



**BUREAU
VERITAS**

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MINERAL TESTING & LABORATORY SERVICES

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Reference: **aa036661**
Date Finished: 24/08/2018
Order: NC_017
Project: Arunta Project
Date Received: 27/07/2018
Type of Sample: Rock Chips
Samples Analysed: **54**

FINAL ANALYSIS REPORT

Analysis of Mineral Samples

for

Northern Cobalt Ltd

67 Goodwood Road WAYVILLE SA 5034

Attention: Mr Duncan Chessell

Authorised By:

Vaughn Noble
Senior Chemist

Christopher Abbott
Senior Chemist

Jenet Hwende
Technical Quality
Manager



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Method	PF102	PF102	PF101	PF102	PF102	PF101	PF102	PF102
Result Name	Ag	As	Ba	Be	Bi	Ca	Cd	Co
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	5	5	5	1	1	1000	10	10
BLANK 1	<5	<5	10	<1	<1	<1000	<10	<10
AR1002	<5	<5	295	<1	<1	1.04%	<10	20
AR1004	<5	10	1150	2	<1	3600	<10	<10
AR1005	<5	<5	155	<1	<1	25.5%	<10	<10
Std Nominal	<5	675	2.94%					730
Determined	<5	725	2.96%	<1	20	3.37%	<10	780
AR1006	<5	<5	35	<1	<1	1100	<10	<10
AR1007	<5	10	590	4	<1	1500	<10	<10
AR1008	<5	<5	175	1	<1	<1000	<10	<10
AR1009	<5	<5	215	1	<1	<1000	<10	<10
AR1010	<5	<5	445	3	<1	4.63%	<10	<10
AR1011	<5	<5	15	<1	<1	<1000	<10	<10
AR1012	<5	10	455	4	<1	4000	<10	20
AR1013	<5	<5	40	1	<1	<1000	<10	<10
AR1014	<5	<5	1030	1	<1	3600	<10	<10
AR1015	<5	<5	195	<1	<1	1000	<10	<10
AR1016	<5	<5	515	1	<1	1900	<10	<10
AR1021	<5	<5	145	2	<1	5.21%	<10	50
AR1022	<5	<5	750	3	<1	7100	<10	<10
Std Nominal	50	305		2	21	1.31%	<10	<10
Determined	50	285	4220	2	20	1.32%	<10	<10
AR1023	<5	10	400	2	<1	1.38%	<10	<10
AR1024	<5	<5	505	1	<1	1300	<10	<10
AR1025	<5	<5	850	2	<1	7200	<10	<10
AR1026	<5	<5	790	2	<1	7000	<10	<10
AR1027	<5	<5	1170	2	<1	1.12%	<10	<10
AR1028	<5	<5	1980	1	<1	4400	<10	<10
AR1029	<5	5	945	2	<1	8700	<10	<10
AR1029 Rpt	<5	5	950	2	<1	8500	<10	<10
AR1030	<5	<5	1180	1	<1	3400	<10	<10
AR1031	<5	10	1140	2	<1	7900	<10	<10
AR1032	<5	<5	1270	<1	<1	2700	<10	<10
AR1033	<5	<5	1230	2	<1	6700	<10	<10
AR1034	<5	<5	2190	1	<1	2600	<10	<10
AR1034 Rpt	<5	<5	2260	1	<1	2600	<10	<10
AR1035	<5	<5	945	1	<1	7600	<10	<10
AR1036	<5	<5	1690	<1	<1	3900	<10	<10
AR1037	<5	10	345	2	<1	9500	<10	<10
AR1038	<5	<5	510	2	<1	5000	<10	<10
AR1039	<5	<5	345	1	<1	2.50%	<10	<10
AR1040	<5	<5	1230	2	<1	7400	<10	<10



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Method	PF102	PF102	PF101	PF102	PF102	PF101	PF102	PF102
Result Name	Ag	As	Ba	Be	Bi	Ca	Cd	Co
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	5	5	5	1	1	1000	10	10
AR1042	<5	<5	4030	<1	<1	1100	<10	<10
AR1043	<5	10	455	3	<1	6600	<10	<10
AR1046	<5	<5	440	5	<1	1.22%	<10	<10
AR1047	<5	<5	475	2	2	9600	<10	<10
AR1052	<5	<5	2500	<1	<1	<1000	<10	<10
AR1053	<5	<5	2440	<1	<1	<1000	<10	<10
AR1054	<5	<5	125	<1	<1	<1000	<10	<10
AR1055	<5	10	475	<1	<1	<1000	<10	<10
AR1056	<5	<5	220	<1	<1	1.18%	<10	<10
AR1057	<5	<5	700	<1	<1	1300	<10	<10
AR1058	<5	<5	15	<1	<1	1.17%	<10	<10
AR1059	<5	<5	825	1	<1	1.99%	<10	<10
Std Nominal	<5	5	430	3	1	5600		10
Determined	<5	5	420	3	<1	6200	<10	20
AR1060	<5	<5	1110	3	<1	2000	<10	<10
Std Nominal	<5	10	710	2	5	2.74%	<10	20
Determined	<5	15	725	2	5	2.74%	<10	20
AR1061	<5	<5	660	2	<1	1400	<10	<10
AR1062	<5	<5	1080	3	<1	1700	<10	<10
BLANK 2	<5	<5	<5	<1	<1	<1000	<10	<10
Std Nominal	<5	675	2.94%					730
Determined	<5	650	2.94%	<1	17	3.44%	<10	680
AR1063	<5	10	205	15	<1	1600	<10	60
AR1063 Rpt	<5	10	200	16	<1	1500	<10	60
AR1064	<5	<5	860	1	<1	2.66%	<10	<10
Std Nominal	50	305		2	21	1.31%	<10	<10
Determined	50	315	4060	3	23	1.36%	<10	<10
AR1065	<5	<5	295	3	60	<1000	<10	<10
AR1066	<5	<5	770	1	<1	1500	<10	<10
AR1067	<5	<5	405	3	<1	1.08%	<10	<10



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Method	PF101	PF102	PF102	PF101	PF102	PF102	PF102	PF101
Result Name	Cr	Cs	Cu	Fe	Ge	Hf	In	K
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	10	1	10	100	20	2	0.2	1000
BLANK 1	<10	<1	<10	<100	<20	<2	<0.2	<1000
AR1002	40	3	30	3.99%	<20	6	<0.2	1.70%
AR1004	<10	2	40	2.05%	<20	<2	0.2	3.50%
AR1005	20	<1	20	1500	<20	<2	<0.2	<1000
Std Nominal	30	<1	2.53%			2	0.6	2.50%
Determined	30	<1	2.80%	27.8%	<20	2	0.8	2.50%
AR1006	50	<1	30	3.29%	<20	<2	<0.2	<1000
AR1007	<10	<1	30	1.47%	<20	<2	<0.2	2.60%
AR1008	10	<1	10	2.11%	<20	<2	<0.2	1.00%
AR1009	20	1	20	1.74%	<20	<2	<0.2	5000
AR1010	40	<1	20	3.68%	<20	6	<0.2	1000
AR1011	<10	1	20	1.15%	<20	<2	<0.2	<1000
AR1012	50	<1	110	31.0%	<20	2	<0.2	<1000
AR1013	50	<1	20	3.20%	<20	8	<0.2	1000
AR1014	<10	4	20	3.02%	<20	4	<0.2	5.70%
AR1015	<10	<1	30	2.37%	<20	<2	<0.2	<1000
AR1016	<10	3	10	1.29%	<20	<2	<0.2	3.80%
AR1021	<10	3	330	15.4%	<20	<2	0.6	2.00%
AR1022	<10	4	10	7000	<20	<2	<0.2	4.40%
Std Nominal	40	7	1010	2.48%	<20	4	1.8	2.10%
Determined	60	7	1020	2.51%	<20	4	2.0	2.10%
AR1023	50	5	30	4.83%	<20	16	<0.2	1.80%
AR1024	10	13	10	7300	<20	<2	<0.2	9.30%
AR1025	<10	3	10	11.2%	<20	8	<0.2	2.40%
AR1026	30	3	20	2.94%	<20	2	<0.2	2.60%
AR1027	50	3	50	5.89%	<20	10	<0.2	1.90%
AR1028	20	3	10	2.45%	<20	2	<0.2	4.50%
AR1029	30	2	30	9.33%	<20	6	<0.2	2.00%
AR1029 Rpt	30	2	30	9.36%	<20	6	<0.2	2.00%
AR1030	10	3	20	6.06%	<20	2	<0.2	3.70%
AR1031	30	3	20	4.71%	<20	8	<0.2	2.40%
AR1032	<10	3	20	1.50%	<20	<2	<0.2	4.10%
AR1033	20	2	10	2.34%	<20	8	<0.2	2.50%
AR1034	10	2	<10	1.00%	<20	<2	<0.2	4.70%
AR1034 Rpt	<10	2	<10	1.06%	<20	<2	<0.2	4.60%
AR1035	20	3	20	3.23%	<20	4	<0.2	2.20%
AR1036	<10	3	<10	1.11%	<20	<2	<0.2	4.30%
AR1037	20	4	10	1.69%	<20	2	<0.2	1.70%
AR1038	10	5	10	2.14%	<20	<2	<0.2	3.70%
AR1039	70	<1	10	4.04%	<20	4	<0.2	1.00%
AR1040	10	2	10	1.40%	<20	<2	<0.2	4.00%



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Method	PF101	PF102	PF102	PF101	PF102	PF102	PF102	PF101
Result Name	Cr	Cs	Cu	Fe	Ge	Hf	In	K
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	10	1	10	100	20	2	0.2	1000
AR1042	<10	2	10	1.00%	<20	<2	<0.2	9.40%
AR1043	<10	2	10	1.82%	<20	<2	<0.2	1.70%
AR1046	<10	3	20	9900	<20	<2	<0.2	4.60%
AR1047	<10	1	10	1.01%	<20	<2	<0.2	2.40%
AR1052	10	10	<10	8000	<20	<2	<0.2	9.40%
AR1053	<10	3	<10	2900	<20	<2	<0.2	8.90%
AR1054	30	<1	<10	3.05%	<20	<2	<0.2	2000
AR1055	<10	<1	<10	1.32%	<20	<2	<0.2	1.30%
AR1056	<10	<1	<10	1.26%	<20	<2	<0.2	2000
AR1057	<10	2	<10	8000	<20	<2	<0.2	6.40%
AR1058	10	<1	10	5.67%	<20	4	<0.2	<1000
AR1059	20	<1	10	1.88%	<20	4	<0.2	2.70%
Std Nominal	100	6	260	4.34%		4		2.90%
Determined	50	7	280	4.22%	<20	6	<0.2	3.00%
AR1060	<10	35	20	2.51%	<20	<2	<0.2	2.30%
Std Nominal	70	5	1.11%	7.33%		<2	0.8	2.90%
Determined	60	5	%1.00	7.43%	<20	2	0.8	2.80%
AR1061	30	25	40	3.10%	<20	6	<0.2	2.00%
AR1062	<10	5	<10	5.97%	<20	<2	<0.2	6.90%
BLANK 2	<10	<1	<10	<100	<20	<2	<0.2	<1000
Std Nominal	30	<1	2.53%			2	0.6	2.50%
Determined	10	<1	2.51%	29.0%	<20	2	0.6	2.40%
AR1063	30	<1	30	53.7%	<20	<2	<0.2	<1000
AR1063 Rpt	20	<1	30	52.9%	<20	<2	<0.2	<1000
AR1064	<10	<1	10	2.03%	<20	4	<0.2	1.60%
Std Nominal	40	7	1010	2.48%	<20	4	1.8	2.10%
Determined	40	7	1010	2.46%	<20	6	2.0	2.10%
AR1065	<10	50	<10	2.53%	<20	<2	<0.2	7.70%
AR1066	<10	3	<10	1.36%	<20	2	<0.2	2.00%
AR1067	<10	5	<10	2.86%	<20	10	<0.2	4.90%



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Method	PF101	PF101	PF101	PF102	PF102	PF102	PF101	PF102
Result Name	Li	Mg	Mn	Mo	Nb	Ni	P	Pb
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	10	100	10	5	5	20	100	10
BLANK 1	<10	<100	10	<5	<5	<20	<100	<10
AR1002	10	1.06%	710	<5	10	20	400	<10
AR1004	20	1300	160	<5	<5	<20	1500	<10
AR1005	<10	6.24%	60	<5	<5	<20	400	<10
Std Nominal				390	5	80	1000	40
Determined	20	9800	5030	420	10	80	900	60
AR1006	<10	6000	300	<5	<5	20	<100	<10
AR1007	20	1300	110	<5	<5	<20	<100	<10
AR1008	20	3200	180	<5	<5	40	200	<10
AR1009	130	400	200	<5	<5	40	<100	20
AR1010	10	1.59%	920	<5	20	40	500	<10
AR1011	20	200	160	<5	<5	40	<100	<10
AR1012	30	2800	310	<5	10	40	600	20
AR1013	20	<100	250	<5	20	40	300	<10
AR1014	30	5400	320	<5	10	40	600	50
AR1015	10	6600	190	<5	<5	<20	100	<10
AR1016	10	500	160	<5	<5	<20	200	30
AR1021	30	7400	1170	2280	50	40	700	40
AR1022	10	200	120	<5	5	<20	200	100
Std Nominal	20	3900	480	<5	15	20	500	330
Determined	40	3900	490	<5	15	40	500	320
AR1023	30	9700	840	70	25	40	1600	40
AR1024	20	100	140	<5	10	<20	<100	250
AR1025	30	1400	900	<5	5	<20	400	90
AR1026	20	2200	680	<5	<5	40	200	70
AR1027	30	8700	2210	<5	15	40	900	40
AR1028	10	2900	550	<5	5	<20	200	70
AR1029	20	5200	2780	<5	10	40	700	60
AR1029 Rpt	20	5400	2810	<5	10	40	700	60
AR1030	20	1700	740	<5	<5	40	<100	110
AR1031	40	3400	1480	<5	10	40	400	70
AR1032	10	800	290	<5	<5	<20	100	90
AR1033	10	1700	430	<5	5	<20	200	60
AR1034	20	300	150	<5	<5	<20	<100	100
AR1034 Rpt	20	400	150	<5	<5	<20	<100	100
AR1035	<10	3200	870	<5	10	40	300	60
AR1036	<10	600	220	<5	<5	<20	<100	90
AR1037	30	2700	250	<5	5	40	<100	40
AR1038	20	1000	280	<5	<5	40	200	60
AR1039	<10	1.24%	1000	<5	5	40	200	<10
AR1040	<10	1800	230	<5	<5	40	200	80



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Method	PF101	PF101	PF101	PF102	PF102	PF102	PF101	PF102
Result Name	Li	Mg	Mn	Mo	Nb	Ni	P	Pb
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	10	100	10	5	5	20	100	10
AR1042	10	800	130	<5	<5	40	300	90
AR1043	10	1000	330	<5	<5	<20	300	40
AR1046	10	1500	150	<5	<5	<20	300	20
AR1047	<10	700	290	<5	<5	40	600	40
AR1052	<10	<100	130	<5	<5	<20	<100	80
AR1053	10	<100	90	<5	<5	<20	<100	60
AR1054	20	400	350	<5	<5	<20	<100	<10
AR1055	<10	2900	180	<5	5	<20	100	<10
AR1056	<10	300	180	<5	<5	<20	<100	<10
AR1057	<10	500	130	<5	<5	<20	<100	50
AR1058	<10	4100	6960	<5	<5	40	300	<10
AR1059	10	5000	340	<5	<5	40	200	30
Std Nominal	30	1.57%	700		15	40	700	<10
Determined	40	1.54%	670	<5	20	40	600	<10
AR1060	40	7900	320	<5	15	40	200	20
Std Nominal	20	1.66%	540	500	10	40	1000	30
Determined	30	1.69%	530	470	10	40	1100	30
AR1061	40	6700	290	<5	10	40	100	<10
AR1062	<10	300	1270	<5	<5	<20	700	30
BLANK 2	10	<100	20	<5	<5	20	<100	<10
Std Nominal				390	5	80	1000	40
Determined	20	9900	4800	405	10	80	1000	50
AR1063	<10	400	1010	<5	<5	60	3700	<10
AR1063 Rpt	<10	200	1030	<5	<5	60	3800	<10
AR1064	<10	5000	340	<5	5	40	200	<10
Std Nominal	20	3900	480	<5	15	20	500	330
Determined	40	4000	500	<5	15	40	400	340
AR1065	<10	<100	160	<5	5	40	400	50
AR1066	210	600	280	<5	<5	40	300	20
AR1067	30	3000	420	<5	35	40	600	60



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Method	PF102	PF102	PF101	PF102	PF101	PF101	PF102	PF102
Result Name	Rb	Re	S	Sb	Sc	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.5	1	100	10	10	100	10	1
BLANK 1	<0.5	<1	<100	<10	<10	<100	<10	<1
AR1002	126	<1	<100	<10	<10	36.7%	<10	99
AR1004	142	<1	<100	<10	<10	34.8%	<10	52
AR1005	2.5	<1	500	<10	<10	6.96%	<10	778
Std Nominal	67.0		5.58%		<10		10	287
Determined	72.5	<1	5.35%	20	<10	12.4%	20	311
AR1006	2.5	<1	<100	<10	<10	41.2%	<10	49
AR1007	86.0	<1	<100	<10	<10	32.6%	<10	150
AR1008	79.0	<1	200	<10	<10	42.4%	<10	6
AR1009	68.5	<1	300	<10	<10	44.3%	<10	26
AR1010	4.5	<1	200	<10	<10	33.8%	<10	364
AR1011	11.5	<1	<100	<10	<10	41.8%	<10	4
AR1012	2.5	<1	700	<10	30	14.9%	<10	65
AR1013	2.5	<1	<100	<10	10	35.4%	10	7
AR1014	210	<1	<100	<10	<10	32.5%	<10	142
AR1015	1.5	<1	<100	<10	<10	37.3%	<10	26
AR1016	155	<1	200	<10	<10	31.5%	<10	71
AR1021	145	<1	1.05%	<10	20	25.8%	90	33
AR1022	199	<1	400	<10	<10	32.1%	<10	391
Std Nominal	97.0	<1	1.07%	30	<10	32.4 %	<10	230
Determined	93.0	<1	1.11%	30	<10	33.1%	<10	217
AR1023	131	<1	500	<10	10	32.5%	<10	189
AR1024	649	<1	300	<10	<10	33.1%	<10	205
AR1025	118	<1	300	<10	<10	31.4%	<10	384
AR1026	141	<1	100	<10	<10	34.6%	<10	310
AR1027	118	<1	200	<10	10	33.2%	<10	255
AR1028	212	<1	<100	<10	<10	32.7%	<10	362
AR1029	109	<1	<100	<10	10	31.9%	<10	270
AR1029 Rpt	109	<1	200	<10	10	32.2%	<10	269
AR1030	198	<1	<100	<10	<10	34.9%	<10	355
AR1031	131	<1	<100	<10	<10	33.8%	<10	362
AR1032	184	<1	<100	<10	<10	27.5%	<10	324
AR1033	111	<1	<100	<10	<10	32.0%	<10	377
AR1034	183	<1	<100	<10	<10	28.9%	<10	453
AR1034 Rpt	192	<1	200	<10	<10	28.2%	<10	476
AR1035	115	<1	300	<10	<10	34.8%	<10	265
AR1036	202	<1	100	<10	<10	31.7%	<10	340
AR1037	110	<1	<100	<10	<10	29.5%	<10	141
AR1038	206	<1	200	<10	<10	34.1%	<10	164
AR1039	38.0	<1	200	<10	10	33.2%	<10	186
AR1040	180	<1	<100	<10	<10	33.6%	<10	364



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Method	PF102	PF102	PF101	PF102	PF101	PF101	PF102	PF102
Result Name	Rb	Re	S	Sb	Sc	Si	Sn	Sr
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.5	1	100	10	10	100	10	1
AR1042	231	<1	<100	<10	<10	31.7%	<10	476
AR1043	56.0	<1	<100	<10	<10	37.9%	<10	117
AR1046	220	<1	100	<10	<10	32.4%	<10	101
AR1047	75.0	<1	<100	<10	<10	33.9%	<10	148
AR1052	334	<1	<100	<10	<10	30.8%	<10	226
AR1053	233	<1	100	<10	<10	31.5%	<10	290
AR1054	10.0	<1	<100	<10	<10	43.2%	<10	9
AR1055	45.5	<1	100	<10	<10	36.9%	<10	13
AR1056	2.5	<1	<100	<10	<10	39.3%	<10	258
AR1057	201	<1	<100	<10	<10	31.0%	<10	180
AR1058	1.5	<1	200	<10	<10	41.0%	<10	9
AR1059	72.0	<1	<100	<10	<10	35.4%	<10	344
Std Nominal	198		800	<10	10	31.6 %	<10	35
Determined	202	<1	700	<10	10	31.9%	<10	35
AR1060	172	<1	300	<10	20	30.4%	20	44
Std Nominal	106	<1	1.31%	<10			10	423
Determined	100	<1	1.29%	<10	20	27.0%	10	381
AR1061	292	<1	<100	<10	10	35.9%	<10	28
AR1062	265	<1	600	<10	<10	32.0%	<10	67
BLANK 2	1.5	<1	100	<10	<10	100	<10	<1
Std Nominal	67.0		5.58%		<10		10	287
Determined	64.5	<1	5.49%	10	<10	12.1%	20	282
AR1063	2.0	<1	1000	<10	<10	3.82%	<10	24
AR1063 Rpt	1.5	<1	1000	<10	<10	3.91%	<10	24
AR1064	34.5	<1	500	<10	<10	33.7%	<10	428
Std Nominal	97.0	<1	1.07%	30	<10	32.4 %	<10	230
Determined	100	<1	1.06%	40	<10	33.3%	<10	243
AR1065	1070	<1	<100	<10	<10	32.4%	<10	44
AR1066	167	<1	300	<10	<10	37.1%	<10	47
AR1067	530	<1	100	<10	<10	32.5%	<10	78



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Method	PF102	PF102	PF101	PF102	PF102	PF101	PF102	PF102
Result Name	Ta	Th	Ti	Tl	U	V	W	Y
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.5	0.5	100	2	0.5	50	5	1
BLANK 1	<0.5	<0.5	<100	<2	<0.5	<50	<5	<1
AR1002	1.0	14.5	3800	<2	2.0	<50	<5	9
AR1004	0.5	4.5	200	<2	3.0	<50	<5	28
AR1005	<0.5	<0.5	<100	<2	4.0	<50	<5	<1
Std Nominal	0.5	8.0			59.0	100	175	17
Determined	1.0	7.5	2800	<2	64.0	<50	160	19
AR1006	<0.5	0.5	1200	<2	<0.5	<50	<5	5
AR1007	<0.5	<0.5	<100	<2	<0.5	<50	<5	2
AR1008	<0.5	13.5	800	<2	2.5	<50	<5	46
AR1009	<0.5	4.0	300	<2	<0.5	<50	<5	3
AR1010	1.5	16.0	3800	<2	3.0	<50	<5	26
AR1011	<0.5	<0.5	<100	<2	<0.5	<50	15	<1
AR1012	1.0	17.0	4000	<2	2.0	400	10	5
AR1013	1.5	7.0	6400	<2	1.0	<50	<5	2
AR1014	0.5	12.5	2100	<2	1.5	<50	<5	10
AR1015	<0.5	<0.5	500	<2	<0.5	<50	<5	18
AR1016	0.5	3.5	200	<2	2.5	<50	<5	10
AR1021	2.0	16.0	1300	<2	116	<50	3.29%	143
AR1022	0.5	11.0	100	<2	2.5	<50	130	15
Std Nominal	1.0	11.5	1800	<2	4.0	<50	5	11
Determined	1.0	11.0	1800	<2	3.5	<50	20	10
AR1023	1.0	26.0	6100	<2	6.5	<50	930	26
AR1024	0.5	4.0	<100	4	1.0	<50	20	4
AR1025	0.5	114	2300	<2	7.5	<50	60	33
AR1026	<0.5	19.0	900	<2	4.0	<50	<5	14
AR1027	1.0	128	4100	<2	7.0	<50	20	66
AR1028	<0.5	14.5	1000	<2	2.5	<50	<5	14
AR1029	1.0	259	2400	<2	12.5	<50	10	82
AR1029 Rpt	1.0	254	2400	<2	12.5	<50	10	82
AR1030	<0.5	50.0	1000	<2	5.0	<50	<5	19
AR1031	0.5	123	1900	<2	7.5	<50	<5	59
AR1032	<0.5	8.5	300	<2	2.5	<50	<5	8
AR1033	0.5	29.5	1700	<2	4.5	<50	<5	18
AR1034	<0.5	9.5	200	<2	2.5	<50	<5	5
AR1034 Rpt	<0.5	9.0	200	<2	2.5	<50	<5	6
AR1035	1.0	30.0	1400	<2	4.0	<50	<5	24
AR1036	<0.5	7.5	300	<2	2.5	<50	<5	7
AR1037	<0.5	4.5	900	<2	2.0	<50	<5	8
AR1038	0.5	3.5	300	<2	3.5	<50	<5	6
AR1039	0.5	9.0	3900	<2	1.5	<50	<5	24
AR1040	<0.5	12.5	600	<2	2.0	<50	<5	9



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Method	PF102	PF102	PF101	PF102	PF102	PF101	PF102	PF102
Result Name	Ta	Th	Ti	Tl	U	V	W	Y
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.5	0.5	100	2	0.5	50	5	1
AR1042	<0.5	<0.5	300	<2	<0.5	<50	10	2
AR1043	1.5	4.0	300	<2	3.0	<50	<5	17
AR1046	1.0	5.5	300	<2	2.0	<50	<5	9
AR1047	<0.5	<0.5	<100	<2	2.0	<50	<5	18
AR1052	<0.5	<0.5	<100	<2	<0.5	<50	<5	2
AR1053	<0.5	<0.5	<100	<2	<0.5	<50	<5	<1
AR1054	<0.5	<0.5	<100	<2	<0.5	<50	<5	<1
AR1055	0.5	11.5	200	<2	3.5	<50	<5	42
AR1056	<0.5	1.0	<100	<2	<0.5	<50	<5	2
AR1057	0.5	1.0	100	<2	1.0	<50	<5	<1
AR1058	<0.5	38.0	200	<2	54.0	<50	<5	11
AR1059	<0.5	11.0	1100	<2	1.5	<50	<5	6
Std Nominal	1.0	16.0	4400	<2	3.5		<5	26
Determined	1.5	17.5	4400	<2	4.0	<50	<5	28
AR1060	6.0	6.0	1500	<2	5.5	<50	<5	30
Std Nominal	0.5	8.5	3600	<2	2.5	150	<5	18
Determined	1.0	7.5	3700	<2	2.5	100	<5	15
AR1061	1.0	17.0	2600	<2	6.0	<50	<5	28
AR1062	<0.5	10.0	200	<2	1.5	<50	<5	18
BLANK 2	<0.5	<0.5	<100	<2	<0.5	<50	<5	<1
Std Nominal	0.5	8.0			59.0	100	175	17
Determined	0.5	8.5	2900	<2	59.0	50	175	16
AR1063	<0.5	2.0	400	<2	16.0	<50	<5	41
AR1063 Rpt	<0.5	2.5	600	<2	17.5	<50	<5	44
AR1064	<0.5	3.5	1000	<2	1.0	<50	<5	8
Std Nominal	1.0	11.5	1800	<2	4.0	<50	5	11
Determined	1.0	12.0	1900	<2	4.5	<50	10	11
AR1065	1.5	2.0	<100	4	3.0	<50	<5	41
AR1066	<0.5	33.0	400	<2	5.5	<50	<5	20
AR1067	1.0	132	2500	2	18.0	<50	<5	24



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Method	PF102	PF102	PF102	PF102	PF102	PF102	PF102	PF102
Result Name	Zn	Zr	La	Ce	Pr	Nd	Sm	Eu
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	10	10	0.5	0.5	0.2	0.5	0.5	0.2
BLANK 1	<10	<10	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2
AR1002	50	160	35.0	69.0	7.6	28.5	5.0	0.8
AR1004	20	<10	17.5	33.0	4.4	16.0	4.0	1.6
AR1005	<10	<10	1.5	2.0	0.4	1.0	<0.5	<0.2
Std Nominal	60	100	286	201	12.8	32.5	4.5	2.0
Determined	100	110	314	213	13.0	33.0	4.5	4.2
AR1006	30	20	3.5	6.5	0.8	3.0	<0.5	<0.2
AR1007	<10	<10	2.0	3.5	0.4	1.0	<0.5	0.2
AR1008	<10	50	29.0	56.5	6.8	29.0	5.0	0.8
AR1009	20	20	9.5	17.0	1.8	6.0	1.0	<0.2
AR1010	200	190	19.5	59.5	5.8	24.0	5.5	1.2
AR1011	20	<10	1.5	2.0	<0.2	1.0	<0.5	<0.2
AR1012	120	100	4.0	12.0	1.4	6.0	1.5	0.4
AR1013	60	250	5.0	4.5	0.6	2.0	<0.5	<0.2
AR1014	50	130	29.5	54.5	6.2	23.5	4.0	1.2
AR1015	20	20	1.0	1.5	<0.2	<0.5	<0.5	<0.2
AR1016	20	20	8.5	14.5	1.8	6.0	1.0	0.6
AR1021	50	50	119	201	24.0	84.5	20.5	3.4
AR1022	<10	20	6.5	11.0	1.6	6.0	2.0	1.0
Std Nominal	1330	160	31.0	63.0	7.6	27.0	5.0	1.2
Determined	1310	170	31.0	59.0	7.0	26.0	4.5	1.2
AR1023	120	490	53.5	120	14.4	53.0	9.0	1.6
AR1024	50	<10	4.0	6.5	1.2	3.5	1.0	0.4
AR1025	130	230	105	209	27.0	107	24.0	2.8
AR1026	<10	110	25.0	48.0	5.8	22.0	4.5	1.0
AR1027	50	310	196	380	46.4	166	29.0	3.4
AR1028	<10	60	22.0	43.0	4.8	18.0	3.0	1.0
AR1029	50	200	257	494	64.8	246	51.5	4.4
AR1029 Rpt	50	190	255	485	64.0	241	50.5	4.4
AR1030	40	70	42.0	83.5	10.8	41.5	9.0	1.4
AR1031	20	260	150	283	36.0	130	23.5	2.8
AR1032	<10	50	12.0	20.5	3.0	10.0	2.0	0.8
AR1033	<10	250	39.0	73.5	9.4	34.0	6.5	1.4
AR1034	<10	40	13.0	23.5	3.2	11.5	2.0	1.2
AR1034 Rpt	20	40	13.0	23.5	3.4	11.5	2.5	1.2
AR1035	<10	130	30.0	59.0	7.0	26.0	5.0	1.0
AR1036	<10	40	16.5	31.5	3.8	12.5	2.0	1.0
AR1037	<10	80	8.5	18.0	2.2	7.5	1.5	0.4
AR1038	<10	50	5.0	10.0	1.2	4.5	1.0	0.4
AR1039	20	160	20.0	38.5	4.8	19.0	4.0	0.8
AR1040	<10	60	13.0	26.0	3.6	12.5	3.0	1.2



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Method	PF102	PF102	PF102	PF102	PF102	PF102	PF102	PF102
Result Name	Zn	Zr	La	Ce	Pr	Nd	Sm	Eu
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	10	10	0.5	0.5	0.2	0.5	0.5	0.2
AR1042	<10	<10	3.5	4.0	0.4	1.5	<0.5	3.4
AR1043	<10	20	10.0	18.5	2.4	7.5	1.5	0.6
AR1046	<10	30	8.5	13.0	1.8	6.0	1.0	0.6
AR1047	<10	20	9.5	12.5	1.8	6.0	1.0	0.4
AR1052	<10	<10	1.0	1.0	<0.2	<0.5	<0.5	0.4
AR1053	<10	<10	<0.5	1.0	<0.2	<0.5	<0.5	0.4
AR1054	<10	<10	<0.5	1.5	<0.2	<0.5	<0.5	<0.2
AR1055	<10	<10	18.5	32.0	4.0	13.0	2.5	0.4
AR1056	<10	<10	4.0	5.5	1.0	2.5	<0.5	<0.2
AR1057	<10	<10	2.0	2.5	0.6	1.5	<0.5	<0.2
AR1058	<10	110	6.0	11.0	1.2	5.0	1.0	0.4
AR1059	<10	130	13.0	25.0	3.2	10.0	1.5	0.4
Std Nominal	70	210	44.0	89.0	10.2	37.0	7.0	1.2
Determined	50	210	47.0	90.0	10.4	37.5	7.5	1.2
AR1060	50	20	28.5	42.0	7.6	30.5	6.5	1.4
Std Nominal	110	60	19.5	38.5	4.6	17.5	3.5	1.0
Determined	90	110	20.0	38.0	4.6	17.0	3.5	1.0
AR1061	50	190	43.0	85.0	11.0	41.5	7.5	1.2
AR1062	<10	20	14.5	27.5	3.8	13.5	3.0	1.6
BLANK 2	<10	<10	<0.5	<0.5	<0.2	<0.5	<0.5	<0.2
Std Nominal	60	100	286	201	12.8	32.5	4.5	2.0
Determined	50	100	266	181	12.4	31.0	4.0	3.8
AR1063	210	20	10.0	34.5	4.0	18.0	6.0	1.4
AR1063 Rpt	230	30	9.5	34.0	3.8	18.0	6.0	1.4
AR1064	<10	140	12.5	26.0	3.0	10.0	2.0	0.4
Std Nominal	1330	160	31.0	63.0	7.6	27.0	5.0	1.2
Determined	1350	170	31.5	59.5	7.2	28.0	5.0	1.2
AR1065	<10	<10	50.5	62.0	9.4	36.5	7.5	1.4
AR1066	60	60	30.0	55.5	8.2	29.5	5.5	1.0
AR1067	40	340	139	269	31.4	100	14.0	1.2



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Method	PF102	PF102	PF102	PF102	PF102	PF102	PF102	PF102
Result Name	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	2	0.2	0.5	0.2	0.5	0.2	0.5	0.2
BLANK 1	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1002	4	0.4	2.5	0.4	1.0	<0.2	1.0	<0.2
AR1004	6	1.2	6.5	1.2	4.0	0.4	3.0	0.4
AR1005	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
Std Nominal	4	0.6	3.0	0.6	2.0		2.0	0.2
Determined	4	0.8	4.0	0.8	2.5	0.4	3.0	0.6
AR1006	<2	<0.2	0.5	<0.2	<0.5	<0.2	<0.5	<0.2
AR1007	<2	<0.2	0.5	<0.2	<0.5	<0.2	<0.5	<0.2
AR1008	6	1.0	7.0	1.4	4.0	0.6	3.5	0.6
AR1009	<2	<0.2	1.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1010	6	1.0	5.5	1.0	3.5	0.4	3.5	0.4
AR1011	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1012	<2	0.2	1.5	0.4	1.0	<0.2	1.0	<0.2
AR1013	<2	<0.2	0.5	<0.2	<0.5	<0.2	<0.5	<0.2
AR1014	4	0.4	2.0	0.4	1.0	<0.2	1.0	<0.2
AR1015	<2	<0.2	1.5	0.6	3.0	0.4	4.0	0.4
AR1016	<2	0.2	1.5	0.4	1.0	<0.2	0.5	<0.2
AR1021	26	5.2	28.5	6.0	20.5	2.6	19.0	2.2
AR1022	2	0.4	2.5	0.6	2.0	<0.2	1.5	<0.2
Std Nominal	4	0.6	2.5	0.4	1.0	<0.2	0.5	<0.2
Determined	4	0.6	2.5	0.4	1.0	<0.2	1.0	<0.2
AR1023	10	1.2	5.5	1.0	3.5	0.4	3.0	0.4
AR1024	<2	<0.2	0.5	<0.2	<0.5	<0.2	<0.5	<0.2
AR1025	22	2.4	8.5	1.4	4.0	0.4	3.0	0.4
AR1026	4	0.6	2.5	0.6	1.5	<0.2	1.5	<0.2
AR1027	26	3.4	14.0	2.8	8.5	1.0	7.0	0.8
AR1028	4	0.4	2.5	0.6	2.0	<0.2	1.5	<0.2
AR1029	46	5.2	20.0	3.4	10.5	1.2	8.0	1.0
AR1029 Rpt	46	5.4	20.0	3.4	10.5	1.2	8.0	1.0
AR1030	8	1.0	4.0	0.8	2.5	0.4	2.0	0.4
AR1031	22	2.8	12.0	2.2	7.5	0.8	6.5	0.8
AR1032	<2	0.2	1.5	0.4	1.0	<0.2	1.0	<0.2
AR1033	6	0.8	3.5	0.6	2.0	0.2	2.0	<0.2
AR1034	<2	0.2	1.0	<0.2	0.5	<0.2	0.5	<0.2
AR1034 Rpt	<2	0.2	1.0	<0.2	0.5	<0.2	0.5	<0.2
AR1035	6	0.8	4.0	0.8	3.0	0.4	3.5	0.4
AR1036	<2	0.2	1.5	<0.2	1.0	<0.2	1.0	<0.2
AR1037	<2	0.2	1.5	0.4	1.0	<0.2	1.0	<0.2
AR1038	<2	<0.2	1.0	<0.2	0.5	<0.2	0.5	<0.2
AR1039	4	0.8	4.5	1.0	3.5	0.4	3.0	0.4
AR1040	2	0.4	1.5	0.4	1.0	<0.2	1.0	<0.2



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Method	PF102	PF102	PF102	PF102	PF102	PF102	PF102	PF102
Result Name	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	2	0.2	0.5	0.2	0.5	0.2	0.5	0.2
AR1042	<2	<0.2	0.5	<0.2	<0.5	<0.2	<0.5	<0.2
AR1043	2	0.4	2.5	0.6	2.0	<0.2	1.5	<0.2
AR1046	<2	0.2	1.5	0.4	1.0	<0.2	1.0	<0.2
AR1047	<2	0.4	2.5	0.6	2.0	0.4	2.0	0.4
AR1052	<2	<0.2	0.5	<0.2	<0.5	<0.2	0.5	<0.2
AR1053	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1054	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1055	4	0.8	6.0	1.6	6.0	0.8	6.5	0.8
AR1056	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1057	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
AR1058	<2	0.4	1.5	0.4	1.5	<0.2	1.5	<0.2
AR1059	<2	0.2	1.5	<0.2	1.0	<0.2	1.0	<0.2
Std Nominal	6	0.8	5.0	1.0	3.0	0.4	2.5	0.4
Determined	8	1.2	6.0	1.2	4.0	0.4	3.5	0.4
AR1060	8	1.2	6.0	1.2	3.5	0.4	3.0	0.4
Std Nominal	4	0.6	3.5	0.6	2.0	0.2	2.0	0.2
Determined	4	0.6	3.0	0.6	2.0	<0.2	2.0	<0.2
AR1061	8	1.2	6.5	1.2	4.0	0.4	3.5	0.4
AR1062	4	0.6	3.0	0.6	2.0	<0.2	1.5	<0.2
BLANK 2	<2	<0.2	0.0	<0.2	<0.5	<0.2	<0.5	<0.2
Std Nominal	4	0.6	3.0	0.6	2.0		2.0	0.2
Determined	4	0.6	3.0	0.6	2.0	0.4	2.5	0.4
AR1063	8	1.8	10.5	2.2	8.0	1.0	8.5	1.0
AR1063 Rpt	8	1.8	10.0	2.2	7.5	1.0	8.5	1.0
AR1064	<2	0.2	1.5	0.4	1.0	<0.2	1.0	<0.2
Std Nominal	4	0.6	2.5	0.4	1.0	<0.2	0.5	<0.2
Determined	4	0.6	2.5	0.4	1.0	<0.2	1.0	<0.2
AR1065	12	1.8	9.0	1.6	5.5	0.6	4.5	0.4
AR1066	6	0.8	4.5	0.8	3.0	0.4	2.5	0.4
AR1067	12	1.6	6.0	1.0	3.0	0.4	2.0	<0.2



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These results pertain to the samples as received at this laboratory.

Where standards are reported, the nominal value for the element is reported above the result found.

"%" Implies this result reported in %

Sample Storage

The excess material (Residue) will be held after 30 days

The pulp samples (Pulp) will be held after 60 days as per instructions.

Sample Preparation

Digest and Analysis:

The samples have been fused with Sodium Peroxide and subsequently the melt has been dissolved in dilute Hydrochloric acid for analysis. Because of the high furnace temperatures, volatile elements are lost. This procedure is particularly efficient for determination of Major element composition (including Silica) in the samples or for the determination of refractory mineral species.

Ba,Ca,Cr,Fe,K,Li,Mg,Mn,P,S,Sc,Si,Ti,V

have been determined by Inductively Coupled Plasma (ICP) Optical Emission Spectrometry.

Ag,As,Be,Bi,Cd,Ce,Co,Cs,Cu,Dy,Er,Eu,Gd,Ge,Hf,Ho,In,La,Lu,Mo,Nb,Nd,Ni,Pb,Pr,Rb,Re,Sb,Sm,Sn,Sr,Ta,Tb,Th,Tl,Tm,U,W,Y,Yb,Zn,Zr

have been determined by Inductively Coupled Plasma (ICP) Mass Spectrometry.