDD373	87.5	0		9	1	0		0		9483	769	1119	192	2338	50
Soil 3 Beam	RDD373	87.6	0		0		18	3	0		0		2109	202	628	23
Soil 3 Beam	RDD373	87.7	34	5	12	1	15	4	0		0		639	160	2524	52
Soil 3 Beam	RDD373	87.8	60	10	47	2	143	8	0		3004	905	984	318	11998	215
Soil 3 Beam	RDD373	87.9	31	7	0		19	4	0		11599	836	552	182	813	28
Soil 3 Beam	RDD373	88	0		50	2	71	6	0		7980	855	964	231	4464	93
Soil 3 Beam	RDD373	88.1	0		21	2	54	5	0		4157	737	0		5604	111
Soil 3 Beam	RDD373	88.2	0		6	1	23	4	0		1783	503	868	180	1743	42
Soil 3 Beam	RDD373	88.3	0		14	2	53	5	0		7909	920	930	259	5604	110
Soil 3 Beam	RDD373	88.4	0		14	2	46	5	0		12543	1068	1534	281	5318	106
Soil 3 Beam	RDD373	88.5	0		26	2	77	5	0		0		961	212	3997	78
Soil 3 Beam	RDD373	88.6	450	15	81	2	131	8	0		9883	1125	4689	404	13707	253
Soil 3 Beam	RDD373	88.7	452	12	9	1	58	5	0		1409	370	1227	151	1174	32
Soil 3 Beam	RDD373	88.8	221	9	5	1	38	4	0		1215	391	1613	169	404	18
Soil 3 Beam	RDD373	88.9	0		44	2	31	5	0		0		1092	183	2832	59
Soil 3 Beam	RDD373	89	0		14	1	0		0		0		799	148	1168	35
Soil 3 Beam	RDD373	89.1	43	9	72	2	57	7	0		3564	922	2289	346	10766	202
Soil 3 Beam	RDD373	89.2	0		12	1	0		0		3725	671	1001	219	3778	75
Soil 3 Beam	RDD373	89.3	0		0		0		0		0		0		594	22
Soil 3 Beam	RDD373	89.4	0		0		0		0		0		0		700	26
Soil 3 Beam	RDD373	89.5	0		0		0		0		3272	604	0		809	28
Soil 3 Beam	RDD373	89.6	0		29	2	23	4	0		0		0		4474	85
Soil 3 Beam	RDD373	89.7	45	9	65	2	90	8	0		14520	1374	1776	393	19587	359
Soil 3 Beam	RDD373	89.8	65	7	208	3	104	8	0		25046	1273	666	221	6593	119
Soil 3 Beam	RDD373	89.9	171	7	45	1	36	5	0		6139	527	411	114	650	23
Soil 3 Beam	RDD373	90	0		129	3	109	8	0		27986	1350	1107	239	6394	115
Soil 3 Beam	RDD373	90.1	0		51	2	46	6	0		8890	837	1273	234	5755	99
Soil 3 Beam	RDD373	90.2	0		26	2	25	5	0		28279	1312	1315	231	2571	61

Mode	Hole	Metre	U	U +/-	Nb	Nb +/-	Th	Th +/-	P	P +/-	S	S +/-	Cl	Cl +/-	Ti	Ti +/-
Soil 3 Beam	RDD373	90.3	0		61	2	39	6	0		9620	805	0		5367	94
Soil 3 Beam	RDD373	90.4	61	7	35	2	29	5	0		2621	483	816	162	2426	50
Soil 3 Beam	RDD373	90.5	133	9	47	2	34	6	0		4985	687	1088	215	5100	94
Soil 3 Beam	RDD373	90.6	0		39	2	36	5	0		4024	526	637	146	1523	39
Soil 3 Beam	RDD373	90.7	78	6	12	1	17	4	0		6497	551	733	131	1225	32
Soil 3 Beam	RDD373	90.8	0		66	2	37	6	0		16913	1110	1182	252	6916	123
Soil 3 Beam	RDD373	90.9	15	5	0		0		0		1534	367	821	133	420	19
Soil 3 Beam	RDD373	91	0		20	1	17	4	0		2347	429	1047	151	1980	43
Soil 3 Beam	RDD373	91.1	0		18	1	12	4	0		4846	548	641	148	1919	43
Soil 3 Beam	RDD373	91.2	0		12	1	13	4	0		6023	638	513	163	1976	48
Soil 3 Beam	RDD373	91.3	0		83	2	39	6	0		17157	1135	1092	258	7619	134
Soil 3 Beam	RDD373	91.4	22	6	37	2	18	5	0		11231	863	1344	217	4494	84
Soil 3 Beam	RDD373	91.5	28	7	50	2	26	6							8083	257
Soil 3 Beam	RDD373	91.6	0		72	2	76	6	0		10193	904	0		5993	106
Soil 3 Beam	RDD373	91.7	0		95	2	0		0		8743	849	0		5560	101
Soil 3 Beam	RDD373	91.8	0		175	3	0		0		17112	1038	0		2850	61
Soil 3 Beam	RDD373	91.9	36	7	220	4	51	9	0		16454	1138	992	259	8608	153
Soil 3 Beam	RDD373	92	0		63	2	19	6	0		10895	958	0		6872	125
Soil 3 Beam	RDD373	92.1	0		7	1	0		0		12920	881	0		2204	51
Soil 3 Beam	RDD373	92.2	382	14	17	2	0		0		33155	2102	1449	404	3294	111
Soil 3 Beam	RDD373	92.3	31	9	51	2	36	6	0		16133	1082	0		6139	112
Soil 3 Beam	RDD373	92.4	97	7	15	1	17	4	0		9621	661	541	129	733	25
Soil 3 Beam	RDD373	92.5	61	7	12	1	20	5	0		4183	620	1714	210	3430	68
Soil 3 Beam	RDD373	92.6	0		17	1	21	4	0		2589	558	1468	201	3867	74
Soil 3 Beam	RDD373	92.7	46	7	15	1	28	5	0		5693	652	1277	192	3822	72
Soil 3 Beam	RDD373	92.8	25	5	0		0		5702	1660	0		0		216	14
Soil 3 Beam	RDD373	92.9	0		37	5	50	13	0		0		4174	739	892	148

Appendix E12 REE Sample Descriptions

a. Ida Dome Deposits								
Sample	**Location**		**∑ (La-Sm)**	**∑ (Gd-Lu)**	**U**	**Th**	**Type**	**Description**
GDD012 13	500931	7483358	16.0	3.3	11.2	3.2	C	Garnet Valley: Pegmatitic sheet, intrudes Khan Fm. banded gneiss below a thick marble hangingwall.
GDD012 37	500931	7483358	41.7	4.8	116.5	18.6	D	Garnet Valley: Low-grade mineralised sheet, intrudes Khan Fm., proximal to the Marble hangingwall.
CZ7-1	501315	7484263	18.3	9.1	54.5	13.7	D	Garnet Valley: Weakly-mineralised leucogranite (alaskite) with typical D type characteristics despite low U content.
IDAG 64	501850	7484922	45.9	36.8	1282.1	132.9	D	Garnet Valley: High-grade leucogranite (alaskite) formt the upper Khan Fm., intruded below the Marble contact.
IDAG 70	502290	7482272	23.4	4.8	11.9	2.1	C	Holland's Dome: Indistinct Pegmatitic sheet, minimal accessories, the lower Khan Fm., well below the Rössing contact.
IDAG 92	501555	7481794	86.7	5.3	4.0	19.9	Grey 3	Holland's Dome: Biotite granite, most evolved grey variety in the Ida Dome area, generation with xenoliths of less evolved diorite
HDD005 321	502266	7482840	53.1	4.7	5.0	12.2	Cm	Ida Central: Magentite-bearing pegmatite, intrudes the Khan Fm banded gneiss.
HDD010 58	503330	7486948	29.6	2.9	20.8	7.5	Grey 3	Ida Central: Biotite granite, most evolved grey variety in the Ida Dome area, generation with xenoliths of less evolved diorite
HDD010 69	503330	7486948	14.4	3.9	7.4	3.6	Cm	Ida Central: Magentite-bearing pegmatite, intrudes the Khan Fm banded gneiss.
HDD010 320	503330	7486948	30.9	18.2	595.3	46.1	D	Ida Central: Mineralised leucogranite (alaskite) with skarn contacts.
HDD025 197	502861	7486303	25.6	6.7	36.2	6.3	E	Ida Central: Weakly-mineralised leucogranite (alaskite) with prominent haematite staining and significant U leaching.
IDAG 1B	0502993	7486813	23.0	3.6	6.5	8.8	C	Ida Central: Indistinct leucogranite sheet, no prominent accesory phases or alteration, intrudes the Khan Fm.
IDAG 09	503114	7487076	28.5	4.2	7.2	6.6	A or C	Ida Central: Indistinct leucogranite sheet, no prominent accesory phases or alteration, intrudes the Khan Fm.

b. Valencia Deposit								
Sample	**Location (WGS84_33S)**		**∑ (La-Sm)**	**∑ (Gd-Lu)**	**U**	**Th**	**Type**	**Description**
VALB 01	523092	7530183	870.0	15.5	31.3	173.2	Salem sheared	Sheared megacrystic quartz diorite granitoid, analogous to the Salem granite. Strong gneissic fabric has developed with partial melt streaks
VALB 03	523092	7530183	297.1	13.6	216.2	19.9	Salem	Megacrystic quartz diorite granitoid, analogous to the Salem granite.
VALG 01	524768	7530557	12.5	3.8	3.9	6.4	Bg	Garnetiferous pegmatite, intrudes the Kuiseb Fm.
VALG 02	524768	7530557	78.6	10.4	11.2	22.0	Ct	Tourmaline pegmatite, intrudes the Kuiseb Fm.
VALG 06	523502	7529135	14.4	2.7	3.6	2.2	Cm	Magnetite-bearing pegmatite sheet, intrudes Khan Fm. Banded gneiss.
VALG 06r	523502	7529135	17.4	2.7	4.5	1.5	Cm	Magnetite-bearing pegmatite sheet, intrudes Khan Fm. Banded gneiss.
VALG 07	523502	7529135	33.1	5.2	1.2	1.4	F	Late pegmatite sheet with charatieristic milky quartz, red orthoclase feldspar and no accessory phases (F type of Nex, 1997)
VALG 11	524002	7528840	90.3	5.9	231.9	47.1	D	Moderately-mineralised sheet (alaskite) intrudes the Rössing Fm.
GRA 74	524260	7528859	585.8	19.0	366.1	200.9	D	Ore-grade sheet (alaskite) intrudes the Rössing Fm.
GRA 83r	524365	7528560	23.7	27.6	4.9	9.4	Bg	Garnetiferous pegmatite, intrudes the Kuiseb Fm.
GRA 83	524365	7528560	19.1	19.0	4.4	8.9	Bg	Garnetiferous pegmatite, intrudes the Kuiseb Fm.
LVA 01	523981	7529088	107.3	8.9	11.1	58.3	Pseudo D	Weakly-mineralised leucogranite (alaskite) with typical D type characteristics despite low U content.
VALG 13	523904	7528727	8.1	1.0	1.4	1.1	Bg	Garnetiferous pegmatite, intrudes the Kuiseb Fm.
VA 26 139_104	524088	7528841	238.8	26.2	1768.7	172.7	D	High-grade leucogranite, intrudes the Rössing Fm.
J04 132.68	523948	7529985	28.2	3.6	36.8		Cm	Jolly Zone: Magnetite-bearing pegmatite sheet, intrudes Khan Fm. Banded gneiss.

c. Etango Deposit								
Sample	**Location**		**∑ (La-Sm)**	**∑ (Gd-Lu)**	**U**	**Th**	**Type**	**Description**
GOADH022 200.42	482068	7488097	137.6	9.4	61.0		D	Weakly-mineralised leucogranite (alaskite) with typical D type characteristics despite low U content.
GOADH034 261.71	482068	7488800	43.6	6.6	15.2		C	Indistinct leucogranite sheet, no prominent accesory phases or alteration, intrudes the Khan Fm.
DH012 127.72	482372	7488695	338.3	98.4	863.2		D	High-grade leucogranite, intrudes the Rössing Fm.
HILG 02	489186	7489596	74.5	11.3	1.7	6.0	Grey 1	Hildenhof: Mafic-rich dioritic granite, primitive relative to other grey type granite in the area, intrudes the Khan Fm.

d. Husab Deposit - Zone 1								
Sample	**Location**		**∑ (La-Sm)**	**∑ (Gd-Lu)**	**U**	**Th**	**Type**	**Description**
RDD008 296	507165	7507204	55.5	26.1	2062.2	271.2	D	High-grade sample from the north end of Husab Zone 1, intrudes the Rossing Formation
RDD008 297	507165	7507204	21.4	10.4	668.9	74.6	Dbr	High-grade sample from the north end of Husab Zone 1, intrudes the Rossing Formation
RDD011 380	506765	7506801	17.1	3.9	4.4	2.3	Cm	Magnetite-bearing pegmatite sheet, intrudes Khan Fm. Banded gneiss.
RDD042 237	506206	7505202	46.5	42.1	1189.4	450.0	Dbr	Ore-grade sheet (alaskite) intrudes the Rössing Fm. Contains significant refractory U deportment.
RDD373 65	506530	7506402	496.6	19.1	464.4	145.2	Dbr	RDD373-65m Ore-grade sheet (alaskite) intrudes metaliferous cordierite gneiss in the Rössing Fm. Contains significant refractory U deportment. (Assay sample RS 54867)
RDD373 125	506530	7506402	1679.3	36.8	430.5	536.1	Dbr	RDD373-125m Ore-grade sheet (alaskite) intrudes metaliferous cordierite gneiss in the Rössing Fm. Contains significant refractory U deportment. (Assay sample RS 54930)
RDD373 160	506530	7506402	132.1	8.0	348.7	53.8	D	RDD373-160 Moderately-mineralised sheet (alaskite) intrudes the Rössing Fm. (Assay sample RS 54966)
RDD373 201	506530	7506402	349.7	6.8	13.9	90.4	Leached D	Weakly-mineralised leucogranite (alaskite) with typical D type characteristics despite low U content. (Assay sample RS 54983)
RDD373 331	506530	7506402	56.4	7.9	11.9	1.4	Cm	Magnetite-bearing pegmatite sheet, intrudes Khan Fm. Banded gneiss.

Appendix E13 ICP-MS Data for REE Samples

Sample	As	Ba	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu
C27-1	0.099	13.171	6.095	1.587	16.053	0.355	4.833	2.988	2.047	0.331
DH012 127.72	1.091	39.665	166.429	2.906	1.935	3.405	25.012	32.764	24.756	1.379
GDD012 13	0.197	48.070	7.423	0.479	1.378	5.489	3.068	0.794	0.673	0.219
GDD012 37	0.566	38.983	21.360	2.471	1.597	3.362	26.677	1.770	1.144	0.147
GOADH022 200.42	0.261	182.745	67.539	1.433	1.602	2.706	5.454	3.806	2.222	0.530
GOADH034 261.71	0.189	366.733	21.818	1.226	2.615	3.869	6.852	2.271	1.552	0.554
GRA 34B (VALG06)	0.296	504.735	8.281	1.029	2.602	9.134	3.098	1.054	0.614	0.552
GRA 71A (VALG 13)	3.790	10.218	3.535	1.043	1.659	3.253	8.957	0.192	0.204	0.016
GRA 74	0.457	35.951	284.809	3.457	9.207	5.304	32.769	10.007	3.789	0.621
GRA 83	0.590	43.629	11.127	0.589	1.067	4.113	2.179	4.477	5.636	0.106
GRA 83 (VALG22)	1.754	39.478	9.373	1.370	2.286	3.411	2.749	3.349	4.096	0.089
HDD 010 69	0.121	215.631	6.762	0.667	1.143	2.471	4.000	1.307	0.872	0.319
HDD005 321	0.490	317.645	24.326	1.647	1.370	7.750	6.389	2.268	1.025	0.393
HDD010 320	0.117	188.195	13.116	1.680	1.270	2.084	6.363	6.369	4.353	0.447
HDD010 58	0.063	220.635	13.531	0.446	1.014	2.239	2.063	1.079	0.648	0.391
HDD025 197	0.107	47.912	10.549	5.146	5.770	0.732	19.153	1.995	1.430	0.265
HILG 02	0.352	217.298	32.763	37.391	142.562	1.193	41.273	4.613	2.603	1.318
IDAG 1B HMS	0.153	56.380	10.972	1.191	1.734	0.904	2.576	1.264	0.766	0.193
IDAG 64	0.617	37.221	20.620	1.511	2.673	0.652	3.853	12.578	8.729	0.374
IDAG 70	0.199	500.068	10.371	1.309	2.206	2.079	3.282	1.831	1.150	0.575
IDAG 9 HMS	0.122	114.581	13.931	1.259	1.804	1.100	4.420	1.410	0.928	0.215
IDAG 92	0.404	563.205	41.728	4.031	5.737	1.148	5.974	2.033	1.246	0.670
J04 132.68	1.627	1061.90	12.010	4.403	4.013	3.041	3.078	1.406	0.841	0.909
LVA 01	0.230	39.678	50.040	1.072	5.631	4.205	4.445	3.797	1.894	0.312
PSL01 (VALG 11)	0.619	55.856	43.908	1.651	1.980	4.367	3.670	2.473	1.341	0.272
RDD008 296	0.260	168.583	22.448	3.457	4.926	11.150	3.918	9.553	6.433	0.820
RDD008 297	0.388	76.089	10.089	2.015	32.953	4.678	6.350	3.731	2.579	0.684
RDD011 380	0.331	218.523	7.735	1.626	4.382	9.946	3.398	1.370	0.935	0.271
RDD042 237	0.500	166.281	17.208	3.464	7.842	3.991	7.459	14.765	9.966	0.983
RDD373 331	0.165	265.409	28.622	2.868	8.267	3.481	4.609	2.929	1.920	0.405
RS 54867	0.410	145.328	270.998	10.241	20.483	9.372	69.197	9.263	4.025	1.036
RS 54930	1.497	128.337	801.072	4.564	11.334	14.158	21.895	18.951	7.606	1.395
RS 54966	0.250	506.033	62.378	13.358	62.393	9.363	23.189	3.150	1.764	1.237
RS 54983	0.372	599.749	163.307	2.525	6.918	3.304	35.408	3.786	1.424	1.228
VA 26 139_104	0.228	179.645	111.373	0.926	2.322	5.126	11.243	10.447	5.518	0.715
VALB 01	0.382	1013.15	415.768	11.827	57.737	8.054	35.482	8.236	3.369	2.912
VALB 03	0.339	352.946	139.573	10.425	23.632	15.096	15.431	6.372	3.044	1.624
VALG 01	0.386	58.591	6.098	1.332	2.021	1.241	3.796	0.859	0.731	0.132
VALG 02	1.015	299.973	38.453	1.399	3.870	10.488	12.350	3.057	2.395	0.514
VALG 06	0.782	465.339	5.925	1.635	2.090	5.833	2.244	1.059	0.639	0.430
VALG 07	0.677	368.004	14.282	1.974	4.854	4.894	1.837	2.009	1.251	0.411
AGV2	1.612	1152.19	68.476	15.529	17.538	1.223	54.127	3.493	1.979	1.697
W2	2.432	168.395	22.831	44.346	89.411	0.932	107.772	3.703	2.270	0.906

Sample	Ga	Gd	Hf	Ho	La	Li	Lu	Nb	Nd	Ni
C27-1	8.358	1.649	6.344	0.649	5.534	5.178	0.405	5.144	4.177	27.501
DH012 127.72	18.893	20.681	0.916	8.414	64.531		3.355	31.312	70.712	6.066
GDD012 13	19.785	0.533	3.712	0.200	5.470	13.166	0.236	12.255	1.914	6.962
GDD012 37	24.679	1.348	0.746	0.381	11.131	16.323	0.158	11.855	5.952	7.135
GOADH022 200.42	12.470	4.770	1.023	0.808	33.423		0.272	6.032	24.920	3.766
GOADH034 261.71	15.697	1.897	3.375	0.524	9.945		0.254	6.927	7.729	4.657
GRA 34B (VALG06)	18.037	1.017	0.323	0.213	3.440	18.613	0.085	2.979	3.524	8.382
GRA 71A (VALG 13)	23.143	0.199	0.356	0.053	0.717		0.058	59.930	3.125	3.622
GRA 74	8.805	17.336	5.385	1.523	146.026	33.665	0.388	14.477	104.906	41.936
GRA 83	14.364	1.138	1.554	1.369	5.964	11.606	1.975	17.581	4.282	4.047
GRA 83 (VALG22)	17.169	0.935	1.575	1.071	4.264		1.284	27.488	3.596	3.987
HDD 010 69	20.291	0.986	0.556	0.287	3.221	25.685	0.161	23.326	2.710	7.504
HDD005 321	16.991	2.623	0.938	0.412	12.527	19.957	0.104	11.324	10.458	6.986
HDD010 320	18.302	3.344	4.392	1.451	6.056	33.980	0.615	7.226	7.166	6.808
HDD010 58	19.913	1.269	1.705	0.224	6.660	24.091	0.110	13.553	6.076	5.862
HDD025 197	8.977	1.363	5.544	0.456	7.347	4.952	0.366	5.932	4.922	22.603
HILG 02	16.574	4.848	3.935	0.937	13.465	19.197	0.358	11.346	19.217	66.832
IDAG 1B HMS	17.241	1.046	1.800	0.268	4.790		0.148	6.291	4.734	3.618
IDAG 64	15.780	4.945	2.449	3.062	7.748		1.224	6.526	10.607	4.745
IDAG 70	15.921	1.323	0.267	0.412	5.161		0.137	3.132	5.144	4.122
IDAG 9 HMS	17.695	1.211	0.938	0.319	6.343		0.170	6.065	5.417	4.020
IDAG 92	18.157	2.625	4.277	0.434	21.402		0.187	14.873	16.338	6.505
J04 132.68	20.704	1.418	1.330	0.304	6.814		0.112	3.065	5.844	7.690
LVA 01	6.377	4.024	2.666	0.673	25.415	26.154	0.262	9.866	21.525	11.370
PSL01 (VALG 11)	13.982	3.063	2.869	0.476	20.914		0.173	9.870	17.667	4.448
RDD008 296	23.093	4.719	5.307	2.162	15.181	47.930	0.785	72.202	10.943	9.163
RDD008 297	26.365	1.786	3.825	0.878	4.974	23.900	0.333	48.399	3.725	12.291
RDD011 380	17.221	0.957	0.206	0.313	3.693	19.901	0.139	11.226	3.627	9.134
RDD042 237	8.966	7.223	11.038	3.275	6.431	16.335	1.449	31.326	13.565	15.482
RDD373 331	11.860	2.564	2.080	0.654	11.426	18.608	0.265	11.359	10.914	8.200
RS 54867	23.974	13.587	11.328	1.569	114.599	28.560	0.452	58.363	73.375	18.451
RS 54930	28.866	37.214	5.068	2.938	460.883	26.199	0.779	97.198	286.295	8.843
RS 54966	19.783	3.925	17.100	0.594	35.301	51.053	0.329	82.669	23.243	28.531
RS 54983	7.514	7.327	1.814	0.578	104.327	10.321	0.101	11.254	55.999	7.977
VA 26 139_104	15.542	10.125	13.764	1.914	54.143	22.133	0.956	6.282	47.884	21.434
VALB 01	26.309	20.722	12.733	1.237	227.943	23.297	0.295	36.228	153.849	24.435
VALB 03	18.232	10.136	7.519	1.132	68.879	54.181	0.329	38.388	61.805	15.373
VALG 01	16.506	0.550	1.881	0.200	2.742		0.252	17.117	2.353	3.959
VALG 02	16.370	2.786	2.905	0.768	18.691		0.492	7.381	14.700	4.184
VALG 06	16.496	0.896	0.351	0.232	3.044		0.085	4.342	3.524	4.049
VALG 07	15.798	1.892	0.210	0.455	6.135		0.158	2.290	8.601	5.203
AGV2	19.988	5.160	5.430	0.676	36.870		0.257	14.707	30.679	19.461
W2	17.011	3.350	2.438	0.787	10.293		0.311	8.056	12.708	68.417

Sample	P	Pb	Pr	Rb	Sc	Sm	Sn	Sr	Ta	Tb
C27-1	22.361	5.104	1.095	6.988	0.680	1.435	0.303	83.767	0.654	0.398
DH012 127.72		29.959	17.402	102.420	5.377	19.214		83.663	2.450	4.530
GDD012 13	125.133	19.764	0.684	244.895	1.099	0.491	0.716	52.143	1.970	0.106
GDD012 37	326.156	31.580	1.971	81.335	1.782	1.244	1.239	138.009	1.534	0.255
GOADH022 200.42		49.232	7.029	470.732	1.625	4.683		54.071	0.248	0.703
GOADH034 261.71		38.290	2.078	368.073	1.019	2.018		70.098	0.420	0.339
GRA 34B (VALG06)	408.124	34.759	0.895	368.800	0.252	1.274	2.752	34.245	0.977	0.168
GRA 71A (VALG 13)		15.557	0.633	263.949	3.310	0.131		5.326	5.894	0.027
GRA 74	517.994	22.877	31.082	103.076	2.666	18.990	4.412	15.721	0.936	2.185
GRA 83	487.016	29.339	1.228	171.597	11.413	1.087	4.491	9.226	2.354	0.373
GRA 83 (VALG22)		29.516	1.002	247.921	10.749	0.914		11.004	3.192	0.285
HDD 010 69	302.682	34.647	0.777	339.491	6.221	0.952	3.452	90.318	1.599	0.190
HDD005 321	637.123	41.154	2.980	375.569	1.267	2.773	2.515	20.332	1.093	0.424
HDD010 320	170.049	20.804	1.608	221.986	1.232	2.989	1.073	41.263	0.577	0.853
HDD010 58	190.564	39.229	1.735	296.887	6.119	1.585	1.937	35.201	0.940	0.197
HDD025 197	215.047	8.336	1.450	88.415	1.713	1.373	1.193	21.024	0.492	0.281
HILG 02	575.387	8.961	4.530	47.819	25.745	4.486	1.835	166.455	0.758	0.763
IDAG 1B HMS		35.702	1.211	239.613	4.138	1.271		27.020	0.308	0.201
IDAG 64		15.494	2.553	72.135	0.884	4.396		41.607	0.900	1.560
IDAG 70		15.690	1.163	358.834	1.137	1.586		110.106	0.234	0.264
IDAG 9 HMS		39.788	1.445	239.631	2.697	1.324		56.341	0.385	0.218
IDAG 92		17.834	4.190	191.089	6.619	3.011		95.294	0.846	0.362
J04 132.68		21.772	1.323	191.149	1.505	2.205		145.391	0.769	0.222
LVA 01	325.752	20.596	5.947	106.562	2.174	4.376	3.514	13.458	0.751	0.653
PSL01 (VALG 11)		31.425	4.722	210.217	1.953	3.135		24.283	0.631	0.450
RDD008 296	51.889	45.587	2.714	359.897	13.120	4.207	0.979	79.980	3.634	1.238
RDD008 297	59.391	35.285	1.049	113.626	4.358	1.523	0.621	51.061	3.736	0.481
RDD011 380	342.739	29.460	0.986	446.201	2.371	1.065	2.163	29.138	1.212	0.199
RDD042 237	61.451	24.012	2.581	189.831	4.419	6.674	0.999	57.524	3.093	1.935
RDD373 331	383.564	21.554	2.899	328.309	2.875	2.510	2.660	61.634	0.881	0.447
RS 54867	500.877	56.179	23.697	289.486	5.366	13.900	1.289	49.274	3.481	1.812
RS 54930	720.577	49.250	88.819	226.757	7.195	42.253	4.144	130.956	8.762	4.210
RS 54966	138.739	29.537	6.857	299.182	12.572	4.365	1.135	128.641	6.302	0.562
RS 54983	288.710	28.098	17.494	245.862	0.982	8.527	1.272	107.351	0.856	0.847
VA 26 139_104	412.467	51.693	14.564	296.776	3.198	10.850	2.865	46.951	0.438	1.743
VALB 01	518.273	40.635	50.262	292.763	8.865	22.207	13.751	89.669	2.138	2.055
VALB 03	1274.205	16.056	16.180	102.636	5.147	10.694	5.396	129.337	3.031	1.270
VALG 01		36.478	0.623	165.348	5.279	0.642		18.151	0.444	0.114
VALG 02		32.058	3.818	333.031	1.404	2.939		38.606	1.561	0.479
VALG 06		28.648	0.724	364.175	0.559	1.225		60.705	0.969	0.161
VALG 07		22.768	1.915	383.079	2.567	2.190		40.940	0.473	0.314
AGV2		14.172	7.789	70.201	12.985	6.016		672.387	0.781	0.680
W2		8.600	2.817	20.520	36.201	3.125		186.292	0.575	0.581

Sample	Th	Ti	Tm	U	V	W	Y	Yb	Zn	Zr
C27-1	13.694	214.541	0.368	54.461	2.902	1.504	14.834	2.688	4.977	203.529
DH012 127.72	330.139	967.719	4.213	863.232	19.435	3.025	242.847	24.902	20.114	18.563
GDD012 13	3.219	73.800	0.144	11.237	1.794	2.033	6.745	1.296	9.428	94.049
GDD012 37	18.573	377.706	0.179	116.465	6.187	2.257	10.035	1.186	31.583	18.363
GOADH022 200.42	49.851	285.838	0.327	60.988	4.384	0.464	21.562	1.959	7.947	27.180
GOADH034 261.71	19.520	181.088	0.252	15.205	2.795	2.231	13.038	1.710	10.476	89.338
GRA 34B (VALG06)	1.536	65.537	0.093	3.586	2.413	0.454	7.212	0.623	13.745	6.738
GRA 71A (VALG 13)	1.092	94.738	0.050	1.387	1.410	6.053	1.087	0.402	6.571	5.940
GRA 74	200.852	858.446	0.465	366.118	5.114	1.845	40.286	2.819	13.522	143.570
GRA 83	9.417	79.478	1.449	4.937	4.256	3.007	38.912	12.720	14.245	30.206
GRA 83 (VALG22)	8.947	119.027	1.011	4.409	4.106	4.782	30.655	8.232	9.331	34.547
HDD 010 69	3.591	268.894	0.148	7.410	3.141	1.920	9.293	1.081	12.659	13.994
HDD005 321	12.175	703.397	0.125	5.015	10.885	1.360	11.478	0.749	15.892	24.313
HDD010 320	46.088	416.705	0.732	595.256	9.716	2.122	32.967	4.646	10.152	154.958
HDD010 58	7.534	222.112	0.098	20.848	3.749	0.730	6.551	0.728	16.228	40.634
HDD025 197	6.335	2067.698	0.273	36.194	2.408	0.603	13.992	2.200	16.772	155.127
HILG 02	6.020	7462.105	0.384	1.660	199.930	0.478	27.719	2.453	76.066	171.475
IDAG 1B HMS	8.788	166.075	0.142	6.524	4.059	0.336	6.853	0.999	6.619	39.439
IDAG 64	132.937	133.705	1.559	1282.123	2.046	3.662	58.647	9.673	4.895	71.011
IDAG 70	2.069	195.029	0.179	11.884	6.539	1.703	12.495	1.045	7.164	7.771
IDAG 9 HMS	6.551	266.333	0.163	7.164	4.433	0.290	9.156	1.213	6.821	22.344
IDAG 92	19.880	1615.267	0.193	4.043	29.058	0.160	10.869	1.256	14.375	157.794
J04 132.68	54.193	742.684	0.121	36.753	39.577	1.128	8.534	0.815	30.905	41.128
LVA 01	58.331	653.968	0.303	11.080	3.206	0.854	15.101	1.959	11.776	65.258
PSL01 (VALG 11)	47.071	376.809	0.192	231.906	3.247	1.031	10.444	1.253	10.898	81.617
RDD008 296	271.173	3145.319	1.031	2062.234	161.504	2.856	49.840	6.132	47.474	160.211
RDD008 297	74.577	1320.301	0.411	668.868	71.625	1.975	19.434	2.515	29.356	109.020
RDD011 380	2.333	561.438	0.148	4.399	4.487	1.148	8.929	0.975	15.633	4.497
RDD042 237	449.981	1743.153	1.704	1189.402	105.679	2.822	82.284	10.896	25.846	363.226
RDD373 331	1.366	713.307	0.297	11.911	5.763	5.641	21.499	1.868	16.340	73.925
RS 54867	145.247	3672.123	0.535	464.428	130.876	8.059	41.182	3.207	89.529	413.647
RS 54930	536.121	3747.177	0.941	430.535	96.053	7.926	80.355	5.627	39.232	147.786
RS 54966	53.753	4620.647	0.280	348.725	209.126	2.292	17.055	1.930	85.613	586.840
RS 54983	90.413	1812.319	0.150	13.945	25.012	1.009	18.027	0.794	12.512	60.075
VA 26 139_104	172.744	272.376	0.920	1768.733	1.400	0.911	48.624	6.453	11.706	436.690
VALB 01	173.242	4629.795	0.334	31.345	97.138	1.890	33.839	2.022	59.555	469.289
VALB 03	19.927	5095.954	0.401	216.178	61.658	0.738	31.420	2.356	62.685	298.558
VALG 01	6.395	460.938	0.177	3.902	2.624	0.239	5.838	1.563	9.715	36.487
VALG 02	21.983	213.066	0.460	11.225	2.752	11.505	22.224	3.223	7.785	94.504
VALG 06	2.155	85.927	0.098	4.483	5.166	0.602	6.679	0.612	6.829	7.545
VALG 07	1.394	346.709	0.183	1.203	18.115	1.843	12.029	1.151	10.376	6.156
AGV2	6.548	6120.212	0.277	1.954	116.321	0.663	20.557	1.646	87.080	242.381
W2	2.245	6541.951	0.345	0.512	268.512	0.303	22.366	2.034	79.503	95.340

Appendix F1

QEMSCAN History and description

Appendix F2

Sample Preparation and sampling

Appendix F3

Appendix F4

Appendix F5

Appendix F6

Appendix F7

Appendix F1 QEMSCAN History and description

The QEMSCAN is an automated mineral identification system, originally made available to the mining industry and has its roots in research that began in Australia in the 1970's. A number of non-mining disciplines including the geosciences have found it to be a useful tool for qualitative assessment of samples, compounds, soil samples, processing plant feed, slurry, and final products, and so on. The system consists of a scanning electron microscope with up to four X-ray dispersive spectrometers (detectors) and a set of custom software processes the spectral data, matching the spectra with a known database. It has its roots in research that began in Australia in the 1970's1. The system provides mineral analyses via rapid automated electron microscopy. It was until recently developed and marketed by Intellection[6], a company set up by the Australian CSIRO (Commonwealth Scientific and Industrial Research Organisation). The CSIRO's Dr Alan F Reid invented the QEM*SEM technology, initially using a scanning electron microscope (SEM) and x-rays to analyse and identify materials during the 1980's. In the 1990's the system was coupled with a more robust Windows-based PC software format, this created the first modern QEMSCAN system.

[6] www.intellection.co.au

The system has found use in a number of applications, a number of recent publications related so some of these are included in the list below:

- Historically; Frost et al. (1976) of the Australian CSIRO, describe the first systems of automation for electron microprobes.
- Process mineralogy and Metallurgy; Sutherland (2006) has published a study of grainsize estimation using automated mineralogical analysis.
- Forensic geosciences; Pirrie et al. (2004) describe the principles, techniques and applications of automated mineral analyses, describing their findings and summarizing the advantages and shortfalls of the system.
- Environmental mineralogy; Arsenic contamination at a Cornwall historical mining site, Camm et al. (2005).
- Precious metals; Gold mineralogy determination, Goodall and Scales (2007).
- Heavy mineral sands; Quelimane deposit, Mozambique, Latti (1997).

The following description of the QEMSCAN and its operation is abbreviated from Pirrie et al. (2004).The QEMSCAN system, which consists of the following:

- A scanning electron microscope (SEM)
- Up to four, light-element, energy dispersive X-ray spectrometers

Integrated, Windows-based, software packages including an up to date mineral spectra database The QEMSCAN requires the user to set the pixel spacing, see Figure 5.7a and b, typically 0.20 µm and 25 µm, which can be analysed at a rate of up to 10 ms per pixel. The measured spectra are then compared for each pixel against the known database, once the entire grain is measured a digital map of the grain is produced, Figure 5.8. The QEMSCAN has the capacity to analyse approximately 1000 grains per hour. The system also provides size, shape and specific density data as well as interpretive analyses such as mineral liberation potential and mineral exposure calculations. There are drawbacks to the system, as Pirrie et al. (1994) describe, one such problem arises when identifying mineral polymorphs, and these cannot be distinguished based upon elemental compositions alone.

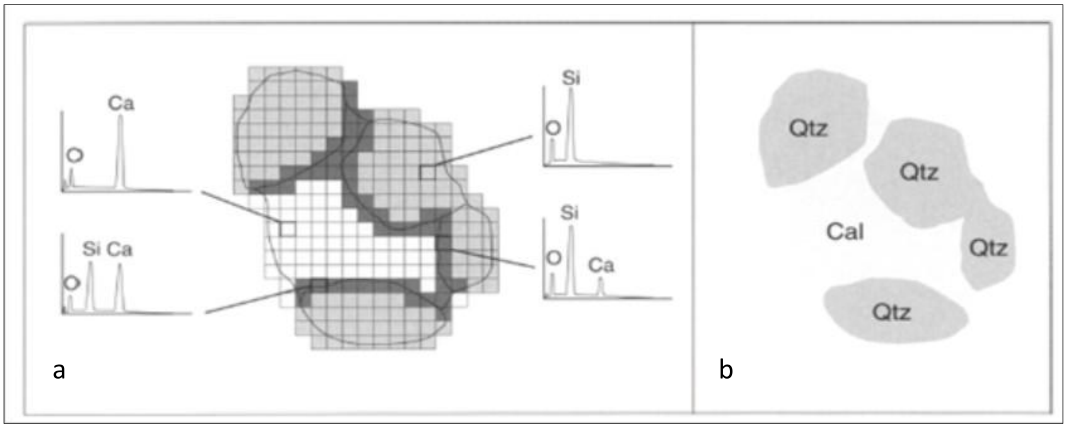


Illustration of the QEMSCAN’s fundamental technique. a) Initially a pixelated map of the composite grain is produced by spectral analysis and interpretation. b) A compositional mineral map is then produced for the analysed particle. Image is from Pirrie et al., 1994.

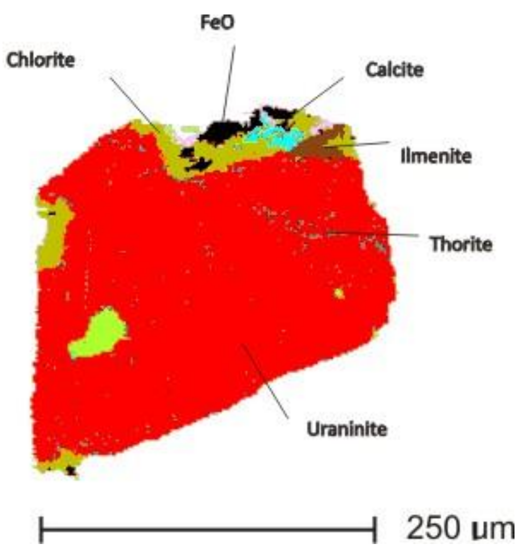


Diagram illustrating a digital mineral map of a CZ uraninite particle produced by the QEMSCAN. The entire grain consists of a number of pixels, each with its own spectral signal and mineral identification, when all the pixels are combined an image is produced.

Appendix F2 QEMSCAN sampling summary

Hand specimens were scrutinised at the University of the Witwatersrand, while core sample selection first utilised available assay data and then refining the interval with a scintillometer to minimise 'waste' material. The sample selections are summarised as follows:

Etango: Five samples: - Bannerman Resources made available five drill cores, from which Guy Freemantle selected three intervals of mineralisation in one of the holes. These represent the three most prominent ore textures observed at the deposit. Luke Longridge provided a single grab sample, selected as a representative of the iconic Rabbit Valley mineralisation exposure (Briqueue, 1980; Kinnaird and Nex, 1995; and Nex 1997) and a grab sample from the nearby Hildenhof Anomaly (EPL3345 section).

Husab: Twenty-two samples: - Swakop Uranium selected sixteen core sections, specifically assembled for a Pre-Feasibility mineralogical study. Six additional specimens were selected and were selected based on the performance of bottle-roll leach test work, and hand held XRF spectrometry studies completed for Swakop Uranium in 2011 and 2012.

Ida Dome: Five samples: - Swakop Uranium made available a single core from the then new Ida Central Deposit, located 750 m south of the abandoned Ida Copper Mine. Two grab samples were sourced from near the abandoned mine from the Holland's Dome deposit on the south side of the Swakop River gorge.

Valencia: Nine samples: - Valencia Uranium provided two drill cores to sample. One is located at the southwest edge of the deposit and bored northward into the main ore body (3 samples); the other is located at the eastern extent of surface mineralisation and is bored NNW into the main body (4 samples). The remaining two are surface samples; one from the Goldfields test pit, located within the main ore body, the other from the southern edge of the main deposit.

Appendix F3 QEMSCAN Sample Preparation

All samples were prepared with the same technique to achieve as much sample in the +90 µm - 125 µm fraction. . The procedure is as follows:

- Unwashed samples are jaw crushed and bagged

- Crushed samples are then placed in large 1 kg steel swing mill pot and milled for 30 seconds
- Samples are sieved through stainless steel sieves with 250 µm, 125 µm, and 90 µm mesh;
- Sample <60 µm and <250 µm is placed aside;
- Sample >250 µm is milled for 30 seconds and fed through the sieves;
- The process is repeated until all or most >250 µm sample is crushed, where only mica remains the process is stopped;
- The >60 µm and <90 µm are discarded.
- The >250 µm, and >125 µm portions are re-combined with the +90 µm - 125 µm fraction.

Appendix F4 QEMSCAN Data validation and bulk mineralogy

Goanikontes

	DH25 / 43.13-43.49		DH25 / 334.91-335.25		DH25 / 353.60-354.03		CZ 14-1		HILG 21	
Elements (wt%)	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*
Si	35.8	35.9	35.1	34.6	41.3	39.7	34.6	32.1	32.2	32.9
Al	5.4	6.0	5.9	6.0	3.2	3.6	6.9	6.7	7.5	8.0
Ca	0.3	0.8	0.2	0.7	0.3	1.0	0.2	0.5	1.3	0.3
Mg	0.2	0.6	0.4	0.8	0.1	0.6	0.3	0.7	0.6	0.3
Fe	2.8	1.2	2.3	1.1	0.1	0.4	1.1	0.9	0.8	1.6
K	3.8	4.2	5.3	5.9	1.7	2.4	5.5	6.1	6.4	7.6
Na	2.2	1.8	1.8	1.1	1.6	0.9	2.4	1.7	2.2	1.7
P	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.1
Ti	0.2	0.1	0.0	0.1	0.0	0.0	0.3	0.1	0.1	0.2
U (ppm)	1421	486	941	519	3816	922	272	248	3940	1339
Th(ppm)	95	108	237	168	84	92	27	43	28	211

Ida Dome

	IDAG 08		IDAG 43		HDD 027-89.47-89.95		HDD 027-104.36-104.70		HDD 027-122.90-123.22	
Elements (wt%)	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*
Si	36.70	35.16	39.40	37.11	35.84	35.20	36.08	35.20	34.42	34.50
Al	6.00	6.92	4.72	5.70	6.80	7.20	6.04	6.46	7.71	7.67
Ca	0.36	1.27	0.32	1.46	0.32	0.69	0.60	0.74	0.23	0.54
Mg	0.12	0.01	0.33	0.21	0.27	0.08	0.35	0.15	0.36	0.07
Fe	1.35	0.76	0.28	0.62	0.66	0.33	0.50	0.41	0.40	0.29
K	1.53	1.98	0.58	0.71	2.73	3.10	4.38	5.01	4.90	5.37
Na	3.77	3.79	3.28	2.92	3.67	3.58	2.23	2.01	2.91	2.67
P	0.00	0.01	0.00	0.01	0.01	0.02	0.20	0.18	0.00	0.03
Ti	0.29	0.08	0.00	0.07	0.00	0.02	0.00	0.04	0.00	0.02
U (ppm)	117.83	128.00	450.92	883.00	109.16	66.00	110.94	283.00	30.85	94.00
Th (ppm)	28.44	73.00	3.52	101.00	2.45	<10	1.30	20.00	0.00	<10

Husab (following pages)

				RDD 004 154-155		RDD005 280-281a		RDD005 280-281b		RDD006 245-246a		RDD006 119-120a		RDD008 284-285b	
				QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*
		Si	**%**	43.414	43.43	34.900	35.20	25.552	24.21	39.952	40.53	38.545	38.80	38.588	39.78
		Al	**%**	1.250	1.58	5.855	6.03	8.779	11.27	3.704	3.69	3.918	4.17	2.895	3.71
		Ca	**%**	0.289	0.49	0.275	0.46	0.399	0.96	0.162	0.20	0.223	0.44	0.280	0.70
		Mg	**%**	0.316	0.23	1.110	0.70	3.337	1.80	0.480	0.27	0.912	0.52	0.254	0.16
		Fe	**%**	1.091	0.91	1.859	1.64	5.411	5.76	0.473	0.43	1.512	1.29	3.396	2.06
		K	**%**	0.446	0.42	5.395	5.31	7.223	6.75	3.799	3.74	3.160	3.04	0.400	0.43
		Na	**%**	0.544	0.74	1.060	1.39	2.226	2.31	0.460	0.59	0.831	0.94	1.891	1.86
		P	**%**	0.000	0.00	0.020	0.03	0.048	0.09	0.020	0.02	0.002	0.01	0.001	0.01
		Ti	**%**	0.088	0.10	0.007	0.15	0.035	0.52	0.006	0.05	0.109	0.22	0.036	0.05
		Th	**ppm**	1	27	3	42	45	38	7	46	9	53	459	384
		U	**ppm**	509	254	3346	439	357	438	741	338	654	362	9077	1357

		RDD006		RDD157		RDD102		RDD072		RDD060		RDD078	
		QEMSCAN	Chemical	QEMSCAN	Chemical	QEMSCAN	Chemical	QEMSCAN	Chemical	QEMSCAN	Chemical	QEMSCAN	Chemical
Na	**%**	2.20	2.07	0.41	0.68	0.98	1.38	0.95	1.45	0.89	1.40	4.51	4.16
Mg	**%**	0.16	0.29	0.13	0.13	0.03	0.08	0.45	0.53	0.46	0.22	0.68	0.86
Al	**%**	5.24	5.98	2.42	3.15	5.86	5.99	7.76	8.35	5.72	6.19	9.43	10.34
Si	**%**	38.40	37.26	42.16	41.38	36.86	36.95	33.23	31.99	36.63	36.16	31.50	30.00
P	**%**	0.00	0.00	0.01	0.00	0.02	0.02	0.00	0.02	0.01	0.01	0.11	0.07
K	**%**	2.49	2.07	2.48	2.66	6.50	5.62	8.93	7.90	5.98	4.91	3.56	3.15
Ca	**%**	0.40	1.13	0.15	0.22	0.15	0.18	0.22	0.80	0.22	0.59	0.86	2.09
Ti	**%**	0.01	0.10	0.02	0.04	0.00	0.02	0.03	0.20	0.03	0.11	0.02	0.19
Mn	**%**	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.03
Fe	**%**	0.14	0.64	0.18	0.37	0.05	0.21	0.37	1.13	0.32	0.63	0.39	1.41
U	**%**	0.04	0.06	0.21	0.08	0.30	0.16	0.05	0.04	0.27	0.17	0.15	0.09

		RDD145		RDD141		RDD141		RDD219			RD 006-171-172	
		QEMSCAN	Chemical	QEMSCAN	Chemical	QEMSCAN	Chemical	QEMSCAN	Chemical		**QEMSCAN**	***Chemical***
Na	%	0.75	1.27	3.21	3.50	3.21	3.24	0.77	1.13	**Si**	37.2	36.7
Mg	%	0.11	0.26	0.04	0.05	0.04	0.08	0.60	0.57	**Al**	4.2	4.5
Al	%	5.06	5.93	6.08	6.55	6.08	6.59	4.84	5.53	**Ca**	0.2	0.4
Si	%	38.19	36.32	37.74	37.69	37.74	36.97	34.85	35.78	**Mg**	1.5	0.8
P	%	0.00	0.01	0.00	0.00	0.00	0.01	0.04	0.03	**Fe**	1.4	1.7
K	%	5.71	5.79	1.35	0.87	1.35	1.35	4.85	4.55	**K**	3.7	3.9
Ca	%	0.12	0.24	0.50	0.71	0.50	0.89	1.05	1.63	**Na**	1.1	0.9
Ti	%	0.00	0.07	0.00	0.01	0.00	0.01	0.13	0.22	**P**	0.0	0.0
Mn	%	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.01	**Ti**	0.0	0.3
Fe	%	0.12	0.47	0.09	0.09	0.09	0.17	2.36	1.56	**Th**	7374	1349
U	%	0.06	0.12	0.03	0.00	0.03	0.02	0.22	0.19	**U**	40	130

Valencia

	Va26 141/ 259.57-260.00		Va26 141/ 261.69-262.00		Va26 141/ 290.75-291.84		Va26 141/ 301.29-301.60	
Elements (wt%)	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*	QEM	*Chem.*
Si	40.10	39.79	37.62	36.61	35.94	35.29	35.68	35.47
Al	4.07	3.97	5.74	6.40	5.97	6.21	6.51	6.92
Ca	0.19	0.49	0.30	0.81	0.19	0.37	0.20	0.48
Mg	0.19	0.62	0.17	0.66	0.69	0.79	0.49	0.78
Fe	0.17	0.40	0.25	0.37	0.51	0.95	0.52	0.70
K	2.31	2.22	2.65	3.04	5.38	6.08	4.75	5.52
Na	1.91	1.59	3.01	2.49	1.82	1.20	2.50	1.65
P	0.01	0.02	0.00	0.02	0.03	0.03	0.01	0.03
Ti	0.00	0.02	0.00	0.02	0.02	0.11	0.02	0.09
U (ppm)	1104.04	137.89	1162.48	314.95	1833.89	259.91	574.64	100.91
Th (ppm)	0.00	<10	0.00	13.97	23.76	28.74	11.81	18.45

	Va26 113/ 81.84-82.22		Va26 113/ 155.97-156.23		Va26 113/ 225.64-225.89		VALG 11		VALG 26	
Elements (wt%)	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*	QEMSCAN	*Chemical*
Si	35.75	35.03	37.79	36.64	38.06	36.21	36.50	35.30	35.61	35.20
Al	6.53	7.08	5.41	5.25	5.07	5.91	6.25	7.32	6.94	6.64
Ca	0.36	0.82	0.30	0.74	0.41	0.82	0.32	0.77	0.28	0.55
Mg	0.29	0.74	0.33	0.71	0.30	0.85	0.27	<0.1	0.28	0.73
Fe	0.69	0.69	0.48	0.67	0.59	0.95	0.64	0.70	0.29	0.64
K	3.02	3.70	2.59	2.71	2.12	2.78	2.91	3.61	3.92	4.70
Na	3.40	2.70	2.76	2.13	2.75	2.20	3.17	2.70	3.14	2.09
P	0.04	0.03	0.01	0.02	0.03	0.03	0.02	0.02	0.01	0.02
Ti	0.03	0.06	0.01	0.04	0.02	0.10	0.01	0.02	0.00	0.05
U	2336.68	559.26	732.37	181.98	1907.11	326.48	964.90	232.69	1053.76	564.09
Th	120.23	105.72	0.53	16.26	17.78	29.97	42.50	42.89	42.20	45.00

Bulk Mineralogy

Goanikontes

Mineral	DH25 / 334.91-335.25	DH25 / 353.60-354.03	DH25 / 43.13-43.49	HILG 21	IDAG 08	IDAG 43	VALG 11	HDD 027-122 90-123	HDD 027-104.36-104.70	HDD 027-89.47-89.95	RDD006-171-172
Units	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Quartz	38.0	68.2	42.6	23.9	41.2	54.7	39.7	29.1	40.4	35.0	54.2
K-Feldspar	42.8	13.3	29.8	48.2	11.7	3.4	22.1	35.4	33.5	20.5	24.6
Albitic Feldspar	11.5	15.6	19.5	15.0	42.5	38.7	32.8	26.3	18.6	39.1	7.1
Muscovite	1.6	0.9	1.6	4.4	1.1	0.3	2.1	6.2	3.0	2.2	1.8
Biotite	0.5	0.1	0.4	2.0	0.2	1.6	0.6	0.6	0.8	0.5	6.3
Chlorite	1.8	0.7	0.9	1.8	0.6	0.6	1.2	1.8	1.5	1.3	3.7
Tourmaline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Zircon/Xenotime	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
Silicates	**96.3**	**98.8**	**95.1**	**95.3**	**97.3**	**99.4**	**98.5**	**99.4**	**98.1**	**98.6**	**97.7**
Ilmenite/Rutile	0.1	0.0	0.6	0.2	0.9	0.0	0.0	0.0	0.0	0.0	0.1
Fe-oxides/hydroxides	2.8	0.1	3.4	0.5	1.3	0.1	0.6	0.2	0.4	0.4	0.8
Oxides	**2.9**	**0.1**	**4.0**	**0.7**	**2.2**	**0.1**	**0.7**	**0.2**	**0.4**	**0.4**	**0.8**
Calcite/Dolomite	0.2	0.1	0.3	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.3
Apatite	0.1	0.3	0.0	2.8	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Monazite	0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Carbonates and Phosphates	**0.5**	**0.4**	**0.4**	**3.0**	**0.1**	**0.1**	**0.3**	**0.1**	**1.2**	**0.0**	**0.3**
Fe-Sulphides	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
U and Th Phases	**0.1**	**0.5**	**0.2**	**0.5**	**0.0**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.8**
Other	0.1	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.5	0.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Husab

	Bulk mineralogy (as mass % of particles containing some Uranium)					
Mineral	RDD373-64	RDD373-68	RDD373-93	RDD373-125	RDD373-155	RDD373-159
Betafite	0.0	0.0	0.3	6.5	0.0	0.0
Uraninite	11.7	3.3	25.2	5.2	30.2	26.4
Uranothorite	1.8	0.0	0.1	2.9	0.0	0.0
Coffinite	4.0	2.0	4.4	4.8	1.9	0.7
Boltwoodite	1.4	8.6	0.4	0.3	0.1	0.0
Brannerite	16.9	0.0	18.0	2.1	1.3	0.4
Uranium Textures	3.5	5.3	1.8	1.5	1.3	0.6
Others	3.1	18.7	4.7	7.0	11.4	7.3
HiBSE	0.9	0.0	0.4	1.7	0.1	0.1
Quartz	25.1	16.4	9.1	2.4	9.7	30.1
Feldspars	7.4	15.7	14.1	8.2	9.9	18.4
Micas	4.2	12.5	7.7	25.6	11.5	9.4
Chlorite	0.1	1.4	2.1	11.5	0.4	0.8
Garnet	0.2	0.1	0.1	1.0	1.0	0.1
Pyroxene	0.1	0.1	0.3	0.1	0.3	0.6
Amphibole (Hornblende)	0.1	1.2	0.1	0.2	0.2	0.8
Sphene	0.0	0.0	0.3	2.8	0.0	0.0
Zircon	0.0	0.1	0.0	0.0	3.1	0.2
'Kaolinite' (clay)	0.9	1.2	0.9	1.2	4.6	2.2
Calcite	0.0	3.0	0.5	0.0	0.0	1.0
Apatite	0.0	0.2	0.2	1.9	0.1	0.2
Rutile/Anatase	0.2	1.2	3.8	3.0	0.0	0.0
Ilmenite	6.7	0.3	3.6	9.8	0.0	0.2
Iron Oxides	11.8	8.4	2.2	0.3	12.9	0.5

Sample	RDD 004 154-155	RDD005 280-281a	RDD005 280-281b	RDD006 245-246a	RDD006 119-120a	RDD008 284-285b
Units	**Mass %**	**Mass %**	**Mass %**	**Mass %**	**Mass %**	**Mass %**
Quartz	85.59	39.92	1.77	63.10	59.45	64.61
K-Feldspar	2.62	31.70	30.92	24.83	19.62	2.25
Albitic Feldspar	6.56	12.76	26.80	5.55	10.01	22.77
Muscovite	0.53	3.78	5.03	2.09	2.01	0.37
Biotite	0.30	6.33	26.46	1.18	2.29	0.53
Chlorite	1.82	2.70	2.46	2.22	4.26	1.24
Tourmaline	0.00	0.00	0.03	0.00	0.00	0.02
Zircon/Xenotime	0.11	0.03	0.02	0.01	0.19	0.16
Silicates	**97.52**	**97.23**	**93.48**	**98.98**	**97.83**	**91.96**
Ilmenite/Rutile	0.18	0.01	0.07	0.01	0.25	0.05
Fe-oxides/hydroxides	0.73	1.00	1.31	0.12	0.94	1.10
Oxides	**0.90**	**1.01**	**1.39**	**0.14**	**1.19**	**1.15**
Calcite/Dolomite	0.57	0.34	0.30	0.19	0.32	0.26
Apatite	0.00	0.11	0.20	0.10	0.00	0.00
Monazite	0.00	0.01	0.09	0.01	0.01	0.00
Carbonates and Phosphates	**0.57**	**0.45**	**0.59**	**0.31**	**0.33**	**0.26**
Fe-Sulphides	**0.56**	**0.35**	**3.20**	**0.00**	**0.04**	**5.00**
U and Th Phases	**0.06**	**0.38**	**0.04**	**0.09**	**0.08**	**1.14**
Other	0.39	0.57	1.30	0.48	0.53	0.50
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Sample	RDD006	RDD157	RDD102	RDD072	RDD060	RDD078	RDD145	RDD141	RDD219
Quartz	51.18	74.79	40.67	21.17	42.49	11.83	48.89	46.29	43.46
K-Feldspar	17.23	17.54	46.19	63.36	41.13	22.73	40.51	9.43	33.41
Plagioclase	27.26	4.99	11.81	11.43	11.37	55.84	9.10	39.02	9.80
Muscovite	0.29	0.14	0.15	0.22	0.37	0.33	0.13	0.20	0.24
Biotite	0.41	0.04	0.01	0.06	1.83	3.67	0.10	0.01	1.43
Chlorite	0.64	0.81	0.21	2.87	1.32	1.04	0.63	0.21	0.77
Amphibole	0.02	0.00	0.00	0.04	0.03	0.05	0.00	0.02	2.36
Zircon	0.51	0.53	0.03	0.04	0.04	0.05	0.07	0.04	1.25
Sphene	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.12
Aluminosilicate	2.04	0.33	0.29	0.32	0.67	3.27	0.26	4.16	0.74
Silicates	**99.57**	**99.18**	**99.36**	**99.51**	**99.27**	**98.82**	**99.70**	**99.39**	**93.57**
Ilmenite/Rutile	0.02	0.02	0.00	0.04	0.05	0.03	0.00	0.00	0.19
Fe-oxide/Hydroxide	0.04	0.12	0.04	0.04	0.05	0.03	0.06	0.04	0.76
Oxide	**0.06**	**0.14**	**0.04**	**0.08**	**0.10**	**0.06**	**0.06**	**0.05**	**0.94**
Carbonate	0.22	0.24	0.05	0.31	0.11	0.17	0.10	0.39	1.43
Apatite	0.00	0.02	0.08	0.00	0.01	0.39	0.00	0.01	0.22
monazite	0.02	0.01	0.00	0.01	0.10	0.26	0.00	0.01	0.02
Carbonate/Phosphate	**0.24**	**0.27**	**0.14**	**0.33**	**0.21**	**0.83**	**0.10**	**0.40**	**1.67**
Sulphides	**0.06**	**0.08**	**0.06**	**0.02**	**0.06**	**0.04**	**0.05**	**0.12**	**3.51**
Other	**0.07**	**0.33**	**0.39**	**0.06**	**0.35**	**0.26**	**0.09**	**0.05**	**0.32**
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Valencia

Mineral	Va26 141/ 259.57-260.00	Va26 141/ 261.69-262.00	Va26 141/ 290.75-291.84	Va26 141/ 301.29-301.60	Va26 113/ 155.97-156.23	Va26 113/ 225.64-225.89	Va26 113/ 81.84-82.22	VALG 26	CZ 14-1
Units	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**	**%**
Quartz	60.4	44.8	39.5	35.9	47.1	49.8	35.9	34.2	31.3
K-Feldspar	17.9	20.6	40.4	36.3	19.6	16.1	23.4	28.8	44.0
Albitic Feldspar	18.6	31.1	12.0	21.2	28.4	29.1	35.2	30.7	18.4
Muscovite	1.1	1.5	2.2	2.3	1.4	1.2	1.5	3.5	2.3
Biotite	0.6	0.4	3.5	1.9	1.1	0.8	0.7	1.4	0.6
Chlorite	0.7	0.8	1.1	1.3	1.1	0.9	1.2	0.4	1.3
Tourmaline	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Zircon/Xenotime	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.1	0.0
Silicates	**99.4**	**99.2**	**98.8**	**99.0**	**98.8**	**98.0**	**98.2**	**99.1**	**97.8**
Ilmenite/Rutile	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Fe-oxides/hydroxides	0.1	0.2	0.2	0.3	0.3	0.6	0.7	0.2	0.9
Oxides	**0.1**	**0.2**	**0.3**	**0.4**	**0.3**	**0.6**	**0.7**	**0.2**	**1.6**
Calcite/Dolomite	0.1	0.1	0.2	0.1	0.1	0.5	0.2	0.1	0.2
Apatite	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0
Monazite	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1
Carbonates and Phosphates	**0.1**	**0.2**	**0.3**	**0.1**	**0.2**	**0.7**	**0.5**	**0.2**	**0.2**
Fe-Sulphides	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
U and Th Phases	**0.1**	**0.1**	**0.2**	**0.1**	**0.1**	**0.2**	**0.3**	**0.1**	**0.0**
Other	0.3	0.3	0.4	0.4	0.5	0.5	0.3	0.3	0.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	

Appendix F5 Deportment statistics

Mass %		Sample	Uraninite/ Pitchblende	Thorite(U)	Coffinite/ U-silicates	Brannerite/ U-Leucoxene	Betafite/ Pyrochlore	Uranophane	U-phosphates	Total
		HDD 027-89.47-89.95	54.2666	0.872098	3.328443	0.003634	0.415016	40.9301	0.184109	100
		HDD 027-104.36-104.70	76.84024	0.723372	4.440203	0.774982	0.120996	17.05646	0.043754	100
		HDD 027-122 90-123	94.51367	0.014321	2.997126	0.0631	0.019236	2.392546		100
Ida Dome		IDAG 08	78.96473	7.359897	1.832648	2.489366	0.100949	9.229989	0.022421	100
		IDAG 43	66.72209	0.498684	27.50923	0.072039	0.004129	5.188204	0.005624	100
		RDD004 c 154-155	93.34506	0.247712	5.064211	0.752957	0.008972	0.571133	0.009957	100
		RDD008 b 284-285	92.65926	1.044925	3.694748	1.447117	0.107757	1.04509	0.001105	100
		RDD060-289m	33.23234	0.041138	65.98395	0.492603	0.09183	0.158143		100
		RDD072-269m	18.61033	0.006702	78.23623	2.577017	0.314632	0.255089		100
		RDD141-245m	3.901297	0.180812	94.32262	1.04824	0.061541	0.485493		100
	Zone 1	RDD145-413m	59.14881	0.073739	38.74387	1.837409	0.083446	0.11273		100
		RDD219-336m	85.36893	0.111164	14.00396	0.407983	0.017327	0.090639		100
		RDD005 a 280-281m	98.95939	0.011416	0.940323	0.023737	0.002604	0.055561	0.006968	100
		RDD005 b 280-281m	99.24498	0.205151	0.466245	0.03681	0.000554	0.037955	0.008302	100
		RDD006 119-120m	78.5647	0.413067	13.88049	6.243998	0.231242	0.617393	0.049107	100
Husab		RDD006 145-146m	29.8371	0.405198	68.59495	0.934755	0.063611	0.16439		100
		RDD006 171-172m	94.09318	0.008972	5.43058	0.190644	0.020135	0.245375	0.011109	100
		RDD006 a 245-246m	47.53918	0.422255	50.55823	0.060378	0.006505	1.412566	0.000886	100
		RDD078 362-363m	85.51335	0.552396	13.52184	0.223243	0.011451	0.177711		100
	Zone 2	RDD102 317-318m	9.340529	0.019686	90.32852	0.179211	0.008103	0.123954		100
		RDD157 343-344m	35.18805	0.537958	62.24671	1.847762	0.068429	0.111095		100
		RDD373 64-65m	49.48604	0.63332	13.93024	27.37281	0.00638	3.874109	4.697104	100
		RDD373 67-68m	27.98151	0	13.87459	0.008488	0	45.08654	13.04887	100
		RDD373 92-93m	68.89501	0.018331	9.90674	18.69926	0.137769	0.610355	1.732529	100
		RDD373 124-125m	42.66591	2.053284	32.45385	6.485245	10.4513	1.512586	4.37783	100
	Zone 1	RDD373 155-156m	92.32919	0	4.829132	1.526525	0	0.158411	1.156744	100
		RDD373 158-159m	96.80584	0.00266	1.988794	0.542773	0.029416	0	0.630518	100

		Mineral	Uraninite/ Pitchblende	Thorite(U)	Coffinite	Brannerite/ U-Leucoxene	Betafite/ Pyrochlore	Uranophane	U-phosphates	Total
Valencia	East of Main Orebody	Va26 141 259.57-260.00m	99.17075	0.002749	0.762305	0.00858	0.003282	0.05203	0.000307	100
		Va26 141 261.69-262.00m	99.30454	0.005163	0.650637	0.002003	0.000465	0.036843	0.000348	100
		Va26 141 290.75-291.84m	99.09195	0.047884	0.426884	0.355441	0.018684	0.056206	0.002949	100
		Va26 141 301.29-301.60m	99.10066	0.026666	0.554207	0.200679	0.009551	0.106679	0.001561	100
	West of Main Orebody	Va26 113 81.84-82.22m	98.74048	0.10547	0.75223	0.050468	0.013061	0.31721	0.021082	100
		Va26 113 155.97-156.23m	97.80481	0.008348	1.837223	0.019775	0.004984	0.315864	0.009001	100
		Va26 113 225.64-225.89m	97.27987	0.067582	1.913705	0.012675	0.01181	0.577822	0.136534	100
	Goldfields historical test pit	VALG 11	98.7049	0.050466	0.891859	0.039478	0.141587	0.171388	0.000323	100
	South end of Main Orebody	VALG 26	62.79546	0.212559	31.44057	0.027818	0.007789	5.464608	0.051195	100
Goanikontes	Etango A	DH025 43.13-43.49m	80.30029	0.46997	16.50363	0.207961	0.16906	2.306088	0.042999	100
		DH025 334.91-335.25m	79.86417	3.344686	5.931935	0.305184	0.028264	10.48126	0.044495	100
		DH25 353.60-354.03m	85.48469	0.041265	7.326962	0.004912	0.000863	7.107854	0.033456	100
	Rabit Valley	CZ 14-1	76.09917	0.406782	21.16986	0.312106	0.068638	1.91082	0.032621	100
	Hildenhof	HILG 21	82.65473	0.035434	14.4082	1.550378	0.076174	1.260968	0.014119	100

Appendix F6 Descriptive Tables of QEMSCAN and EPMA Samples

The descriptive tables in this section give summarised accounts of all the samples that were analysed by the QEMSCAN system at SGS in Johannesburg. A number of the QEMSCAN samples were utilised in the EPMA analysis program, undertaken at the Department of Geology, Rhodes University, Grahamstown.

Etango Deposit Mineralogy Sample Summary

Prospect		Sample; U/Th/ratio ppm		Thin Section Highlights	QEMSCAN deportment wt%	EPMA - minerals/ specimens/ analyses	Description	Location Geology
Bannerman Resources EPL3345	Etango U:Th = 5.84	CZ14-1 surface	248/43/5.8	No Section	Uran-76.1; Coff-21.2	No analyses	Coarse - pegmatitic alaskite with prominent smoky quartz and discoloration of feldspars from hydrothermal alteration. Weathered at surface	Type locality E-type of Nex (1997) from Rabbit Valley*.
		DH025 43.13-43.49	486/108/4.5	No Section	Uran-80.3; Coff-16.5; Uranoph-2.3	Uran/3/13	Oxidised alaskite, medium grained with homogeneous texture. Prominent Fe staining throughout, combination of haematite and limonite coloration.	Near palaeo-surface, near hypothetical Rössing contact.
		DH025 334.91-335.25	519/168/3.1	No U minerals visible	Uran-79.9; Coff-5.9; Uranoph-10.5; Thor-3.3	No analyses	Oxidised alaskite, medium grained and homogeneous textured with black smoky quartz. Discoloration associated with metasediment contact. Feldspars are corroded and altered, quartz overgrowth	Khan Formation magnetite schist hosted alaskite
		DH025 353.60-354.03	922/92/10	Uraninite in magnetite; secondary U surrounding magnetite	Uran-85.5; Coff-7.3; Uranoph-7.1	Uran/7/26	Pristine alaskite with coarse pegmatitic texture and black smoky quartz, and evidence of one episode of U mobilisation.	Khan Formation magnetite schist hosted alaskite, lower down in the sequence toward the Etusis Fm. contact.
	Hildenhof	HILG21 surface	1339/211/6.3	New microcline surrounds plagioclase, secondary U between grains, no primary phases	Uran-82.7; Coff-14.4; Brann-1.6	Uran/5/22	Pegmatoidal textured alaskite, light pink with coarse accessory biotite. Feldspar >> quartz, no quartz chains. Mobilised uranium is abundant between crystals and in inter-grain fractures.	White pegmatite, with a weathered zone of pink oxidation (E type coloration). Intrudes sub-parallel to a local antiform in Rössing Formation schist, near the Chuos Formation contact.

Ida Dome Area Mineralogy Sample Summary

Prospect		Sample; U/Th/ratio ppm		Thin Section Highlights	QEMSCAN deportment wt%	EPMA - minerals/ specimens/ analyses	Description	Location Geology
EPL3439	H. Dome	IDAG43 surface	883/101/8.7	Secondary U in fractures surrounds metamict primary phases, form coatings on quartz. No intact primary phases observed.	Uran-66.7; Coff-27.5; Uranoph-5.2	Uran/1/3; Coff/2/4; Thor/1/2	Holland's Dome, Deep pink alaskite, with smoky quartz and a subtle fabric, suggest some deformation post/syn intrusion, sampled from a boudin hosted in Khan Fm. Banded gneiss	Khan Fm. Gneiss - hosted with S_0/S_1-parallel boudin granite lenses, all mineralised. Proximal to a marble-skarn hanging wall (Rössing).
Swakop Uranium EPL3138	Ida Central U:Th = 10.5	IDAG08 surface	128/73/1.8	Zircon, monazite and thorite - all contain radioactive inclusions (radial fractures) myrmekite at feldspar edges - recrystallisation	Uran-79; Uranoph-9.2; Thor-7.4	No analyses	Light pink, even textured alaskite. Feldspars are pink and white, quartz is in singular grains, no chains.	Sampled from a large pavement of alaskite - leucogranite with distinctive oxidation front staining - analogous to the Rabbit Valley locality of Nex (1997).
		HDD027 89.47-89.97	119/<12/10	Prominent chloritised biotite, secondary U coatings on quartz and feldspar, throughout section	Uran-54.3; Uranoph-40.9	No analyses	Inhomogeneous textured leucogranite - disseminated biotite, pyroxene and other contaminant metasedimentary phases, quartz is variably smoky, no chains.	Core sample, hangining wall is a dark grey banded gneiss with qtz-fspar leucosomes throughout and calcsilicate lenses, selected from a ~42 m package of leucogranites with a sulphide bearing Khan gneiss footwall.
		HDD027 104.36-104.70	303/15/20	Zircon with large U inclusions, secondary U on mineral surfaces, prominent, purple fluorspar overprint between RFM and in biotite cleavage.	Uran-76.8; Uranoph-17.1	No analyses	Pristine alaskite with typical coarse pegmatoidal texture, black smoky quartz and minimal feldspar discoloration, quartz in chains, accessory biotite in cm-booklets	Core sample: hangining wall is a dark grey banded gneiss with qtz-fspar leucosomes throughout and calcsilicate lenses, selected from a ~42 package of leucogranites with a sulphide bearing Khan gneiss footwall.
		HDD027 122.90-123.22	91/<9/10	Prominent sulphides (>1 cm) pyrite and chalcopyrite dominate, albite veins cross cut rock forming minerals. Abundant mafic phases (skeletal, entrained)	Uran-94.5; Uranoph-2.4	No analyses	pegmatitic leucogranite, with prominent metasediment interaction, contact is characterised by altered sulphides and green secondary-Cu staining. Graphic)non-smoky) quartz and light pink feldspar throughout	Core sample within a ~5 m leucogranite package, Hanging wall is ~6 m thick, strongly - foliated, sulphide - bearing Khan schist-calcsilicate package. Footwall comprises ~12 m alternating grey granite and pegmatite.

Husab Mineralogy Sample Summary

Prospect		Sample; U/Th/ratio ppm		Thin Section Highlights	QEMSCAN deportment wt% EPMA - mineral/ specimens/ analyses		Description	Location Geology
Swakop Uranium ML171	Husab Zone 1: U:Th = 8.61	RDD 004c 154-155	254/27/ 9.4	Mag-haematite with biotite. Large >4 mm pyrite, 1 x 0.25 mm chalcopyrite.	Uran-93.3; Coff-5.89	No analyses	Quartz-rich pod, pegmatitic, sericitised feldspar, smoky-quartz, fine biotite.	Quartz rich pod in an assemblage of quartzite and intercalated schists (Rössing Fm.)
		RDD 008b 284-285	1357/384 /3.5	Pyrrhotite-pentlandite, pyrite are all present in fine grained, <1-2 mm, sparse - disseminated	Uran-92.6; Coff-5.8	Uran/5/2 3	Quartz-pod/calcsilicate appears to be a reaction margin between skarn and alaskite. Predominantly smoky quartz with abundant sulphide, pyrite, blebs (1-5 mm)	Quartz pods and alaskite in the lower sequence of the Rossing Formation, intrude banded gneiss above the Khan Formation contact.
		RDD060-289m	450/77/5. 9	Uranophane along grain boundaries, fractures and cleavages, particularly in radiating cracks surrounding zircons. Gummite masses up to 0.5 mm in some feldspars and associated with zircons.	Uran-33.2; Coff-66.2	No analyses	Coarse - pegmatitic alaskite, with light pink and light green feldspars (sericite). Smoky quartz forms chains and surrounds feldspars, accessory, coarse, biotite books, feldspar recrystallisation gives distinct appearance.	1 m alaskite within a sequence of Chuos diamictite, there is some presence of carbonate (calcsilicate) type lithology within the package. Alternative interpretation is that the sequence is of Rossing metapelite with leucosomes resembling diamictite lithic fragments.
		RDD078-363m	1627/113 /14.4	0.05 mm chalcopyrite in K-feldspar, fairly abundant euhedral to subhedral <1 mm pyrite. Subhedral pyrite, <0.3 mm, with jarocite halos, associated with pyrite in biotite clusters, compound uraninite up to 0.5 mm cross-cut biot. cleave.	Uran-85.5; Coff-14.3	No analyses	Coarse-pegmatitic alaskite, moderately smoky quartz	Within 32 m thick alaskite package, intruding between a quartzite-calcsilicate footwall package (lower carbonate equivalent) and a sulphide bearing gneiss (lower cordierite gneiss equivalent of Nash, 1997).
		RDD 141 244-245m	206/29/ 7.2	Deformed twinning in plag. and microcline - deformation	Uran-3.9; Coff-94.9	No analyses	Sericitised granite, bimodal, coarse with medium-grained patches. Light grey to smoky quartz in patches,	Alaskite intruding between the upper quartzite-carbonate package and the main cordierite gneiss package (between the upper and lower carbonate packages of Nash, 1997).
		RDD145-413m	1194/279 /15.2	Minor uraninite, very sparsely disseminated, <0.1 mm. Magnetite with altered biotite.	Uran-59.1; Coff-38.7; Brann-1.8	No analyses	Very coarse granite - pegmatite, with smoky quartz, and prominent uranophane/boltwoodite on fracture surfaces. Distinct black and white coloration	49 m package of high grade alaskite which intrudes and overwhelms the cordierite gneiss. Footwall to end of hole comprises variably textured cordierite gneiss with intercalated calcsilicate- quartzite (lower carbonate package).
		RDD219-336m	1923/279 /6.9	Abundant uraninite, clustered and included in feldspar, titanite, diopside and quartz, also interstitial to larger minerals, halos of jarosite and pyrite with uranophane, 0.3 mm - 0.5 mm, subrounded.	Uran-85.3; Coff-14.2	No analyses	Combination of calcsilicate and granite, with gossanous reaction margin with granite contact, where silicates are leached out.	Interval is quartz rich and dark grey to black in colour, with hydrothermal epidote, haematite and sericite. The sample represents a skarn margin within the Rössing Formation.

Prospect		Sample; U/Th/ratio ppm		Thin Section Highlights	QEMSCAN deportment wt% EPMA - mineral/ specimens/ analyses		Description	Location Geology
Swakop Uranium ML171	Husab Zone 1: U:Th = 8.61	RDD373-64m	464/145/ 3.2	mm-Scale brannerite, coarse mm-scale skeletal pyrite, mobilised U and Fe in biotite cleavage	Uran-49.4; Coff-23.1; Brann-27.3	No analyses	Coarse alaskite with moderately smoky and milky quartz. Hydrothermal alteration is evident in chlorite fracture fill and red haematite in hairline fractures. There is a meteoric fluid alteration component that overprints the entire sample.	Oxidised pegmatite intruding a cordierite gneiss between upper- Rossing carbonate package and the Chuos Formation. The gneiss has garnet and cordierite porphyroblasts, which at Husab indicate the position is near the top of the Formation's sequence.
		RDD373-68m	306/12/ 25.3	Euhedral and skeletal U with pyrite halos, abundant secondary U in granite and metasediment contact aureole, coffinite veins in granite and metasediment	Uran-27.9; Coff-23.1	Brann/1/15	The mineralised section comprises a centimetric vein of quartz and feldspar, where quartz>>feldspar. Prominent haematite coloration fills inter-mineral planes. Calcite veins cut the metasediments and granitic components.	Oxidised pegmatite intruding a cordierite gneiss between the lower- and upper-Rossing carbonate packages. The gneiss has garnet and cordierite porphyroblasts, which at Husab indicate the position is near the top of the Formation's sequence.
		RDD373-93m	463/76/ 6.1	Prominent pyrite, euhedral framboids II to biot. Cleavage. Late veins cut most primary minerals. Pyrite fills in corroded uraninite casts	Uran-68.9; Coff-12.3; Brann-18.7	Brann/1/11	Orange and green coloration, where metasediment interaction is associated with deep green chlorite and light green feldspar sericitisation	Alaskite intrudes a chloritic gneiss which has a marble package at its base (112 m downhole). Cordierite is present but not garnet.
		RDD373-115m	220/98/ 2.2	1.25 mm betafite grain with zircon inclusion	No analyses	Beta/1/15	Light orange pegmatite with fine fracture fill of chlorite throughout. Betafite is visible without aide.	Package of banded cordierite gneiss and calcsilicate-quartzite. Titanite and pyroxene are present in the metasediments. The interval occurs below a marble unit of the Rössing upper marble package.
		RDD373-125m	431/536/ 0.8	Brannerite, magnetite, haematite, uraninite. Hydrothermal pyrite halos around reduced U phases.	Uran-42.7; Coff-40.4; Brann-6.5; Beta-10.5	Uran/1/14; Coff/1/4; Leuco/1/8	Orange pink pegmatite with finer-grained patches characterised by biotite and other mafic phases filling junctions between feldspars and milky quartz. Anomalous U is located around the finer grained patches.	Package of banded cordierite gneiss and calcsilicate-quartzite. Titanite and pyroxene are present in the metasediments. The interval occurs below a marble unit of the Rössing upper marble package.
		RDD373-155m	791/104/ 7.6	Hydrothermal pyrite veins, accompanied by fine, euhedral uraninite, 250 µm uraninite-coffinite replacement in fractures	Uran-92.3; Coff-6.1; Brann-1.5	No analyses	Coarse granitoid, intensely fractured and altered with chlorite coloration throughout. All feldspars are sericitised and are in equal proportions with quartz and an interactive contact with footwall gneiss.	Occurs in a gneissic unit between an upper marble unit and a quartzite-calcsilicate.
		RDD373-159m	349/54/ 6.5	No section	Uran-96.8; Coff-2.6; Brann-0.5	No analyses	Alaskite, grey in colour with oxidised orange tint, globular quartz patches with net-textured sericitised-clay feldspar matrix. Disseminated sulphides occur in association with mafic entrainments.	Gneiss package is intercalated with carbonate-quartzites, and granite veins. The package is part of a thick ~55 m succession of carbonate-silicate to gneissic rocks, which equate to the lower Rossing Gneiss of Nash (1997).

Prospect		Sample; U/Th/ratio ppm		Thin Section Highlights	QEMSCAN deportment wt% EPMA - mineral/ specimens/ analyses		Description	Location Geology
Swakop Uranium ML171	Husab Zone 2 U:Th = 7.41	RDD 005a 280-281	439/42/10.5	Euhedral uraninite, with later pyrite	Uran-99; Coff-1	No analyses	Alaskite with pegmatite texture, light pink quartz, in contact with a coarse textured gneiss, probably Rossing Formation. Quartz is dark grey to black in colour and >>feldspar.	Occurs within a gneiss package, which correlates to the Rössing Formation sequence.
		RDD 005b 280-281	438/38/11.5	No section	Uran-99.2; Coff-0.7	No analyses	Coarse gneiss with streaky to banded texture. Dark grey in colour with only minor interaction at the granite contact and a low % of feldspar development.	Occurs within a gneiss package, which correlates to the Rössing Formation sequence.
		RDD006 a 119-120	362/53/6.8	Minor magnetite with biotite, fluorspar and pleochroic inclusions in biotite, monazite and thorite.	Uran-78.6; Coff-15; Brann-6.2	No analyses	Fine grained alaskite with homogenous texture. Alteration throughout is evident in new fine feldspars (albite at rims) and haematite halos around disseminated mafic phases.	Occurs at a contact with upper Rössing Formation Schist.
		RDD006 145-146m	582/158/3.7	Uraninite-uranophane-zircon clusters with secondary Fe.	Uran-29.8; Coff-69.2; Brann-0.9	No analyses	Typical coarse textured alaskite with white feldspar and black smoky quartz. Fine textured patches appear to be remnant metasediment laths and contain abundant fine, mafic phases.	Located within a thick package of alaskite, intruding Rössing gneiss above the lower carbonate package.
		RDD 006 - 171-172	2439/229/ 10.6	Magnetite-ilmenite, magnetite with uraninite- has radiation cracks- weathered out U-oxide/silicates.	Uran-94.1; Coff-5.7	Uran/6/2 2	Typical coarse textured alaskite with white feldspar and grey, globular smoky quartz. Coarse, centimetric biotite occurs at one end of the core section	Located within a thick package of alaskite, intruding Rössing gneiss above the lower carbonate package.
		RDD006 a 245-246	338/46/7.3	Fine magnetite with biotite, pleochroic inclusions and fluorspar in some biotite, secondary U halos around metamict primary phases	Uran-47.5; Coff-52.4	No analyses	Typical coarse textured alaskite with orange-pink stained feldspar and black, globular smoky quartz. Quartz is dominant, and feldspar fills spaces in a net-textured assembly. Haematite is prominent near the metasediment contact.	Located within a thick package of alaskite, intruding Rössing gneiss above the lower carbonate package.
		RDD072 268-269m	929/423/2.2	Uranophane on grain boundaries and cleavages, migration of U into metasediment fractures at contact.	Uran-85.5; Coff-13.5	No analyses	Pegmatite, white, feldspar dominant with grey - milky, variably smoky quartz. Sample contains abundant uranophane/boltwoodite as coatings on late fractures and contacts a calcsilicate.	Alaskite intrudes calcsilicate within the lower carbonate package of the Rössing Formation.
		RDD102-318m	1656/199/ 8.3	Boltwoodite in fractures, pitchblende/coffinite and gummite. Uranophane in at least 3 generations of fracture veinlets. Uraninite surrounded by gummite and/or jarosite halos.	Uran-9.3; Coff-90.5	No analyses	Pegmatite, white, feldspar dominant with grey - milky, variably smoky quartz. Coarse biotite books occur, sparsely throughout the interval. Sample contains abundant uranophane/boltwoodite as coatings on late fractures and contacts a calcsilicate.	Alaskite intrudes calcsilicate within the lower carbonate package of the Rössing Formation.
		RDD157-344m	787/137/5.7	Uraninite <0.2 mm associated with biotite, 1 mm botryoidal masses of pitchblende also with biotite. Magnetite with biotite.	Uran-35.2; Coff-62.9; Brann-1.85	No analyses	Quartz dominant alaskite interval, minimal feldspar with quartz displaying a replacement texture by linking grains in dense chains. Smoky grey to black in colour. Replacement quartz is accompanied by fine haematite and sericitisation of feldspar.	Occurs toward the base of the Rossing formation within the carbonate package.

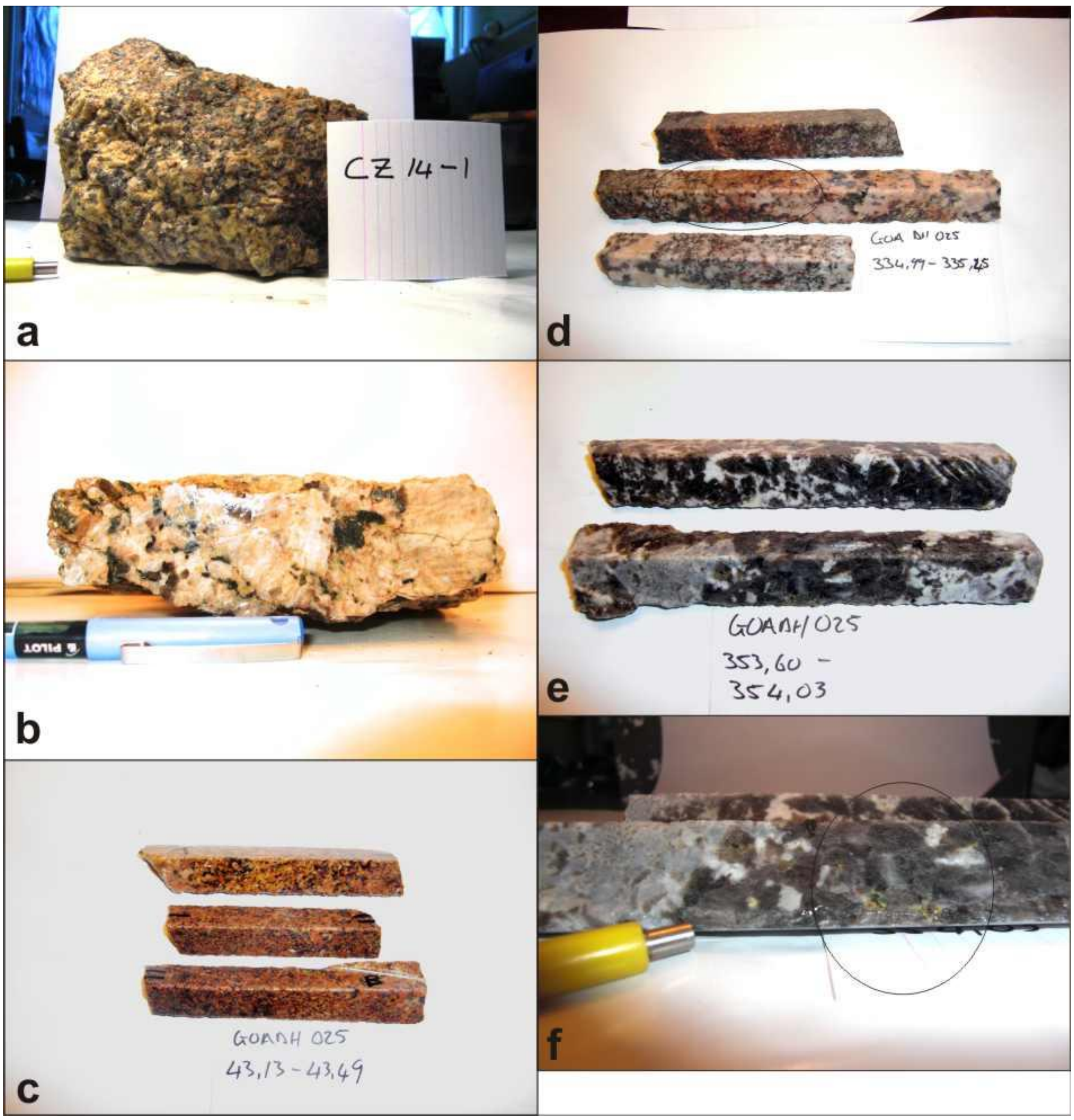
Valencia Mineralogy Sample Summary

Prospect		Sample; U/Th/ratio ppm		Thin Section Highlights	QEMSCAN deportment wt% EPMA - mineral/ specimens/ analyses		Description	Location Geology
Valencia Uranium ML150	Valencia Main Ore body U:Th = 10.93	VALG11 surface	257/43/6	Metamict primary phases in fractured microcline, secondaries in microcline cleavage, zircon in biotite	Uran-98.7	Uran/7/23	Distinct homogeneous texture, quartz is smoky and in singular, or 2-3 grain clusters, feldspar is white.	Sourced from a test pit on the southern section of the exposed alaskite ore body.
		VALG26 surface	564/45/12.5	Secondary U on quartz, associated with pleochroic halos in biotite, 2 generations of quartz-one is strained	Uran-62.8; Coff-31.4; Uranoph-5.5	No analyses	Distinct homogeneous texture, quartz is smoky and in singular, or 2-3 grain clusters and sometimes in rune/graphic shapes, feldspar is white.	Sourced on surface from a large alaskite body, which forms part of the main ore body.
		Va26 113 81.84-82.22	182/16/11.3	No section	Uran-98.7	No analyses	Typical black and white alaskite, colloquially described as 'salt and pepper' texture at prospect.	Alaskite occurs within a package of uraniferous pegmatite, all intruding a coarse grained Rössing schist.
		Va26 113 155.97-156.23	326/30/10.9	No section	Uran-97.8	No analyses	Light pink, coarse with a reaction margin at Rössing gneiss contact, and minor haematite staining.	Alaskite occurs within a package of U-barren pegmatite, all intruding a coarse grained Rössing schist.
		Va26 113 225.64-225.89	559/106/5.3	No section	Uran-97.3	Uran/6/22	Light pink and white coloured alaskite, pegmatitic with coarse quartz chains and inhomogeous haematite staining.	Alaskite occurs within a package of uraniferous pegmatite, all intruding a coarse grained Rössing schist.
		Va26 141 259.57-260.00	138/9/15.3	Chloritised biotite and myrmekite, new quartz textures	Uran-99.2	No analyses	Coarse alaskite-pegmatite with variably smoky quartz in chains and clusters. Alteration dominated by haematite staining along fracture and mineral boundary planes.	Intrudes a thick package of cordierite gneiss, interpreted as Kuiseb Schist.
		Va26 141 261.69-262.00	315/14/22.5	High % of biot contains multiple radioactive inclusions - uraninite most <25 µm and sub-hedral >40 µm disseminated uraninite.	Uran-99.3	No analyses	Coarse alaskite-pegmatite with variably smoky quartz in chains and clusters. Alteration dominated by haematite staining along fracture and mineral boundary planes.	Intrudes a thick package of cordierite gneiss, interpreted as Kuiseb Schist.
		Va26 141 290.75-291.84	260/29/9	No section	Uran-99.1	Uran/5/24; Coff/2/5	Typical black and white alaskite, colloquially described as 'salt and pepper' texture at prospect. Quartz is in singular and small clusters, rarely in chains, and moderately smoky. Biotite is coarse.	Intrudes Rössing Formation cordierite gneiss.
		Va26 141 301.29-301.60	101/18/5.6	Prominent uraninite >100 µm inclusions in biotite	Uran-99.1	No analyses	Foliated granite, high % biotite in streaks defining fabric. Moderately smoky fine-grained quartz.	Intrudes Rössing Formation cordierite gneiss.

Appendix F7 Photographs of samples submitted for QEMSCAN analyses

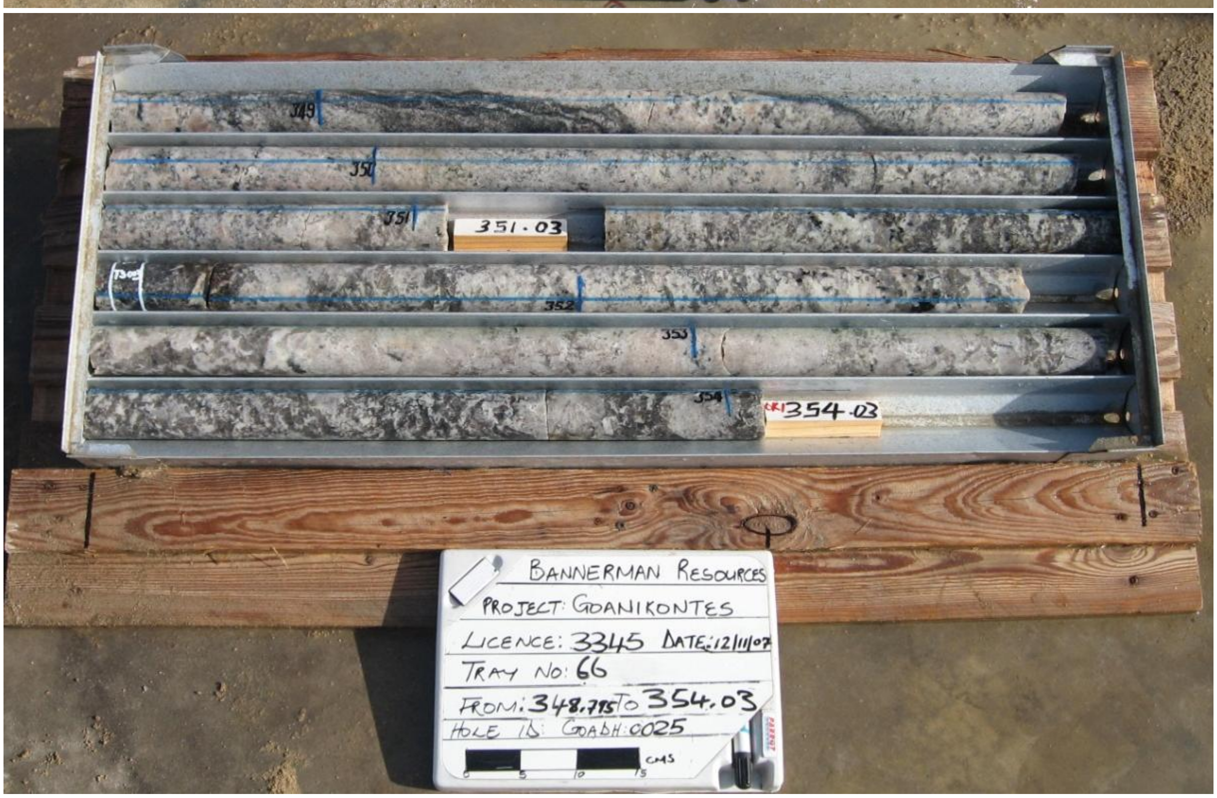
Samples from the Goanikontes (including a single Hildenhof Anomaly sample) Husab-, Ida Central-, and Valencia deposits were prepared for analysis by QEMSCAN. The preparation was completed at the University of the Witwatersrand, Johannesburg. All QEMSCAN analyses were performed at SGS, Johannesburg under the supervision of Dr. Brandon Youlton.

Goanikontes and Hildenhof



Preceding Page - Appendix 7.3a Photographs of surface and core specimens. **(a)** Surface sample CZ14-1, mineralised SLG from Rabbit Valley. Sample has typical smoky quartz, even texture and minor accessory biotite. **(b)** Surface sample HILG 19, Hildenhof Anomaly, the sample has a pegmatitic texture and large books and laths of biotite, often accompanied by visible secondary-U minerals. **(c)** ¼ -Core sample DH025 43.13-43.49, near surface sample, weathering by meteoric fluids has resulted in Fe-oxide (limonite) staining of the feldspars. **(d)** Sample DH025 334.99-335.45 is a coarse grained 'E-type' with a distinct oxidation halo (circled). FeO staining is prominent at the contact with the country gneiss (Khan FM). **(e)** Typical 'D type' SLG of DH025 353.60-354.03, with characteristic black smoky quartz and white feldspar, with no FeO staining visible. Quartz grains are in chains, giving the sample an irregular texture. **(f)** Close-up of the sample in '**e**', highlighting the visible secondary U minerals, these surround a large (2 mm) magnetite and has permeated along fractures between the quartz and feldspar grains.


333:03
336·03
BANNERMAN RESOURCES
PROJECT: GOANIKONTES
LICENCE: 3345 DATE: 11/11/07
TRAY NO: 63
FROM: 332.32 TO 337.75
HOLE ID: GOADH:0025

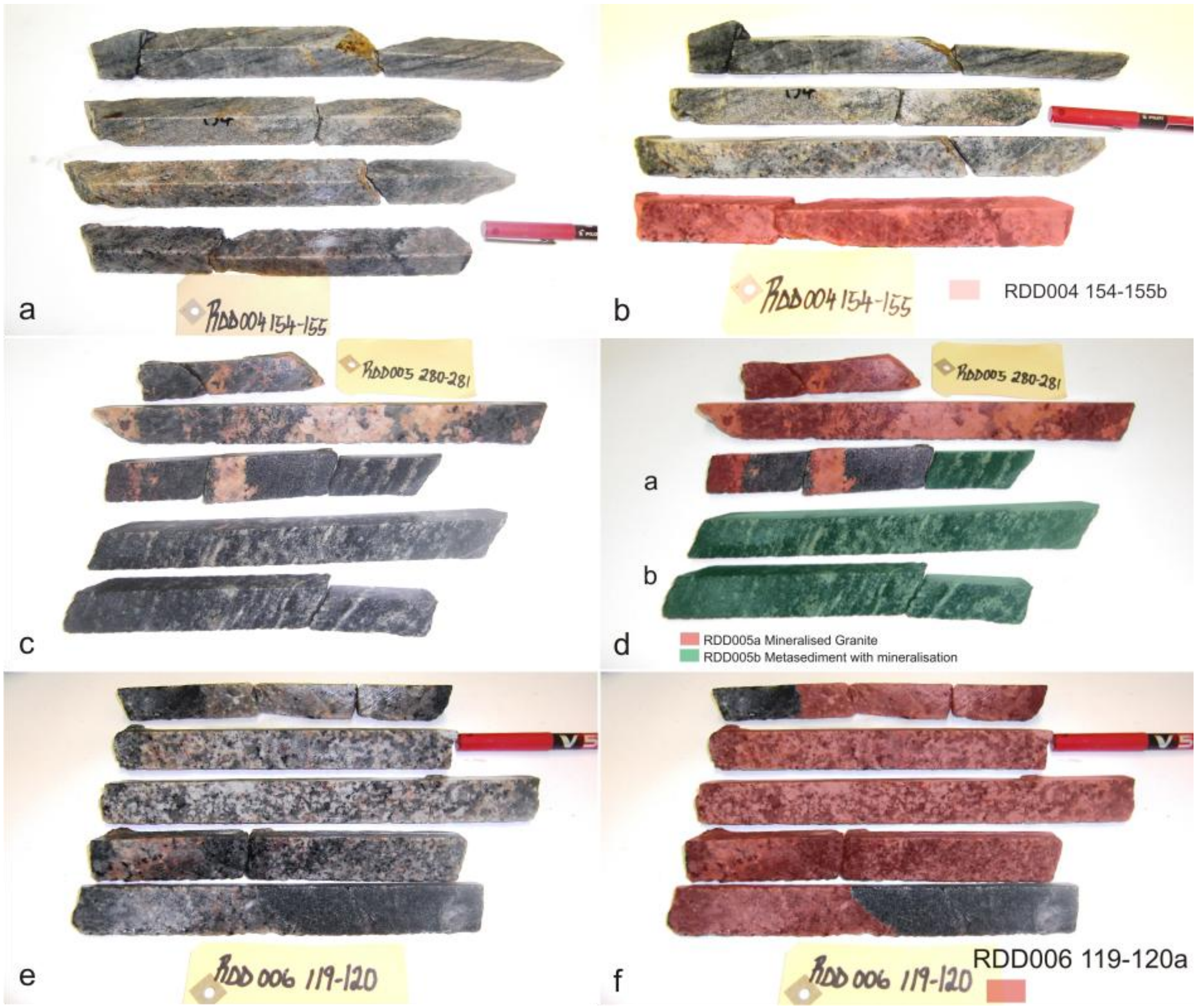

351·03
354·03
BANNERMAN RESOURCES
PROJECT: GOANIKONTES
LICENCE: 3345 DATE: 12/11/07
TRAY NO: 66
FROM: 348.795 TO 354.03
HOLE ID: GOADH:0025

Husab

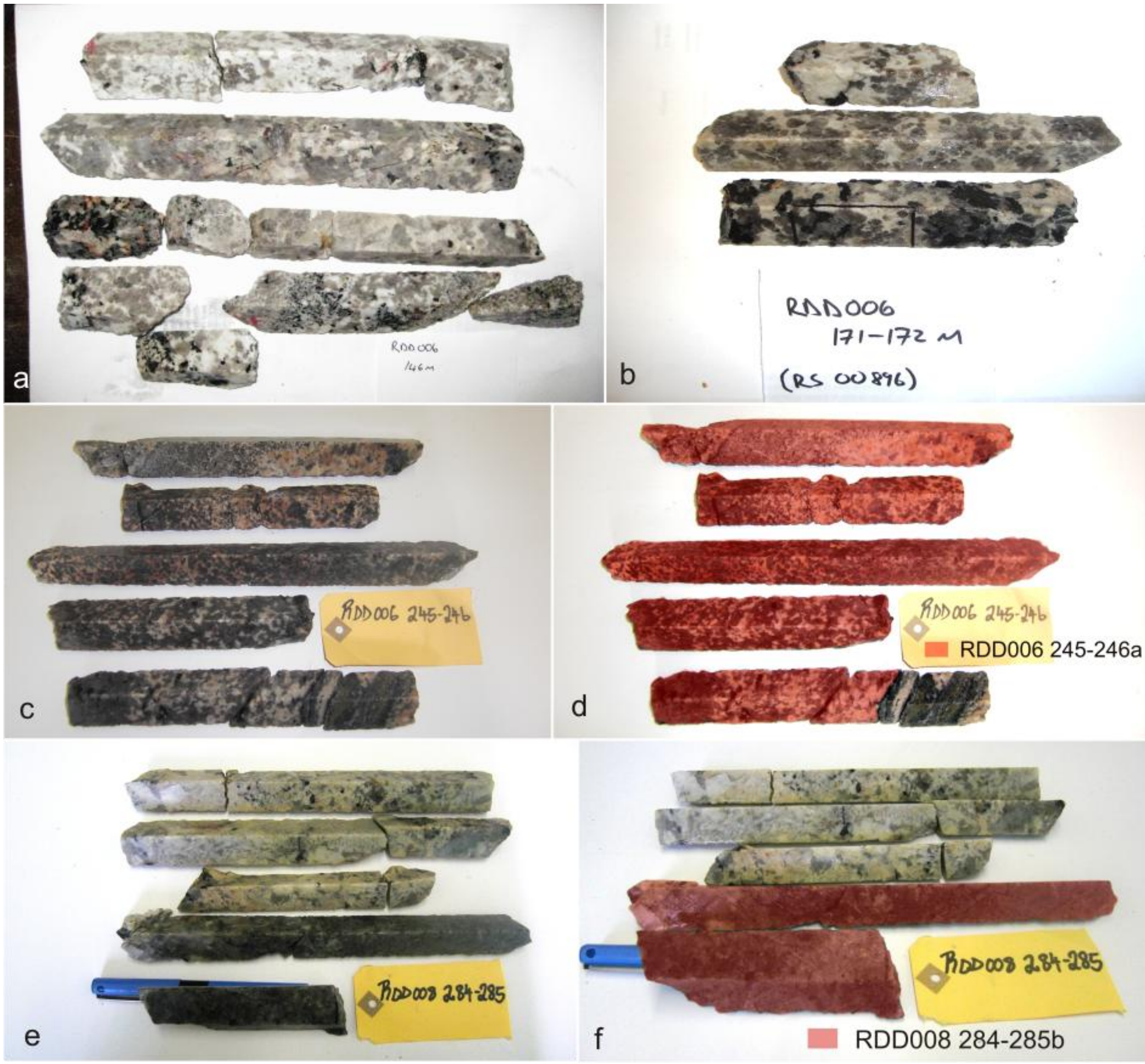
The sample set includes seven sections of ¼ NQ core. The granite is a typical D-type, with smoky quartz, minor biotite and is similar to those at Rössing, Ida Central, Garnet Valley and Holland's Dome in both colour and texture. It is medium to coarse grained, however, it is not as homogeneous as one would expect from a typical mineralised SLG. There are large biotite laths in parts that have likely been entrained from the gneiss it intrudes as it is somewhat skeletal in thin section.

The granite varieties in the sample set include three varieties of ore and at least three varieties of U-barren SLG. The mineralised varieties include typical D type texture and colouration as well as typical E type varieties with the characteristic red and orange oxidation staining a prominent feature. There is an additional texture, a medium to course inhomogeneous variety that has laths of biotite entrained in it. This variety has also been observed in other localities at the Ida Dome as well as Goanikontes and Valencia. In addition to the mineralised granites there are also uranium enhanced calc-silicates, from the Rössing Formation that carry grades of uranium that compare with the granites.

Husab

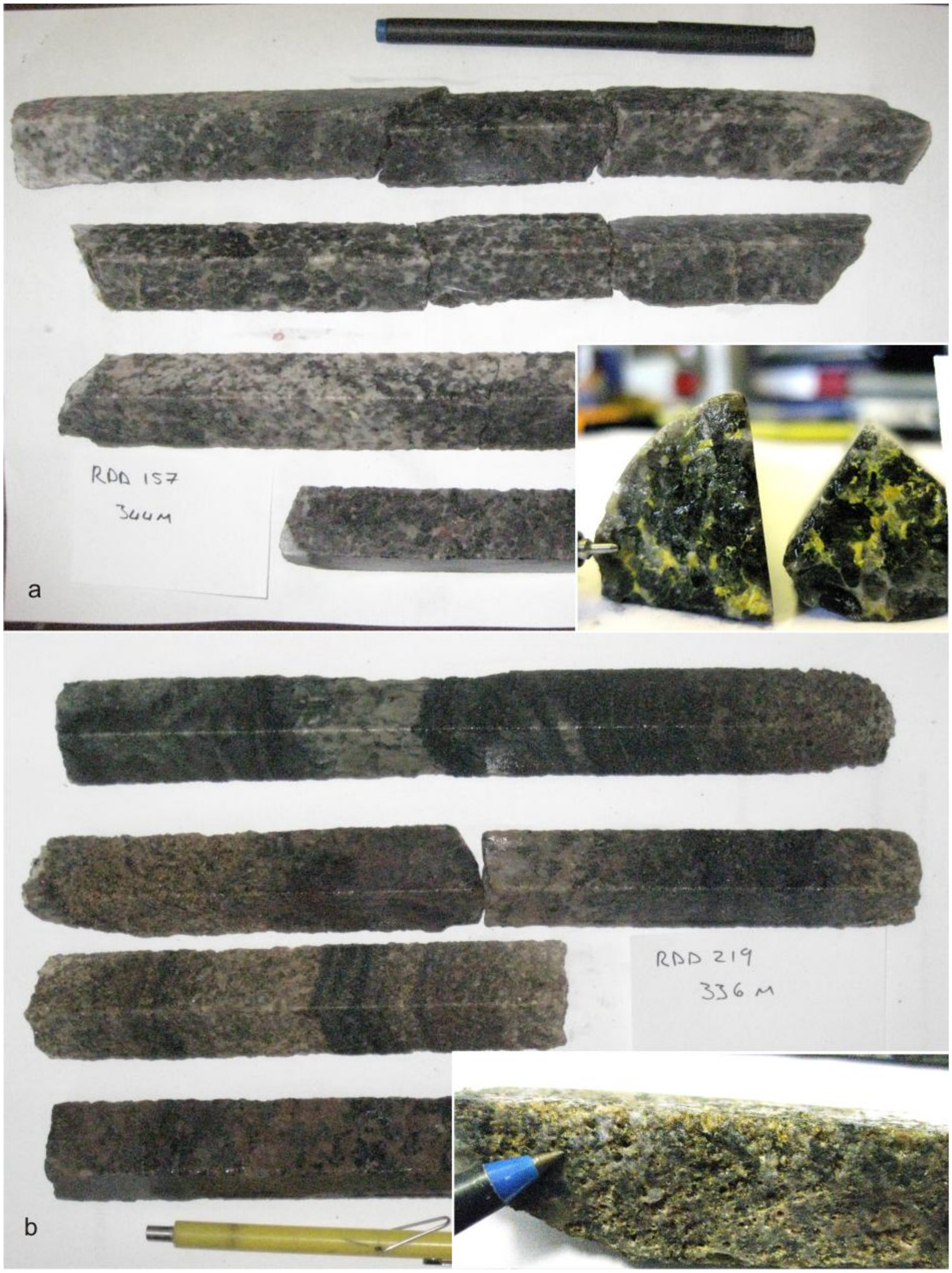


Appendix 7.3b Core sections from the Husab deposits at Zone 1 and Zone 2 The sections of core selected for QEMSCAN analyses are highlighted in red and green **(a-b) Zone 1** RDD004 154-155 consists of a section of quartzite, aplitic granite, characterised by sericitisation of feldspar, with little U content, and a quartz-rich granitoid that is mineralised. **(c-d) Zone 2** RDD005 280-281 consists of a mineralised granite with typical coarse to pegmatitic texture and smoky quartz. The granite has significant amounts of entrained biotite and an interactive contact with the country gneiss. The gneiss is interpreted as Chuos, due to its texture and prominent augen (elongate/deformed). **(e-f) Zone 2** RDD006 119-120 is comprised of a typical D type leucogranite (alaskite) along with some in-homogeneity in texture and colour associated with the contacts with the Chuos diamictite (drop stone at bottom right of image).



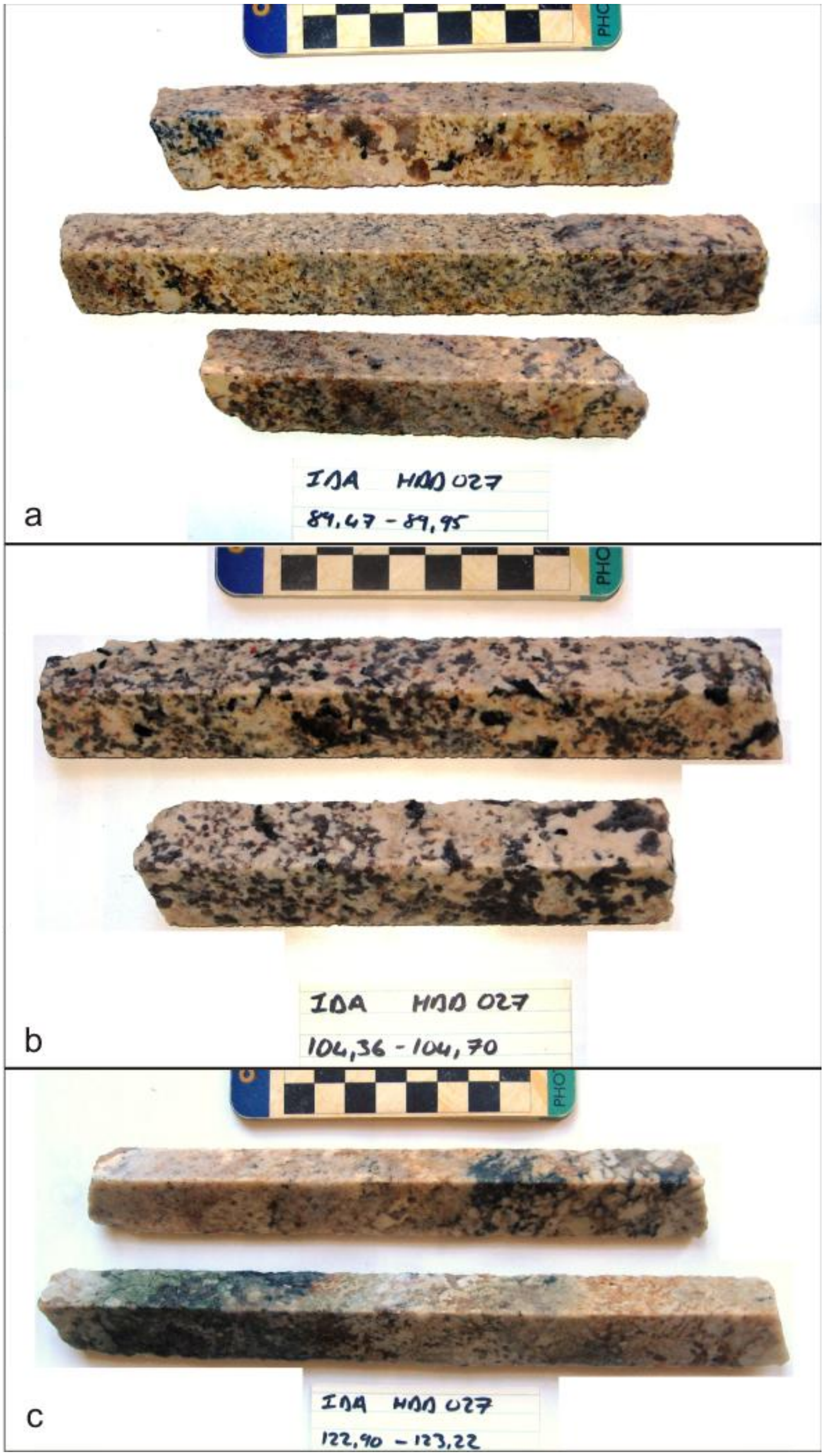
Core sections from the Husab deposits at Zone 1 and Zone 2 The sections of core selected for QEMSCAN analyses are highlighted in red and green **(a) Zone 2** RDD006 145-146, coarse - pegmatitic sheeted leucogranite, with moderately smoky quartz and coarse biotite. **(b) Zone 2** RDD006 171-172, the sample is about 40 cm long and consists entirely of pegmatitic alaskite, the quartz is not as smoky as is expected, however there are large biotite laths which are often associated with mineralisation in other deposits. **(c-d) Zone 2** RDD006 245-246 is a typical E type as seen at Goanikontes and Ida Central, the ubiquitous 'oxidation halo' staining is prominent, the green epidote present in the gneiss contact zone is a mineral usually seen in the upper Khan Formation, especially with skarns. **(e-f) Zone 1** RDD008 284-285 is unique in the sample set as it is a sulphide bearing calc-silicate, the granite intruding it is relatively barren.

Core sections from the Husab deposits at Zone 1 and Zone 2 The core sections illustrate samples with well-formed secondary uranium minerals, namely uranophane (β-) and boltwoodite (Townend, 2009). **(a) Zone 1** RDD060 288-289 Coarse, inhomogeneous textured leucogranite with coarse biotite books and patches of graphic and aplitic textured quart-feldspar. **(b)** Zone 2 RDD072 268-269 Pegmatitic leucogranite with low % of quartz. K-feldspar is dominant and biotite occurs as fine disseminated books (<0.5 cm) **(c) Zone 1** RDD078 362-363 Pegmatitic leucogranite, quartz is milky, and only locally smoky, associated with biotite. Fractures and vugs contain secondary uranium minerals. **(d) Zone 1** RDD141 244-245 Typical D-type texture; Coarse to very coarse grainsize, homogeneous textures in patches. Quartz is most often globular, clustered and intensity of colour (black-smoky) may be used as an indicator of U content. **(e) Zone 1** RDD145 412-413 Typical D-type with inhomogeneous, coarse texture, dark smoky quartz and coarse accessory biotite books. **(f-g) Zone 2** RDD102 317-318 Brittle fractures serve as pathways and deposition sites for u-bearing fluids. These may crosscut metasomatic alteration features, indicating that lower T° fluids are responsible for U transport and deposition. The presence of well-formed, secondary minerals such as boltwoodite indicates hydrothermal fluid circulation over a protracted period, first to leach silicates and later to deposit remobilised uranium.



Textural varieties of uraniferous granites at Husab. **(a) Zone 2** RDD157 343-344 Quartz-rich segregations and pods occur sporadically throughout CZ uranium deposits, but are frequently associated with high U content and contain visible mineralisation. In some instances, the leucogranite is dominated by chains and clusters of quartz, with only interstitial feldspars. **(b)**

Ida Dome



Photographs of granite core samples from Ida Central and Husab. **(a)** HDD027 89.47-89.95, with typical 'E-type' colouration, inhomogeneous texture, and a mixture of smoky and clear quartz. **(b)** HDD027 104.36-104.70, typical 'D-type' texture with white feldspars and smoky quartz, fairly homogeneous despite variable grain size with minor biotite content. **(c)** HDD027 122.9-123.22, the sample contains an anomalous zone of uranium mineralization characterised by haematisation and magnetite with epidote and biotite-chlorite, quartz in this zone is smoky.

Valencia

Appendix 5.14 Valencia QEMSCAN samples. **a and b)** Surface samples. **c to f)** Samples from Va26 141. **g to i)** Samples from Va26 113.

Preceding Page - Photographs of granite samples from the Valencia Deposit. a) VALG 11, grab sample from the Goldfields test pit, the sample has the typical 'salt and pepper' colouration and texture of a mineralised leucogranite. b) VALG 26 is an in-situ sample from the main mineralised body, 100 m from kink-fold hinge, the sample is characterised by veinlets of smoky quartz, and these are also common in mineralised leucogranites. **1.1c-f** Samples from Hole Va26 141. c) Altered sample from 259.57-260 m depth with growth of sericite on feldspars and haematite in fractures throughout sample. d) Un-altered sample from 290.75-291.04 m depth, mineralisation appears to be around laths of biotite where smoky quartz is darkest, inhomogeneous texture. e) Altered sample from 261.69-262 m depth, mineralisation is localised at a quartz rich pod in the sample characterised by haematisation. f) Un-altered sample from 301.29-301.60 m depth, sample has entrained laths of biotite and has inherited gneissosity from the country rock. g) Typical well mineralised sample from the 81.84-82.22 m interval, the sample shows little alteration from groundwater. h) Altered sample from the 155.99-156.23 m interval, it has minor entrained biotite at the country rock contact, inhomogeneous texture highlighted by large smoky quartz patches, limonite, haematite and sericite are found throughout. i) Altered sample from the 225.64-225.89 m interval, the sample has an inhomogeneous texture also characterised by large smoky quartz patches accompanied by disseminated haematite staining, limonite colouration is a result of weathering by brackish groundwater.

RDD006 QEMSCAN samples in core trays


RDD006
Box # 4
From: 118.41
To: 124.95
13/11/2008

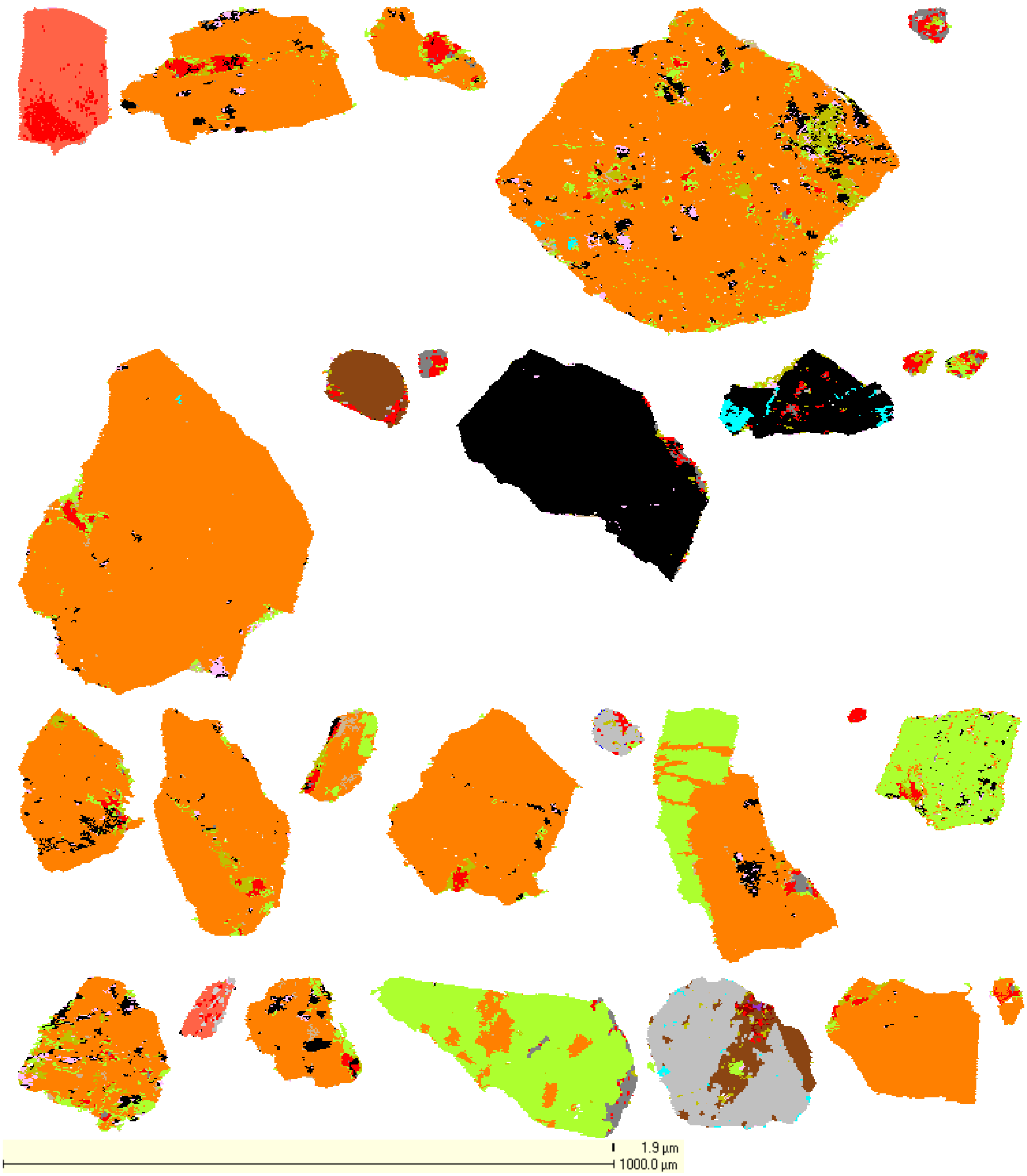

RDD006
Box # 8
From: 144.05
To: 150.20
13/11/2008


RDD006
Box # 12
From: 169.33
To: 175.71
13/11/2008


RDD006
Box # 23
From: 240.54
To: 246.83
13/11/2008

Appendix F8 QEMSCAN mineral map collages (original data)

CZ14-1

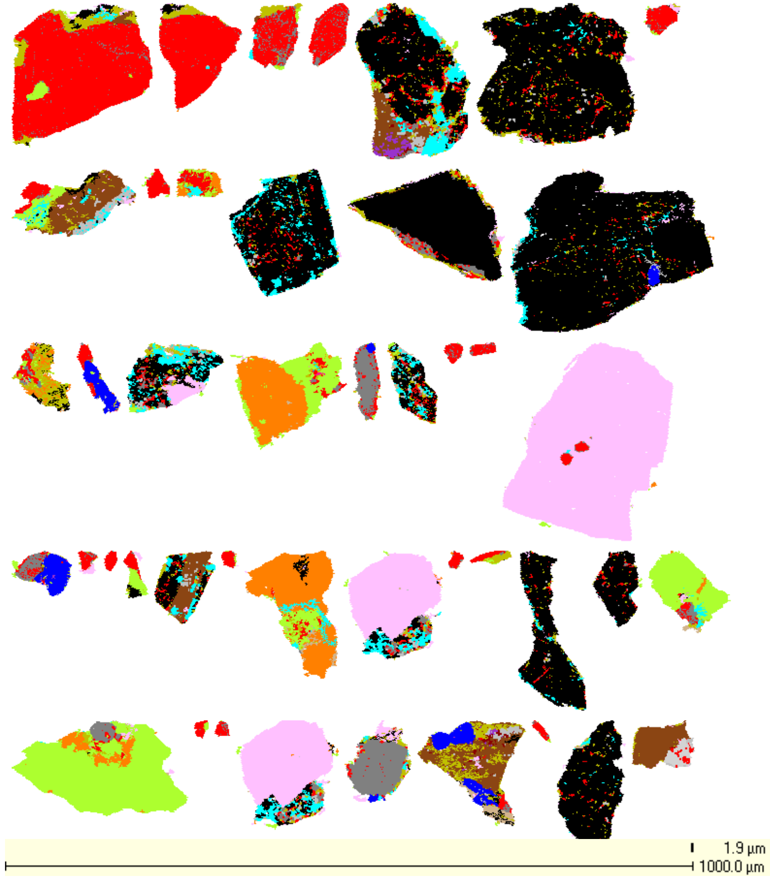


CZ14-1. The majority of the uranium bearing grains occur as inclusions in feldspars, uraninite also occurs as inclusions in phosphates and Fe-oxides (magnetite), Fe-Ti oxides (ilmenite) and is associated with thorite (silicate). As the largest grains are represented in the map, there may be 100 % uraninite grains in the sample that are smaller in size than the grains represented above. CZ14-1 is a surface sample and uraninite trapped in larger grains has been preferentially retained during the weathering process.

HILG 21

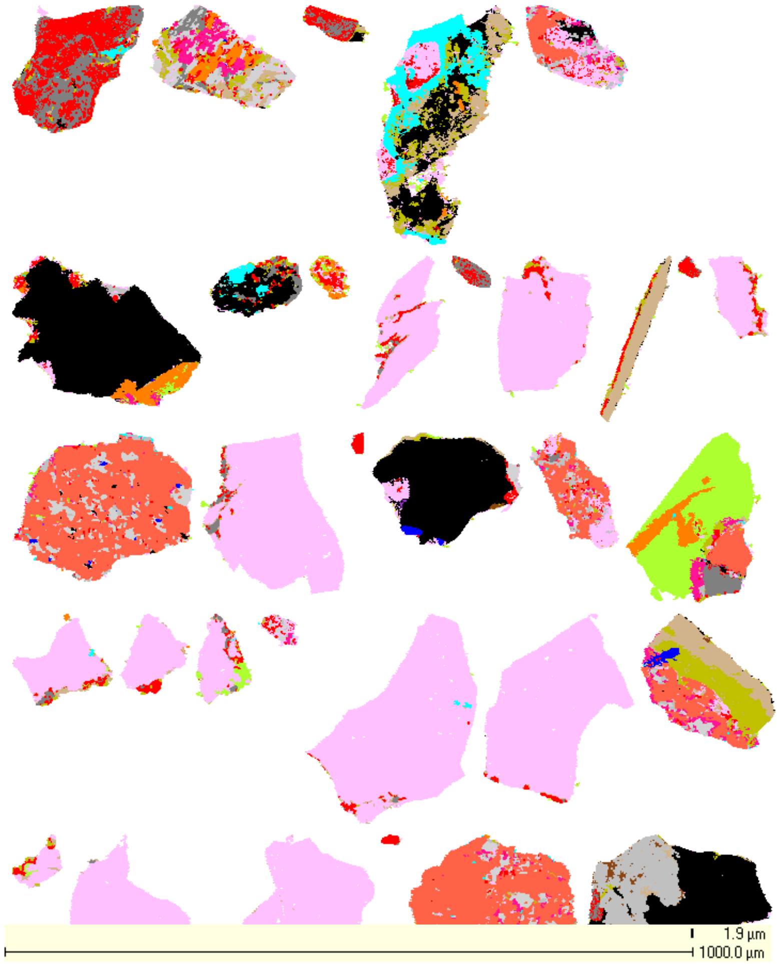
HILG 21. Uraninite is the dominant uranium bearing phase, the map shows a bimodal grainsize distribution, with finer grains predominantly uranium oxide-silicates, a product of surface weathering. The chlorite is a possible result of the weathering of biotite, where uraninite is found II to the cleavage. Uraninite in this sample is up to 300 µ across.

DH025 43.13-43.49



DH015 43.13-43.49. Uraninite is the main uranium bearing phase, it occurs as singular grains up to 200 µ across, and as inclusions in magnetite, feldspar, quartz and phosphates, and it is also associated with zircon, Fe-Ti oxides and has altered to U-silicates in some finer grains. Some uraninites are large enough to have feldspar inclusions.

DH025 334.99-334.45



DH025 334.99-335.45. Uraninite is found along quartz grain boundaries and fracture planes, along biotite cleavages, as inclusions in phosphates such as monazite and apatite, and on the edges of magnetite crystals. Some uraninite grains are altering to U-silicates.

DH025 353.60-354.03

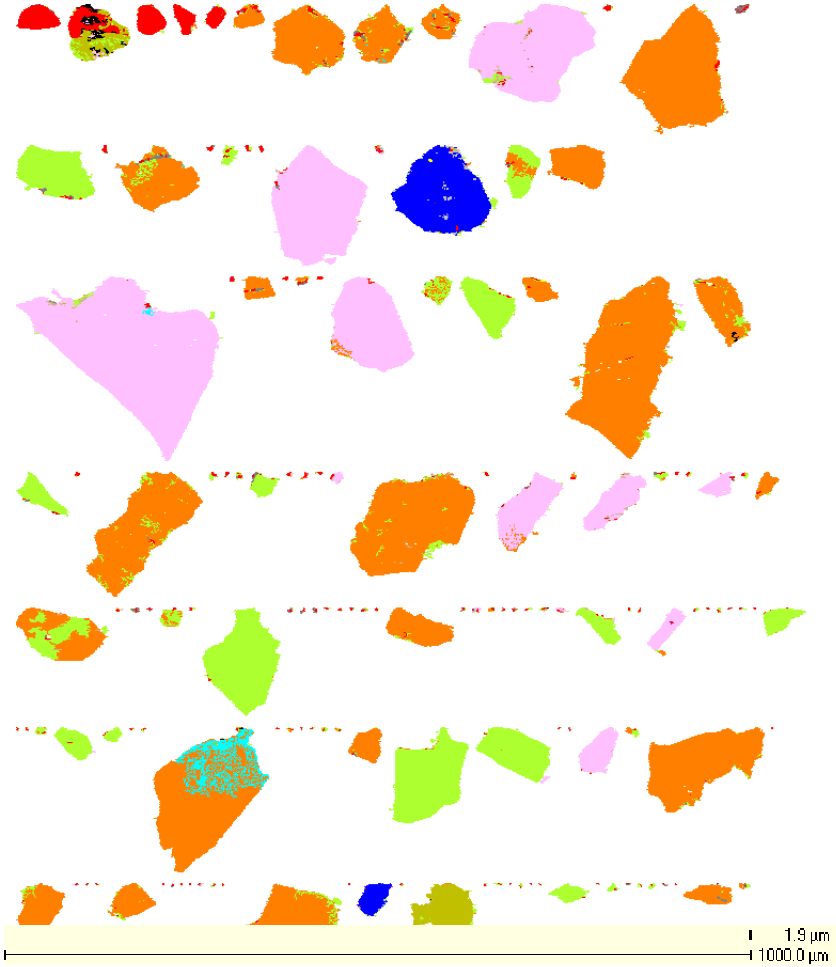
DH025 353.60-354.03. Uranium is predominantly in uraninite, altering to U-silicates. Uraninite is also associated with magnetite, phosphates, quartz and feldspars.

Ida Dome

IDAG 08

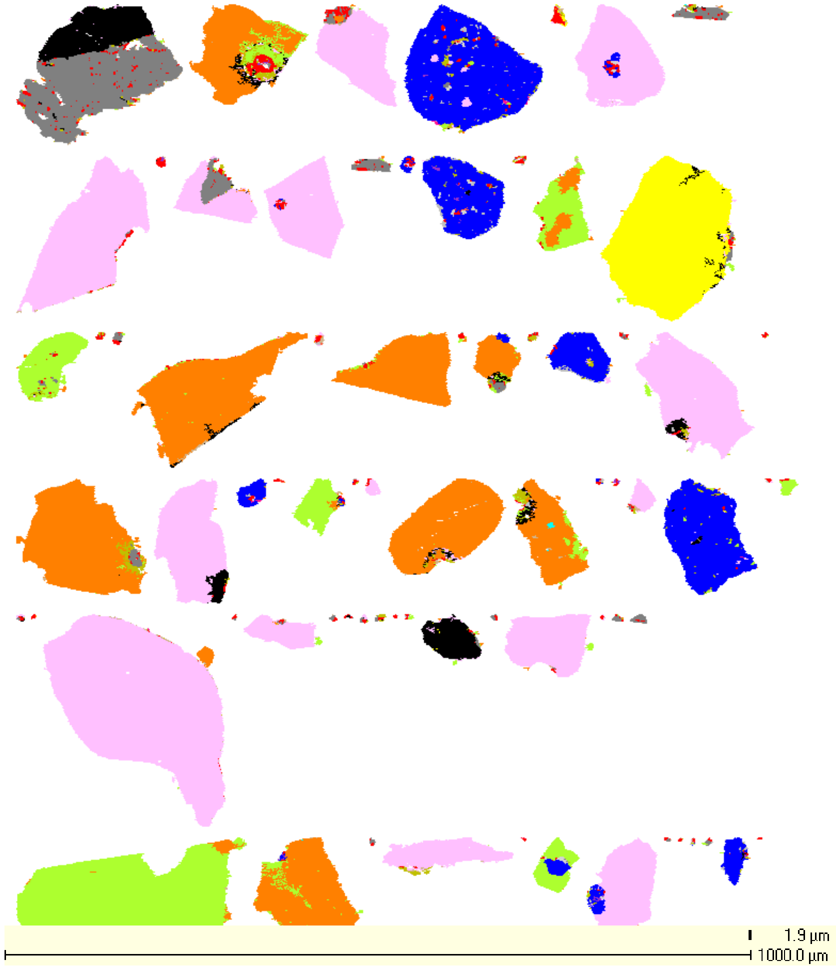
HDD027 122.90-123.22

IDAG 43



HDD027 104.36-104.70

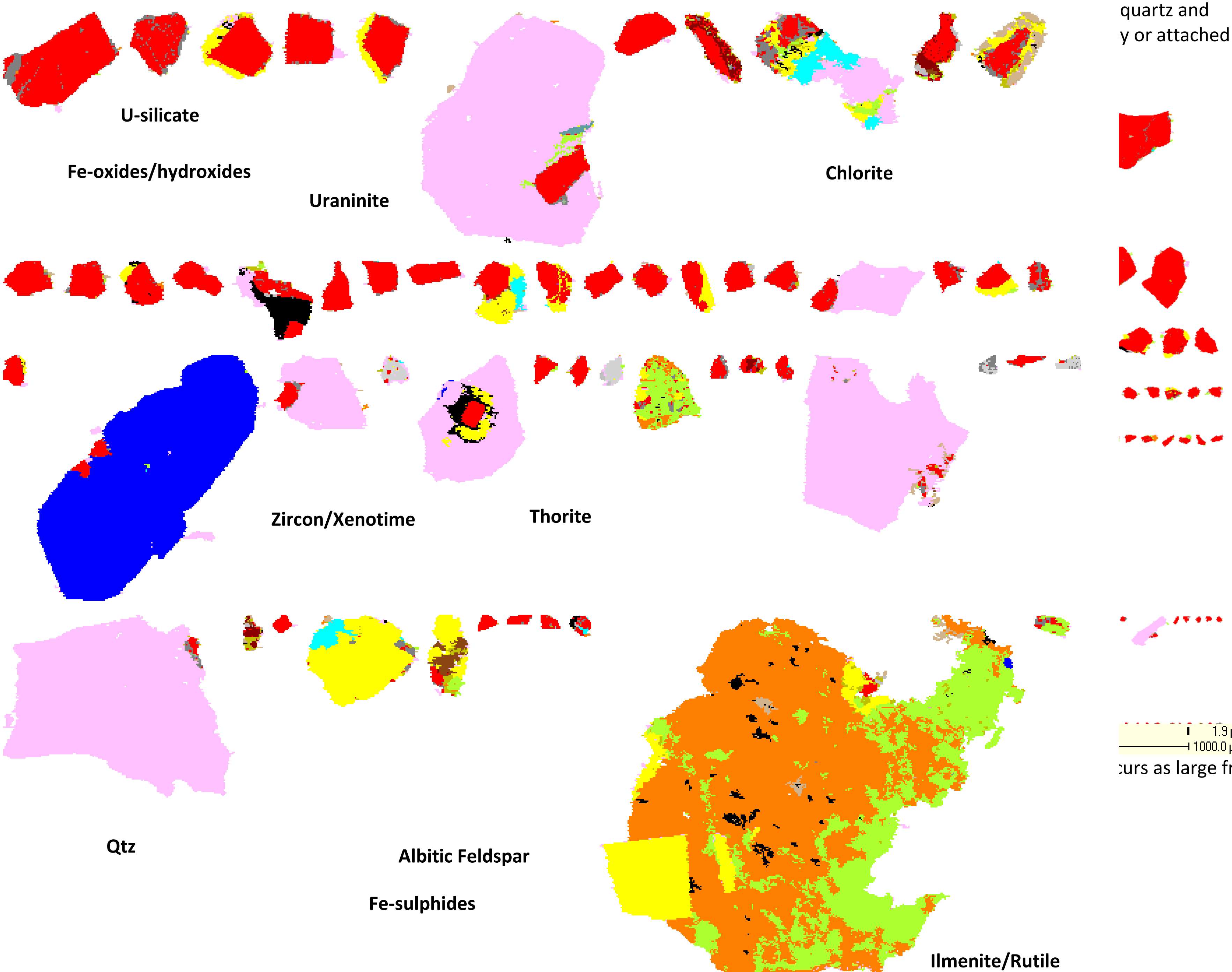
HDD027 89.47-89.95



RDD004 c 154-155

Husab

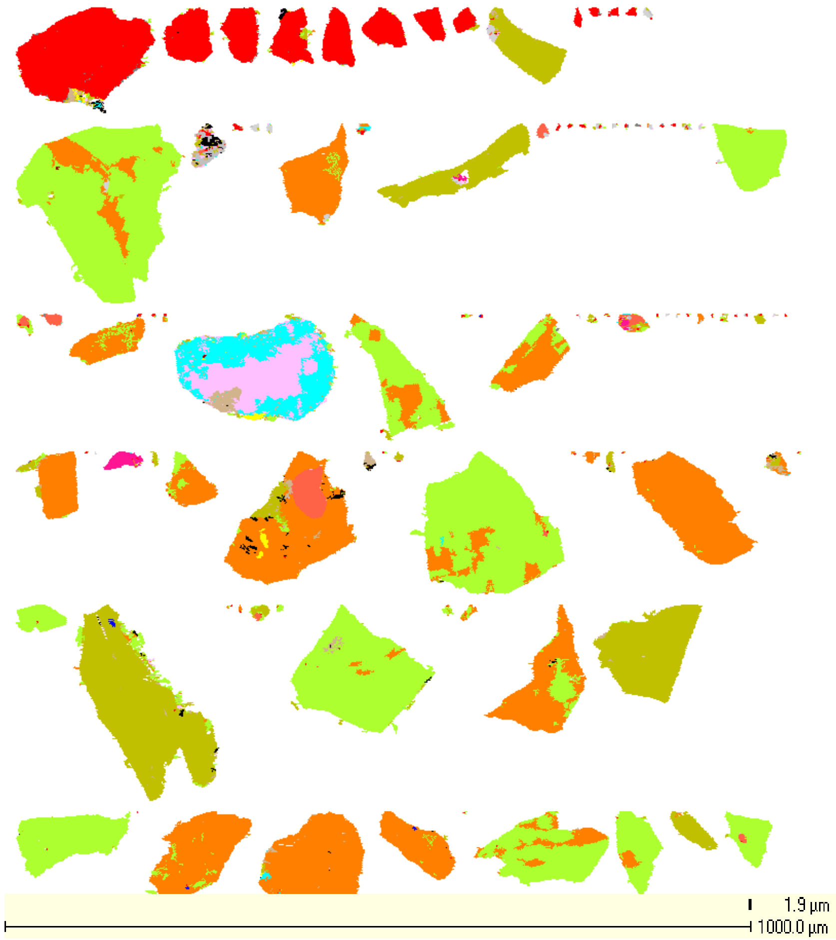
quartz and
y or attached to



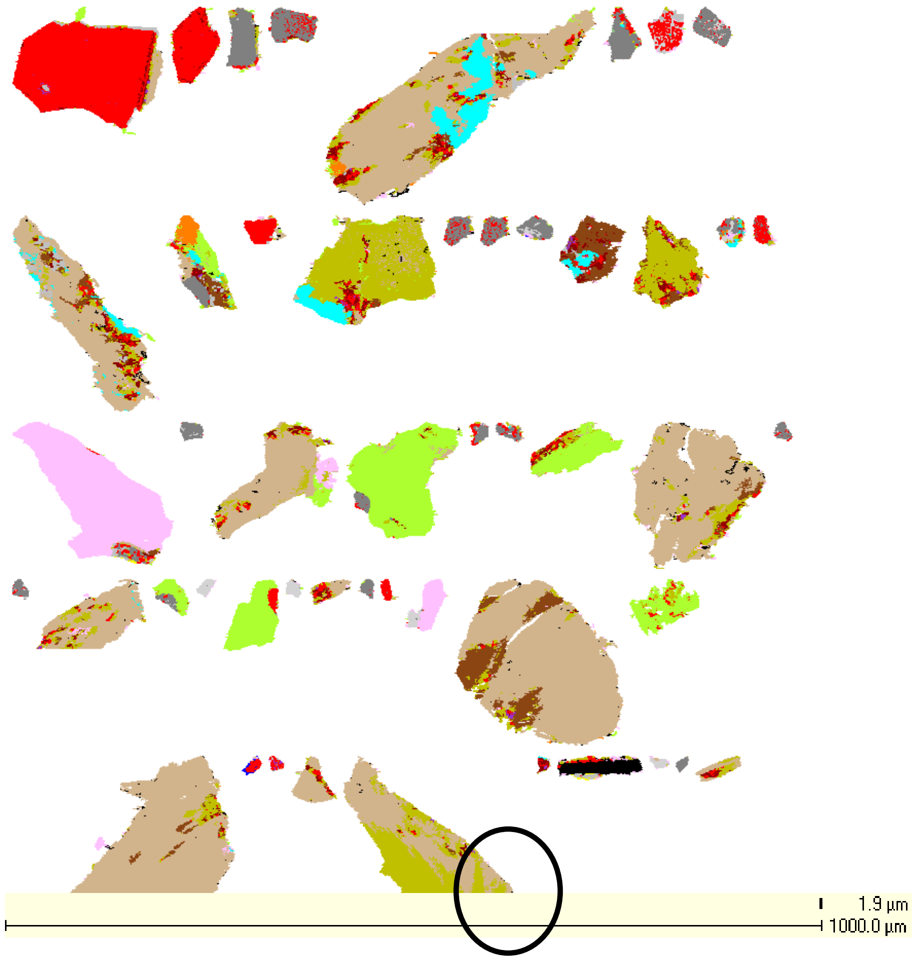
curs as large free

The metasedimenatary sample above is dominated by feldspars and phosphates with uraninite inclusions. There are large free uraninite grains present as well.

RDD005 b 280-281

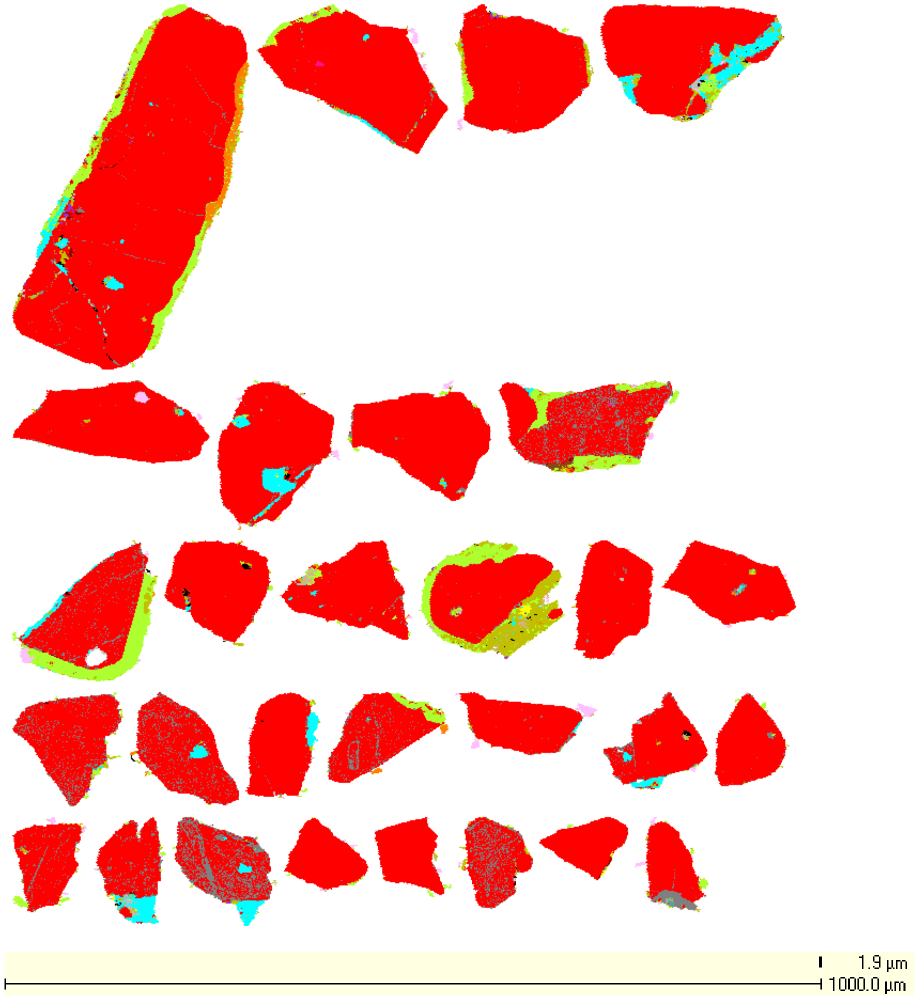


RDD006 a 119-120



Uraninite occurs as large free grains or as fine inclusions in biotite, the grainsize distribution. The circled grain would have a high liberation and a lower exposure, while the large grain at the top has a large liberation value, the fine layer of biotite and feldspar on its edges negate its exposure significantly, while not affecting its liberation as much.

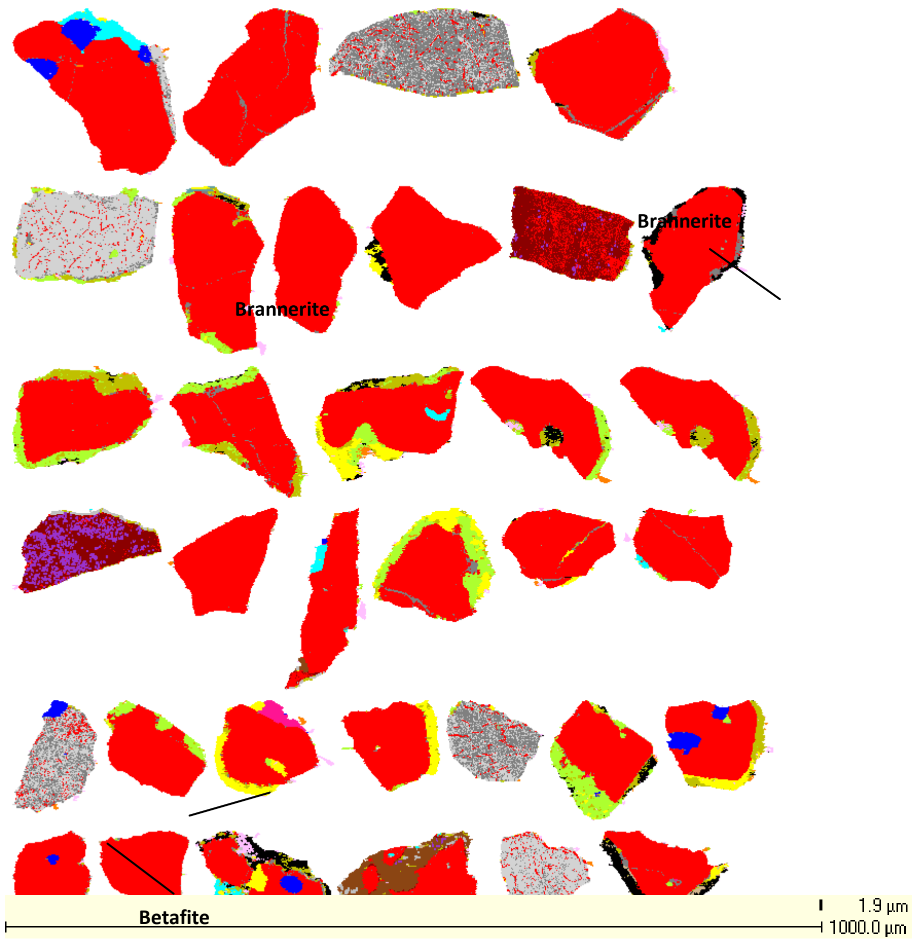
RDD006 171-172



Uraninite occurs as particularly large free grains in RDD006 171-172, it is often accompanied by feldspar and/or biotite rims, calcite may be a supergene feature.

RDD006 a 245-246

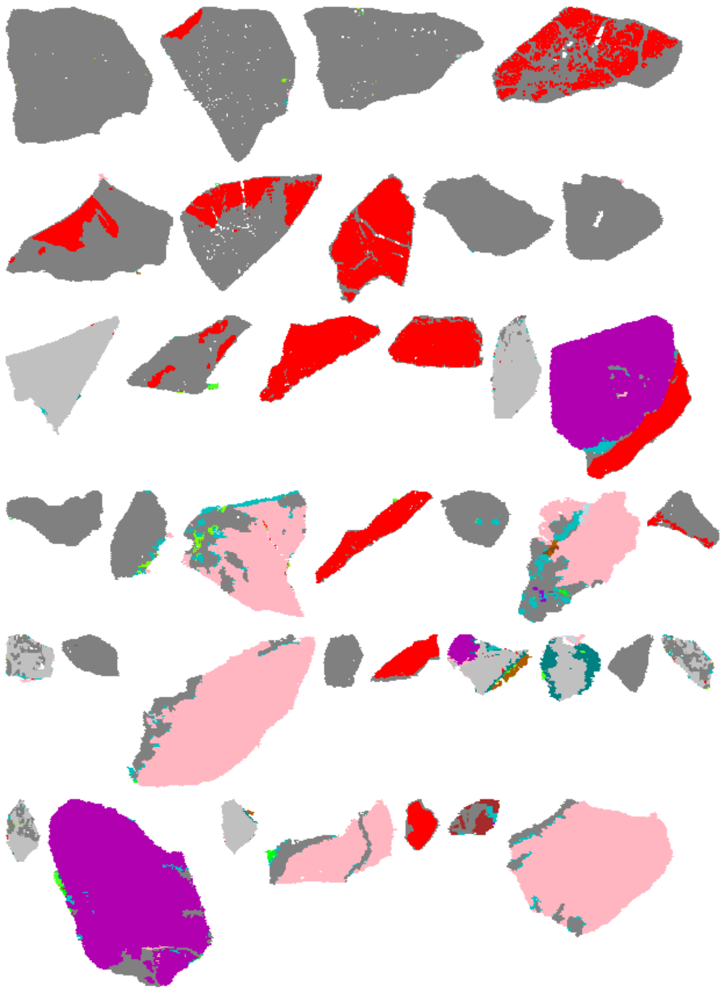
The largest uranium phase by grainsize in RDD006 a 245-246 is coffinite, uranium occurs as free grains or as inclusions and coatings, particularly quartz.

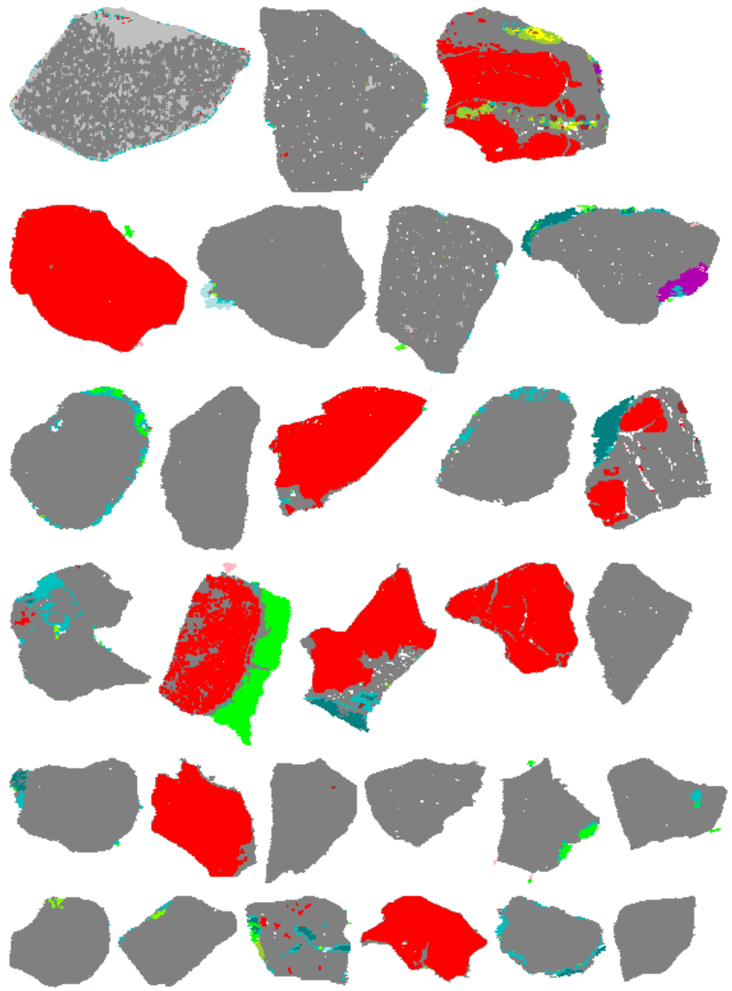


Uraninite occurs as fine inclusions in thorite, it is also intergrown with brannerite and betafite.

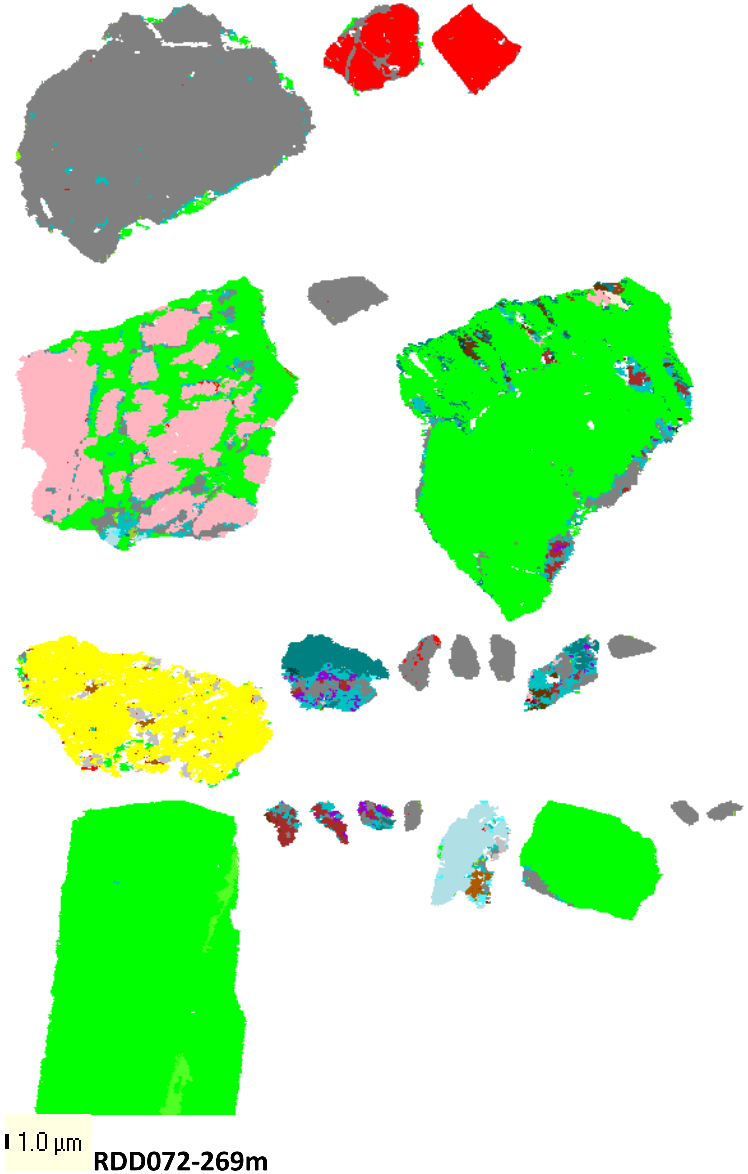
RDD008 b 284-285

RDD006-146m

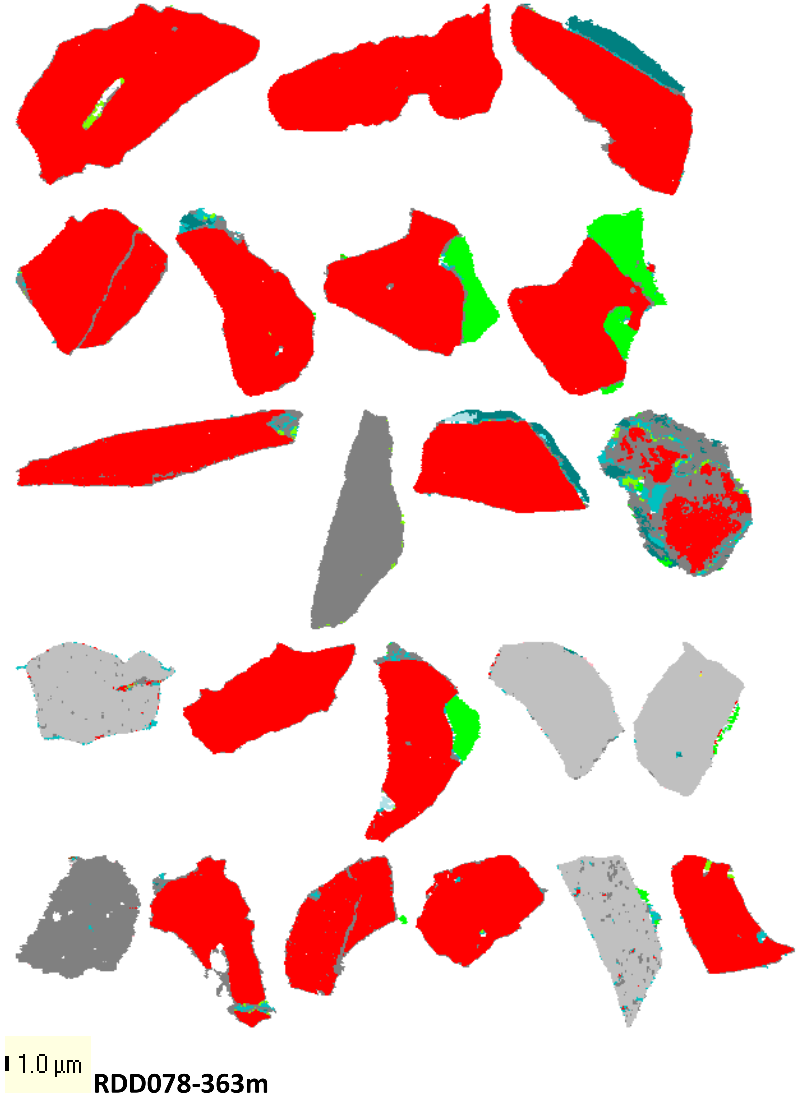




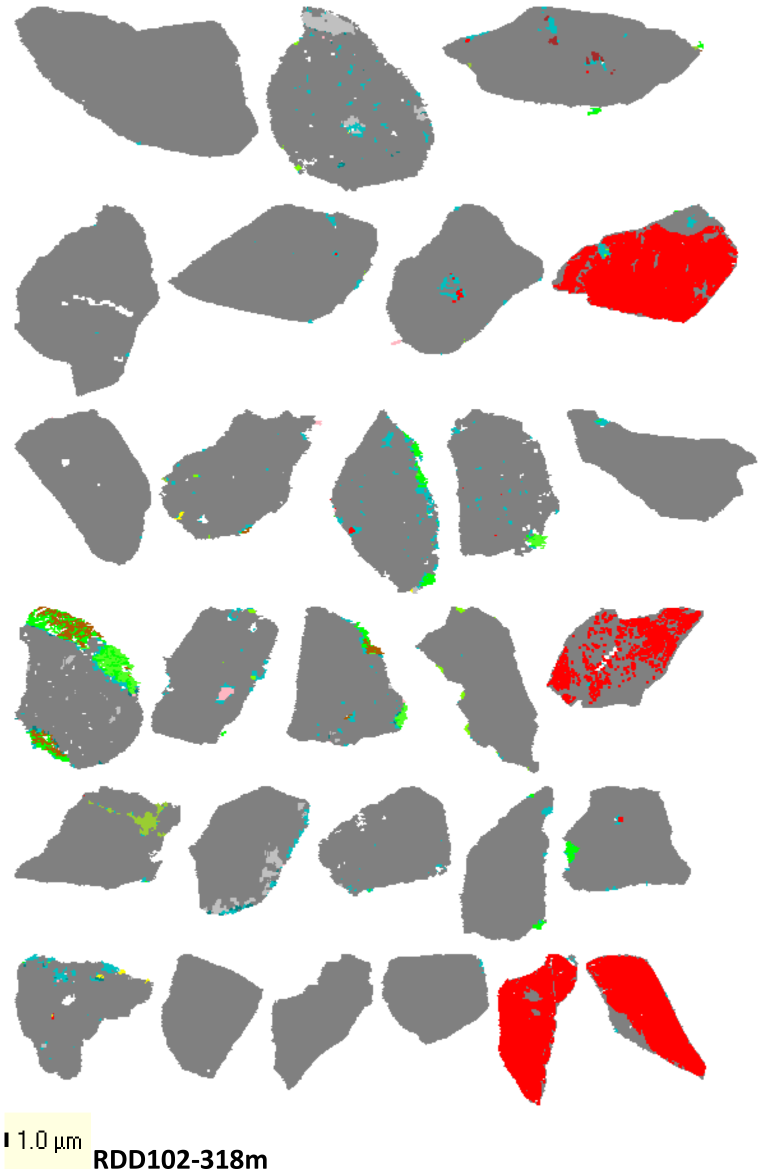
RDD060-289m



RDD072-269m



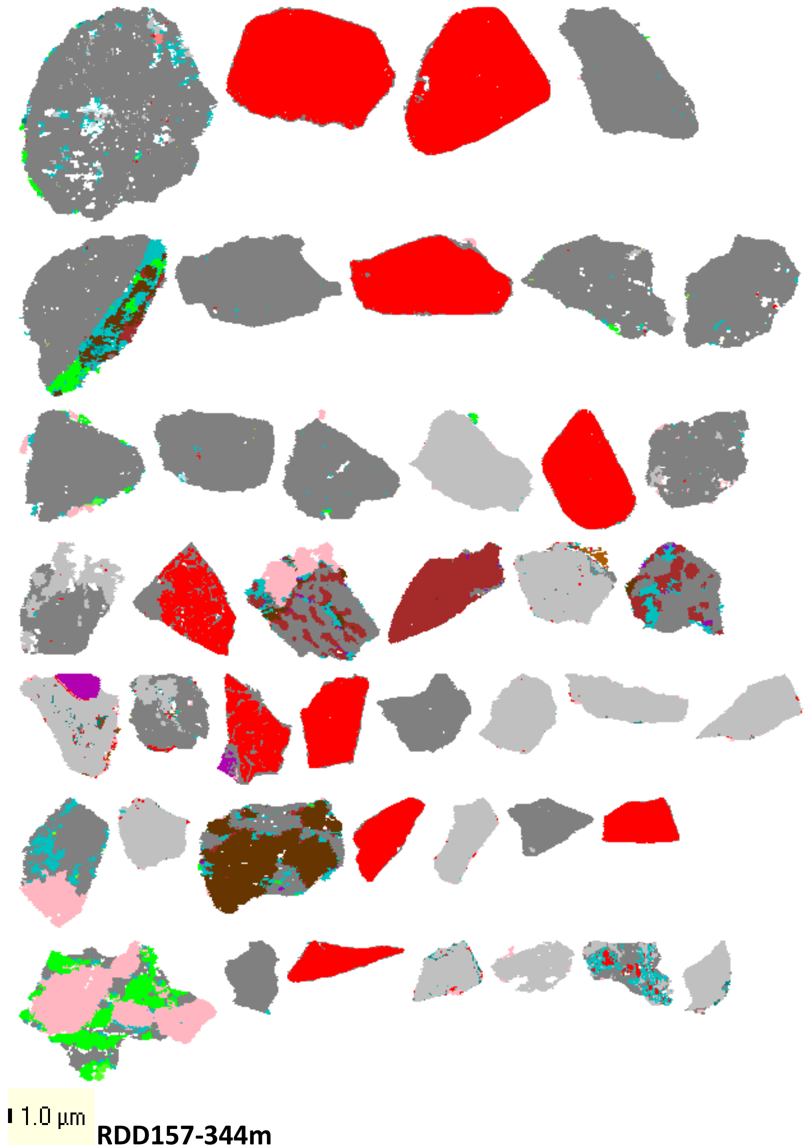
RDD078-363m



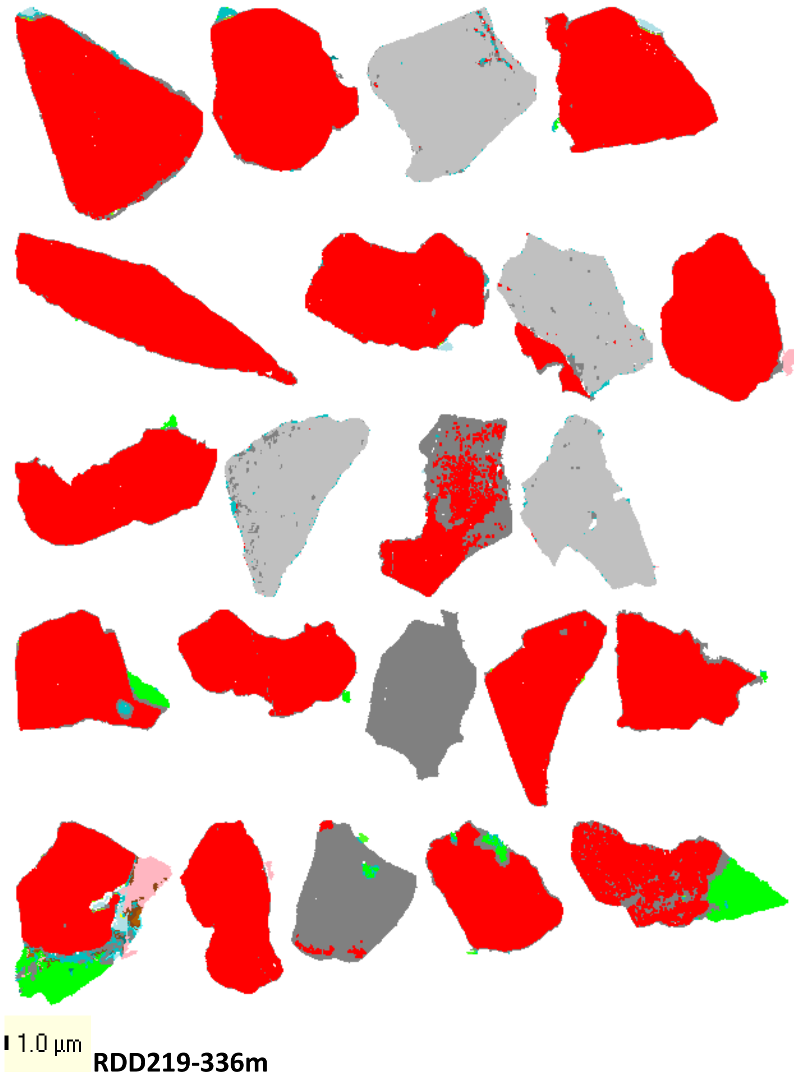
RDD102-318m

RDD141-245m

RDD145-413m

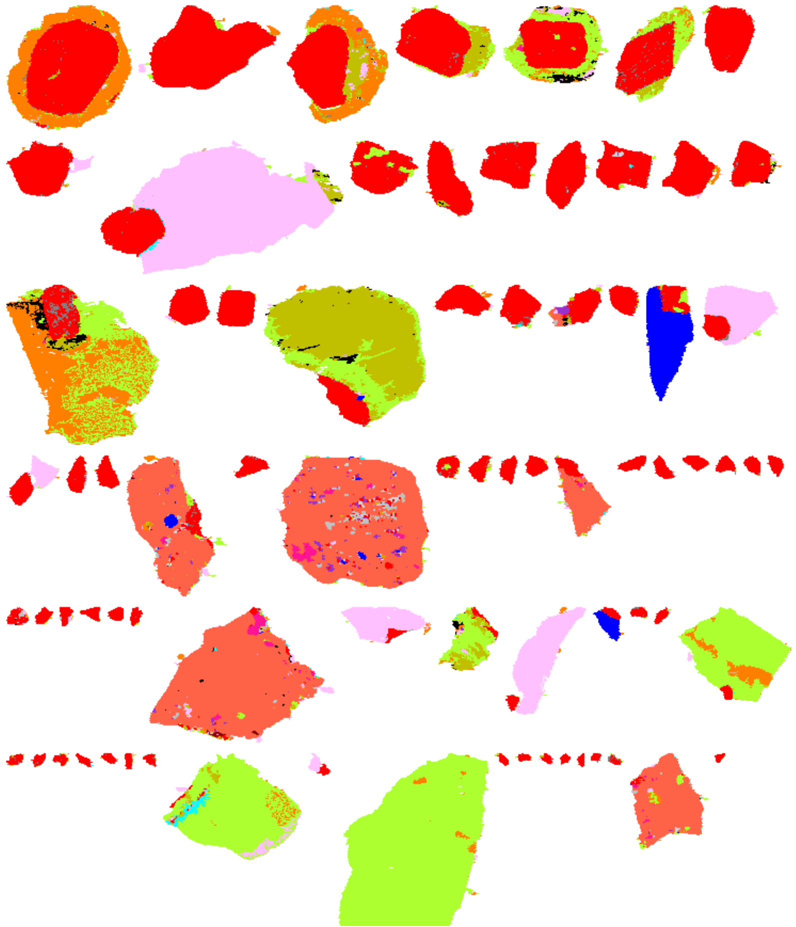


RDD157-344m



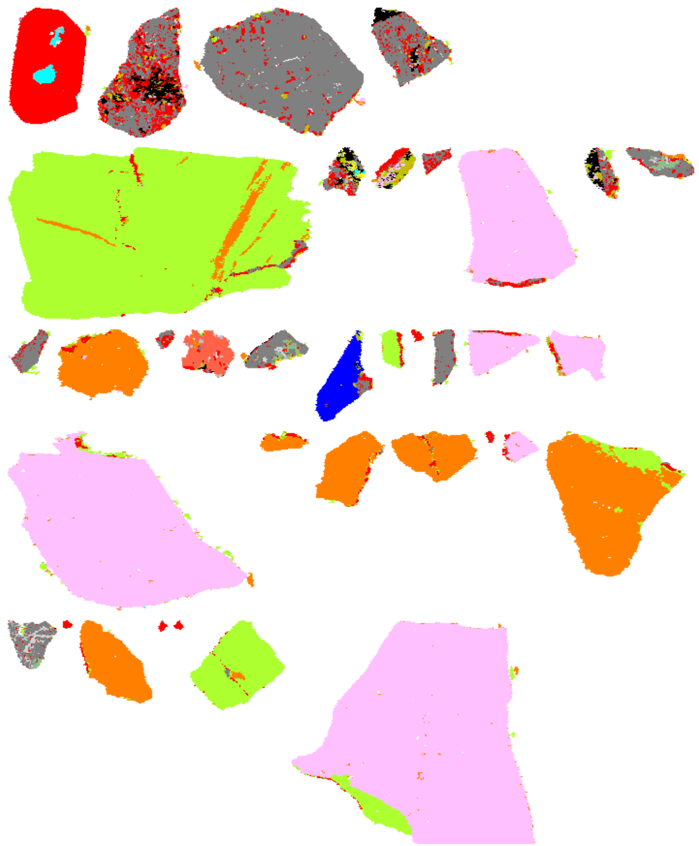
RDD219-336m

Valencia



VALG 11

Phosphates surround uraninites, this is similar in appearance to the image in Figure 1.4c. The uraninite at the top left (circled) has a 0 % exposure as none of its surface is in contact with background, however its liberation is high as the uraninite accounts for most of the total area of the grain.

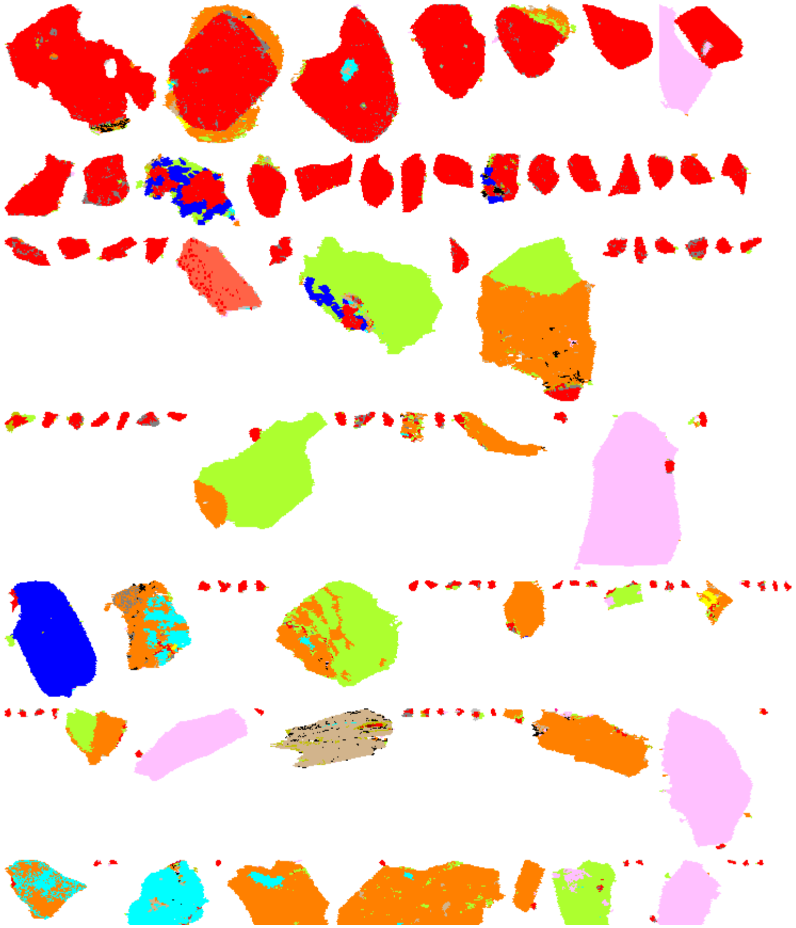


VALG 26

The uraninite at top left (circled) has calcite inclusions; the exposure value of this grain will be near 100 % as almost the entire circumference is in contact with the background; its liberation value however is mitigated against by the inclusions. This sample has relatively low liberation and exposure values as the uraninites occur as fine inclusions, or as thin veneers along grain boundaries of gangue minerals such as quartz and feldspar. A significant proportion of the sample's uranium is in coffinite and this is reflected in the mineral map as well. 12

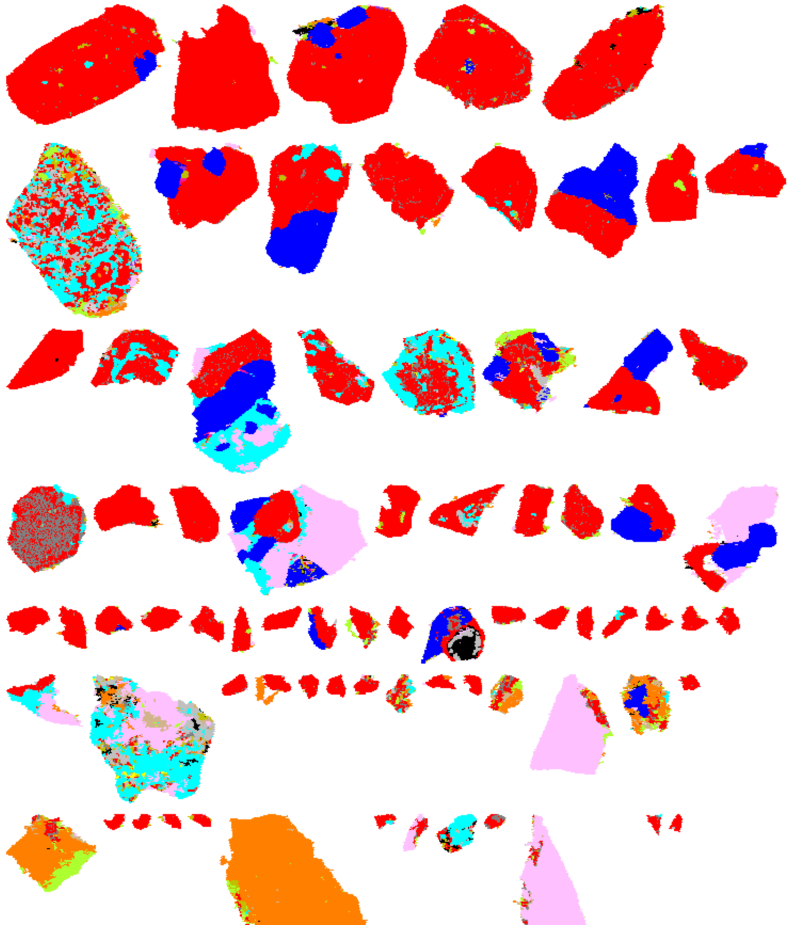
Va26 113/ 81.84-82.22

Uraninite is the dominant uranium mineral, it occurs in a wide range of grain sizes and is closely associated with zircon. Fine uraninite inclusions are also present in the large monazites. Uraninites also appear to have a calcite halo, where they are attached to quartz. 13



Va26 113/ 155.97-156.23

Uraninite occurs as large impure grains with inclusions and rims of gangue minerals, it also is found as fine inclusions in biotite (chloritised), feldspar and quartz. 14



Va26 113/ 225.64-225.89

Zircon is the primary accessory mineral in this sample, carbonates have filled the weathered portions of uraninites (circled). 15

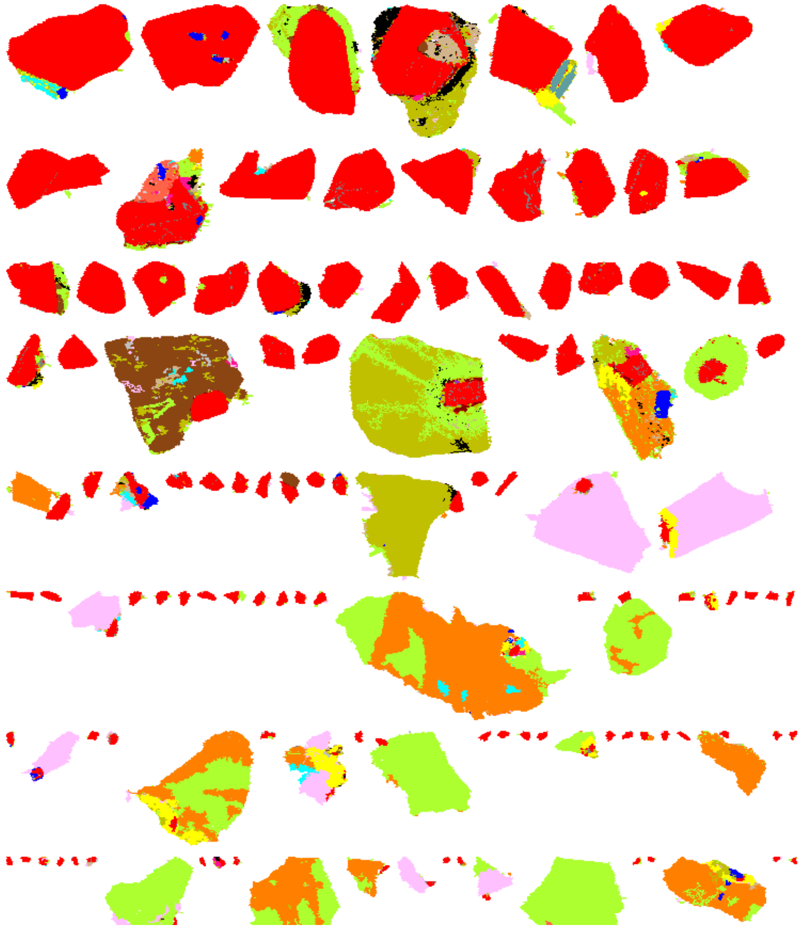
Va26 141/ 259.57-260.01

This sample has large uraninites, predominantly un-attached to other minerals. Quartz is the dominant mineral attached to uraninite, although it is also associated with Fe-sulphides, Fe-oxides and zircon to a lesser degree. The nature of the grains shown above is reflected in the sample having the highest liberation and exposure values. 16

Va26 141/ 261.69-262.01

Uraninite clusters around zircon and Fe-oxides (magnetite), again the smaller grains remain attached to larger rock forming minerals. 17

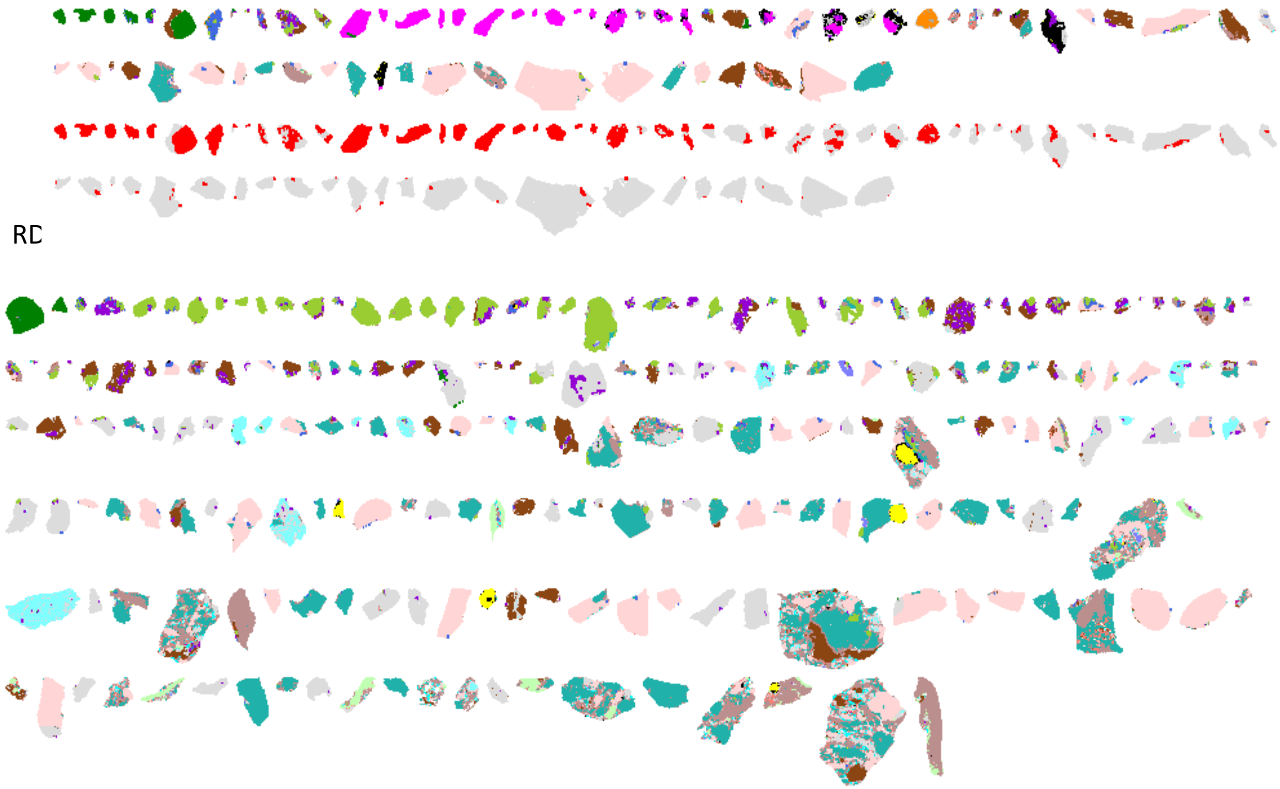
Va26 141/ 290.75-291.84
Large grains contain inclusions of feldspar, and are attached to feldspar, biotite and zircon. Smaller grains tend to be free and un-attached to other minerals, as well as devoid of inclusions, some remain attached to quartz and feldspars. 18

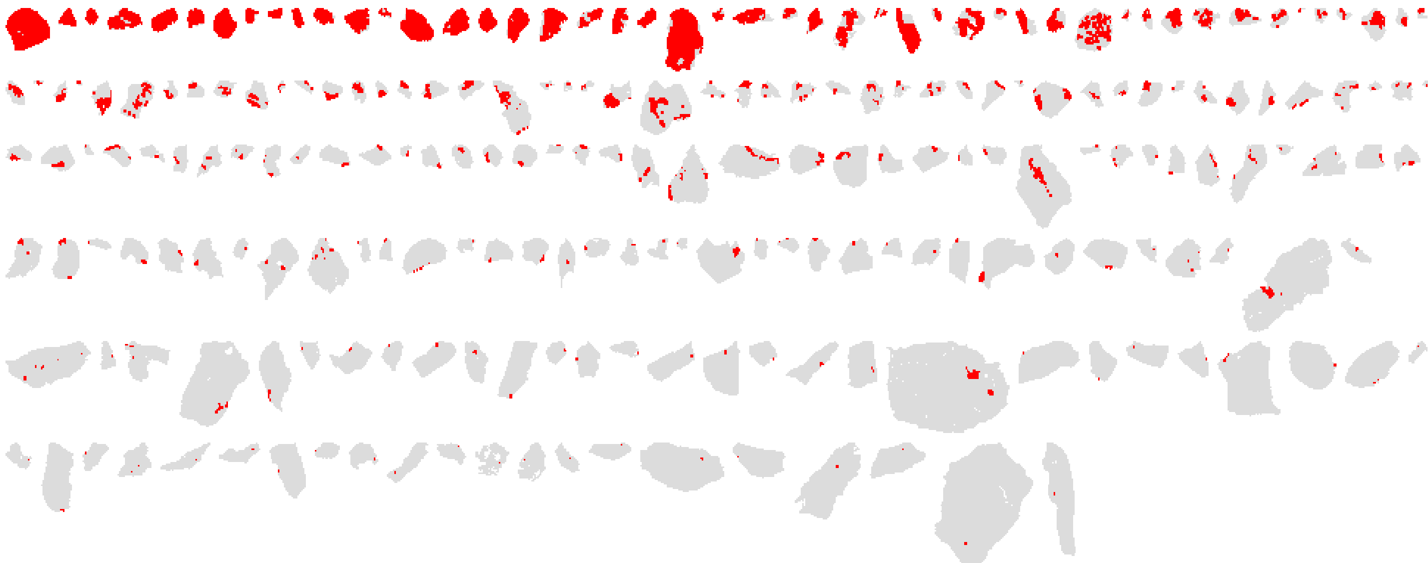


Va26 141/ 301.29-301.60
This sample has a wide Range of uraninite grainsizes; this can be attributed to the brittle nature of the mineral during crushing. It is associated with ilmenite, biotite and chlorite.

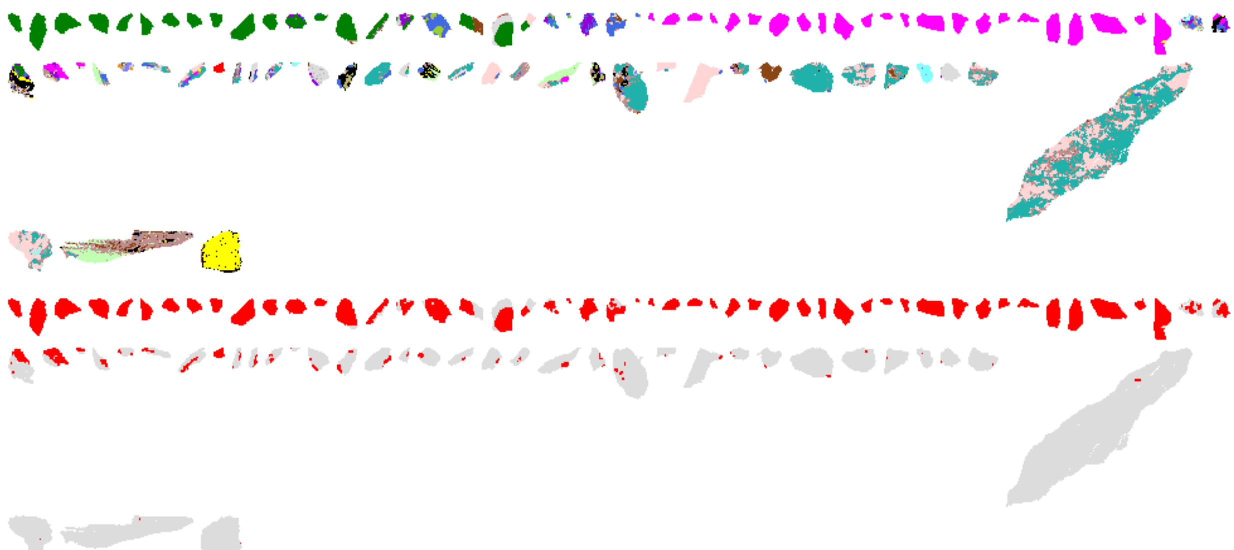
Background
Betafite
Uraninite
Uranothorite
Coffinite
Boltwoodite
Brannerite
Uranium Textures
Others
HiBSE
Quartz
Feldspars
Micas
Chlorite
Garnet
Pyroxene
Amphibole (Hornblende)
Sphene
Zircon
'Kaolinite' (clay)
Calcite
Apatite
Rutile/Anatase
Ilmenite
Iron Oxides

RDD373 64 m Note BETAFITE is in RED in these images

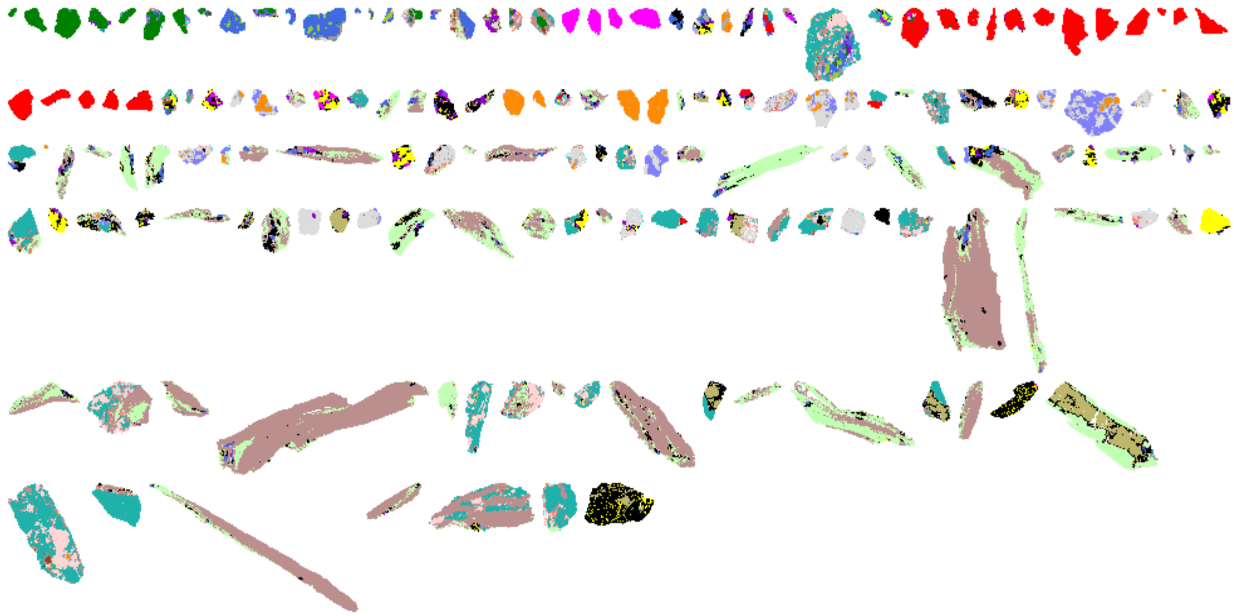


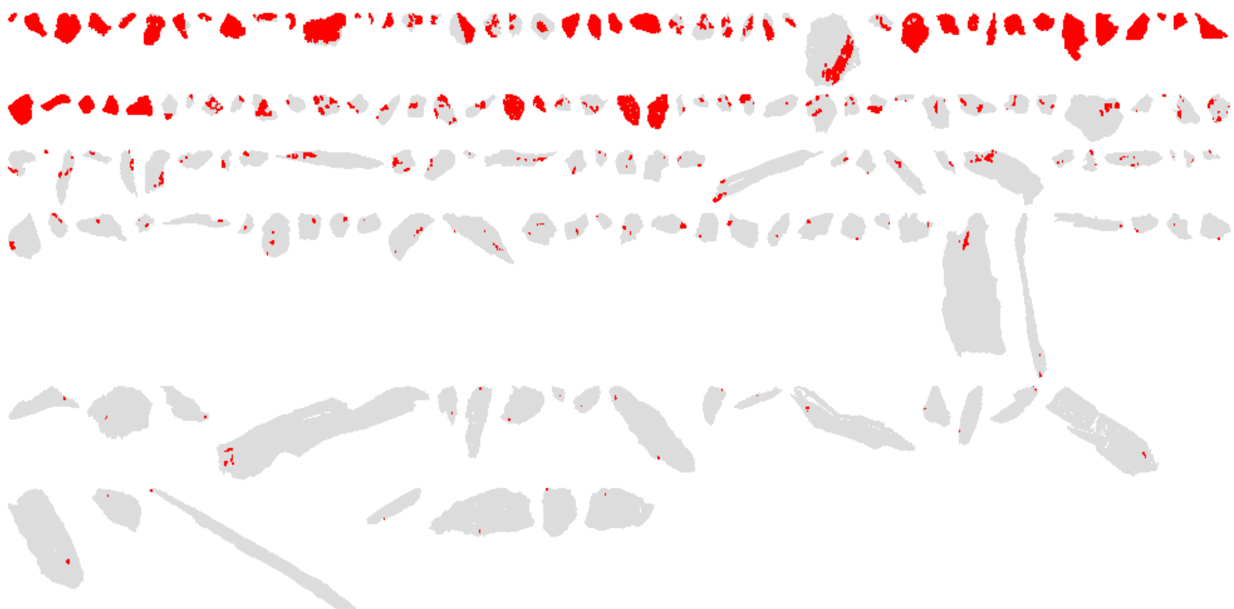


RDD373 93 m

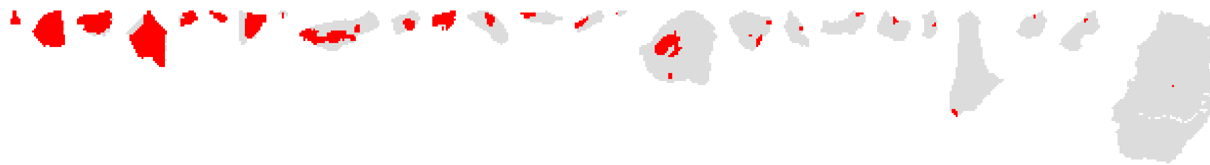


RDD373 125m





RDD373 155 m



RDD373 159m

Appendix G1 Electron Probe Microanalyser Operating Conditions and Calibration standards

EPMA data acquisition was performed at Rhodes University, Department of Geology, on a Jeol JXA 8230 Superprobe, using 4 WD spectrometers. The analytical conditions employed were: acceleration voltage 15 kV, probe current 20 nA and spot beam size (1 micron). Qualitative analysis (WDS total scan) used 100 ms dwell time, at 50 microns step. For each element, the quantitative analysis run at 20 sec counting time on peak and 10 sec on each upper and lower background, respectively (except for REE measured in monazite, where the counting time was 30 sec on peak and 15 sec on each background). The quantitative analysis used integral mode of measuring the peak/background ratios, except for U – Pb –Th where differential mode was used, adjusting the interference as follows: U-Th interference k=0.0438 ; Pb-U interference k=0.0011. Virtual WDS software was used in order to asses peak overlapping and to setup the correct backgrounds for each element avoiding or reducing the peak and background partial overlapping.

The standards (std) used for measuring the characteristic Mα lines of U, Th, Pb and REE were U metal std., Th metal std., Crocoite std., REE1 and REE2 std. glasses, respectively. Other standards used (for measuring Kα lines) were: forsteritic olivine std. for Si and Mg, fayalite std. for Fe, diopside std. for Ca in silicates and oxides, apatite std. for Ca in phosphates, orthoclase std. for Al and K in all analyzed minerals, albite std. for Na, rhodonite std. for Mn, chromium oxide std. for Cr, rutile std. for Ti. In most of the cases, the concentration of elements in each phases were first estimated by WDS scans and semi-quantitative analysis. For element concentration below 5%, a large diffracting crystal with high sensitivity was used for quantitative analysis: LIFL for Fe and Mn, PETL for U, Pb, Th, REE and K, TAPL for Na. The ZAF matrix correction method was used for quantification.

The analysis data for each mineral specimen are presented in oxide wt% for each spot on each mineral specimen, as calculated by the spectrometers and JEOL software. The software package JEOL SpecView exports the processed data analyses to Excel spreadsheet.

All results are presented as oxide wt percentages on the exported spread sheet.. Dr Gelu Costin provided an Excel Macro that allows the user to balance cation proportions of any given mineral, allowing for a calculation of U^{4+}/U^{6+} for a given analysis point.

Appendix G2 Formulae recalculation procedures

Point Analyses of Central Zone Uranium Phases

Point Analyses:- All analysis points in this study have been scrutinised by Dr. Gelu Costin of Rhodes University's Geology Department. Dr Costin has written a correction workbook in Microsoft Excel which is supplied on the digital Appendix Volume. Dr Costin is available at Rhodes University at the time of writing (2013).

Calculation Notes
All calculation Macro Tables are in Digital Appendix 5. Individual Mineral Formulae are calculated from the Excel Macro of Dr G. Costin of Rhodes University.

Uraninite Excel macro procedure:

- Uraninite composition from EPMA analyses are entered into the Excel Macro;
- UO3 or UO2 are entered as master values;
- Oxygen co-ordination is set to 2;
- A quadratic equation is inserted into the unknown U oxide cell; such that:
- UO3 or UO2 are adjusted such that the sum of cation charges = 1.
- The example Table G1 illustrates four re-calculated analyses.

Coffinite

- Coffinite composition calculations were performed utilising the following conditions:
- is variable in the formula $U(SiO_4)_{1-x}(OH)_{4x}$, such that U + Th=1 and Si=(1-chosen X);
- Giving a random value to X, e.g. 0.5, in $U(SiO_4)_{1-0.5}(OH)_{4x(0.5)}$ gives $(U,Th)_1\ Si_{0.5}\ O_2\ (OH)_2$. In this case, normalisation is to 3 Oxygen (2O +2OH=6 negative charges which is equivalent with 3 O). O is then adjusted to values near 3, in order to satisfy U + Th = 1 with Si = 1 - X; and
- H_2O is always excluded as H_2O is charge balanced. However, O linked to other cations are included as well as from OH (1OH is ½ O in terms of negative charge).
- An example of calculated values for IDAG 43 U6 is below in Table G2.

Coffinite Macro procedure:

- Set probe UO3 to maximum, calculated UO2 set to 0.00
- Set Oxygen to 3.0
- Insert H2O as 100 wt% - Probe total wt%
- Set “x” as 1-(calculated H/4)
- Adjust oxygen such that sum (Si, Al, Fe, K) close to 1-(calculated H/4)
- Adjust UO3 such that sum(Si, Al, F, K) = 1-(calculated H/4)

Example of recalculated uraninite points from RDD373_64m, Husab Zone 1.

X		EPMA analyses total UO3							
Y	UO3 tot	83.327	83.236	82.286	78.752	83.327	83.236	82.286	78.752
Z									
Name		**Raw**	**Raw**	**Raw**	**Raw**	**Re-calc.**	**Re-calc.**	**Re-calc.**	**Re-calc.**
	Point	RDD373-64B uran 8-52	RDD373-64B uran 8-53	RDD373-64B uran 9-54	RDD373-64B uran 9-55	RDD373-64B uran 8-52	RDD373-64B uran 8-53	RDD373-64B uran 9-54	RDD373-64B uran 9-55
	UO3	Adjust so cation total =1				34.6	36	35.3	33.6
	TiO2	0.009	0.393	0	0	0.009	0.393	0	0
	ZrO2	0	0.027	0.04	0.099	0	0.027	0.04	0.099
	FeO	0.081	0.277	0.059	0	0.081	0.277	0.059	0
	CaO	0.37	0.118	0.209	0.15	0.37	0.118	0.209	0.15
	ThO2	6.974	8.535	8.916	10.074	6.974	8.535	8.916	10.074
	Y2O3	0.287	0.26	0.399	0.307	0.287	0.26	0.399	0.307
	PbO	5.415	5.202	4.879	4.887	5.415	5.202	4.879	4.887
	UO2	(C2-C8)*(1/1.06) use UO3 analyses to calculate UO2				45.97	50.07	49.81	47.86
Total-	Total	13.1360	14.8120	14.5020	15.5170	93.7049	100.8822	99.6072	96.9781
2	# of Oxygens -	2	2	2	2	2	2	2	2
First Cation	Ti	0.000	0.020	0.000	0.000	0.000	0.013	0.000	0.000
	Zr	0.000	0.001	0.001	0.004	0.000	0.001	0.001	0.002
	Fe	0.003	0.016	0.003	0.000	0.003	0.010	0.002	0.000
	Ca	0.018	0.009	0.016	0.012	0.018	0.005	0.010	0.007
	Th	0.074	0.133	0.144	0.166	0.074	0.084	0.089	0.104
	Y	0.007	0.009	0.015	0.012	0.007	0.006	0.009	0.007
	Pb	0.068	0.096	0.093	0.095	0.068	0.060	0.058	0.060
	U	0.338	0.519	0.525	0.512	0.338	0.326	0.327	0.321
	U	0.491	0.000	0.000	0.000	0.491	0.495	0.503	0.498
Total	Total	1.000	0.803	0.797	0.801	1.000	1.000	1.000	1.000
	F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

IDAG 43 Coffinite Calculated Composition Table

Data Point	IDAG43_uran-coff6-9	IDAG43_uran-coff6-10	IDAG43_uran-coff6-11	Average
UO2 tot	66.836	73.218	65.41	68.488
(U,Th, other)	0.3782	0.585	0.366	0.4431
Sum Si,Al,Fe,K	0.4389	0.6719	0.4645	0.5251
	0.9995	1.0002	1.0001	0.9999
1-x (=1-4H*)	0.4391	0.6718	0.4645	0.5251
UO_2	56.75	67.3	53.8	59.283
ThO_2	0	0	0	0
SiO_2	15.442	17.369	16.035	16.282
Al_2O_3	0.089	0.031	0.07	0.0633
Fe_2O_3	2.162	2.465	3.821	2.816
K_2O	0.561	0.153	0.116	0.2767
P_2O_5	0.001	0	0.005	0.002
PbO	0.591	0.709	0.611	0.637
V_2O_3	0	0	0	0
UO_3	10.691	6.2731	12.307	9.7569
Calculated H_2O = H* (100 – sum cations)	13.713	5.6999	13.235	10.883
Total	**100**	**100**	**100**	**100**
# of Oxygens – adjusted for each data point	2.6	2.9	2.6	2.7
Th	0	0	0	0
Si	0.3788	0.5998	0.3891	0.4559
Al	0.0026	0.0013	0.002	0.0019
Fe	0.0399	0.0641	0.0698	0.0579
K	0.0176	0.0067	0.0036	0.0093
P	2E-05	0	0.0001	4E-05
Pb	0.0039	0.0066	0.004	0.0048
U	0.3192	0.5329	0.2993	0.3838
V	0	0	0	0
U	0.0551	0.0455	0.0627	0.0544
H*	2.2438	1.313	2.1421	1.8996
Total	3.0608	2.5699	2.9726	2.8678
F	0	0	0	0
Cl	0	0	0	0

Appendix G3 Weight Percentage Portions of Raw EPMA Data Sheets

Full Digital Versions are available in Digital Appendix 5

Etango (Goanikontes)

DH025 – 43 m Uraninite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	La_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	P_2O_5 (Mass%)	Ce_2O_3 (Mass%)	Total (Mass%)
1	DH25_43_U2-1	0.058	0	14.115	1.864	0	11.306	0.025	0.388	2.119	1.27	0	31.145
2	DH25_43_U2-2	0.037	0	11.886	1.763	0	11.1	0	0.106	2.016	1.222	0	28.13
3	DH25_43_U3-3	0.051	0	8.88	1.705	0	11.473	0	0.251	1.562	1.301	0	25.223
4	DH25_43_U3-4	0.021	0	12.705	1.799	0	11.429	0.019	0.148	1.841	1.078	0	29.04
5	DH25_43_U3-5	0.019	0	10.927	1.57	0	11.687	0.005	0.207	1.789	1.149	0	27.353
6	DH25_43_Ph1-1	0.038	0	12.629	1.2	0	13.617	0	0.232	3.083	26.351	0	57.15
7	DH25_43_Ph1-2	0.019	0	16.296	2.049	0	9.708	0	0.363	3.448	1.306	0	33.189
8	DH25_43_U4-6	0.026	0	15.373	2.555	0	10.426	0	0.309	2.315	1.107	0	32.111
9	DH25_43_U4-7	0.024	0	11.714	1.202	0	12.574	0	0	3.733	1.298	0	30.545
10	DH25_43_U5-8	0	72.671	5.464	0.393	0	0	0.039	6.561	0.563	0.015	0.395	86.101
11	DH25_43_U5-9	0	72.258	5.254	0.378	0	0	0.018	6.579	0.443	0.024	1.018	85.972
12	DH25_43_U5-10	0	72.468	5.332	0.54	0	0.412	0.022	6.638	0.382	0	0.048	85.842
13	DH25_43_U5-11	0	71.619	6.17	0.961	0	0.094	0.024	5.839	0.467	0.001	0.74	85.915
14	DH25_43_U5-12	0	69.311	5.743	1.157	0	0.103	0.069	6.115	0.5	0	0.749	83.747
15	DH25_43_U6-13	0.566	74.159	7.648	1.507	0	0.501	0.06	0.898	0.339	0.054	1.032	86.764
16	DH25_43_U6-14	0	72.747	4.557	0.575	0	0	0.013	6.351	0.601	0	0.816	85.66
17	DH25_43_U6-15	0	73.429	6.857	1.994	0	0	0.045	0.7	0.264	0	1.633	84.922
18	DH25_43_U6-16	0	70.483	6.721	2.397	0	0	0.039	0.522	0.395	0.014	0	80.571
19	DH25_43_U7-17	1.057	48.24	16.244	15.853	0	0.265	0.027	0.087	1.068	0.096	1.284	84.221
20	DH25_43_U7-18	0.39	55.892	11.271	16.588	0.005	0	0.03	0.024	0.983	0.05	0	85.233
21	DH25_43_U7-19	0.608	62.34	8.109	16.37	0.018	0	0.001	0.2	0.865	0.053	0	88.564
22	DH25_43_U7-20	0.715	66.47	4.665	17.146	0	0.05	0	0.107	0.904	0.019	0	90.076
23	DH25_43_U8-21	0.06	0	14.372	1.929	0	10.968	0	0.27	3.134	1.11	0	31.843
24	DH25_43_U8-22	0.033	0	13.109	2.427	0	11.558	0.005	0.202	2.141	1.133	0	30.608
25	DH25_43_Ucomp3-23	0.06	0	16.183	2.36	0	11.906	0.01	0.385	2.322	24.716	0	57.942
26	DH25_43_Ucomp3-24	0	67.789	5.466	0.06	0	0.006	0.129	5.99	0.143	0	0	79.583
27	DH25_43_U11-25	0.042	0	15.839	1.998	0	9.833	0	0.356	3.291	1.186	0	32.545
28	DH25_43_U11-26	0.017	0	16.395	2.15	0	9.686	0	0.367	3.184	1.165	0	32.964
29	DH25_43_U11-27	0.037	0	14.913	2.026	0	10.037	0	0.31	3.062	1.268	0	31.653

DH025 – 43 m Coffinite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	La_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	P_2O_5 (Mass%)	Ce_2O_3 (Mass%)	Total (Mass%)
19	DH25_43_U7-17	1.057	48.24	16.244	15.853	0	0.265	0.027	0.087	1.068	0.096	1.284	84.221
20	DH25_43_U7-18	0.39	55.892	11.271	16.588	0.005	0	0.03	0.024	0.983	0.05	0	85.233
21	DH25_43_U7-19	0.608	62.34	8.109	16.37	0.018	0	0.001	0.2	0.865	0.053	0	88.564
22	DH25_43_U7-20	0.715	66.47	4.665	17.146	0	0.05	0	0.107	0.904	0.019	0	90.076

DH025 – 353m - Uraninite

Point	Sample	UO_3	TiO_2	SiO_2	FeO	CaO	ThO_2	La_2O_3	Y_2O_3	PbO	Ce_2O_3	Total
1	DH025_353_urancoff_1-1	70.58	0	1.645	0	3.579	8.835	0	2.295	5.483	0.057	92.474
2	DH025_353_urancoff_1-2	68.798	0.021	1.754	0.053	3.735	8.91	0	2.249	5.728	0.038	91.286
3	DH025_353_urancoff_1-3	69.293	0	0.812	0	2.844	8.326	0	2.088	6.32	0.006	89.689
4	DH025_353_urancoff_1-4	67.933	0	1.081	0.022	3.515	8.26	0	2.036	6.435	0	89.282

5	DH025_353_urancoff_1-5	68.15	0	1.517	0	3.093	8.552	0	2.201	6.546	0	90.059
6	DH025_353_urancoff_1-6	67.452	0	1.687	0	3.512	9.027	0	2.186	5.893	0	89.757
7	DH025_353_urancoff_1-7	68.481	0	0.989	0	2.853	8.327	0	2.43	6.474	0	89.554
8	DH025_353_urancoff_1-8	68.914	0	1.413	0	3.103	7.831	0	2.077	6.032	0	89.37
9	DH025_353_urancoff_1-9	64.448	0	2.237	0	3.109	8.738	0	2.069	6.108	0	86.709
10	DH025_353_urancoff_1-10	62.352	0	2.227	0	3.127	9.379	0	2	5.545	0.029	84.659
11	DH025_353_urancoff_2-11	63.42	0	1.325	0.067	3.358	7.974	0	2.689	7.269	0	86.102
12	DH025_353_urancoff_2-12	67.155	0.012	1.442	0.05	3.499	7.928	0	2.153	6.999	0	89.238
13	DH025_353_urancoff_2-13	63.943	0	4.184	0	2.214	9.31	0	2.052	4.407	0	86.11
14	DH025_353_urancoff_2-14	60.084	0	4.297	0	2.445	9.878	0	2.25	4.076	0.023	83.053
15	DH025_353_urancoff_2-15	62.852	0	3.108	0	2.638	9.038	0	2.598	4.944	0.1	85.278
16	DH025_353_urancoff_2-16	59.994	0	2.112	0.022	2.944	8.072	0	1.985	6.291	0	81.42
17	DH025_353_urancoff_2-17	63.507	0	3.081	0	2.731	9.036	0	2.274	5.323	0.098	86.05
18	DH025_353_urancoff_2-18	59.83	0	4.874	0.025	2.299	10.441	0	3.072	3.825	0.053	84.419
19	DH025_353_urancoff_2-19	63.357	0	2.969	0.034	2.843	8.194	0	2.29	5.187	0.03	84.904
20	DH025_353_urancoff_2-20	64.882	0	2.416	0.081	2.9	9.046	0	2.059	5.581	0	86.965
21	DH025_353_urancoff_3-21	64.649	0	2.664	0	3.207	8.725	0	2.464	5.304	0	87.013
22	DH025_353_urancoff_3-22	65.04	0	2.201	0.12	3.129	8.725	0	2.354	5.742	0	87.311
23	DH025_353_urancoff_3-23	64.915	0	2.3	0	3.078	8.418	0	2.111	5.597	0	86.419
24	DH025_353_urancoff_3-24	62.426	0	3.263	0.039	2.873	8.942	0	2.185	5.118	0	84.846
25	DH025_353_urancoff_3-25	61.976	0	3.097	0	2.811	9.281	0	2.789	5.238	0.01	85.202
26	DH025_353_urancoff_6-26	67.396	0	1.3	0.053	3.106	8.512	0	2.147	5.626	0.009	88.149
27	DH025_353_urancoff_6-27	66.273	0	1.839	0	3.036	8.7	0	2.087	5.36	0	87.295
28	DH025_353_urancoff_6-28	66.613	0.001	1.258	0	2.445	8.489	0	2.103	5.814	0.067	86.79
29	DH025_353_urancoff_6-29	64.079	0	1.582	0	3.335	9.631	0	2.611	5.887	0	87.125
30	DH025_353_urancoff_6-30	63.915	0	2.212	0	1.332	8.879	0	2.654	5.899	0	84.891
31	DH025_353_urancoff_7-31	58.458	0	4.121	0	1.376	10.378	0	2.781	4.155	0	81.269
32	DH025_353_urancoff_7-32	61.245	0	3.748	0.087	1.47	9.414	0	2.536	4.155	0.121	82.776
33	DH025_353_urancoff_7-33	63.092	0	2.998	0.095	1.534	9.277	0	2.888	4.342	0	84.226
34	DH025_353_urancoff_8-34	69.387	0	0.885	0	1.726	9.086	0	2.088	5.232	0.089	88.493
35	DH025_353_urancoff_8-35	68.838	0	0.583	0	1.469	8.773	0	1.938	5.485	0	87.086
36	DH025_353_urancoff_8-36	67.242	0	1.072	0	1.367	9.104	0	2.008	5	0	85.793
37	DH025_353_urancoff_8-37	70.117	0	0.614	0.074	1.242	8.909	0	2.101	5.609	0.014	88.68
38	DH025_353_urancoff_8-38	70.5	0	0.498	0	1.126	8.366	0	2.16	5.133	0.001	87.784
39	DH025_353_urancoff_9-39	62.605	0	3.708	0.031	2.874	8.59	0	2.292	4.857	0.022	84.979
40	DH025_353_urancoff_9-40	65.04	0	1.322	0.078	2.091	8.551	0	2.494	6.023	0	85.599
41	DH025_353_urancoff_9-41	67.223	0	1.48	0	2.617	7.729	0	2.461	4.955	0	86.465
42	DH025_353_urancoff_9-42	66.406	0	1.515	0.075	2.708	9.502	0	2.61	5.293	0.069	88.178
43	DH025_353_urancoff_10-43	62.305	0	2.865	0.034	3.086	8.698	0	2.142	4.917	0	84.047
44	DH025_353_urancoff_10-44	60.935	0.001	4.425	0	2.849	9.351	0	2.309	4.031	0.126	84.027
45	DH025_353_urancoff_10-45	65.535	0.004	2.093	0.036	3.477	9.832	0	2.272	5.309	0.056	88.614
46	DH025_353_urancoff_10-46	62.179	0	2.953	0.056	3.271	10.355	0	2.232	4.553	0.015	85.614

Hildenhof - Uraninite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	P_2O_5 (Mass%)	V_2O_3 (Mass%)	Total (Mass%)
1	HILG21_U1-1	0	88.304	3.998	0	0	0.023	6.199	0.915	0	0	99.439
2	HILG21_U1-2	0	86.617	3.199	0.017	0	0.046	5.964	0.93	0	0	96.773
3	HILG21_U1-3	0	86.003	2.988	0.077	0	0	6.272	0.359	0	0	95.699
4	HILG21_U2-4	0	85.684	4.332	0.682	0	0.134	5.48	1.402	0.007	0	97.721
5	HILG21_U2-5	0	85.928	4.802	0.34	0	0.19	5.159	1.834	0.047	0	98.3
6	HILG21_U2-6	0	83.735	3.537	0.652	0	0.077	5.602	1.553	0	0	95.156
7	HILG21_U2-7	0	86.817	3.366	0.457	0	0.134	5.38	1.88	0.047	0	98.081

8	HILG21_U3-8	0	87.295	3.356	0.49	0	0.198	5.041	1.876	0.001	0	98.257
9	HILG21_U3-9	0	88.391	2.776	0.015	0	0.135	4.785	2.511	0	0	98.613
10	HILG21_U3-10	0	88.707	2.973	0.14	0	0.113	5.018	1.95	0.012	0	98.913
11	HILG21_U3-11	0	85.903	2.356	0.176	0	0.029	5.098	1.477	0	0	95.039
12	HILG21_U3-12	0	86.413	3.703	0.072	0	0.031	5.217	1.47	0.008	0	96.914
13	HILG21_U3-13	0	86.313	2.789	0.024	0	0.078	5.437	1.81	0.035	0	96.486
14	HILG21_U4-14	0	86.632	2.125	0.28	0	0.098	5.509	1.268	0.039	0	95.951
15	HILG21_U4-15	0	84.949	3.399	0.619	0	0.132	5.312	2.103	0.01	0	96.524
16	HILG21_U4-16	0	85.304	2.744	0.196	0	0.115	5.211	1.377	0	0	94.947
17	HILG21_U4-17	0	79.547	6.716	0.586	0	0.064	5.071	1.564	0	0	93.548
18	HILG21_U4-18	0	85.72	3.25	0	0	0.039	5.448	1.257	0	0	95.714
19	HILG21_U5-19	0	85.114	3.085	0.108	0	0.081	5.966	0.78	0	0	95.134
20	HILG21_U5-20	0	86.114	3.37	0.106	0	0.091	5.582	1.414	0	0	96.677
21	HILG21_U5-21	0	86.367	3.656	0.028	0	0.052	6.115	1.141	0	0	97.359
22	HILG21_U5-22	0	79.727	7.563	0.064	0	0	5.767	0.897	0	0	94.018

Husab

RDD006 - 171 m Uraninite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	P_2O_5 (Mass%)	V_2O_3 (Mass%)	Total (Mass%)
1	RDD006_171_U2-1	0	83.308	7.578	0.361	0	0	5.533	0.723	0	0	97.503
2	RDD006_171_U2-2	0	84.695	7.569	0.253	0	0	5.659	0.682	0.004	0	98.862
3	RDD006_171_U2-3	0	85.668	8.025	0.204	0	0.028	5.811	0.811	0.004	0	100.551
4	RDD006_171_U2-4	0	82.397	7.728	0.168	0	0	5.606	0.877	0	0	96.776
5	RDD006_171_U3-1	0	82.2	7.75	0.28	0	0.016	5.353	0.78	0.002	0	96.381
6	RDD006_171_U3-2	0	78.903	7.054	2.686	0	0.054	4.563	0.389	0.022	0	93.671
7	RDD006_171_U3-3	0	80.514	8.032	1.779	0	0	4.819	0.331	0.021	0	95.496
8	RDD006_171_U3-4	0.888	78.414	6.687	2.581	0	0.004	4.467	0.385	0	0	93.426
9	RDD006_171_U3b-1	0	84.478	7.554	0.158	0	0.004	5.686	0.64	0.022	0	98.542
10	RDD006_171_U3b-2	0	81.338	8.146	0.096	0	0	5.674	0.502	0.016	0	95.772
11	RDD006_171_U3b-3	0	81.68	8.122	0.217	0	0.01	5.513	0.709	0	0	96.251
12	RDD006_171_U4-1	0	85.442	7.506	0.014	0	0.07	5.675	0.416	0.019	0	99.142
13	RDD006_171_U4-2	0	84.156	6.685	0.134	0	0	5.387	0.586	0	0	96.948
14	RDD006_171_U4-3	0	82.611	7.996	0.052	0	0.021	5.708	0.492	0.004	0	96.884
15	RDD006_171_U5-1	0	82.128	8.705	0.086	0	0	5.752	0.666	0	0	97.337
16	RDD006_171_U5-2	0	80.997	8.002	0.074	0	0	5.846	0.544	0	0	95.463
17	RDD006_171_U5-3	0	84.226	8.024	0.009	0	0	6.12	0.391	0	0	98.77
18	RDD006_171_U5-4	0	80.005	8.416	0.135	0	0.023	5.547	0.485	0.001	0	94.612
19	RDD006_171_U6-5	0	82.081	7.913	0.089	0	0.007	5.703	0.431	0.014	0	96.238
20	RDD006_171_U6-6	0	83.24	7.374	0.121	0	0	5.4	0.499	0	0	96.634
21	RDD006_171_U6-7	0	81.837	7.448	0.011	0	0	5.705	0.214	0.004	0	95.219
22	RDD006_171_U6-8	0	82.963	7.187	0.036	0	0	5.801	0.143	0.017	0	96.147
23	RDD006_171_U6-9	0	83.836	7.482	0.05	0	0	5.637	0.366	0	0	97.371
24	RDD006_171_U6-10	0	82.929	8.037	0.25	0	0.067	5.265	0.75	0.025	0	97.323

RDD008 – 248 m Uraninite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	P_2O_5 (Mass%)	V_2O_3 (Mass%)	Total (Mass%)
25	RDD008_248_U1-1	0	85.574	8.485	0.155	0	0.005	6.058	0.475	0	0	100.752
26	RDD008_248_U1-2	0	85.351	7.802	0.01	0	0.014	5.661	0.423	0.008	0	99.269
27	RDD008_248_U1-3	0	87.037	7.892	0	0	0.036	5.872	0.498	0	0	101.335
28	RDD008_248_U1-4	0	86.324	8.238	0	0	0.012	5.989	0.54	0.028	0	101.131
29	RDD008_248_U2-1	0	85.864	8.647	0.106	0	0.067	5.769	0.393	0.022	0	100.868
30	RDD008_248_U2-2	0	84.338	9.008	0.022	0	0	5.906	0.438	0.016	0	99.728
31	RDD008_248_U2-3	0	81.892	8.836	0.091	0	0.007	6.107	0.43	0	0	97.363
32	RDD008_248_U2-4	0	85.376	8.485	0.005	0	0.005	5.755	0.34	0.004	0	99.97
33	RDD008_248_U2-5	0	86.504	8.525	0.107	0	0.021	5.487	0.684	0.007	0	101.335
34	RDD008_248_U3-1	0	83.426	8.897	0.014	0	0.03	5.855	0.454	0.028	0	98.704

35	RDD008_248_U3-2	0	84.627	8.65	0.017	0	0	5.847	0.613	0	0	99.754
36	RDD008_248_U3-3	0	84.814	8.785	0.105	0	0	5.976	0.275	0.002	0	99.957
37	RDD008_248_U3-4	0	88.055	7.507	0.248	0	0.031	5.745	1.126	0	0	102.712
38	RDD008_248_U3-5	0	84.773	8.26	0.032	0	0	6.207	0.533	0.031	0	99.836
39	RDD008_248_U4-1	0	83.983	9.034	0.111	0	0.042	5.76	0.332	0	0	99.262
40	RDD008_248_U4-2	0	85.05	8.28	0.05	0	0	6.107	0.21	0.006	0	99.703
41	RDD008_248_U4-3	0	85.393	7.989	0.014	0	0	5.881	0.193	0	0	99.47
42	RDD008_248_U4-4	0	84.916	8.279	0.106	0	0.051	5.735	0.147	0	0	99.234
43	RDD008_248_U4-5	0	84.432	8.722	0.025	0	0	5.981	0.247	0.006	0	99.413
44	RDD008_248_U5-1	0	84.354	9.245	0.135	0	0	6.214	0.464	0	0	100.412
45	RDD008_248_U5-2	0	85.822	8.421	0.096	0	0	5.478	0.771	0.02	0	100.608
46	RDD008_248_U5-3	0	85.344	8.256	0	0	0	5.541	0.508	0.001	0	99.65
47	RDD008_248_U5-4	0	84.724	8.674	0.145	0	0.003	5.494	0.512	0.002	0	99.554

RDD373 – 125 m Uraninite

Point	Comment	UO_3 (Mass%)	TiO_2 (Mass%)	FeO (Mass%)	CaO (Mass%)	ThO_2 (Mass%)	Y_2O_3 (Mass%)	PbO (Mass%)	Total (Mass%)
1	RDD373_125_U2-6	42.842	36.06	0.359	4.158	6.101	0.455	3.086	93.061
2	RDD373_125_U2-7	43.194	36.398	0.459	4.502	5.434	0.472	2.137	92.596
3	RDD373_125_U2-8	43.568	37.196	0.261	4.749	6.702	0.476	1.004	93.956
4	RDD373_125_U2-9	38.702	38.319	0.604	3.637	9.009	0.52	1.414	92.205
5	RDD373_125_U2-10	43.137	36.764	0.267	4.584	5.858	0.432	1.131	92.173
6	RDD373_125_U2-11	43.102	36.188	0.426	4.486	6.56	0.396	1.328	92.486
7	RDD373_125_U2-12	39.419	34.896	1.08	3.854	8.039	0.443	2.017	89.748
8	RDD373_125_U2-13	43.616	37.478	0.443	4.401	4.839	0.634	1.392	92.803
4	RDD373-125 uran no 7-1	86.782	0	0.293	0.451	8.193	5.721	0	101.44
5	RDD373-125 uran no 7-2	85.601	0.014	0.229	0.461	8.404	5.094	0	99.803
6	RDD373-125 uran no 7-3	87.271	0	0.157	0.503	7.848	5.342	0.043	101.164
7	RDD373-125 uran no 7-4	85.89	0.075	0.193	0.428	7.405	5.197	0	99.188
8	RDD373-125 uran no 7-5	89.438	0	0.048	0.309	7.47	6.093	0	103.358
9	RDD373-125 uran no 7-6	85.294	0	0.311	0.085	7.66	5.329	0.037	98.716
10	RDD373-125 uran no 7-7	87.557	0	0.104	0.288	7.174	5.815	0	100.938
11	RDD373-125 uran no 7-8	81.687	0.054	0.123	0.329	7.626	4.951	0	94.77
12	RDD373-125 uran no 7-9	84.334	0.003	0.036	0.273	7.692	5.478	0	97.816
13	RDD373-125 uran no 7-10	84.487	0.095	0.039	0.27	7.289	5.791	0	97.971
14	RDD373-125 uran no 7- rim 11	72.704	0	4.525	1.262	17.757	2.756	0.303	99.307
15	RDD373-125 uran no 7- rim 12	76.829	0	2.903	1.023	15.481	3.227	0.049	99.512
16	RDD373-125 uran no 7- rim 13	73.429	0	4.737	0.778	13.809	2.377	0.287	95.417

RDD373 – 125 m Wulfenite

Point	Comment	UO_3 (Mass %)	SO_3 (Mass%)	SiO_2 (Mass%)	CaO (Mass%)	ThO_2 (Mass%)	PbO (Mass%)	MoO_3 (Mass%)	Total (Mass%)
1	RDD373-125 wulf no 6-1	4.589	0.688	1.033	0.472	0.958	55.674	37.058	100.472
2	RDD373-125 wulf no 6-2	8.3	0.788	1.789	0.428	2.112	50.732	33.01	97.159
3	RDD373-125 wulf no 6-3	6.361	0.574	1.6	0.476	2.211	52.152	34.308	97.682

RDD373 - 115 m A Betafite

Point	Comment	UO2 (Mass%)	TiO2 (Mass%)	FeO (Mass%)	CaO (Mass%)	ThO2 (Mass%)	Nb2O5 (Mass%)	Y2O3 (Mass%)	PbO (Mass%)	Ta2O5 (Mass%)	Total (Mass%)
1	RDD373-115A betaf 1-1	31.698	29.128	1.388	4.931	3.843	12.954	7.834	1.651	0.432	93.859
2	RDD373-115A betaf 1-2	30.274	28.075	2.147	4.874	4.074	14.2	7.478	1.397	0.462	92.981
3	RDD373-115A betaf 1-3	32.403	28.468	1.009	5.169	3.606	12.883	6.983	1.639	0.487	92.647
4	RDD373-115A betaf 1-4	29.206	28.542	1.323	4.391	3.123	14.427	8.336	1.44	0.516	91.304
5	RDD373-115A betaf 1-5	28.824	27.658	1.553	4.047	3.709	14.644	7.843	1.494	0.542	90.314
6	RDD373-115A betaf 1-6	29.529	28.328	1.262	1.312	5.291	11.15	3.307	4.402	0.491	85.072
7	RDD373-115A betaf 1-7	31.053	29.168	1.104	5.149	3.878	13.388	7.572	1.517	0.39	93.219
8	RDD373-115A betaf 1-8	32.222	28.677	1.479	4.643	3.813	12.523	6.542	1.549	0.483	91.931
9	RDD373-115A betaf 1-9	69.97	14.217	0.336	0.953	0.599	3.293	0.165	1.22	0.337	91.09
10	RDD373-115A betaf 2-10	31.19	28.588	1.947	4.059	3.932	12.716	6.773	1.183	0.505	90.893

11	RDD373-115A betaf 2-11	32.249	29.052	1.364	3.781	3.807	13.253	5.981	1.475	0.407	91.369
12	RDD373-115A betaf 2-12	31.422	28.233	1.538	4.194	4.065	12.829	6.134	1.585	0.461	90.461
13	RDD373-115A betaf 2-13	28.669	27.828	1.314	4.271	3.663	14.362	8.296	2.087	0.574	91.064
14	RDD373-115A betaf 2-14	31.242	28.84	1.295	4.398	4.151	12.371	5.847	1.731	0.428	90.303
15	RDD373-115A betaf 2-15	24.049	28.58	1.47	3.762	3.893	13.99	6.182	2.9	0.429	85.255

RDD373 - 64 m B and 93 m C Brannerite

Point	Comment	UO_3 (Mass%)	TiO_2 (Mass%)	Fe_2O_3 (Mass%)	CaO (Mass%)	ThO_2 (Mass%)	Y_2O_3 (Mass%)	PbO (Mass%)	Total (Mass%)
1	RDD373_64B_brann1-1	43.515	38.478	0.733	3.025	7.595	1.709	2.2	97.255
2	RDD373_64B_brann1-2	43.523	37.17	1.151	3.2	7.174	1.757	2.41	96.385
3	RDD373_64B_brann1-3	42.492	37.237	0.906	3.449	7.656	1.781	1.99	95.511
4	RDD373_64B_brann1-4	44.01	37.335	1.227	3.261	6.818	1.629	1.868	96.148
5	RDD373_64B_brann1-5	43.116	36.783	2.842	2.857	6.441	1.724	2.611	96.374
6	RDD373_64B_brann1-6	36.598	38.76	0.836	2.67	11.859	2.826	2.01	95.559
7	RDD373_64B_brann1-7	41.95	37.483	1.283	3.109	6.193	2.531	2.626	95.175
8	RDD373_64B_brann1-8	38.785	37.871	1.878	2.527	9.963	2.331	1.837	95.192
9	RDD373_64B_brann1-9	43.616	37.546	0.584	3.498	9.028	1.405	2.185	97.862
10	RDD373_64B_brann1-10	42.233	38.075	1.362	2.885	7.513	1.991	1.814	95.873
11	RDD373_64B_brann1-11	40.76	37.612	1.071	3.178	8.076	1.967	1.315	93.979
12	RDD373_64B_brann1-12	36.549	39.05	0.549	2.484	12.026	3.003	1.266	94.927
13	RDD373_64B_brann1-13	34.568	38.88	1.498	2.641	12.463	3.034	1.687	94.771
14	RDD373_64B_brann1-14	37.299	38.304	0.83	3.384	11.868	2.797	1.388	95.87
15	RDD373_64B_brann1-15	40.496	38.421	1.315	2.885	8.647	2.585	1.692	96.041
16	RDD373_93C_2-16	48.662	36.377	0.535	5.086	4.903	0.89	2.017	98.47
17	RDD373_93C_2-17	46.878	34.913	3.951	3.92	5.048	0.688	1.662	97.06
18	RDD373_93C_2-18	47.847	36.024	0.317	5.283	5.803	0.843	2.434	98.551
19	RDD373_93C_2-19	46.469	35.841	3.18	4.575	5.148	0.872	0.947	97.032
20	RDD373_93C_2-20	46.878	35.912	1.705	5.386	5.972	0.832	0.928	97.613
21	RDD373_93C_2-21	46.673	37.734	0.42	3.845	6.336	1.087	0.935	97.03
22	RDD373_93C_2-22	48.797	37.47	0.841	4.514	4.105	1.237	0.94	97.904
23	RDD373_93C_2-23	50.505	35.881	0.94	4.107	5.676	0.897	0.925	98.931
24	RDD373_93C_2-24	50.562	36.577	0.783	4.655	5.965	0.902	0.454	99.898
25	RDD373_93C_2-25	49.438	36.662	0.858	4.448	5.601	0.83	1.101	98.938
26	RDD373_93C_2-26	44.343	36.551	0.976	4.436	6.708	1.634	1.664	96.312

Ida Dome Deposits

IDAG 43 – Holland's Dome Uraninite

Point	Comment	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	K_2O (Mass%)	P_2O_5 (Mass%)	V_2O_3 (Mass%)	Total (Mass%)
1	IDAG43_uran-coff1-1	0	0.021	20.327	2	1.285	0.016	0	0	23.649
2	IDAG43_uran-coff1-2	0	0	3.097	0.145	0.756	0.005	0	0	4.003
3	IDAG43_uran-coff1-3	0	0.039	5.13	1.568	12.703	0.03	0	0	19.47
4	IDAG43_uran-coff2-4	28.274	24.973	18.348	1.707	2.259	0	0.072	0.016	75.649
5	IDAG43_uran-coff3-5	44.014	14.816	16.17	0	0.025	0	0.02	0.022	75.067
6	IDAG43_uran-coff4-6	0	0.038	0.275	0.028	3.704	0.009	0	0.009	4.063
7	IDAG43_uran-coff5-7	45.709	16.488	16.339	0.091	0	0	0.028	0.069	78.724
8	IDAG43_uran-coff5-8	18.604	22.887	13.981	0.003	0.038	0	0.078	0.069	55.66
12	IDAG43_uran-coff7-12	76.089	6.788	0	0	0.017	0	0.026	0	82.92
13	IDAG43_uran-coff7-13	75.824	7.241	0.005	0	0.009	0	0.009	0	83.088
14	IDAG43_uran-coff7-14	76.139	6.084	0.169	0	0.057	0	0	0	82.449
15	IDAG43_uran-coff7-15	77.794	7.162	0	0	0	0	0	0	84.956
16	IDAG43_uran-coff8-16	59.884	7.104	15.972	0	0	0	0	0	82.96
17	IDAG43_uran-coff8-17	25.796	30.243	16.007	0	0.037	0	0.05	0.023	72.156
18	IDAG43_uran-coff8-18	45.165	17.608	15.684	0	0	0.287	0.039	0	78.783

IDAG 43 – Holland's Dome Coffinite

Point	Comment	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	K_2O (Mass%)	P_2O_5 (Mass%)	V_2O_3 (Mass%)	Total (Mass%)
9	IDAG43_uran-coff6-9	68.528	0	16.12	0.023	2.07	0.555	0	0	87.296

10	IDAG43_uran-coff6-10	67.787	0	15.661	0.064	2.579	0.751	0	0	86.842
11	IDAG43_uran-coff6-11	70.721	0	15.918	0.013	3.641	0.692	0.031	0	91.016

Valencia

Va26-113_225m Uraninite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	P_2O_5 (Mass%)	V_2O_3 (Mass%)	Total (Mass%)
23	VA113_225_U1-1	1.003	48.459	20.513	12.455	0	0.075	0.864	1.073	0.001	0	84.443
24	VA113_225_U1-2	0	50.029	4.951	0	0	0.073	19.208	2.209	0.024	0	76.494
25	VA113_225_U1-3	0.322	21.245	2.199	1.945	0	0.041	34.939	3.613	0.067	0	64.371
26	VA113_225_U1-4	0.987	75.362	5.085	4.471	0	0.008	3.559	0.384	0.007	0	89.863
27	VA113_225_U1-5	1.872	49.283	21.038	11.802	0	0.092	0.979	0.962	0.008	0	86.036
28	VA113_225_U2-6	0.74	77.606	7.549	1.514	0	0.012	5.151	0.487	0	0	93.059
29	VA113_225_U2-7	0	76.38	6.74	2.069	0	0	4.657	0.668	0	0	90.514
30	VA113_225_U2-8	0.836	72.303	8.796	1.993	0	0.032	5.544	0.711	0.011	0	90.226
31	VA113_225_U2-9	0.187	71.882	8.439	2.519	0	0.039	4.484	0.85	0	0	88.4
32	VA113_225_U3-10	0.077	0	5.173	0.405	0	0.014	0	1.358	20.777	0	27.804
33	VA113_225_U3-11	0.07	0	5.367	0.55	0	0.007	0.009	1.35	20.767	0	28.12
34	VA113_225_U3-12	0.02	0	5.227	0.529	0	0.017	0	1.387	20.235	0	27.415
35	VA113_225_U3-13	0.047	0.106	5.544	0.531	0	0.013	0	1.383	20.561	0	28.185
36	VA113_225_U4-14	0	84.999	6.617	0.003	0	0.001	5.85	0.374	0.017	0	97.861
37	VA113_225_U4-15	0	84.451	6.525	0.004	0	0	5.796	0.312	0.016	0	97.104
38	VA113_225_U4-16	0	84.494	6.427	0	0	0	6.318	0.373	0.007	0	97.619
39	VA113_225_U4-17	0	84.052	5.779	0.015	0	0	6.002	0.197	0	0	96.045
40	VA113_225_U5-18	0.163	76.525	6.167	1.785	0	0	5.708	0.468	0.026	0	90.842
41	VA113_225_U5-19	0	58.504	5.606	0.282	0	0.012	15.961	1.129	0.017	0	81.511
42	VA113_225_U5-20	0.337	76.851	6.464	1.738	0	0.063	4.869	0.621	0	0	90.943
43	VA113_225_U5-21	0	79.173	5.81	1.364	0	0.065	5.112	0.365	0.028	0	91.917
44	VA113_225_U5-22	0.254	76.761	6.957	1.926	0	0.008	5.217	0.615	0	0	91.738
45	VA113_225_U6-23	0	81.48	4.842	0.833	0	0	4.842	0.582	0.001	0	92.58
46	VA113_225_U6-24	0.948	80.375	5.284	1.119	0	0	5.338	0.431	0	0	93.495
47	VA113_225_U6-25	0	78.894	5.135	1.031	0	0.034	5.004	0.741	0	0	90.839
48	VA113_225_U6-26	0	77.866	6.244	0.817	0	0.042	4.838	0.912	0.021	0	90.74
49	VA113_225_U7-27	0	56.463	12.228	13.386	0	0.017	0.402	5.973	0	0	88.469
50	VA113_225_U7-28	0	65.735	1.735	13.481	0.081	0	0.495	7.408	0	0	88.935
51	VA113_225_U7-29	0	8.745	0.871	0.905	0	0	42.513	4.162	0.047	0	57.243
52	VA113_225_U7-30	0	18.507	2.202	0.415	0	0.016	37.846	2.914	0.016	0	61.916
53	VA113_225_U7-31	0	24.786	40.377	13.856	0.05	0.066	0.77	3.433	0.013	0	83.351

Va26-141_290m Uraninite

Point	Comment	UO_3 (Mass%)	TiO_2 (Mass%)	SiO_2 (Mass%)	FeO (Mass%)	CaO (Mass%)	ThO_2 (Mass%)	La_2O_3 (Mass%)	Y_2O_3 (Mass%)	PbO (Mass%)	Ce_2O_3 (Mass%)	Total (Mass%)
2	Va141_290_uran 4-1	88.199	0.003	0.128	0.052	0.567	8.378	0	0.362	5.582	0	103.271
3	Va141_290_uran 4-2	86.468	0	0	0.118	0.461	8.189	0	0.353	5.94	0	101.529
4	Va141_290_uran 4-3	84.101	0	0	0	0.346	8.112	0	0.43	5.178	0	98.167
5	Va141_290_uran 4-4	84.168	0	0	0	0.246	8.475	0	0.388	5.521	0	98.798
6	Va141_290_uran 4-5	84.983	0.005	0.058	0.034	0.171	7.901	0	0.355	5.933	0	99.44
7	Va141_290_uran 5-6	90.678	0	0	0	0.586	5.276	0	0.222	5.904	0	102.666
8	Va141_290_uran 5-7	91.001	0.007	0.074	0	0.319	4.621	0	0.193	5.802	0	102.017
9	Va141_290_uran 5-8	92.638	0	0.085	0	0.482	3.748	0	0.12	6.076	0	103.149
10	Va141_290_uran 5-9	92.111	0	0.066	0	0.547	3.664	0	0.143	5.633	0	102.164
11	Va141_290_uran 5-10	90.249	0	0	0.028	0.386	4.879	0	0.303	6.083	0	101.928
12	Va141_290_uran 6-11	92.581	0	0.022	0.043	0.471	3.572	0	0.187	6.009	0	102.885
13	Va141_290_uran 6-12	91.377	0	0.012	0	0.2	3.851	0	0.136	5.62	0	101.196
14	Va141_290_uran 6-13	92.198	0	0.084	0	0.272	3.6	0	0.101	6.757	0	103.012
15	Va141_290_uran 6-14	85.638	0	0.048	0	0.394	8.207	0	0.164	6.208	0	100.659
16	Va141_290_uran 6-15	90.288	0	0	0	0.57	3.468	0	0.163	5.958	0	100.447
17	Va141_290_uran 7-16	89.023	0.047	0	0	0.525	6.038	0	0.142	5.02	0	100.795

18	Va141_290_uran 7-17	88.418	0	0.077	0	0.364	6.142	0	0.156	6.043	0	101.2
19	Va141_290_uran 7-18	82.578	0.001	0.797	0.054	0.469	5.199	0	0.1	9.709	0	98.907
20	Va141_290_uran 7-19	87.703	0.016	0.203	0.038	0.681	4.206	0	0.106	8.195	0	101.148
21	Va141_290_uran 7-20	87.064	0	0	0.023	0.288	6.192	0	0.129	6.305	0	100.001

VALG11 Uraninite

Point	Comment	K_2O (Mass%)	UO_2 (Mass%)	ThO_2 (Mass%)	SiO_2 (Mass%)	Al_2O_3 (Mass%)	Fe_2O_3 (Mass%)	PbO (Mass%)	CaO (Mass%)	La_2O_3 (Mass%)	P_2O_5 (Mass%)	Ce_2O_3 (Mass%)	Total (Mass%)
1	VALG11_U1-1	0	85.215	4.687	0	0	0	6.715	0	0	0	0	96.617
2	VALG11_U1-2	0	85.353	4.141	0.008	0	0	7.207	0.044	0.055	0.04	0	96.848
3	VALG11_U1-3	0	83.115	4.864	0.397	0	0.009	6.863	0	0.115	0	0	95.363
4	VALG11_U2-4	0	82.687	4.542	0.057	0	0.07	7.022	0.261	0	0.014	0	94.653
5	VALG11_U2-5	0	82.867	5.002	0.047	0	0.035	7.241	0.13	0	0.001	0	95.323
6	VALG11_U2-6	0	82.097	4.9	0.023	0	0.036	6.902	0.171	0	0	0	94.129
7	VALG11_U2-7	0	82.814	5.436	0	0	0.012	7.006	0.274	0	0	0	95.542
8	VALG11_U2-8	0	83.058	5.174	0.038	0	0.033	7.154	0.348	0.075	0.028	0	95.908
9	VALG11_U3-9	0.113	0	11.874	0.59	0	0.134	0.121	3.966	12.155	23.775	0	52.728
10	VALG11_U3-10	0.129	0	10.817	0.774	0	0.23	0	3.504	9.999	1.212	0	26.665
11	VALG11_U3-11	0.038	0	11.239	0.625	0	0.189	0.12	3.835	10.457	1.246	0	27.749
12	VALG11_U4-12	0.048	0	13.455	1.138	0	0.015	0.245	3.597	9.357	1.174	0	29.029
13	VALG11_U4-13	0.008	0	13.306	2.157	0	0.005	0.236	2.164	10.757	1.062	0	29.695
14	VALG11_U4-14	0.037	0	15.115	1.314	0	0.047	0.244	3.296	11.481	22.831	0	54.365
15	VALG11_U6-15	0	82.997	4.589	0	0	0	6.694	0.776	0	0.014	0	95.07
16	VALG11_U6-16	0	87.149	4.998	0	0	0	6.727	0.322	0.166	0	0	99.362
17	VALG11_U6-17	0	82.112	3.657	0.15	0	0.017	7.05	0.426	0.18	0.009	0	93.601
18	VALG11_U7-18	0	81.451	6.002	0.128	0	0.049	7.037	0.436	0.033	0	0	95.136
19	VALG11_U7-19	0	81.109	5.214	0.058	0	0.052	7.017	0.374	0	0.02	0	93.844
20	VALG11_U7-20	0	76.193	5.287	0.005	0	0.017	5.713	0.354	0.042	0	0	87.611
21	VALG11_U8-21	0	77.828	4.902	0	0	0.082	6.975	0.415	0.099	0	0	90.301
22	VALG11_U8-22	0	80.588	5.335	0.111	0	0.061	6.936	0.342	0.175	0.031	0	93.579
23	VALG11_U8-23	0	78.066	5.009	0.118	0	0.046	6.646	0.352	0.015	0	0	90.252
24	VALG11_U10-24	0	85.961	4.93	0.026	0	0	7.253	0.129	0	0	0	98.299
25	VALG11_U10-25	0	83.902	4.663	0	0	0	6.691	0.513	0.034	0.007	0	95.81
26	VALG11_U10-26	0	87.293	3.354	0	0	0.056	6.988	0.096	0	0.014	0	97.801
27	VALG11_U11-27	0	78.66	3.961	0.054	0	0.052	6.586	0.359	0.061	0	0	89.733
28	VALG11_U11-28	0	79.396	4.496	0.03	0	0.045	6.945	0.279	0	0.004	0	91.195
29	VALG11_U11-29	0	76.977	4.429	0.142	0	0.028	6.498	0.473	0	0	0	88.547

Appendix G4 Appendix G12 Etango Calculated Mineral Compositions

DH025_43

Sample Block: Diamond Hole 025, 43 m down hole. Uraninite compositions by EPMA. Cation Corrections Applied X = 1, O = 2.

DH025_43 sample set contains spot analyses of 3 uraninites (U-) in a polished grain mount; two are isolated grains, U-5 and U-7, the third is a set of spot analyses along the length of uraninite surface coating on a magnetite.

Uraninite/spot	**UO 2**	**UO 3**	**ThO 2**	**PbO**	**SiO 2**	**CaO**	**Al2 O3**	**K2 O**	**Fe2 O3**	**Ce2 O3**	**La2 O3**	**P2 O5**	**Tot al**
DH25_43_U5-8	48.100	37.192	5.442	5.912	0.394	0.563	0.000	0.000	0.039	0.395	0.000	0.013	95.945

DH25_43_U5-9	47.850	36.942	5.233	5.927	0.379	0.443	0.000	0.000	0.018	1.018	0.000	0.020	95.739
DH25_43_U5-10	48.500	36.512	5.310	5.980	0.541	0.382	0.000	0.000	0.022	0.048	0.412	0.000	95.640
DH25_43_U5-11	48.000	36.074	6.145	5.262	0.963	0.467	0.000	0.000	0.024	0.740	0.094	0.001	95.728
DH25_43_U5-12	45.800	35.557	5.718	5.507	1.159	0.500	0.000	0.000	0.069	0.749	0.103	0.000	93.149
DH25_43_U5	47.650	36.455	5.570	5.718	0.687	0.471	0.000	0.000	0.034	0.590	0.122	0.007	97.304
DH25_43_U6-13	50.500	36.777	7.632	0.835	1.506	0.338	0.000	0.565	0.060	1.031	0.501	0.046	97.709
DH25_43_U6-14	48.000	37.329	4.538	5.722	0.575	0.601	0.000	0.000	0.013	0.816	0.000	0.000	95.481
DH25_43_U6-15	53.400	32.774	6.843	0.657	1.992	0.264	0.000	0.000	0.045	1.631	0.000	0.000	95.751
DH25_43_U6-16	51.700	30.993	6.707	0.497	2.395	0.395	0.000	0.000	0.039	0.000	0.000	0.012	90.984
DH25_43_U6	50.900	34.468	6.430	1.928	1.617	0.400	0.000	0.141	0.039	0.870	0.125	0.015	96.932
DH25_43_U7-17	26.600	30.942	16.132	0.098	15.817	1.064	0.000	1.049	0.027	1.277	0.264	0.081	91.600
DH25_43_U7-18	37.000	28.816	11.188	0.045	16.552	0.979	0.004	0.387	0.030	0.000	0.000	0.042	93.412
DH25_43_U7-19	40.800	32.358	8.049	0.204	16.331	0.861	0.018	0.603	0.001	0.000	0.000	0.045	97.438
DH25_43_U7-20	43.000	34.770	4.629	0.124	17.102	0.900	0.000	0.710	0.000	0.000	0.050	0.016	99.333
DH25_43_U7	39.660	32.271	9.286	0.480	13.484	0.841	0.004	0.578	0.019	0.429	0.088	0.040	97.180

DH025_353

Sample Block: Diamond Hole 025, 353 m down hole. Uraninite compositions by EPMA. Cation Corrections Applied X = 1, O = 2.

The sample block contains a set of 27 analyses spread over 7 uraninites. A total of 8 individual grains were analysed by a spread of 44 spots. The lower totals (< 85%) are filtered out for this section and a full summary is available in Digital Appendix 6.3b. Two of the uraninites below contain only two spots with >85 wt% totals, although the lower totals are in fact below 85 wt% (uraninite 8 and uraninite 9).

DH025_353m Averages of Uraninite Compositions												
Uraninite/Grain	UO_2	UO_3	ThO_2	PbO	SiO_2	CaO	FeO	TiO2	Ce_2O_3	La_2O_3	Y_2O_3	Total
DH025_353_1	25.625	40.994	8.487	6.161	1.423	3.201	0.003	0.000	0.008	0.000	2.173	88.074
DH025_353_2	22.942	40.833	8.316	6.616	1.728	3.252	0.066	0.004	0.000	0.000	2.300	86.058
DH025_353_3	24.058	39.367	8.623	5.548	2.388	3.138	0.040	0.000	0.000	0.000	2.310	85.471
DH025_353_6	25.392	39.175	8.833	5.672	1.495	2.981	0.013	0.000	0.019	0.000	2.237	85.816
DH025_353_8	33.029	34.700	8.784	5.365	0.645	1.391	0.019	0.000	0.026	0.000	2.072	86.029
DH025_353_9	26.948	38.250	8.616	5.124	1.498	2.663	0.038	0.000	0.035	0.000	2.536	85.705
DH025_353_10	23.214	39.250	10.094	4.931	2.523	3.374	0.046	0.002	0.036	0.000	2.252	85.721

DH025_353m Uraninite Spot Compositions												
Uraninite/spot	UO_2	UO_3	ThO_2	PbO	SiO_2	CaO	FeO	TiO2	Ce_2O_3	La_2O_3	Y_2O_3	Total
DH025_353_1-1	26.302	42.700	8.835	5.483	1.645	3.579	0.000	0.000	0.057	0.000	2.295	90.896
DH025_353_1-3	27.399	40.250	8.326	6.320	0.812	2.844	0.000	0.000	0.006	0.000	2.088	88.045
DH025_353_1-4	24.276	42.200	8.260	6.435	1.081	3.515	0.022	0.000	0.000	0.000	2.036	87.825
DH025_353_1-5	25.613	41.000	8.552	6.546	1.517	3.093	0.000	0.000	0.000	0.000	2.201	88.522

DH025_353_1-6	24.483	41.500	9.027	5.893	1.687	3.512	0.000	0.000	0.000	0.000	2.186	88.288
DH025_353_1-7	26.492	40.400	8.327	6.474	0.989	2.853	0.000	0.000	0.000	0.000	2.430	87.965
DH025_353_1-8	26.617	40.700	7.831	6.032	1.413	3.103	0.000	0.000	0.000	0.000	2.077	87.773
DH025_353_1-9	23.819	39.200	8.738	6.108	2.237	3.109	0.000	0.000	0.000	0.000	2.069	85.280
DH025_353_1	25.625	40.994	8.487	6.161	1.423	3.201	0.003	0.000	0.008	0.000	2.173	88.074
DH025_353_2-11	20.679	41.500	7.974	7.269	1.325	3.358	0.067	0.000	0.000	0.000	2.689	84.861
DH025_353_2-12	23.259	42.500	7.928	6.999	1.442	3.499	0.050	0.012	0.000	0.000	2.153	87.842
DH025_353_2-20	24.889	38.500	9.046	5.581	2.416	2.900	0.081	0.000	0.000	0.000	2.059	85.472
DH025_353_2	22.942	40.833	8.316	6.616	1.728	3.252	0.066	0.004	0.000	0.000	2.300	86.058
DH025_353_3-21	23.914	39.300	8.725	5.304	2.664	3.207	0.000	0.000	0.000	0.000	2.464	85.578
DH025_353_3-22	23.811	39.800	8.725	5.742	2.201	3.129	0.120	0.000	0.000	0.000	2.354	85.882
DH025_353_3-23	24.448	39.000	8.418	5.597	2.300	3.078	0.000	0.000	0.000	0.000	2.111	84.952
DH025_353_3	24.058	39.367	8.623	5.548	2.388	3.138	0.040	0.000	0.000	0.000	2.310	85.471
DH025_353_6-26	25.845	40.000	8.512	5.626	1.300	3.106	0.053	0.000	0.009	0.000	2.147	86.598
DH025_353_6-27	25.729	39.000	8.700	5.360	1.839	3.036	0.000	0.000	0.000	0.000	2.087	85.751
DH025_353_6-28	27.371	37.600	8.489	5.814	1.258	2.445	0.000	0.001	0.067	0.000	2.103	85.148
DH025_353_6-29	22.622	40.100	9.631	5.887	1.582	3.335	0.000	0.000	0.000	0.000	2.611	85.768
DH025_353_6	25.392	39.175	8.833	5.672	1.495	2.981	0.013	0.000	0.019	0.000	2.237	85.816
DH025_353_8-34	31.875	35.600	9.086	5.232	0.885	1.726	0.000	0.000	0.089	0.000	2.088	86.581
DH025_353_8-35	32.300	34.600	8.773	5.485	0.583	1.469	0.000	0.000	0.000	0.000	1.938	85.148
DH025_353_8-37	33.412	34.700	8.909	5.609	0.614	1.242	0.074	0.000	0.014	0.000	2.101	86.675
DH025_353_8-38	34.528	33.900	8.366	5.133	0.498	1.126	0.000	0.000	0.001	0.000	2.160	85.712
DH025_353_8	33.029	34.700	8.784	5.365	0.645	1.391	0.019	0.000	0.026	0.000	2.072	86.029
DH025_353_9-41	27.663	37.900	7.729	4.955	1.480	2.617	0.000	0.000	0.000	0.000	2.461	84.805
DH025_353_9-42	26.232	38.600	9.502	5.293	1.515	2.708	0.075	0.000	0.069	0.000	2.610	86.604
DH025_353_9	26.948	38.250	8.616	5.124	1.498	2.663	0.038	0.000	0.035	0.000	2.536	85.705
DH025_353_10-45	23.618	40.500	9.832	5.309	2.093	3.477	0.036	0.004	0.056	0.000	2.272	87.197
DH025_353_10-46	22.810	38.000	10.355	4.553	2.953	3.271	0.056	0.000	0.015	0.000	2.232	84.245
DH025_353_10	23.214	39.250	10.094	4.931	2.523	3.374	0.046	0.002	0.036	0.000	2.252	85.721

Etango uranophane analyses

Ca was erroneously left off the EPMA recipe at the time of analysis. The results, with CaO calculated as 100 wt% composition - (12.8 wt% H2O + existing oxides). 12.8 % is approximate to analyses in Viswanathan and Harneit (1986).

Comment	UO2	ThO2	SiO2	Al2O3	Fe2O3	K2O	P2O5	V2O3	CaO calc.	Assume H2O	Total	Total Calc.
HD25_353_ uranoph4-1	61.746	0	15.468	0	0.018	0	0	0	10.268	12.5	77.232	**100**
HD25_353_ uranoph4-2	63.706	0	15.498	0	0	0	0	0	8.296	12.5	79.204	**100**
HD25_353_ uranoph4-3	63.244	0	15.213	0	0	0	0.007	0	9.036	12.5	78.464	**100**
HD25_353_ uranoph4-4	63.532	0	15.767	0	0.008	0	0	0	8.193	12.5	79.307	**100**
HD25_353_ uranoph4-5	60.978	0	15.21	0	0.036	0	0	0	11.276	12.5	76.224	**100**
HD25_353_ uranoph5-6	64.252	0	15.178	0	0	0	0	0	8.07	12.5	79.43	**100**
HD25_353_ uranoph5-7	58.715	0	17.747	0.075	0.078	0.027	0	0	10.858	12.5	76.642	**100**

HD25_353_uranoph5-8	64.376	0	16.201	0.088	0.017	0.061	0	0	6.757	12.5	80.743	**100**
HD25_353_uranoph6-9	63.916	0	14.735	0.005	0	0	0	0	8.844	12.5	78.656	**100**
HD25_353_uranoph6-10	56.573	0	15.438	0.061	0.016	0	0	0	15.412	12.5	72.088	**100**
HD25_353_uranoph6-11	57.784	0	16.75	0.028	0	0.033	0.01	0	12.895	12.5	74.605	**100**
HD25_353_uranoph6-12	62.72	0	14.594	0	0	0	0.007	0	10.179	12.5	77.321	**100**
HD25_353_uranoph7-13	63.416	0	15.362	0	0	0	0	0	8.722	12.5	78.778	**100**
HD25_353_uranoph7-14	59.701	0	14.985	0	0.005	0	0	0	12.809	12.5	74.691	**100**
HD25_353_uranoph7-15	53.659	0.03	19.743	0.62	0.216	0.146	0.003	0	13.083	12.5	74.417	**100**
HD25_353_uranoph8-16	64.247	0	15.023	0	0.032	0	0	0	8.198	12.5	79.302	**100**
HD25_353_uranoph8-17	63.993	0	15.317	0	0.041	0.005	0	0	8.144	12.5	79.356	**100**
HD25_353_uranoph8-18	64.129	0	14.868	0.013	0.017	0	0	0	8.473	12.5	79.027	**100**
HD25_353_uranoph9-19	48.816	0	28.27	4.504	0.077	0.049	0.008	0	5.776	12.5	81.724	**100**
HD25_353_uranoph9-20	48.383	0.056	28.144	4.436	0.07	0.122	0	0	6.289	12.5	81.211	**100**
HD25_353_uranoph9-21	50.664	0	27.668	4.913	0.056	0.118	0.022	0	4.059	12.5	83.441	**100**
HD25_353_uranoph10-22	10.659	9.481	22.511	1.091	0.576	0.066	0.019	0.015	43.082	12.5	44.418	**100**
HD25_353_uranoph10-23	19.528	12.042	28.842	2.343	0.556	0.033	0.005	0	24.151	12.5	63.349	**100**
HD25_353_uranoph10-24	8.661	7.799	19.912	0.916	0.513	0.065	0.001	0	49.633	12.5	37.867	**100**

Appendix G5 Appendix G12 Hildenhof Calculated Mineral Compositions

The Hildenhof EPMA dataset comprises 22 analyses for 5 grains of uraninite. All uraninite specimens are sourced from a single polished grain mount produced from a +90 µm-125 µm size fraction of heavy mineral separates (heavy medium is Bromoform).

Table D Hildenhof uraninite analyses summaries. averages are shaded and bold, spurious values removed.

Comment	UO_2	UO_3	PbO	ThO_2	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	P_2O_5	V_2O_3	Total
HILG21_U1-1	49.551	39.501	6.095	3.931	0.000	0.000	0.900	0.023	0.000	0.000	0.000	101.713
HILG21_U1-2	49.896	39.846	6.024	3.231	0.017	0.000	0.939	0.046	0.000	0.000	0.000	99.006
HILG21_U1-3	51.726	38.362	6.412	3.054	0.079	0.000	0.367	0.000	0.000	0.000	0.000	97.823
HILG21_U1	**50.391**	**39.237**	**6.177**	**3.405**	**0.032**	**0.000**	**0.735**	**0.023**	**0.000**	**0.000**	**0.000**	**99.514**
HILG21_U2-4	47.597	40.367	5.480	4.332	0.682	0.000	1.402	0.134	0.000	0.007	0.000	100.006
HILG21_U2-5	46.295	41.414	5.125	4.771	0.338	0.000	1.822	0.189	0.000	0.047	0.000	100.660
HILG21_U2-6	47.007	41.271	5.750	3.630	0.669	0.000	1.594	0.079	0.000	0.000	0.000	97.432
HILG21_U2-7	46.780	42.009	5.355	3.350	0.455	0.000	1.871	0.133	0.000	0.047	0.000	100.470
HILG21_U2	**46.920**	**41.265**	**5.427**	**4.021**	**0.536**	**0.000**	**1.672**	**0.134**	**0.000**	**0.025**	**0.000**	**99.642**
HILG21_U3-8	47.094	42.015	5.008	3.334	0.487	0.000	1.864	0.197	0.000	0.001	0.000	100.651
HILG21_U3-9	45.880	44.012	4.731	2.745	0.015	0.000	2.483	0.133	0.000	0.000	0.000	101.132
HILG21_U3-10	47.663	42.266	4.952	2.934	0.138	0.000	1.924	0.112	0.000	0.012	0.000	101.337
HILG21_U3-11	49.219	41.393	5.238	2.421	0.181	0.000	1.518	0.030	0.000	0.000	0.000	97.319
HILG21_U3-12	48.585	40.830	5.259	3.733	0.073	0.000	1.482	0.031	0.000	0.008	0.000	99.207
HILG21_U3-13	47.341	42.368	5.500	2.821	0.024	0.000	1.831	0.079	0.000	0.035	0.000	98.857
HILG21_U3	**47.630**	**42.147**	**5.115**	**2.998**	**0.153**	**0.000**	**1.850**	**0.097**	**0.000**	**0.009**	**0.000**	**99.751**

HILG21_U4-14	49.579	40.934	5.608	2.163	0.285	0.000	1.291	0.100	0.000	0.040	0.000	98.227
HILG21_U4-15	45.491	42.808	5.370	3.436	0.626	0.000	2.126	0.133	0.000	0.010	0.000	98.921
HILG21_U4-16	48.967	41.114	5.361	2.823	0.202	0.000	1.417	0.118	0.000	0.000	0.000	97.209
HILG21_U4-17	45.342	40.030	5.298	7.017	0.612	0.000	1.634	0.067	0.000	0.000	0.000	95.717
HILG21_U4-18	49.201	40.597	5.561	3.318	0.000	0.000	1.283	0.040	0.000	0.000	0.000	97.965
HILG21_U4	**47.716**	**41.097**	**5.440**	**3.751**	**0.345**	**0.000**	**1.550**	**0.092**	**0.000**	**0.010**	**0.000**	**97.608**
HILG21_U5-19	50.148	39.556	6.131	3.170	0.111	0.000	0.802	0.083	0.000	0.000	0.000	97.313
HILG21_U5-20	48.295	41.033	5.640	3.405	0.107	0.000	1.429	0.092	0.000	0.000	0.000	98.976
HILG21_U5-21	48.576	40.392	6.137	3.669	0.028	0.000	1.145	0.052	0.000	0.000	0.000	99.637
HILG21_U5-22	47.039	38.088	6.002	7.871	0.067	0.000	0.934	0.000	0.000	0.000	0.000	96.090
HILG21_U5	**48.514**	**39.767**	**5.977**	**4.529**	**0.078**	**0.000**	**1.077**	**0.057**	**0.000**	**0.000**	**0.000**	**98.004**

Appendix G6 Husab Calculated Mineral Analyses

Samples RDD373_64m and RDD373_93m: Leached and Pristine Primary Brannerite

Leached Brannerite RDD373_64 m

Bright- Y:X = 1.920 and Cation Total = 3.006

$$(U_{0.560} + Ca_{0.226} + Y_{0.076} + Pb_{0.037} + Th_{0.130})\Sigma{=}1.030(Fe_{0.061} + Ti_{1.916})_{\Sigma=1.977}O_{6.139}$$

Dull- Y:X = 1.980 and Cation Total = 2.990

$$(U_{0.534} + Ca_{0.204} + Y_{0.086} + Pb_{0.030} + Th_{0.1349})\Sigma{=}1.003(Fe_{0.067} + Ti_{1.926})_{\Sigma=1.986}O_{6.002}$$

Average Y:X = 1.982 and Cation Total = 2.999

$$(U_{0.552} + Ca_{0.216} + Y_{0.079} + Pb_{0.035} + Th_{0.136})\Sigma{=}1.017(Fe_{0.067} + Ti_{1.915})_{\Sigma=1.982}O_{6.068}$$

Pristine Brannerite Sample Formula

Good x:y and $cation_{tot}$ x ~ 1.0 and y > 1.7; $cation_{tot}$ ~ 3

$$(U_{0.655} + Ca_{0.298} + Y_{0.034} + Pb_{0.020} + Th_{0.078})_{\Sigma 1.084}(Fe_{0.104} + Ti_{1.812})_{\Sigma 1.917}O_{6.218}$$

Poor x:y and good $cation_{tot}$ x > 1.1 and y < 1.7; $cation_{tot}$ ~ 3

$$(U_{0.671} + Ca_{0.338} + Y_{0.034} + Pb_{0.024} + Th_{0.087})_{\Sigma 1.154}(Fe_{0.043} + Ti_{1.803})_{\Sigma 1.846}O_{6.248}$$

All Average

$$(U_{0.665} + Ca_{0.323} + Y_{0.034} + Pb_{0.023} + Th_{0.084})_{\Sigma 1.129}(Fe_{0.065} + Ti_{1.806})_{\Sigma 1.871}O_{6.275}$$

Sample RDD373_115A Betafite

The 125^{th} meter down hole of Husab diamond hole RDD373 comprises a betafite-bearing interval of Alaskite. The hole collar is located within the western side of the Zone 1 deposit. The collar plunges -60° and intersects Rossing Formation cordierite gneiss with intercalated and cross-cutting granite sheets, most of which are alaskitic. The refractory-bearing granite sheet has a strongly oxidised appearance, accentuated by pervasive red - orange iron oxide staining.

Analyses

Offline corrections of the EPMA analyses and calculation macros for cation proportions were undertaken, and provided by Dr. Gelu Costin at Rhodes University.

The betafite grain contains a euhedral, primary zircon inclusion, metal leaching by hydrothermal fluids has pervaded fracture planes and corroded grain edges. Spots used in the calculation were selected as best representatives of unaltered betafite and at representative spots where metal leaching was evident, and uniform. Spots were also taken at fractures and at grain edges but returned inconsistent readings.

The best-fit cation proportions require U to be in the 6+ oxidation state. It is therefore assumed for this study that U in betafite is oxidised, with only minor remobilised U precipitating as U^{4+} in fractures and at grain margins.

Betafite Analyses Correction Methodology

The betafite analyses represent the most complex mineral analyses in this dataset. As such the table below represent the summary of cation proportions. Charge balances were adjusted by oxygen for each individual point. On the advice of Dr. Gelu Costin (Rhodes University) all U was assumed U^{6+} in order to obtain the optimum cation charge balance. All point analyses had oxygen balanced to obtain Y totals close to- or = 2 first and then adjusting to get sum X close to 1. Water was calculated by cation correction factor for '100 -sum oxides wt%. Thus a general formula for Betafite composition is calculated with the following formula $(X)_{\Sigma x=1}(Y)_{\Sigma y\sim 2}O_{\sim 8}.H_2O_{(oxygen\text{-}OH).}$

The data set comprises 7 spot analyses on 'pristine' betafite and 6 analyses on 'leached' betafite. The formulae of the pristine and leached betafite are as follows:

Combined Analyses: O coordination = 7.859

$$(U^{6+}{}_{0.446}Ca_{0.295}Y_{0.227})_{\Sigma=0.968}(Ti_{1.423}Nb_{0.397}Fe^{3+}{}_{0.079}Th_{0.059}Pb_{0.033}Ta_{0.009})_{\Sigma=2.00}O_{4.721}(OH)_{3.588}$$

Pristine: O coordination = 7.841

$$(U^{6+}{}_{0.452}Ca_{0.300}Y_{0.224})_{\Sigma=0.976}(Ti_{1.425}Nb_{0.398}Fe^{3+}{}_{0.076}Th_{0.059}Pb_{0.034}Ta_{0.009})_{\Sigma=2.00}O_{4.330}(OH)_{3.511}$$

Leached: O coordination = 7.880

$$(U^{6+}{}_{0.449}Ca_{0.261}Y_{0.229})_{\Sigma=0.938}(Ti_{1.420}Nb_{0.394}Fe^{3+}{}_{0.076}Th_{0.060}Pb_{0.036}Ta_{0.009})_{\Sigma=2.00}O_{4.203}(OH)_{3.677}$$

Betafite Analyses - Cation Correction Table

Spot	**1_2**	**1_3**	**1_4**	**1_5**	**1_6**	**1_7**	**1_8**	**2_10**	**2_11**	**2_12**	**2_13**	**2_14**	**2_15**
Ca+U4+U6+Y	0.911	1.118	1.032	0.991	0.651	1.085	1.046	0.985	0.950	0.990	1.022	0.988	0.822
Ti+Nb+Ta+ Fe+Th+Pb	2.000	2.001	2.001	2.000	2.000	1.999	2.000	2.000	2.001	2.000	1.999	2.000	1.999
Oxygens	8.310	7.570	7.690	7.860	8.550	7.330	7.580	7.690	7.580	7.840	7.730	7.860	8.580
2Ti	2.815	2.908	2.832	2.763	2.849	2.894	2.887	2.845	2.881	2.851	2.783	2.902	2.788
Nb+Ta	0.410	0.404	0.439	0.449	0.346	0.406	0.388	0.389	0.402	0.398	0.442	0.382	0.418
	2.197	1.790	1.940	2.018	3.074	1.842	1.912	2.030	2.107	2.020	1.957	2.023	2.433
UO2 tot measured	**30.212**	**32.403**	**29.206**	**28.824**	**29.529**	**31.053**	**32.222**	**31.190**	**32.249**	**31.422**	**28.669**	**31.242**	**24.049**
UO2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TiO2	28.197	28.468	28.542	27.658	28.328	29.168	28.677	28.588	29.052	28.233	27.828	28.840	28.580
FeO	1.847	1.009	1.323	1.553	1.262	1.104	1.479	1.947	1.364	1.538	1.314	1.295	1.470
CaO	4.715	5.169	4.391	4.047	1.312	5.149	4.643	4.059	3.781	4.194	4.271	4.398	3.762
ThO2	3.810	3.606	3.123	3.709	5.291	3.878	3.813	3.932	3.807	4.065	3.663	4.151	3.893
Nb2O5	13.424	12.883	14.427	14.644	11.150	13.388	12.523	12.716	13.253	12.829	14.362	12.371	13.990
Y2O3	3.659	6.983	8.336	7.843	3.307	7.572	6.542	6.773	5.981	6.134	8.296	5.847	6.182
PbO	1.242	1.639	1.440	1.494	4.402	1.517	1.549	1.183	1.475	1.585	2.087	1.731	2.900

Ta2O5	0.428	0.487	0.516	0.542	0.491	0.390	0.483	0.505	0.407	0.461	0.574	0.428	0.429
UO3	32.004	34.324	30.938	30.533	31.280	32.894	34.133	33.040	34.161	33.285	30.369	33.095	25.475
H2O	10.674	5.432	6.964	7.977	13.177	4.940	6.158	7.257	6.719	7.676	7.236	7.844	13.319
Total	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
# of Oxygens -	**8.310**	**7.570**	**7.690**	**7.860**	**8.550**	**7.330**	**7.580**	**7.690**	**7.580**	**7.840**	**7.730**	**7.860**	**8.580**
Ti	1.407	1.454	1.416	1.382	1.424	1.447	1.444	1.423	1.440	1.425	1.391	1.451	1.394
Fe	0.102	0.057	0.073	0.086	0.071	0.061	0.083	0.108	0.075	0.086	0.073	0.072	0.080
Ca	0.335	0.376	0.310	0.288	0.094	0.364	0.333	0.288	0.267	0.302	0.304	0.315	0.261
Th	0.058	0.056	0.047	0.056	0.080	0.058	0.058	0.059	0.057	0.062	0.055	0.063	0.057
Nb	0.403	0.395	0.430	0.440	0.337	0.399	0.379	0.380	0.395	0.389	0.432	0.374	0.410
Y	0.129	0.252	0.293	0.277	0.118	0.266	0.233	0.238	0.210	0.219	0.293	0.208	0.213
Pb	0.022	0.030	0.026	0.027	0.079	0.027	0.028	0.021	0.026	0.029	0.037	0.031	0.051
U	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ta	0.008	0.009	0.009	0.010	0.009	0.007	0.009	0.009	0.007	0.008	0.010	0.008	0.008
U	0.446	0.490	0.429	0.426	0.439	0.456	0.480	0.459	0.473	0.469	0.424	0.465	0.347
H	4.725	2.460	3.064	3.533	5.875	2.173	2.749	3.203	2.954	3.436	3.209	3.500	5.761
Total	**7.635**	**5.579**	**6.096**	**6.524**	**8.527**	**5.258**	**5.795**	**6.188**	**5.905**	**6.426**	**6.230**	**6.489**	**8.582**
F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.489	8.582
Cl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum positive charges	**15.464**	**13.643**	**13.684**	**14.053**	**16.223**	**13.111**	**13.750**	**13.937**	**13.786**	**14.293**	**13.781**	**14.402**	**15.794**
Sum negative charges	**16.620**	**15.140**	**15.380**	**15.720**	**17.100**	**14.660**	**15.160**	**15.380**	**15.160**	**15.680**	**15.460**	**15.720**	**17.160**
O in formula	**3.585**	**5.110**	**4.626**	**4.327**	**2.675**	**5.157**	**4.831**	**4.487**	**4.626**	**4.404**	**4.521**	**4.360**	**2.819**

Sample RDD373_125m Coffinite

The RDD373_125m Coffinite sample is an example of near-complete Coffinite replacement of primary Uraninite.

- Oxygen Co-ordination: 2.675
- *x = 0.575; 1-x = 0.417 (difference ~0.008)*
- *∑ (Si,Al,Fe,K,Na) = 0.417 (1-x)*

$(U^{3+}_{0.099}U^{2+}_{0.212}Th_{0.065Pb})x_{=0.376}(Si_{0.372}Al_{0.000}Fe_{0.004}K_{0.039}Na_{0.002})_{\Sigma=0.417}(OH)_{2.30}$

Appendix G7 Ida Dome Calculated Mineral Compositions

The Ida Dome area comprises a collection of minor uranium deposits; namely the U occurrences at the Ida Cu Mine (Ida Central); the Holland's Dome antiform and the deposit at Garnet Valley, which is stratigraphically parallel to Ida Central along the eastern margin of the Ida Dome. A single grain mount of -125 µm + 90 µm heavy medium separates was used from hand sample IDAG 43, an 883 ppm U alaskite from the Holland's Dome.

IDAG 43

Uraninite

$(U^{2+}_{0.609}U^{3+}_{0.306}Th_{0.082}Si_{0.002})_{\Sigma=0.999}O_2$

Spot	UO_2	UO_3	ThO_2	SiO_2	Al_2O_3	K_2O	Fe_2O_3	P_2O_5	V_2O_3	Total
IDAG43_U7-12	50.20	27.442	6.788	0.000	0.000	0.000	0.017	0.026	0.000	84.47
IDAG43_U7-13	50.00	27.373	7.241	0.005	0.000	0.000	0.009	0.009	0.000	84.64
IDAG43_U7-14	50.20	27.495	6.084	0.169	0.000	0.000	0.056	0.000	0.000	84.00
IDAG43_U7-15	58.60	32.054	7.078	0.000	0.000	0.000	0.000	0.000	0.000	97.73

Th - Uraninite

$(U^{2+}_{0.217}U^{3+}_{0.110}Th_{0.141}Si_{0.530}Pb_{0.001}Ca_{0.001})_{\Sigma=1}O_2$

Spot	UO_2	UO_3	ThO_2	SiO_2	La_2O_3	Fe_2O_3	PbO	CaO	P_2O_5	Total
IDAG43_uran-coff8-16	39.50	21.61	7.10	15.97	0.00	0.00	0.00	0.00	0.00	84.18
IDAG43_uran-coff8-17	16.90	9.43	30.24	16.01	0.00	0.04	0.00	0.05	0.02	72.69
IDAG43_uran-coff8-18	29.50	16.60	17.61	15.68	0.00	0.00	0.29	0.04	0.00	79.72

Coffinite

The formula for the IDAG 43 sample is as follows and is calculated from the values table presented below.

$\mathbf{(U^{3+}_{0.055}U^{2+}_{0.384}Pb_{0.005})_{\Sigma=0.444}(Si_{0.456}Al_{0.002}Fe_{0.058}K_{0.009})_{\Sigma=0.525}(OH)_{1.9}}$

Conditions:

- Oxygen co-ordination range : 2.6 – 2.9
- Calculated water: 5.7 – 13.7
- Validation: Sum Si, Al, Fe, K = **0.525**; OH = 1.9; x = 0.475; 1-x = **0.525**

Spot	UO_2	UO_3	ThO_2	SiO_2	Al_2O_3	Fe_2O_3	K_2O	P_2O_5	PbO	V_2O_3	H_2O calc.	Total
IDAG43_6-9	37.90	30.672	0.000	15.442	0.089	2.162	0.561	0.001	0.591	0.000	12.582	87.42
IDAG43_6-10	44.00	30.971	0.000	17.369	0.031	2.465	0.153	0.000	0.709	0.000	4.302	95.70
IDAG43_6-11	37.60	29.479	0.000	16.035	0.070	3.821	0.116	0.005	0.611	0.000	12.263	87.74

Appendix G8 Valencia Calculated Mineral Compositions

Sample: VALG11 - Uraninite Compositions by EPMA. Cation Corrections Applied X = 1, O = 2

The VALG 11 sample set comprises spot analyses of 7 uraninite grains in a polished grain mount. Six of the grains have 3 spot analyses and one has 5 analyses for a total of 23 spot analyses.

The average compositions are presented in Table E1.

Table E1 Averages of sample VALG 11 uraninites

VALG 11 Summary Averages													
Uraninite Grain	UO_2	UO_3	ThO_2	PbO	SiO_2	Al_2O_3	K_2O	CaO	Fe_2O_3	Ce_2O_3	La_2O_3	P_2O_5	Total
VALG11_U1	50.217	36.405	4.564	6.928	0.135	0.000	0.000	0.015	0.003	0.000	0.057	0.013	98.337
VALG11_U2	48.180	36.596	5.011	7.065	0.033	0.000	0.000	0.237	0.037	0.000	0.015	0.009	97.182
VALG11_U6	48.367	37.862	4.415	6.824	0.050	0.000	0.000	0.508	0.006	0.000	0.115	0.008	98.154
VALG11_U7	45.983	35.617	5.501	6.589	0.064	0.000	0.000	0.388	0.039	0.000	0.025	0.007	94.213
VALG11_U8	45.267	35.574	5.082	6.852	0.076	0.000	0.000	0.370	0.063	0.000	0.096	0.010	93.391
VALG11_U10	24.550	67.427	2.162	3.612	0.004	0.009	2.158	0.129	3.498	18.543	0.009	0.004	97.770
VALG11_U11	45.983	35.617	4.295	6.676	0.075	0.000	0.000	0.370	0.042	0.000	0.020	0.001	93.081

Table E2 VALG 11 spot compositions of uraninites, averages are shaded and bold, spurious values removed.

VALG 11 Uraninite Spot Compositions													
Sample Point	**UO_2**	**UO_3**	**ThO_2**	**PbO**	**SiO_2**	**Al_2O_3**	**K_2O**	**CaO**	**Fe_2O_3**	**P_2O_5**	**Ce_2O_3**	**La_2O_3**	**Total**
VALG11_U1-1	50.850	36.427	4.687	6.715	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.679
VALG11_U1-2	50.500	36.944	4.141	7.207	0.008	0.000	0.000	0.044	0.000	0.040	0.000	0.055	98.939
VALG11_U1-3	49.300	35.844	4.864	6.863	0.397	0.000	0.000	0.000	0.009	0.000	0.000	0.115	97.392
VALG11_U1	50.217	36.405	4.564	6.928	0.135	0.000	0.000	0.015	0.003	0.013	0.000	0.057	98.337
VALG11_U2-4	48.100	36.662	4.542	7.022	0.057	0.000	0.000	0.261	0.070	0.014	0.000	0.000	96.728
VALG11_U2-5	48.500	36.429	5.002	7.241	0.047	0.000	0.000	0.130	0.035	0.001	0.000	0.000	97.385
VALG11_U2-6	48.100	36.037	4.900	6.902	0.023	0.000	0.000	0.171	0.036	0.000	0.000	0.000	96.169
VALG11_U2-7	48.200	36.691	5.436	7.006	0.000	0.000	0.000	0.274	0.012	0.000	0.000	0.000	97.619
VALG11_U2-8	48.000	37.161	5.174	7.154	0.038	0.000	0.000	0.348	0.033	0.028	0.000	0.075	98.011
VALG11_U2	48.180	36.596	5.011	7.065	0.033	0.000	0.000	0.237	0.037	0.009	0.000	0.015	97.182
VALG11_U6-15	47.000	38.157	4.589	6.694	0.000	0.000	0.000	0.776	0.000	0.014	0.000	0.000	97.230
VALG11_U6-16	51.000	38.318	4.998	6.727	0.000	0.000	0.000	0.322	0.000	0.000	0.000	0.166	101.531
VALG11_U6-17	47.100	37.113	3.657	7.050	0.150	0.000	0.000	0.426	0.017	0.009	0.000	0.180	95.702
VALG11_U6	48.367	37.862	4.415	6.824	0.050	0.000	0.000	0.508	0.006	0.008	0.000	0.115	98.154
VALG11_U7-18	46.650	36.889	6.002	7.037	0.128	0.000	0.000	0.436	0.049	0.000	0.000	0.033	97.224
VALG11_U7-19	46.700	36.474	5.214	7.017	0.058	0.000	0.000	0.374	0.052	0.020	0.000	0.000	95.909
VALG11_U7-20	44.600	33.489	5.287	5.713	0.005	0.000	0.000	0.354	0.017	0.000	0.000	0.042	89.507
VALG11_U7	45.983	35.617	5.501	6.589	0.064	0.000	0.000	0.388	0.039	0.007	0.000	0.025	94.213
VALG11_U8-21	44.300	35.540	4.902	6.975	0.000	0.000	0.000	0.415	0.082	0.000	0.000	0.099	92.313
VALG11_U8-22	46.500	36.133	5.335	6.936	0.111	0.000	0.000	0.342	0.061	0.031	0.000	0.175	95.624
VALG11_U8-23	45.000	35.050	5.009	6.646	0.118	0.000	0.000	0.352	0.046	0.000	0.000	0.015	92.236
VALG11_U8	45.267	35.574	5.082	6.852	0.076	0.000	0.000	0.370	0.063	0.010	0.000	0.096	93.391
VALG11_U10-24	48.550	36.514	4.930	7.253	0.026	0.000	0.000	0.129	0.000	0.000	0.000	0.000	97.402
VALG11_U10-25	50.500	38.848	4.663	6.691	0.000	0.000	0.000	0.513	0.000	0.007	0.000	0.034	101.256
VALG11_U10-26	48.250	35.894	3.354	6.988	0.000	0.000	0.000	0.096	0.056	0.014	0.000	0.000	94.652
VALG11_U10	22.959	17.894	3.767	1.208	0.004	0.066	0.000	0.069	0.019	0.007	0.000	0.009	97.770
VALG11_U11-27	47.300	36.200	3.961	6.586	0.054	0.000	0.000	0.359	0.052	0.000	0.000	0.061	94.573
VALG11_U11-28	47.100	36.050	4.496	6.945	0.030	0.000	0.000	0.279	0.045	0.004	0.000	0.000	94.949
VALG11_U11-29	43.550	34.602	4.429	6.498	0.142	0.000	0.000	0.473	0.028	0.000	0.000	0.000	89.722
VALG11_U11	45.983	35.617	4.295	6.676	0.075	0.000	0.000	0.370	0.042	0.001	0.000	0.020	93.081

Table E3 Averages of sample Va26_113_225m uraninites

Va26_113-225m Summary Averages												
Uraninite Grain	**UO_2**	**UO_3**	**ThO_2**	**PbO**	**SiO_2**	**Al_2O_3**	**K_2O**	**CaO**	**Fe_2O_3**	**P_2O_5**	**V_2O_3**	**Total**
Va26_113_225_U1	14.033	37.059	18.113	0.556	13.574	0.044	0.000	5.605	0.028	0.004	0.000	89.016
Va26_113_225_U2	14.033	37.059	18.113	0.556	13.574	0.044	0.000	5.605	0.028	0.004	0.000	89.016
Va26_113_225_U4	14.033	37.059	18.113	0.556	13.574	0.044	0.000	5.605	0.028	0.004	0.000	89.016
Va26_113_225_U5	14.033	37.059	18.113	0.556	13.574	0.044	0.000	5.605	0.028	0.004	0.000	89.016
Va26_113_225_U6	14.033	37.059	18.113	0.556	13.574	0.044	0.000	5.605	0.028	0.004	0.000	89.016
Va26_113_225_U7	14.033	37.059	18.113	0.556	13.574	0.044	0.000	5.605	0.028	0.004	0.000	89.016

Table E4 Va26_113-225m spot compositions of uraninites, averages are shaded and bold, spurious values removed.

Va26_113_225m Uraninite Spot Compositions												
Sample Point	**UO_2**	**UO_3**	**ThO_2**	**PbO**	**SiO_2**	**Al_2O_3**	**K_2O**	**CaO**	**Fe_2O_3**	**P_2O_5**	**V_2O_3**	**Total**
Va113_225_U1-1	22.100	27.941	20.513	0.864	12.455	0.000	1.003	1.073	0.075	0.001	0.000	86.025
Va113_225_U1-4	40.100	37.378	5.085	3.559	4.471	0.000	0.987	0.384	0.008	0.007	0.000	91.979
Va113_225_U1-5	18.000	33.160	21.038	0.979	11.802	0.000	1.872	0.962	0.092	0.008	0.000	87.913
Va26_113_225_U1	**26.733**	**32.826**	**15.545**	**1.801**	**9.576**	**0.000**	**1.287**	**0.806**	**0.058**	**0.005**	**0.000**	**88.639**
Va113_225_U2-6	41.400	38.378	7.549	5.151	1.514	0.000	0.740	0.487	0.012	0.000	0.000	95.231
Va113_225_U2-7	44.600	33.687	6.740	4.657	2.069	0.000	0.000	0.668	0.000	0.000	0.000	92.421
Va113_225_U2-8	36.300	38.163	8.796	5.544	1.993	0.000	0.836	0.711	0.032	0.011	0.000	92.386
Va113_225_U2-9	40.000	33.795	8.439	4.484	2.519	0.000	0.187	0.850	0.039	0.000	0.000	90.313
Va26_113_225_U2	**40.575**	**36.006**	**7.881**	**4.959**	**2.024**	**0.000**	**0.441**	**0.679**	**0.021**	**0.003**	**0.000**	**92.588**
Va113_225_U4-14	50.300	36.781	6.617	5.850	0.003	0.000	0.000	0.374	0.001	0.017	0.000	99.943
Va113_225_U4-15	50.100	36.412	6.525	5.796	0.004	0.000	0.000	0.312	0.000	0.016	0.000	99.165
Va113_225_U4-16	49.500	37.094	6.427	6.318	0.000	0.000	0.000	0.373	0.000	0.007	0.000	99.719
Va113_225_U4-17	50.100	35.989	5.779	6.002	0.015	0.000	0.000	0.197	0.000	0.000	0.000	98.082
Va26_113_225_U4	**50.000**	**36.569**	**6.337**	**5.992**	**0.006**	**0.000**	**0.000**	**0.314**	**0.000**	**0.010**	**0.000**	**99.227**
Va113_225_U5-18	43.600	34.901	6.167	5.708	1.785	0.000	0.163	0.468	0.000	0.026	0.000	92.818
Va113_225_U5-20	42.900	35.988	6.464	4.869	1.738	0.000	0.337	0.621	0.063	0.000	0.000	92.980
Va113_225_U5-21	47.000	34.103	5.810	5.112	1.364	0.000	0.000	0.365	0.065	0.028	0.000	93.847
Va113_225_U5-22	43.100	35.681	6.957	5.217	1.926	0.000	0.254	0.615	0.008	0.000	0.000	93.758
Va26_113_225_U5	**44.150**	**35.168**	**6.350**	**5.227**	**1.703**	**0.000**	**0.189**	**0.517**	**0.034**	**0.014**	**0.000**	**93.351**
Va113_225_U6-23	48.100	35.383	4.842	4.842	0.833	0.000	0.000	0.582	0.000	0.001	0.000	94.583
Va113_225_U6-24	42.000	40.678	5.284	5.338	1.119	0.000	0.948	0.431	0.000	0.000	0.000	95.798
Va113_225_U6-25	45.700	35.186	5.135	5.004	1.031	0.000	0.000	0.741	0.034	0.000	0.000	92.831
Va113_225_U6-26	44.600	35.262	6.244	4.838	0.817	0.000	0.000	0.912	0.042	0.021	0.000	92.736
Va26_113_225_U6	**45.100**	**36.627**	**5.376**	**5.006**	**0.950**	**0.000**	**0.237**	**0.667**	**0.019**	**0.006**	**0.000**	**93.987**
Va113_225_U7-27	18.000	40.771	12.228	0.402	13.386	0.000	0.000	5.973	0.017	0.000	0.000	90.777
Va113_225_U7-28	19.400	49.115	1.735	0.495	13.481	0.081	0.000	7.408	0.000	0.000	0.000	91.715
Va113_225_U7-31	4.700	21.291	40.377	0.770	13.856	0.050	0.000	3.433	0.066	0.013	0.000	84.556
Va26_113_225_U7	**14.033**	**37.059**	**18.113**	**0.556**	**13.574**	**0.044**	**0.000**	**5.605**	**0.028**	**0.004**	**0.000**	**89.016**

Table E5 Averages of sample Va26_141-290m uraninites

Va26_141-290m Summary Averages												
Uraninite Grain	**UO_2**	**UO_3**	**PbO**	**ThO_2**	**SiO_2**	**CaO**	**Fe_2O_3**	**TiO_2**	**Ce_2O_3**	**La_2O_3**	**Y_2O_3**	**Total**
Va26_141_290_U4	48.268	36.040	5.706	8.211	0.037	0.358	0.041	0.002	0.000	0.000	0.378	99.041
Va26_141_290_U5	50.998	38.160	5.979	4.438	0.045	0.464	0.006	0.001	0.000	0.000	0.196	100.287
Va26_141_290_U6	50.575	37.710	6.189	4.540	0.033	0.381	0.009	0.000	0.000	0.000	0.150	99.588
Va26_141_290_U7	47.542	37.660	7.130	5.555	0.215	0.465	0.023	0.013	0.000	0.000	0.127	98.731
Va26_141_290_U8	49.508	37.363	6.033	4.276	0.020	0.461	0.007	0.000	0.000	0.000	0.185	97.852
Va26_141_290_U4	48.268	36.040	5.706	8.211	0.037	0.358	0.041	0.002	0.000	0.000	0.378	99.041

Table E6 Va26_141-290m spot compositions of uraninites, averages are shaded and bold, spurious values removed.

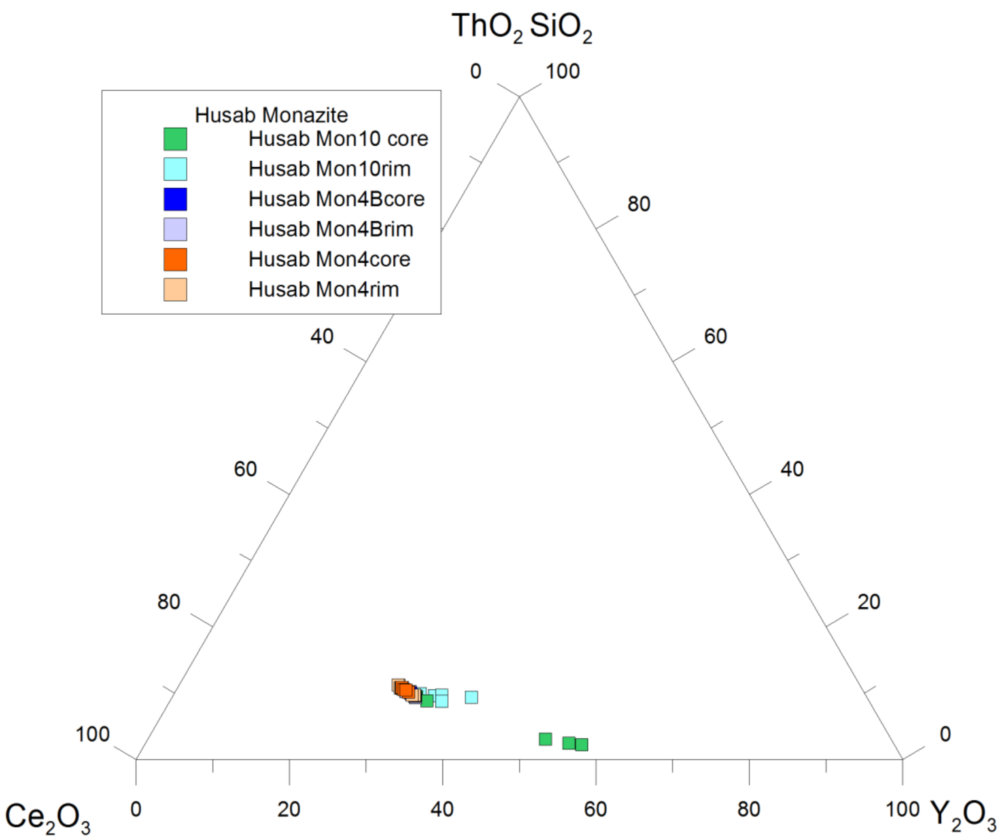
Va26_141_290m Uraninite Spot Compositions

Sample Point	UO_2	UO_3	PbO	ThO_2	SiO_2	CaO	Fe_2O_3	TiO_2	Ce_2O_3	La_2O_3	Y_2O_3	Total
Va141_290_4_1	49.294	37.600	5.660	8.378	0.128	0.567	0.052	0.003	0.000	0.000	0.362	102.044
Va141_290_4_2	48.192	37.000	6.016	8.189	0.000	0.461	0.118	0.000	0.000	0.000	0.353	100.329
Va141_290_4_3	47.692	35.150	5.252	8.112	0.000	0.346	0.000	0.000	0.000	0.000	0.430	96.982
Va141_290_4_4	47.963	35.000	5.595	8.474	0.000	0.246	0.000	0.000	0.000	0.000	0.388	97.666
Va141_290_4_5	48.200	35.450	6.008	7.901	0.058	0.171	0.034	0.005	0.000	0.000	0.355	98.182
Va26_141_290_U4	**48.268**	**36.040**	**5.706**	**8.211**	**0.037**	**0.358**	**0.041**	**0.002**	**0.000**	**0.000**	**0.378**	**99.041**
Va141_290_5_6	50.258	38.450	5.983	5.276	0.000	0.586	0.000	0.000	0.000	0.000	0.222	100.775
Va141_290_5_7	51.340	37.500	5.881	4.621	0.074	0.319	0.000	0.007	0.000	0.000	0.193	99.935
Va141_290_5_8	51.638	38.650	6.157	3.749	0.085	0.482	0.000	0.000	0.000	0.000	0.120	100.881
Va141_290_5_9	51.408	38.350	5.713	3.664	0.066	0.547	0.000	0.000	0.000	0.000	0.143	99.891
Va141_290_5_10	50.346	37.850	6.162	4.879	0.000	0.386	0.028	0.000	0.000	0.000	0.303	99.954
Va26_141_290_U5	**50.998**	**38.160**	**5.979**	**4.438**	**0.045**	**0.464**	**0.006**	**0.001**	**0.000**	**0.000**	**0.196**	**100.287**
Va141_290_6_11	51.505	38.700	6.090	3.573	0.022	0.471	0.043	0.000	0.000	0.000	0.187	100.591
Va141_290_6_12	52.119	36.900	5.700	3.852	0.012	0.200	0.000	0.000	0.000	0.000	0.136	98.919
Va141_290_6_13	51.478	38.350	6.837	3.601	0.084	0.272	0.000	0.000	0.000	0.000	0.101	100.723
Va141_290_6_14	47.885	36.500	6.283	8.207	0.048	0.394	0.000	0.000	0.000	0.000	0.164	99.481
Va141_290_6_15	49.887	38.100	6.037	3.468	0.000	0.570	0.000	0.000	0.000	0.000	0.163	98.225
Va26_141_290_U6	**50.575**	**37.710**	**6.189**	**4.540**	**0.033**	**0.381**	**0.009**	**0.000**	**0.000**	**0.000**	**0.150**	**99.588**
Va141_290_7_16	50.303	36.900	5.098	6.038	0.000	0.525	0.000	0.047	0.000	0.000	0.142	99.053
Va141_290_7_17	49.654	37.000	6.120	6.142	0.077	0.364	0.000	0.000	0.000	0.000	0.156	99.513
Va141_290_7_18	42.639	38.400	9.781	5.199	0.797	0.469	0.054	0.001	0.000	0.000	0.100	97.440
Va141_290_7_19	46.258	39.500	8.271	4.206	0.203	0.680	0.038	0.016	0.000	0.000	0.106	99.278
Va141_290_7_20	48.858	36.500	6.381	6.192	0.000	0.288	0.023	0.000	0.000	0.000	0.129	98.371
Va26_141_290_U7	**47.542**	**37.660**	**7.130**	**5.555**	**0.215**	**0.465**	**0.023**	**0.013**	**0.000**	**0.000**	**0.127**	**98.731**
Va141_290_8_22	49.027	36.900	6.308	4.384	0.000	0.369	0.000	0.000	0.000	0.000	0.135	97.123
Va141_290_8_23	48.577	37.450	6.042	4.379	0.005	0.551	0.008	0.000	0.000	0.000	0.211	97.223
Va141_290_8_24	49.480	38.000	5.647	3.861	0.046	0.685	0.021	0.000	0.000	0.000	0.193	97.933
Va141_290_8_25	50.949	37.100	6.135	4.479	0.027	0.239	0.000	0.000	0.000	0.000	0.200	99.129
Va26_141_290_U8	**49.508**	**37.363**	**6.033**	**4.276**	**0.020**	**0.461**	**0.007**	**0.000**	**0.000**	**0.000**	**0.185**	**97.852**

Appendix G9 Husab Monazite mass% raw data

Sample/mass%	CaO	ThO2	SiO2	Ce2O3	La2O3	UO2	PbO	Nd2O3	Pr2O3	P2O5	Y2O3	Total
monazite 373-125 no. 4 core 1	0.6303	12.29	1.9162	16.51	12.45	1.0864	0.3492	23.41	0.7081	23.58	1.0152	93.9454
monazite 373-125 no. 4 core 2	0.5529	12.55	1.8648	17.01	12.42	1.0396	0.3313	23.15	0	23.36	1.2145	93.4931
monazite 373-125 no. 4 core 3	0.5067	12.31	1.9727	18.14	12.94	1.0358	0.3436	22.99	0.2204	24.13	1.0756	95.6648
monazite 373-125 no. 4 core 4	0.6235	12.39	1.8694	18.14	12.75	1.0246	0.3352	23.07	0	24.46	1.1816	95.8443
monazite 373-125 no. 4 core 5	0.5265	12.19	2.0005	17.49	13.01	1.0078	0.3134	23.48	0.6058	24.53	1.1594	96.3134
monazite 373-125 no. 4 rim 6	0.7501	12.06	1.6828	17.02	13	1.0763	0.2956	23.06	0.3415	24.47	1.2066	94.9629
monazite 373-125 no. 4 rim 7	0.5203	12.64	2.1049	17.84	12.35	1.0348	0.3084	23.11	0.5251	23.86	1.1197	95.4132
monazite 373-125 no. 4 rim 8	0.8028	12.07	1.8638	18.01	12.13	0.8824	0.3393	22.5	0	22.8	1.46	92.8583
monazite 373-125 no. 4 rim 9	0.669	12.24	1.9146	17.86	13.34	1.0249	0.3271	22.47	0.3346	23.23	1.0684	94.4786
monazite 373-125 no. 4 rim 10	0.6115	11.69	1.7146	17.78	13.03	0.9284	0.3003	22.51	0.5245	23.77	1.1193	93.9786
monazite 373-125 no. 4B core 11	0.7248	12.12	1.8019	17.27	12.57	1.0895	0.3207	23.38	0.1231	24.16	1.49	95.05
monazite 373-125 no. 4B core 12	0.7583	12	1.6732	17.66	13.06	0.5591	0.331	24.55	0	24.56	1.1578	96.3094
monazite 373-125 no. 4B core 13	0.8008	12.44	1.7685	17.94	12.94	0.9952	0.3358	23.38	0	24.65	1.2141	96.4644
monazite 373-125 no. 4B core 14	0.7706	12.2	1.8088	18.36	12.34	1.0566	0.3598	23.17	0	25.09	1.34	96.4958
monazite 373-125 no. 4B core 15	0.8198	12.87	1.7002	17.09	12.1	1.15	0.3391	22.48	0	24.31	1.31	94.1691
monazite 373-125 no. 4B rim 16	0.9478	12.72	1.965	17.84	11.58	1.0654	0.2631	22.85	0.1751	24.05	1.0564	94.5128
monazite 373-125 no. 4B rim 17	0.9003	13.11	2.004	17.43	11.9	0.9473	0.2866	22.96	0	24	0.9701	94.5083
monazite 373-125 no. 4B rim 18	0.7064	12.45	1.7245	18.05	13.42	1.0715	0.3301	23.24	0	23.62	1.31	95.9225
monazite 373-125 no. 4B rim 19	0.7012	11.34	1.6808	17.91	13.39	0.9087	0.3385	23.15	0.8619	24.04	1.2515	95.5726
monazite 373-125 no. 4B rim 20	0.9024	9.7	1.1352	18.23	14.18	0.4808	0.224	22.59	0	25.16	1.1162	93.7186
monazite 373-125 no. 10 core 21	0.3047	5.45	0.7386	20.12	14.45	0.1169	0.0909	25.77	0	25.97	0.8097	93.8208
monazite 373-125 no. 10 core 22	0.2835	5.01	0.6319	20.73	15.13	0.1045	0.0949	26.13	0.0028	26.64	0.745	95.5026
monazite 373-125 no. 10 core 23	0.3617	4.8	0.588	19.94	15.02	0.1688	0.0921	26.85	0.2491	27.34	0.6614	96.0711
monazite 373-125 no. 10 core 24	0.541	12.09	1.7706	18.76	12.8	0.9628	0.3739	22.85	0	25.02	1.2549	96.4232
monazite 373-125 no. 10 core 25	0.9039	12.13	1.5825	17.71	12.5	1.0581	0.3463	22.61	0	25.89	1.37	96.1008

Sample/mass%	CaO	ThO2	SiO2	Ce2O3	La2O3	UO2	PbO	Nd2O3	Pr2O3	P2O5	Y2O3	Total
monazite 373-125 no. 10 rim 26	0.7278	11.5	1.4311	17.44	12.83	0.8635	0.3432	23.37	0.8769	25.54	1.54	96.4625
monazite 373-125 no. 10 rim 27	0.7282	9.62	1.5207	18.45	12.88	1.18	0.2131	23.85	0.2784	25.09	0.7825	94.5929
monazite 373-125 no. 10 rim 28	0.8485	9.36	1.2011	18.21	13.2	0.5974	0.2203	24.55	0	26.82	1.62	96.6273
monazite 373-125 no. 10 rim 29	0.8563	12.27	1.6247	18.07	12.88	1.0921	0.3999	22.66	0	25.08	1.27	96.203
monazite 373-125 no. 10 rim 30	0.9359	10.73	1.3803	18.1	13.33	0.4927	0.2449	23.32	0.0314	25.74	0.9268	95.232



Appendix G10 EPMA Calculated Analyses for Uranophane species

Comment	HD25_353 Uranoph 4-1	HD25_353 Uranoph 4-2	HD25_353 Uranoph 4-3	HD25_353 Uranoph 4-4	HD25_353 Uranoph 4-5	HD25_353_ Uranoph 6-9	HD25_353 Uranoph 6-10	HD25_353 Uranoph 6-11	HD25_353 Uranoph 6-12
UO2	65.341	67.418	66.932	67.232	64.529	67.646	59.861	61.137	66.38
ThO2	0	0	0	0	0	0	0	0	0
SiO2	15.392	15.422	15.137	15.689	15.135	14.662	15.363	16.669	14.522
Al2O3	0	0	0	0	0	0.005	0.065	0.029	0
Fe2O3	0.02	0	0	0.009	0.04	0	0.018	0	0
K2O	0	0	0	0	0	0	0	0.023	0
P2O5	0	0	0.01	0	0	0	0	0.016	0.01
V2O3	0	0	0	0	0	0	0	0	0
Calculated CaO	6.447	4.36	5.121	4.27	7.496	4.887	11.893	9.326	6.288
Assume H2O	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Total (excluding CaO and H2O)	**80.753**	**82.84**	**82.079**	**82.93**	**79.704**	**82.313**	**75.307**	**77.874**	**80.912**