CDN Resource Laboratories Ltd.

Certificate of Analysis

REFERENCE MATERIAL: CDN-PGMS-34

Recommended values and the "Between Lab" Two Standard Deviations

Precious Metals and Targeted Major Base Metals				
Gold	0.220 gpt	± 0.028 gpt	30 g Fire Assay, ICP or AA finish	Certified value
Platinum	0.54 gpt	± 0.06 gpt	30 g Fire Assay, ICP or AA finish	Certified value
Palladium	1.50 gpt	± 0.08 gpt	30 g Fire Assay, ICP or AA finish	Certified value
Copper	5.55 %	± 0.22 %	4 Acid digestion / ICP finish	Certified value
Copper	5.50 %	± 0.47 %	Fusion / ICP finish	Certified value
Nickel	1.74 %	± 0.11 %	4 Acid digestion / ICP finish	Certified value
Nickel	1.67 %	± 0.09 %	Fusion / ICP finish	Certified value
Cobalt	173 ppm	± 15 ppm	4 Acid digestion / ICP finish	Certified value
Cobalt	167 ppm	± 21 ppm	Fusion / ICP finish	Provisional value
Specific Gravity	3.24	± 0.04	Gas pycnometer	Certified value

Major Oxides			
SiO_2	37.85 %	± 1.24 %	Certified value
Al_2O_3	9.58 %	± 0.34 %	Certified value
Fe_2O3	26.58 %	± 1.44 %	Certified value
Cr_2O3	0.07 %		Indicated Mean
Na_2O	2.43 %	± 0.28 %	Certified value
CaO	3.82 %	± 0.26 %	Certified value
MnO	0.10 %	± 0.02 %	Provisional value
MgO	2.56 %	± 0.26 %	Certified value
K_2O	0.81 %	± 0.06 %	Certified value
TiO_2	0.42 %	± 0.04 %	Certified value
Total S	11.84 %	± 0.96 %	Certified value

Note 1: Standards with an RSD of near or less than 5% are certified; RSD's of between 5% and 15% are Provisional; RSD's over 15% are Indicated. Provisional and Indicated values cannot be used to monitor accuracy with a high degree of certainty.

PREPARED BY: AMIS African Mineral Standards
PRODUCTION AND QUALITY CONTROLED BY: Mike McWha, BSc (Hons), FGSSA, MAusIMM, Pr.Sci.Nat
CERTIFIED BY: Ali Alizadeh, MSc, MBA, P Geo, FGC
INDEPENDENT GEOCHEMIST: Dr. Barry Smee., Ph.D., PGeo
DATE OF CERTIFICATION: April 19th, 2012

Note: Production of CDN-PGMS-34 was carried out by AMIS African Mineral Standards.
All QAQC procedures and statistical analyses and lab results were reviewed and certified by Ali Alizadeh, MSc, MBA, PGeo, FGC, from CDN.

ORIGIN OF REFERENCE MATERIAL:

Standard CDN-PGMS-34 was prepared by AMIS African Mineral Standards, using material provided by Quandra FNX Mining Ltd. and SGS Minerals Services from FNX's project located in Sudbury, ON. Canada. The vast bulk

of sulfides in the Sudbury ores consist of varying proportions of pyrrhotite, chalcopyrite and pentlandite with varying amounts of other Cu-, Ni-, Co-, PGM-bearing minerals and gold.

METHOD OF PREPARATION:

The material was crushed, dry-milled and air-classified to <54um. Wet sieve particle size analysis of random samples confirmed the material was 98.5% <54um. It was then blended in a bi-conical mixer, systematically divided and then sealed into 1kg Laboratory Packs. Explorer Packs are subdivided from the Laboratory packs as required. Samples were randomly selected for homogeneity testing and third party analysis. Statistical analysis of both homogeneity and the consensus test results were carried out by independent statisticians.

Assay Procedures:

Au, Pt, Pd:	30 gr. fire assay pre-concentration, AA or ICP finish.
Cu, Ni, Co:	4-acid digestion, AA or ICP finish and Fusion, ICP-MS or OES finish.
TS:	LECO IR Combustion.
Specific Gravity:	Gas pycnometer.
Major Oxides:	Fusion, XRF Finish.

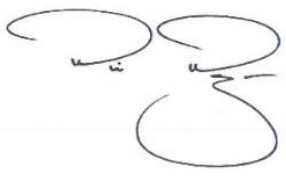
Statistical Procedures:

The final limits were calculated after first determining if all data was compatible within a spread normally expected for similar analytical methods done by reputable laboratories. Data from any one laboratory was removed from further calculations when the mean of all analyses from that laboratory failed a t test of the global means of the other laboratories. The means and standard deviations were calculated using all remaining data. Any analysis that fell outside of the mean ±2 standard deviations was removed from the ensuing database. The mean and standard deviations were again calculated using the remaining data. This method is different from that used by Government agencies in that the actual "between-laboratory" standard deviation is used in the calculations. This produces upper and lower limits that reflect actual individual analyses rather than a grouped set of analyses. The limits can therefore be used to monitor accuracy from individual analyses, unlike the Confidence Limits published on other standards.

LEGAL NOTICE:

This certificate and the reference material described in it have been prepared with due care and attention. However, CDN Resource Laboratories Ltd. nor Barry Smee accept any liability for any decisions or actions taken following the use of the reference material. Our liability is limited solely to the cost of the reference material.

Certified by



Ali Alizadeh, MSc, MBA, P.Geo.

Geochemist

Dr. Barry Smee, PhD, FGC

APPENDIX I: Participating Laboratories: (not in same order as table of assays)

Activation Labs, Thunder Bay, Ontario, Canada	SGS Australia Pty Ltd (Newburn) WA
Alex Stewart International Corporation Zambia	SGS Chelopech (Bulgaria)
ALS, Brisbane, Australia	SGS Durango (Mexico)
ALS, Johannesburg, South Africa	SGS Geosol Laboratories Ltda (Brazil)
Genalysis Laboratory Services (South Africa) Pty	SGS Mineral Services Lakefield (Canada)
Genalysis Laboratory Services (W Australia P)	SGS South Africa (Pty) Ltd - Booysens JHB
Inspectorate Metals & Minerals	SGS Toronto (Canada)
Intertek Utama Services (Indonesia)	SGS Townsville (Australia)
Set Point Laboratories (Isando) SA	Ultra Trace (Pty) Ltd WA

APPENDIX II: Results from round-robin assaying:

Standard	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
	Au by Fire Assay, 30g sample size and ICP or AA finish																	
PGMS-34	0.266	0.204	0.25	-	0.240	0.216	0.218	0.211	0.210	0.219	0.23	-	0.21	0.193	0.236	-	0.224	0.240
	0.250	0.207	0.25	-	0.228	0.221	0.218	0.247	0.190	0.221	0.21	-	0.20	0.165	0.232	-	0.214	0.214
	0.230	0.209	0.12	-	0.246	0.215	0.211	0.227	0.200	0.208	0.22	-	0.22	0.167	0.237	-	0.213	0.227
	0.233	0.211	0.25	-	0.270	0.217	0.218	0.230	0.200	0.207	0.22	-	0.21	0.161	0.227	-	0.224	0.224
	0.230	0.208	0.25	-	0.212	0.225	0.234	0.240	0.200	0.196	0.22	-	0.14	0.170	0.239	-	0.206	0.234
	0.228	0.199	0.12	-	0.234	0.209	0.219	0.220	0.190	0.201	0.23	-	0.16	0.183	0.234	-	0.209	0.222
	0.219	0.209	0.37	-	0.224	0.217	0.224	0.227	0.200	0.243	0.23	-	0.14	0.166	0.224	-	0.204	0.249
	0.234	0.214	0.25	-	0.219	0.218	0.224	0.250	0.200	0.226	0.21	-	0.20	0.142	0.224	-	0.209	0.233
Mean	0.236	0.208	0.23	-	0.234	0.217	0.221	0.232	0.199	0.215	0.22	-	0.19	0.168	0.232	-	0.213	0.230
Std. Devn.	0.01	0.00	0.08	-	0.02	0.00	0.01	0.01	0.01	0.02	0.01	-	0.03	0.02	0.01	-	0.01	0.01
% RSD	6.26	2.18	34.77	-	7.78	2.13	3.05	5.77	3.22	7.09	3.77	-	17.81	8.96	2.56	-	3.57	4.78
	Pt (ppm) by Fire Assay, 30g sample size and ICP or AA finish																	
PGMS-34	0.593	0.514	-	-	0.545	0.532	0.510	0.402	0.50	0.604	0.54	-	-	0.39	-	-	0.54	0.581
	0.597	0.504	-	-	0.585	0.541	0.526	0.573	0.51	0.588	0.56	-	-	0.40	-	-	0.54	0.585
	0.588	0.524	-	-	0.585	0.528	0.502	0.560	0.49	0.620	0.53	-	-	0.40	-	-	0.55	0.587
	0.591	0.521	-	-	0.545	0.528	0.545	0.570	0.50	0.625	0.55	-	-	0.39	-	-	0.54	0.531
	0.574	0.528	-	-	0.500	0.535	0.511	0.523	0.50	0.632	0.53	-	-	0.40	-	-	0.53	0.595
	0.585	0.506	-	-	0.540	0.526	0.536	0.577	0.50	0.610	0.55	-	-	0.45	-	-	0.53	0.529
	0.572	0.528	-	-	0.530	0.531	0.536	0.593	0.50	0.605	0.53	-	-	0.40	-	-	0.53	0.543
	0.586	0.505	-	-	0.530	0.526	0.520	0.523	0.51	0.605	0.55	-	-	0.40	-	-	0.53	0.553
Mean	0.586	0.516	-	-	0.545	0.531	0.523	0.540	0.50	0.611	0.54	-	-	0.40	-	-	0.54	0.563
Std. Devn.	0.01	0.01	-	-	0.03	0.01	0.02	0.06	0.01	0.01	0.01	-	-	0.02	-	-	0.01	0.03
% RSD	1.50	2.00	-	-	5.24	0.97	2.88	11.32	1.28	2.29	2.15	-	-	4.76	-	-	1.39	4.79
	Pd (ppm) by Fire Assay, 30g sample size and ICP or AA finish																	
PGMS-34	1.49	1.46	-	-	1.46	1.44	1.51	1.55	1.44	1.60	1.56	-	-	1.03	-	-	1.47	1.57
	1.54	1.46	-	-	1.65	1.45	1.52	1.53	1.44	1.52	1.54	-	-	1.02	-	-	1.48	1.51
	1.47	1.47	-	-	1.79	1.47	1.40	1.43	1.43	1.64	1.51	-	-	1.04	-	-	1.50	1.53
	1.51	1.47	-	-	1.46	1.47	1.50	1.51	1.47	1.58	1.52	-	-	0.98	-	-	1.47	1.51
	1.47	1.53	-	-	1.38	1.49	1.46	1.53	1.42	1.57	1.53	-	-	1.00	-	-	1.45	1.54
	1.47	1.47	-	-	1.48	1.44	1.44	1.52	1.44	1.58	1.54	-	-	1.24	-	-	1.50	1.58
	1.43	1.48	-	-	1.45	1.48	1.52	1.51	1.42	1.55	1.52	-	-	0.96	-	-	1.47	1.50
	1.46	1.46	-	-	1.50	1.49	1.52	1.53	1.46	1.54	1.56	-	-	0.94	-	-	1.47	1.53
Mean	1.48	1.47	-	-	1.52	1.46	1.48	1.51	1.44	1.57	1.54	-	-	1.03	-	-	1.48	1.53
Std. Devn.	0.03	0.02	-	-	0.13	0.02	0.05	0.04	0.02	0.04	0.02	-	-	0.09	-	-	0.02	0.03
% RSD	2.26	1.50	-	-	8.73	1.28	3.06	2.39	1.23	2.37	1.21	-	-	9.07	-	-	1.14	1.87

Standard	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
	Cu (%) by 4Acid digestion ICP finish																	
PGMS-34	5.61	5.55	-	5.41	5.56	5.67	-	5.60	5.53	5.35	5.55	5.69	-	-	5.71	-	5.57	5.56
	5.30	5.57	-	5.42	5.61	5.59	-	5.58	5.56	5.33	5.21	5.60	-	-	5.80	-	5.64	5.62
	5.48	5.53	-	5.30	5.58	5.64	-	5.43	5.47	5.45	5.46	5.67	-	-	5.70	-	5.53	5.68
	5.44	5.69	-	5.45	5.63	5.62	-	5.47	5.57	5.28	5.19	5.70	-	-	5.70	-	5.55	5.60
	5.49	5.73	-	5.42	5.53	5.60	-	5.56	5.31	5.35	5.24	5.73	-	-	5.77	-	5.70	5.62
	5.32	5.56	-	5.38	5.60	5.64	-	5.44	5.38	5.38	5.59	5.67	-	-	5.49	-	5.75	5.62
	5.57	5.61	-	5.59	5.59	5.63	-	5.48	5.64	5.27	5.64	5.62	-	-	5.53	-	5.59	5.62
	5.48	5.61	-	5.49	5.56	5.57	-	5.42	5.47	5.47	5.62	5.59	-	-	5.50	-	5.61	5.42
Mean	5.46	5.61	-	5.43	5.58	5.62	-	5.50	5.49	5.36	5.44	5.66	-	-	5.65	-	5.62	5.59
Std. Devn.	0.11	0.07	-	0.08	0.03	0.03	-	0.07	0.11	0.07	0.19	0.05	-	-	0.12	-	0.08	0.08
% RSD	1.98	1.26	-	1.55	0.57	0.58	-	1.31	1.96	1.34	3.56	0.89	-	-	2.20	-	1.35	1.38
	Cu (%) by Fusion ICP finish																	
PGMS-34	-	5.74	5.16	5.42	5.37	5.87	-	5.42	5.16	-	5.38	5.54	-	-	-	-	5.81	5.78
	-	5.72	5.10	5.44	5.59	5.84	-	5.37	5.07	-	5.34	5.57	-	-	-	-	5.78	5.44
	-	5.73	5.08	5.41	5.52	5.92	-	5.46	5.34	-	5.34	5.60	-	-	-	-	5.83	5.34
	-	5.76	5.06	5.44	5.51	5.91	-	5.55	5.40	-	5.35	5.59	-	-	-	-	5.79	5.65
	-	5.76	5.06	5.46	5.50	5.61	-	5.45	5.23	-	5.41	5.55	-	-	-	-	5.76	5.44
	-	5.71	5.10	5.43	5.71	5.91	-	5.53	5.07	-	5.39	5.59	-	-	-	-	5.77	5.48
	-	5.80	5.08	5.45	5.71	5.69	-	5.51	5.12	-	5.35	5.60	-	-	-	-	5.69	5.45
	-	5.76	5.16	5.37	5.59	5.95	-	5.48	5.09	-	5.33	5.53	-	-	-	-	5.81	5.49
Mean	-	5.75	5.10	5.43	5.56	5.84	-	5.47	5.19	-	5.36	5.57	-	-	-	-	5.78	5.51
Std. Devn.	-	0.03	0.04	0.03	0.11	0.12	-	0.06	0.13	-	0.03	0.03	-	-	-	-	0.04	0.14
% RSD	-	0.50	0.78	0.52	2.04	2.07	-	1.09	2.45	-	0.53	0.50	-	-	-	-	0.75	2.53
	Ni (%) by 4Acid digestion ICP finish																	
PGMS-34	1.75	1.81	-	1.73	1.74	1.85	-	1.77	1.69	1.81	-	1.73	-	-	1.46	-	1.67	1.68
	1.65	1.76	-	1.73	1.76	1.83	-	1.75	1.68	1.82	-	1.69	-	-	1.49	-	1.70	1.76
	1.76	1.74	-	1.71	1.76	1.82	-	1.74	1.66	1.76	-	1.67	-	-	1.49	-	1.73	1.72
	1.71	1.78	-	1.76	1.77	1.83	-	1.74	1.68	1.79	-	1.63	-	-	1.48	-	1.70	1.76
	1.71	1.81	-	1.69	1.74	1.84	-	1.73	1.61	1.81	-	1.66	-	-	1.48	-	1.74	1.77
	1.70	1.77	-	1.70	1.80	1.83	-	1.73	1.63	1.83	-	1.65	-	-	1.40	-	1.77	1.73
	1.76	1.76	-	1.77	1.75	1.84	-	1.73	1.66	1.80	-	1.64	-	-	1.51	-	1.68	1.74
	1.73	1.77	-	1.72	1.75	1.82	-	1.72	1.66	1.81	-	1.64	-	-	1.48	-	1.75	1.69
Mean	1.72	1.77	-	1.72	1.76	1.83	-	1.74	1.66	1.80	-	1.66	-	-	1.47	-	1.72	1.73
Std. Devn.	0.04	0.02	-	0.03	0.02	0.01	-	0.02	0.03	0.02	-	0.03	-	-	0.03	-	0.04	0.03
% RSD	2.16	1.37	-	1.66	1.11	0.59	-	0.89	1.63	1.18	-	1.98	-	-	2.23	-	2.06	1.91
	Ni (%) by Fusion ICP finish																	
PGMS-34	-	-	1.61	1.67	1.62	1.74	-	1.74	1.64	-	1.60	1.61	-	-	-	-	1.68	1.68
	-	-	1.62	1.71	1.71	1.82	-	1.74	1.66	-	1.60	1.63	-	-	-	-	1.68	1.67
	-	-	1.62	1.69	1.73	1.87	-	1.74	1.68	-	1.65	1.64	-	-	-	-	1.74	1.63
	-	-	1.62	1.68	1.70	1.85	-	1.74	1.67	-	1.66	1.66	-	-	-	-	1.73	1.71
	-	-	1.61	1.72	1.68	1.73	-	1.75	1.69	-	1.64	1.68	-	-	-	-	1.66	1.70
	-	-	1.61	1.71	1.74	1.87	-	1.72	1.64	-	1.61	1.63	-	-	-	-	1.73	1.70
	-	-	1.61	1.69	1.74	1.81	-	1.71	1.64	-	1.65	1.64	-	-	-	-	1.68	1.67
	-	-	1.66	1.62	1.70	1.88	-	1.74	1.63	-	1.62	1.65	-	-	-	-	1.75	1.62
Mean	-	-	1.62	1.69	1.70	1.82	-	1.74	1.66	-	1.63	1.64	-	-	-	-	1.71	1.67
Std. Devn.	-	-	0.02	0.03	0.04	0.06	-	0.01	0.02	-	0.02	0.02	-	-	-	-	0.03	0.03
% RSD	-	-	1.04	1.80	2.32	3.31	-	0.75	1.33	-	1.48	1.29	-	-	-	-	2.03	1.96

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Standard	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
	Co (ppm) by 4Acid digestion ICP finish																	
PGMS-34	160	168	-	170	170	191.3	-	175	177	201	169	172	-	151.38	-	136	173	177
	164	166	-	180	185	190.2	-	171	173	184	171	164	-	140.06	-	134	167	180
	170	169	-	170	180	188.8	-	164	178	182	174	168	-	147.29	-	131	178	176
	168	166	-	170	180	183.5	-	170	177	182	171	162	-	148.03	-	131	171	177
	158	165	-	180	170	186.2	-	170	170	182	170	162	-	149.33	-	133	171	176
	165	160	-	170	170	185.1	-	162	169	186	170	171	-	145.02	-	130	166	174
	182	163	-	180	175	184.9	-	168	178	185	170	161	-	143.81	-	135	170	180
	173	160	-	180	185	182.6	-	167	178	186	174	164	-	142.78	-	136	166	177
Mean	168	164	-	175	177	186.6	-	168	175	186	171	166	-	145.96	-	133	170	177
Std. Devn.	7.67	3.27	-	5.35	6.51	3.18	-	4.10	3.78	6.30	1.89	4.28	-	3.73	-	2.38	4.06	2.03
% RSD	4.58	1.99	-	3.05	3.68	1.70	-	2.44	2.16	3.39	1.10	2.58	-	2.55	-	1.78	2.39	1.15
	Co (ppm) by 4Acid digestion ICP finish																	
PGMS-34	159	165	200	-	182	175	-	133	155	188	170	164	-	156.8	177	166	165	159
	160	158	160	-	184	175	-	135	149	187	170	167	-	156.7	181	173	162	156
	155	162	199	-	181	185	-	139	163	185	180	166	-	152.5	178	169	158	159
	157	161	199	-	171	189	-	136	163	182	170	164	-	156.1	179	174	159	157
	163	163	240	-	176	175	-	133	161	187	170	170	-	155.0	178	164	158	154
	161	161	160	-	175	191	-	137	159	183	170	164	-	154.5	178	165	166	154
	157	160	160	-	178	181	-	134	159	182	170	168	-	150.0	175	173	160	150
	155	161	180	-	173	180	-	132	161	181	170	160	-	153.1	178	169	167	154
Mean	158	161	187	-	178	181	-	135	159	184	171	165	-	154.3	178	169	162	155
Std. Devn.	2.88	2.04	28.03	-	4.57	6.41	-	2.36	4.71	2.72	3.54	3.07	-	2.36	1.69	3.91	3.68	3.02
% RSD	1.82	1.27	14.97	-	2.57	3.54	-	1.75	2.97	1.48	2.06	1.85	-	1.53	0.95	2.31	2.27	1.94
	Specific Gravity Pycnometer																	
PGMS-34	-	3.21	-	-	3.37	3.31	3.190	-	-	3.25	-	3.23	3.21	-	-	-	3.20	-
	-	3.23	-	-	3.35	3.45	3.260	-	-	3.27	-	3.24	3.21	-	-	-	3.24	-
	-	3.32	-	-	3.34	3.42	3.250	-	-	3.25	-	3.26	3.23	-	-	-	3.22	-
	-	3.22	-	-	3.33	3.46	3.250	-	-	3.26	-	3.25	3.22	-	-	-	3.22	-
	-	3.23	-	-	3.32	3.34	3.260	-	-	3.25	-	3.26	3.19	-	-	-	3.24	-
	-	3.20	-	-	3.35	3.32	3.220	-	-	3.25	-	3.26	3.20	-	-	-	3.26	-
	-	3.20	-	-	3.34	3.30	3.270	-	-	3.27	-	3.25	3.19	-	-	-	3.24	-
	-	3.22	-	-	3.32	3.22	3.250	-	-	3.25	-	3.26	3.21	-	-	-	3.28	-
Mean	-	3.23	-	-	3.34	3.35	3.244	-	-	3.26	-	3.25	3.21	-	-	-	3.24	-
Std. Devn.	-	0.04	-	-	0.02	0.08	0.03	-	-	0.01	-	0.01	0.01	-	-	-	0.02	-
% RSD	-	1.20	-	-	0.51	2.49	0.81	-	-	0.28	-	0.35	0.43	-	-	-	0.77	-
	Total S (%) LECO																	
PGMS-34	-	11.9	11.72	12.4	11.8	-	-	11.5	-	-	12.0	11.7	12.33	12.20	12.4	-	-	-
	-	11.7	11.60	12.2	11.8	-	-	11.2	-	-	12.6	11.5	12.25	12.25	12.0	-	-	-
	-	11.8	11.69	12.5	11.9	-	-	11.5	-	-	12.2	11.8	12.18	12.17	12.0	-	-	-
	-	11.8	11.73	12.6	11.9	-	-	11.4	-	-	11.9	11.7	12.16	12.16	12.0	-	-	-
	-	11.9	11.68	12.4	11.8	-	-	11.6	-	-	11.9	11.8	12.28	12.00	12.2	-	-	-
	-	11.8	11.54	12.1	11.9	-	-	11.5	-	-	11.8	11.7	12.25	12.08	11.8	-	-	-
	-	11.8	11.63	12.8	11.9	-	-	11.5	-	-	12.0	11.7	12.22	12.17	11.8	-	-	-
	-	11.9	11.54	12.6	11.7	-	-	11.4	-	-	11.7	11.6	12.24	12.18	12.0	-	-	-
Mean	-	11.8	11.64	12.5	11.8	-	-	11.5	-	-	12.01	11.69	12.24	12.15	12.0	-	-	-
Std. Devn.	-	0.07	0.08	0.23	0.07	-	-	0.12	-	-	0.28	0.10	0.05	0.08	0.20	-	-	-
% RSD	-	0.60	0.65	1.82	0.63	-	-	1.04	-	-	2.33	0.85	0.44	0.64	1.65	-	-	-

Standard	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
	SiO2 (%) XRF																	
PGMS-34	-	-	-	37.5	38.15	-	-	38.07	34.61	36.63	37.4	38.3	-	-	-	-	-	-
	-	-	-	37.9	38.19	-	-	37.94	34.58	36.65	37.4	38.6	-	-	-	-	-	-
	-	-	-	37.6	38.11	-	-	38.07	34.89	35.86	37.4	38.4	-	-	-	-	-	-
	-	-	-	37.7	38.17	-	-	38.01	34.36	34.93	37.3	38.8	-	-	-	-	-	-
	-	-	-	37.9	38.07	-	-	38.00	34.32	36.68	37.4	38.8	-	-	-	-	-	-
	-	-	-	37.9	38.13	-	-	38.24	34.26	35.34	37.4	38.8	-	-	-	-	-	-
	-	-	-	37.9	38.16	-	-	37.96	34.15	36.41	37.4	38.9	-	-	-	-	-	-
	-	-	-	37.5	38.13	-	-	38.10	34.50	36.74	37.3	39.0	-	-	-	-	-	-
Mean	-	-	-	37.7	38.14	-	-	38.05	34.46	36.16	37.4	38.7	-	-	-	-	-	-
Std. Devn.	-	-	-	0.18	0.04	-	-	0.10	0.23	0.70	0.05	0.24	-	-	-	-	-	-
% RSD	-	-	-	0.49	0.10	-	-	0.25	0.68	1.93	0.12	0.63	-	-	-	-	-	-
	Al2O3 (%) XRF																	
PGMS-34	8.37	9.77	-	9.54	9.60	9.36	-	9.60	7.785	9.62	9.41	9.79	9.88	-	-	-	-	8.37
	7.39	9.71	-	9.62	9.63	9.39	-	9.57	7.710	9.44	9.42	9.81	10.17	-	-	-	-	7.39
	7.86	9.92	-	9.50	9.60	9.34	-	9.60	8.201	9.22	9.41	9.90	9.71	-	-	-	-	7.86
	7.90	9.75	-	9.54	9.63	9.39	-	9.60	8.071	9.02	9.38	9.81	9.35	-	-	-	-	7.90
	8.90	9.60	-	9.59	9.59	9.37	-	9.60	8.136	9.47	9.41	9.95	9.62	-	-	-	-	8.90
	9.67	9.54	-	9.62	9.60	9.32	-	9.64	8.213	9.17	9.41	9.95	9.73	-	-	-	-	9.67
	9.18	9.62	-	9.59	9.64	9.34	-	9.56	8.101	9.37	9.41	9.91	9.75	-	-	-	-	9.18
	8.18	9.58	-	9.52	9.63	9.38	-	9.61	8.169	9.41	9.39	9.88	9.64	-	-	-	-	8.18
Mean	8.43	9.69	-	9.57	9.62	9.36	-	9.60	8.048	9.34	9.41	9.88	9.73	-	-	-	-	8.43
Std. Devn.	0.76	0.13	-	0.05	0.02	0.02	-	0.02	0.19	0.19	0.01	0.06	0.23	-	-	-	-	0.76
% RSD	9.07	1.30	-	0.48	0.20	0.26	-	0.25	2.39	2.05	0.14	0.65	2.38	-	-	-	-	9.07
	CaO (%) XRF																	
PGMS-34	4.463	3.72	-	3.84	3.89	3.799	-	3.94	3.62	3.96	3.80	3.92	3.624	-	-	-	-	4.463
	4.491	3.71	-	3.88	3.89	3.799	-	3.95	3.61	3.98	3.79	3.98	3.638	-	-	-	-	4.491
	4.771	3.79	-	3.85	3.89	3.797	-	3.96	3.61	3.87	3.80	3.93	3.568	-	-	-	-	4.771
	4.561	3.74	-	3.87	3.90	3.782	-	3.94	3.57	3.97	3.80	3.93	3.498	-	-	-	-	4.561
	3.988	3.65	-	3.88	3.89	3.809	-	3.94	3.56	3.98	3.80	3.98	3.470	-	-	-	-	3.988
	4.226	3.64	-	3.86	3.88	3.790	-	3.96	3.56	3.90	3.81	3.95	3.596	-	-	-	-	4.226
	5.191	3.65	-	3.87	3.90	3.813	-	3.96	3.53	3.95	3.80	3.95	3.624	-	-	-	-	5.191
	4.911	3.65	-	3.85	3.89	3.851	-	3.95	3.57	3.97	3.81	3.98	3.666	-	-	-	-	4.911
Mean	4.575	3.69	-	3.86	3.89	3.805	-	3.95	3.58	3.95	3.80	3.95	3.585	-	-	-	-	4.575
Std. Devn.	0.38	0.05	-	0.01	0.01	0.02	-	0.01	0.03	0.04	0.01	0.02	0.07	-	-	-	-	0.38
% RSD	8.33	1.47	-	0.39	0.16	0.55	-	0.23	0.84	1.03	0.17	0.63	1.93	-	-	-	-	8.33
	Cr2O3 (%) XRF																	
PGMS-34	0.042	0.064	-	0.0731	0.085	0.065	-	0.074	-	0.09	0.08	0.09	0.035	-	-	-	-	0.042
	0.037	0.064	-	0.0731	0.086	0.059	-	0.066	-	0.09	0.08	0.13	0.037	-	-	-	-	0.037
	0.055	0.065	-	0.0731	0.087	0.053	-	0.090	-	0.09	0.08	0.08	0.036	-	-	-	-	0.055
	0.037	0.063	-	0.0731	0.085	0.060	-	0.084	-	0.09	0.08	0.09	0.036	-	-	-	-	0.037
	0.036	0.062	-	0.0731	0.087	0.061	-	0.080	-	0.10	0.08	0.10	0.037	-	-	-	-	0.036
	0.043	0.062	-	0.0877	0.085	0.061	-	0.090	-	0.10	0.08	0.09	0.036	-	-	-	-	0.043
	0.045	0.064	-	0.0731	0.086	0.052	-	0.069	-	0.10	0.08	0.09	0.038	-	-	-	-	0.045
	0.038	0.063	-	0.0731	0.087	0.065	-	0.084	-	0.09	0.08	0.09	0.036	-	-	-	-	0.038
Mean	0.042	0.063	-	0.0749	0.086	0.060	-	0.080	-	0.09	0.08	0.10	0.036	-	-	-	-	0.042
Std. Devn.	0.01	0.00	-	0.01	0.00	0.00	-	0.01	-	0.01	0.00	0.02	0.00	-	-	-	-	0.01
% RSD	14.89	1.45	-	6.90	1.08	8.25	-	11.47	-	5.52	0.00	15.91	2.35	-	-	-	-	14.89

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Standard	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
	Fe2O3 (%) XRF																	
PGMS-34	22.02	28.17	-	25.73	26.35	28.09	-	26.88	22.67	26.41	25.8	26.4	26.15	-	-	-	-	22.02
	21.87	27.38	-	25.88	26.39	28.09	-	26.71	22.90	26.76	25.8	26.7	26.29	-	-	-	-	21.87
	22.59	27.16	-	25.81	26.29	27.95	-	27.06	23.08	26.51	25.8	26.4	26.32	-	-	-	-	22.59
	23.45	27.81	-	25.81	26.38	27.82	-	26.71	22.80	26.18	25.9	26.4	26.18	-	-	-	-	23.45
	22.59	28.17	-	25.88	26.29	28.08	-	26.93	22.75	26.54	25.9	26.1	26.09	-	-	-	-	22.59
	23.88	27.52	-	25.88	26.26	27.86	-	27.16	22.64	26.23	25.9	26.0	26.08	-	-	-	-	23.88
	24.73	27.95	-	25.88	26.38	27.92	-	27.25	22.68	26.50	25.8	25.8	26.25	-	-	-	-	24.73
	24.02	27.59	-	25.73	26.37	28.08	-	26.99	22.88	26.36	25.9	26.1	26.41	-	-	-	-	24.02
Mean	23.14	27.72	-	25.82	26.34	27.99	-	26.96	22.80	26.44	25.9	26.2	26.22	-	-	-	-	23.14
Std. Devn.	1.03	0.37	-	0.06	0.05	0.11	-	0.20	0.15	0.19	0.05	0.29	0.12	-	-	-	-	1.03
% RSD	4.45	1.32	-	0.25	0.19	0.40	-	0.72	0.65	0.70	0.21	1.10	0.44	-	-	-	-	4.45
	K2O (%) XRF																	
PGMS-34	0.78	0.76	-	0.80	0.82	0.907	-	0.81	0.69	0.82	0.8	0.84	0.81	-	-	-	-	0.78
	0.81	0.75	-	0.81	0.83	0.912	-	0.80	0.67	0.83	0.8	0.83	0.82	-	-	-	-	0.81
	0.82	0.77	-	0.80	0.82	0.907	-	0.81	0.67	0.81	0.8	0.85	0.80	-	-	-	-	0.82
	0.87	0.76	-	0.81	0.83	0.898	-	0.81	0.65	0.85	0.8	0.85	0.76	-	-	-	-	0.87
	0.81	0.75	-	0.81	0.83	0.906	-	0.81	0.67	0.82	0.8	0.88	0.78	-	-	-	-	0.81
	0.78	0.73	-	0.81	0.82	0.902	-	0.81	0.67	0.81	0.8	0.87	0.76	-	-	-	-	0.78
	0.87	0.75	-	0.81	0.83	0.901	-	0.80	0.66	0.82	0.8	0.84	0.81	-	-	-	-	0.87
	0.92	0.75	-	0.80	0.83	0.906	-	0.81	0.68	0.84	0.8	0.87	0.78	-	-	-	-	0.92
Mean	0.83	0.75	-	0.81	0.83	0.905	-	0.81	0.67	0.83	0.8	0.85	0.79	-	-	-	-	0.83
Std. Devn.	0.05	0.01	-	0.01	0.00	0.00	-	0.00	0.01	0.01	0.00	0.02	0.02	-	-	-	-	0.05
% RSD	5.69	1.47	-	0.64	0.22	0.48	-	0.57	1.43	1.71	0.00	2.07	2.83	-	-	-	-	5.69
	MgO (%) XRF																	
PGMS-34	2.57	2.34	-	2.59	2.69	2.63	-	2.56	2.12	2.69	2.61	2.55	2.40	-	-	-	-	2.57
	1.94	2.34	-	2.61	2.70	2.61	-	2.54	2.10	2.75	2.61	2.58	2.42	-	-	-	-	1.94
	2.32	2.39	-	2.59	2.68	2.61	-	2.59	2.19	2.61	2.60	2.59	2.29	-	-	-	-	2.32
	2.09	2.35	-	2.61	2.70	2.61	-	2.55	2.15	2.66	2.61	2.56	2.34	-	-	-	-	2.09
	2.32	2.29	-	2.60	2.68	2.70	-	2.58	2.20	2.65	2.60	2.59	2.29	-	-	-	-	2.32
	2.70	2.29	-	2.62	2.69	2.66	-	2.53	2.23	2.61	2.61	2.60	2.21	-	-	-	-	2.70
	2.69	2.30	-	2.62	2.68	2.63	-	2.56	2.16	2.60	2.62	2.61	2.34	-	-	-	-	2.69
	2.17	2.30	-	2.60	2.69	2.64	-	2.60	2.19	2.65	2.61	2.59	2.27	-	-	-	-	2.17
Mean	2.35	2.33	-	2.61	2.69	2.64	-	2.56	2.17	2.65	2.61	2.58	2.32	-	-	-	-	2.35
Std. Devn.	0.28	0.04	-	0.01	0.01	0.03	-	0.02	0.04	0.05	0.01	0.02	0.07	-	-	-	-	0.28
% RSD	11.98	1.51	-	0.46	0.31	1.15	-	0.95	2.02	1.88	0.25	0.77	3.07	-	-	-	-	11.98
	MnO (%) XRF																	
PGMS-34	0.09	0.1	-	0.12	0.10	0.10	-	0.10	0.10	0.12	0.10	0.10	0.10	-	-	-	-	0.09
	0.08	0.1	-	0.12	0.10	0.10	-	0.10	0.10	0.12	0.10	0.11	0.10	-	-	-	-	0.08
	0.09	0.1	-	0.12	0.10	0.10	-	0.10	0.10	0.12	0.10	0.11	0.10	-	-	-	-	0.09
	0.09	0.1	-	0.12	0.10	0.10	-	0.10	0.10	0.13	0.10	0.11	0.10	-	-	-	-	0.09
	0.09	0.1	-	0.12	0.10	0.11	-	0.10	0.13	0.13	0.10	0.11	0.10	-	-	-	-	0.09
	0.10	0.1	-	0.12	0.11	0.11	-	0.11	0.12	0.12	0.10	0.11	0.10	-	-	-	-	0.10
	0.10	0.1	-	0.12	0.10	0.11	-	0.10	0.10	0.12	0.10	0.11	0.10	-	-	-	-	0.10
	0.09	0.1	-	0.12	0.10	0.11	-	0.10	0.11	0.12	0.10	0.11	0.10	-	-	-	-	0.09
Mean	0.09	0.1	-	0.12	0.10	0.11	-	0.10	0.11	0.12	0.10	0.11	0.10	-	-	-	-	0.09
Std. Devn.	0.01	0.00	-	0.00	0.00	0.00	-	0.00	0.01	0.00	0.00	0.00	0.00	-	-	-	-	0.01
% RSD	8.19	1.48	-	0.00	1.38	1.18	-	1.38	8.49	3.78	0.00	3.25	0.74	-	-	-	-	8.19

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Standard	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10	Lab 11	Lab 12	Lab 13	Lab 14	Lab 15	Lab 16	Lab 17	Lab 18
	Na2O (%) XRF																	
PGMS-34	2.44	2.21	-	-	-	2.58	-	2.60	2.27	2.97	2.44	2.41	2.60	-	-	-	-	2.44
	1.87	2.21	-	-	-	2.60	-	2.57	2.31	2.99	2.46	2.35	2.59	-	-	-	-	1.87
	2.18	2.24	-	-	-	2.57	-	2.56	2.31	2.90	2.43	2.54	2.51	-	-	-	-	2.18
	1.69	2.21	-	-	-	2.55	-	2.57	2.31	2.98	2.41	2.59	2.45	-	-	-	-	1.69
	1.89	2.18	-	-	-	2.58	-	2.56	2.29	2.94	2.45	2.37	2.57	-	-	-	-	1.89
	2.40	2.17	-	-	-	2.58	-	2.59	2.25	2.93	2.43	2.37	2.48	-	-	-	-	2.40
	2.51	2.18	-	-	-	2.57	-	2.59	2.30	2.95	2.43	2.32	2.44	-	-	-	-	2.51
	1.90	2.17	-	-	-	2.59	-	2.55	2.26	2.98	2.43	2.34	2.43	-	-	-	-	1.90
Mean	2.11	2.20	-	-	-	2.58	-	2.57	2.29	2.96	2.44	2.41	2.51	-	-	-	-	2.11
Std. Devn.	0.31	0.02	-	-	-	0.01	-	0.02	0.02	0.03	0.02	0.10	0.07	-	-	-	-	0.31
% RSD	14.84	1.09	-	-	-	0.53	-	0.69	1.08	1.04	0.62	4.12	2.81	-	-	-	-	14.84
	TiO2 (%) XRF																	
PGMS-34	-	0.41	-	0.43	0.43	0.42	-	0.43	0.45	0.44	0.43	0.43	0.42	-	-	-	-	-
	-	0.40	-	0.41	0.44	0.43	-	0.43	0.46	0.44	0.43	0.45	0.42	-	-	-	-	-
	-	0.41	-	0.43	0.43	0.42	-	0.44	0.39	0.43	0.43	0.43	0.38	-	-	-	-	-
	-	0.40	-	0.42	0.44	0.43	-	0.43	0.38	0.43	0.43	0.44	0.40	-	-	-	-	-
	-	0.40	-	0.42	0.43	0.43	-	0.44	0.39	0.44	0.42	0.45	0.37	-	-	-	-	-
	-	0.39	-	0.42	0.43	0.42	-	0.43	0.39	0.43	0.42	0.44	0.37	-	-	-	-	-
	-	0.40	-	0.42	0.44	0.42	-	0.42	0.38	0.44	0.42	0.44	0.40	-	-	-	-	-
	-	0.40	-	0.42	0.44	0.43	-	0.43	0.40	0.44	0.44	0.44	0.38	-	-	-	-	-
Mean	-	0.40	-	0.42	0.44	0.43	-	0.43	0.41	0.44	0.43	0.44	0.39	-	-	-	-	-
Std. Devn.	-	0.01	-	0.01	0.01	0.00	-	0.01	0.03	0.01	0.01	0.01	0.02	-	-	-	-	-
% RSD	-	1.60	-	1.52	1.23	1.13	-	1.49	7.93	1.19	1.65	1.72	5.09	-	-	-	-	-
	LOI (%) XRF																	
PGMS-34	-	-	-	5.30	5.72	-	-	-	3.76	4.40	4.55	5.83	-	-	-	-	-	-
	-	-	-	5.14	5.71	-	-	-	3.96	4.41	4.56	5.49	-	-	-	-	-	-
	-	-	-	5.24	5.72	-	-	-	3.83	4.22	4.59	5.44	-	-	-	-	-	-
	-	-	-	5.40	5.74	-	-	-	4.16	4.50	4.44	5.56	-	-	-	-	-	-
	-	-	-	5.21	5.72	-	-	-	4.04	4.42	4.42	5.48	-	-	-	-	-	-
	-	-	-	5.30	5.69	-	-	-	4.03	4.15	4.47	5.44	-	-	-	-	-	-
	-	-	-	5.30	5.72	-	-	-	4.43	4.24	4.48	5.57	-	-	-	-	-	-
	-	-	-	5.25	5.68	-	-	-	3.73	4.51	4.48	5.48	-	-	-	-	-	-
Mean	-	-	-	5.27	5.71	-	-	-	3.99	4.36	4.50	5.54	-	-	-	-	-	-
Std. Devn.	-	-	-	0.08	0.02	-	-	-	0.23	0.14	0.06	0.13	-	-	-	-	-	-
% RSD	-	-	-	1.46	0.33	-	-	-	5.80	3.10	1.35	2.32	-	-	-	-	-	-

Notes: Highlighted assay results were removed for failing the t test.

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APPENDIX IV: Uncertified trace element statistics- 4Acid digestion ICP finish

Analyte	Unit	Mean	2SD	RSD%	No. of assays
Al	%	4.99	0.44	4.38	105
As	ppm	4.01	3.74	46.6	57
Ba	ppm	247	299	60.6	88
Be	ppm	0.59	0.23	19.3	62
Bi	ppm	1.33	0.31	11.5	56
Ca	%	2.73	0.38	6.88	107
Cd	ppm	5.37	3.64	33.9	93
Ce	ppm	39.92	4.79	6	53
Cr	ppm	368	204	27.8	104
Cs	ppm	0.3	0.03	5.42	42
Dy	ppm	1.57	0.13	4.17	30
Er	ppm	0.88	0.34	19.4	31
Eu	ppm	0.93	0.27	14.7	32
Fe	%	18.4	1.48	4.01	83
Ga	ppm	11.8	2.59	11	56
Gd	ppm	2.44	0.49	10.1	32
Ge	ppm	0.78	0.76	48.6	32
Hf	ppm	0.86	0.18	10.6	55
Ho	ppm	0.27	0.06	11.5	32
In	ppm	1.41	0.16	5.78	51
K	%	0.67	0.1	7.21	104
La	ppm	19.5	4.25	10.9	87
Li	ppm	7.79	1.83	11.7	88
Lu	ppm	0.1	0.04	19.8	29
Mg	%	1.53	0.22	7.15	107
Mn	ppm	782	99.1	6.34	105
Mo	ppm	2.43	1.14	23.5	55
Na	%	1.81	0.2	5.53	106
Nb	ppm	2.51	0.4	7.93	55
Nd	ppm	18.2	2.32	6.38	30
P	ppm	573	155	13.5	85
Pb	ppm	79.9	25.7	16.1	96
Pr	ppm	4.93	0.41	4.14	30
Rb	ppm	15	3.08	10.3	56
Re	ppm	0	0	36.2	18

Analyte	Unit	Mean	2SD	RSD%	No. of assays
S	%	11.4	0.8	3.49	45
Sb	ppm	1.03	0.25	12.1	55
Sc	ppm	10.1	1.68	8.33	89
Se	ppm	44.7	25.3	28.4	56
Si	%	17.3	0.43	1.24	8
Sm	ppm	3.13	0.55	8.76	31
Sn	ppm	3.26	0.53	8.11	52
Sr	ppm	347	49.3	7.1	99
Ta	ppm	0.21	0.21	48.1	50
Tb	ppm	0.31	0.08	12.4	39
Te	ppm	2.97	0.63	10.6	52
Th	ppm	1.62	0.29	8.84	51
Ti	%	0.25	0.03	5.63	80
Tl	ppm	0.26	0.07	13	56
Tm	ppm	0.09	0.05	27.9	32
U	ppm	0.4	0.12	14.5	51
V	ppm	84.3	25.9	15.4	96
W	ppm	0.85	1.84	109	44
Y	ppm	7.4	1.48	10	91
Yb	ppm	0.69	0.16	11.8	39
Zn	ppm	719	58.7	4.08	95
Zr	ppm	26.9	21	39.2	86

APPENDIX V: General Notes

Intended Use

This Certified Reference Material, fit for use as a control sample in routine assay laboratory quality control when inserted within runs of test samples and measured in parallel to test samples. This material can also be used for method development, use as independent calibration verification check standard or for validation of accuracy in a method validation exercise.

This CRM can also be used to assess inter-laboratory or instrument bias and establish within-laboratory precision and within-laboratory reproducibility. The certified concentrations and expanded uncertainty for this material are property values based on an inter-laboratory measurement campaign and reflect consensus results from the laboratories that took part in the exercise.

Handling

Do not use if the seal is broken or there are any signs of contamination.

The material is packaged in either Tin Tie envelopes, foil envelopes or jars that must be shaken before use.

Storage information

The material should be stored in a dry place, in such a way that it does not compromise the integrity of the CRM. The material should be stored in conditions which will ensure it does not absorb moisture.

Certificate is not valid if re-packaged by a third party.

Metrological Traceability

The values quoted herein are based on the consensus values derived from statistical analysis of the data from an inter-laboratory measurement program. Traceability to SI units is via the standards used by the individual laboratories majority of which are accredited to the ISO17025 general requirements for the competence of testing and calibration laboratories and who have maintained measurement traceability during the analytical process.

Period of Validity

The certified values are valid for this product, while still sealed in its original packaging, until notification to the contrary. The material's stability will undergo regular testing every five years throughout its inventory duration. Should product stability become an issue, all customers will be notified and notification to that effect will be placed on the http://www.cdnlabs.com/ website.

Minimum Sample Size

Most of the laboratory's reporting used a 0.5g sample size for the ICP and a 30g sample size for the fire assay. Our certified gold values are based on 30 g Fire Assay determinations. For optimal results, we strongly recommend you assay our standards with similar methods using "at least" 30 g of material. Using a smaller sample weight may result in erratic values. These are the recommended minimum sample sizes for the use of this material.