African Mineral Standards
REFERENCE MATERIALS FOR AFRICAN ORES

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A Division of Set Point Industrial Technology (Pty) Ltd. Reg.No. 1989/000201/07.

UG2 Reef, Eastern Limb
PGE Reference Material

AMIS0075

Certificate of Analysis

Recommended Concentrations and two "Between Laboratory" Standard Deviations

Certified Concentrations

Pt NIS	1.20	±	0.08	g/t
Pd NIS	1.50	±	0.08	g/t
Pd Pb Collection	1.49	±	0.12	g/t
Ir NiS	0.085	±	0.010	g/t
Cr XRF	6.49	±	0.27	%
Cu M/ICP	234	±	26	ppm
Cu P	231	±	20	ppm
Ni M/ICP	1051	±	124	ppm
Ni P	381	±	38	ppm
Ni XRF	1114	±	78	ppm
Specific Gravity	3.40	±	0.18	

Provisional Concentrations

Pt Pb Collection	1.14	±	0.14	g/t
Rh NiS	0.25	±	0.04	g/t
Ru NiS	0.35	±	0.04	g/t
Au NIS	0.07	±	0.02	g/t
Au Pb Collection	0.07	±	0.016	g/t
Co M/ICP	126	±	36	ppm
Co P	23.5	±	4.2	ppm
Cr M/ICP	5.21	±	1.23	%
Cu XRF	227	±	46	ppm

4E = 3.02 g/t (Pt, Pd, Rh plus Au)

NB Additional certified and uncertified major and trace element data is presented on p2 and as an appendix.

Intended Use: AMIS0075 is suitable for monitoring the accuracy of a single analysis of PGE, Cu and Ni ores hosted by UG2 Reef or similar other mafic rocks. The material can be used for routine quality control by inserting within a batch of samples.

The major and trace element composition of this material has also been determined but it has not been certified. The iterated statistics are set out below and as an appendix and this information may be useful for instrument calibration or method development.

Origin of Material: This material was supplied by Anglo Platinum. AMIS0075 is from a UG2 reef stockpile of ore transported from Middlepunt Hill Section, Lebowa Platinum Mines. The mine is situated in the Eastern Limb of the Bushveld Complex, approximately 60km NW of Steelpoort, in Mpumulanga Province, South Africa.

Mineral and Chemical Composition: AMIS0075 comprises approximately 50% UG2 Chromitite seam, 45% pegmatoidal pyroxenite footwall and 5% pyroxenite hanging wall. The UG2 Chromitite is composed of chromite (60-90% by volume), orthopyroxene (5-25%), plagioclase (5-15%) as well as accessory amounts of other minerals, of which the more important are clinopyroxene, base metal sulphides, platinum-group minerals, ilmenite and magnetite. The base metal sulphides are predominantly pentlandite, pyrrhotite, pyrite, chalcopyrite and to a lesser extent millerite. The Platinum Group Minerals identified in the UG2 are cooperite, laurite, braggite, Pt-Fe Alloy and sperrylite.

This major element chemistry (below) is also certified and was determined from (predominantly) XRF data supplied by 13 of the laboratories

Recommended Concentrations and two "Between Laboratory" Standard Deviations

Certified Concentrations

Al_2O_3	10.10	±	0.28	%
CaO	3.88	±	0.12	%
Cr_2O_3	9.45	±	0.34	%
Fe_2O_3	15.97	±	0.28	%
K_2O	0.14	±	0.016	%
MgO	18.27	±	0.62	%
MnO	0.35	±	0.04	%
Na_2O	0.63	±	0.06	%
P_2O_5	0.32	±	0.024	%
SiO_2	40.69	±	0.50	%
TiO_2	0.367	±	0.016	%

Provisional Concentrations

S	0.06	±	0.01	%

Appearance: The material is a very fine Greenish Grey powder (Corstor colour chart - 5Y 7/2).

Method of preparation: The material was crushed, dry-milled and air-classified to 100% <54um. Wet sieve particle size analysis of random samples confirmed the material was 100% <54um. It was then blended in a bi-conical mixer, systematically divided and then sealed into 1kg Laboratory Packs. Samples were randomly selected for homogeneity testing and third party analysis.

Statistical analysis for the consensus test results were carried out by an independent statistician. Explorer Packs are subdivided from the Laboratory packs as required.

Methods of analysis requested:

1. Pt, Pd and Au. Pb collection with Ag as a co-collector, ICP-OES or ICP-MS.
2. Pt, Pd, Au, Rh, Ru, Ir. NiS collection, ICP-OES or ICP-MS.
3. Multi element scan to include Co, Cu and Ni. Multi-acid total digestion, including HF, ICP-OES or ICP-MS.
4. Co, Cu and Ni. Aqua regia digestion with ICP-OES or ICP-MS.
5. Cr, Co, Cu and Ni. Pressed Pellet, XRF.
6. Majors (Al2O3, CaO, Cr2O3, Fe2O3, K2O, MgO, MnO, Na2O, SiO2, TiO2. LOI.) XRF fusion.
7. SG, gas pycnometer.

Information requested:

1. State and provide brief description of analytical techniques used.
2. State aliquots used for all determinations.
3. Results for individual analyses to be reported.
4. All results for individual PGM's to be reported in ppb.
5. All results for base metals to be reported in ppm.
6. Report all QC data, to include replicates, blanks and certified reference materials used.

Method of certification: Thirty laboratories were each given eight samples, comprising eight packages of sample scientifically selected from throughout the batch. Certification is based on results from the twenty four labs that returned results timeously.

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 data base. 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. Standards with an RSD of near or less than 5 % are certified, RSD’s of between near 5 % and 15 % are Provisional, and RSD’s over 15 % are Indicated.

Participating Laboratories: (Not in same order as in the table of assays)

1. ACME Analytical Laboratories Ltd CA
2. Activation Laboratories Pty Ltd (ActLabs) CA
3. ALS Chemex Laboratory Group Johannesburg SA
4. ALS Chemex Laboratory Group Perth WA
5. ALS Chemex Laboratory Group Vancouver CA
6. Ammtec Limited WA
7. Anglo Platinum - Mogalakwena Analytical Laboratory (PPL)
8. Anglo Research (Crown Campus)
9. Assayers Canada
10. Barplats Laboratory SA
11. Becquerel Laboratories Inc CA
12. De Bruyn Spectroscopic Solutions

13. Genalysis Laboratory Services WA
14. Intertek Testing Services Ltd Shanghai (ITS Beijing)
15. Intertek Utama Services (Indonesia)
16. Labtium Inc Finland
17. Nkomati JV Laboratory SA
18. Set Point Laboratories (Isando) SA
19. Set Point Laboratories (Mokopane) SA
20. SGS Australia Pty Ltd (Newburn) WA
21. SGS Lakefield Research Africa Pty Ltd (Booysens) SA
22. SGS Mineral Services Lakefield (Canada)
23. Ultra Trace (Pty) Ltd WA
24. Zimplats Head Office Assay Laboratory.

Assay Data: Data as received from the laboratories for the important certified elements listed on p1 is set out below. A proficiency report has been sent to the managers of the participating laboratories. Additional data from this round robin is available on request.

Lab Code	NiS Au g/t	NiS Ir g/t	NiS Pd g/t	NiS Pt g/t	NiS Rh g/t	NiS Ru g/t	Pb Coll Au g/t	Pb Coll Pd g/t	Pb Coll Pt g/t	M ICP Co ppm	Aq Reg Co ppm	XRF Co ppm	M ICP Cr ppm	XRF Cr ppm	M ICP Cu ppm	Aq Reg Cu ppm	XRF Cu ppm	M ICP Ni ppm	Aq Reg Ni ppm	XRF Ni ppm	SG g/cc
A	0.06		1.50	1.29	0.25	0.38	0.07	1.48	1.19	150	20.00	140			240	250	240	1100	370	1190	3.40
A	0.06		1.47	1.22	0.24	0.38	0.08	1.52	1.23	150	20.00	140			240	240	230	1100	370	1170	3.40
A	0.06		1.46	1.24	0.23	0.36	0.08	1.49	1.20	150	20.00	140			230	250	230	1100	370	1170	3.39
A	0.07		1.43	1.19	0.24	0.35	0.07	1.50	1.22	150	20.00	150			240	240	230	1100	370	1190	3.39
A	0.06		1.45	1.17	0.23	0.38	0.07	1.46	1.19	150	20.00	140			240	250	230	1100	370	1160	3.39
A	0.06		1.50	1.25	0.24	0.41	0.07	1.50	1.20	150	20.00	140			230	240	230	1100	380	1160	3.40
A	0.07		1.45	1.20	0.23	0.39	0.08	1.52	1.21	150	20.00	150			240	240	230	1100	380	1180	3.42
A	0.06		1.47	1.23	0.24	0.38	0.07	1.49	1.21	160	20.00	140			230	240	240	1100	380	1190	3.39
B	0.05	0.08	1.56	1.00	0.23	0.36		1.69	1.00	128	26.00	134	47200	64700	231	307	223	977	450	1100	3.38
B	0.05	0.08	1.50	0.96	0.22	0.34		1.50	1.00	128	27.00	135	50000	64000	235	260	226	1010	479	1110	3.26
B	0.05	0.08	1.49	0.95	0.21	0.34		1.57	1.03	128	25.00	141	49600	64500	240	249	225	1010	455	1120	3.41
B	0.05	0.07	1.45	1.00	0.22	0.34		1.66	1.04	126	25.00	139	49000	64000	233	232	224	996	434	1120	3.48
B	0.05	0.08	1.57	1.02	0.22	0.35				133	25.00	136	47700	64100	246	239	218	1010	441	1100	3.41
B	0.05	0.08	1.62	1.04	0.22	0.37		1.50	1.09	131	25.00	143	50100	64300	248	234	231	1030	451	1140	3.47
B	0.05	0.08	1.61	1.04	0.23	0.36		1.58	1.06	127	25.00	139	48800	64800	240	232	224	1010	444	1120	3.29
B	0.05	0.08	1.50	0.97	0.22	0.31		1.60	1.04	131	26.00	134	50000	64600	251	237	219	1050	447	1100	3.13
C								1.52	1.19	100	21.00	100		56800	250	220		1100	350	1200	3.41
C								1.52	1.23	96	21.00	200		59800	240	220	300	1100	350	1100	3.46
C								1.49	1.14	100	22.00	200		57000	250	220	200	1100	360	1100	3.41
C								1.59	1.30	100	22.00	100		60100	240	220	200	1100	350	1100	3.42
C								1.65	1.27	100	22.00	200		60900	250	220	300	1000	350	1100	3.42
C								1.59	1.25	96	22.00	100		64000	250	230	200	1100	360	1100	3.35
C								1.56	1.26	90	22.00	100		61300	250	210	100	1100	340	1100	3.35
C								1.66	1.31	90	22.00	200		62100	260	220	200	1100	350	1200	3.38
D							0.05	1.07	0.89	116	25.70				216	232		953	377		3.22
D							0.06	1.31	1.02	125	25.60				219	240		979	390		3.26
D							0.05	0.99	0.81	124	24.50				218	239		984	393		3.32
D							0.07	1.44	1.09	128	22.50				227	231		1030	381		3.23
D							0.07	1.41	1.10	122	24.10				218	235		977	385		3.23
D							0.07	1.41	1.07	118	24.10				207	237		930	387		3.35
D							0.05	1.03	0.84	123	23.90				218	234		986	382		3.28
D							0.05	1.06	0.93	128	24.20				246	232		1010	380		3.44
E										139	95.30				239	234		970	967		
E										139	97.80				249	244		957	956		
E										139	96.00				249	244		962	962		
E										138	94.00				252	248		957	962		
E										139	94.40				252	246		953	956		
E										142	97.00				249	244		963	970		
E										135	92.40				249	244		947	946		
E										139	94.80				248	243		962	965		
F	0.07	0.09	1.52	1.22	0.25	0.34	0.08					152		67300						1080	
F	0.03	0.09	1.48	1.27	0.26	0.34	0.10					153		67400						1090	
F	0.05	0.08	1.39	1.17	0.23	0.34	0.08					154		67400						1090	
F	0.05	0.08	1.37	1.22	0.24	0.35	0.09					157		68600						1090	
F	0.09	0.08	1.49	1.17	0.24	0.30	0.07					151		67300						1050	
F	0.04	0.09	1.34	1.25	0.24	0.36	0.08					152		67500						1110	
F	0.06	0.09	1.39	1.28	0.26	0.34	0.08					147		64600						1110	
F	0.06	0.09	1.34	1.25	0.25	0.33	0.08					147		64100						1120	
H							0.09	1.57	1.23			148		64900			219			1063	
H							0.09	1.53	1.21			151		65100			218			1056	
H							0.08	1.51	1.17			139		65300			217			1057	
H							0.08	1.48	1.23			145		65200			215			1045	
H							0.09	1.51	1.26			130		65000			213			1061	
H							0.08	1.56	1.19			143		65100			220			1065	
H							0.09	1.58	1.24			135		65200			212			1042	
H							0.09	1.58	1.21			160		65300			219			1074	
J	0.08	0.23	1.56	1.35	0.28	0.41						250		69433			270			1370	3.39
J												250		69796			270			1370	3.38
J	0.09	0.18	1.55	1.41	0.29	0.41						251		69543			270			1370	3.38
J	0.09	0.14	1.63	1.39	0.29	0.42						251		69789			260			1360	3.38
J	0.08	0.18	1.55	1.28	0.27	0.39						252		69673			270			1370	3.39
J	0.07	0.19	1.52	1.27	0.26	0.37						252		69755			260			1360	3.39
J	0.07	0.11	1.52	1.24	0.26	0.38						252		69632			270			1350	3.38
J	0.07	0.11	1.58	1.30	0.27	0.38						248		69556			260			1350	3.37
K							0.07	1.39	1.11	150					260			1030			
K							0.07	1.45	1.16	160					240			1080			
K							0.06	1.44	1.17	160					250			1060			
K							0.07	1.43	1.01	160					270			1130			
K							0.07	1.48	1.07	150					240			1040			
K							0.10	1.44	1.11	150					230			1010			
K							0.10	1.49	1.20	150					230			1050			
K							0.09	1.47	1.18	150					240			1030			
L	0.10	0.08	1.49	1.16	0.25	0.36															
L	0.08	0.09	1.52	1.19	0.25	0.36															
L	0.07	0.09	1.52	1.19	0.25	0.37															
L	0.07	0.08	1.48	1.15	0.25	0.36															
L	0.09	0.08	1.51	1.22	0.25	0.37															
L	0.07	0.09	1.53	1.20	0.25	0.37															
L	0.07	0.09	1.52	1.18	0.25	0.37															
L	0.08	0.09	1.55	1.25	0.26	0.38															

Assay Data (cont):

Lab Code	NiS Au g/t	NiS Ir g/t	NiS Pd g/t	NiS Pt g/t	NiS Rh g/t	NiS Ru g/t	Pb Coll Au g/t	Pb Coll Pd g/t	Pb Coll Pt g/t	M ICP Co ppm	Aq Reg Co ppm	XRF Co ppm	M ICP Cr ppm	XRF Cr ppm	M ICP Cu ppm	Aq Reg Cu ppm	XRF Cu ppm	M ICP Ni ppm	Aq Reg Ni ppm	XRF Ni ppm	SG g/cc
M								1.54	1.21	98					231			850			
M								1.52	1.21	101					235			864			
M								1.59	1.26	100					235			861			
M								1.59	1.25	99					233			843			
M								1.50	1.21	101					239			847			
M								1.57	1.22	101					231			884			
M								1.53	1.19	101					233			885			
M								1.53	1.25	99					241			885			
N							0.07	1.50	1.09								231			1080	3.52
N							0.08	1.53	1.10								230			1080	3.56
N							0.07	1.52	1.09								228			1080	3.55
N							0.08	1.49	1.08								232			1080	3.54
N							0.07	1.47	1.09								229			1080	3.55
N							0.07	1.51	1.10								228			1070	3.61
N							0.09	1.46	1.08								230			1080	3.51
N							0.07	1.52	1.11								231			1080	3.57
O							0.07	1.56	1.22	130	22.00				210	221		1020	366		3.22
O							0.07	1.48	1.14	121	24.00				194	230		965	381		3.22
O							0.08	1.40	1.09	121	23.00				195	228		956	377		3.24
O							0.07	1.42	1.08	130	23.00				208	230		927	379		3.23
O							0.07	1.30	1.02	126	23.00				200	227		922	377		3.22
O							0.07	1.43	1.06	125	23.00				199	232		941	380		3.24
O							0.07	1.57	1.16	126	23.00				201	228		965	378		3.27
O							0.07	1.46	1.10	126	22.00				203	229		988	381		3.22
P	0.07	0.09	1.46	1.18	0.27	0.37	0.07	1.46	1.18	135	24.00				244	220		1060	392		3.48
P	0.07	0.09	1.55	1.16	0.26	0.40	0.08	1.40	1.14	135	25.00				239	220		1070	389		3.50
P	0.07	0.09	1.46	1.19	0.25	0.37	0.07	1.42	1.16	135	23.00				246	215		1060	391		3.48
P	0.07	0.09	1.50	1.20	0.25	0.39	0.08	1.50	1.24	135	24.00				238	225		1090	386		3.48
P	0.07	0.09	1.52	1.25	0.27	0.40	0.08	1.42	1.18	140	24.00				237	220		1080	382		3.48
P	0.07	0.09	1.48	1.22	0.25	0.38	0.07	1.44	1.16	140	23.00				238	215		1050	389		3.49
P	0.07	0.09	1.56	1.20	0.26	0.39	0.07	1.48	1.18	140	24.00				238	215		1070	386		3.48
P	0.07	0.09	1.43	1.20	0.24	0.36	0.07	1.46	1.18	140	23.00				242	215		1070	389		3.46
R							0.08	1.50	1.20	153	24.00		41700		221	214		909	345		
R							0.08	1.51	1.21	185	23.00		44400		227	211		975	348		
R							0.08	1.51	1.24	188	25.00		45200		229	217		998	355		
R							0.08	1.51	1.19	184	23.00		42300		229	210		983	349		
R							0.08	1.52	1.25	183	23.00		49200		219	213		901	350		
R							0.08	1.53	1.21	172	22.00		38200		220	210		938	344		
R							0.08	1.53	1.22	168	24.00		37500		219	218		926	362		
R							0.08	1.51	1.18	167	25.00		44900		217	212		932	357		
T	0.07	0.09	1.43	1.12	0.28	0.30	0.08	1.45	1.12	111		122	44200	64504	240		197	1024		859	3.38
T	0.08	0.08	1.43	1.16	0.24	0.34	0.08	1.51	1.12	114		127	52500	65108	226		196	1023		879	3.38
T	0.07	0.09	1.43	1.13	0.28	0.31	0.07	1.48	1.12	109		129	50200	64642	198		198	1018		794	3.38
T	0.07	0.10	1.50	1.17	0.29	0.34	0.07	1.53	1.17	116		112	51400	64461	223		196	1012		865	3.38
T	0.08	0.09	1.46	1.20	0.28	0.32	0.07	1.50	1.16	124		126	55900	64607	237		197	1018		905	3.39
T	0.07	0.09	1.42	1.21	0.28	0.30	0.07	1.45	1.13	111		123	48000	64637	220		196	1017		840	3.39
T	0.07	0.10	1.47	1.22	0.29	0.31	0.07	1.44	1.14	125		123	55600	64754	225		199	1022		915	3.38
T	0.08	0.08	1.51	1.20	0.26	0.34	0.08	1.50	1.13	121		121	53400	64699	228		199	1029		901	3.39
U							0.06	1.29	1.08	101	25.00				265	231		819	400		
U							0.06	1.30	1.09	106	25.00				265	229		842	402		
U							0.06	1.27	1.05	106	27.00				266	230		837	409		
U							0.06	1.25	1.04	105	26.00				270	230		823	408		
U							0.06	1.26	1.08	106	28.00				264	234		919	416		
U							0.06	1.28	1.07	108	28.00				268	229		934	418		
U							0.06	1.28	1.10	105	27.00				280	234		810	414		
U							0.07	1.27	1.05	101	25.00				266	231		754	403		
V	0.06	0.06	1.47	1.23	0.27	0.37				134				64884	250			1099			
V	0.06	0.04	1.49	1.23	0.27	0.37				141				65661	264			1119			
V	0.07	0.05	1.47	1.19	0.27	0.36				135				65342	245			1133			
V	0.06	0.11	1.45	1.19	0.26	0.37				137				65579	252			1115			
V	0.07	0.06	1.50	1.16	0.25	0.37				140				66879	236			1126			
V	0.06	0.05	1.48	1.16	0.25	0.37				136				66083	237			1091			
V	0.05	0.05	1.48	1.19	0.24	0.37				132				66498	238			1049			
V	0.06	0.06	1.52	1.18	0.25	0.38				134				65271	251			1064			
W							0.07	1.35	1.11	156	20.00				262	220		1126	370		
W							0.07	1.28	1.03	149	30.00				250	230		1146	390		
W							0.06	1.36	1.07	163	20.00				253	220		1141	370		
W							0.07	1.39	1.10	162	20.00				264	220		1207	370		
W							0.05	1.24	0.90	172	30.00				278	230		1174	390		
W							0.06	1.08	0.85	159	20.00				265	220		1122	370		
W							0.05	1.04	0.79	155	20.00				248	220		1162	370		
W							0.07	1.25	0.98	160	20.00				264	230		1186	370		
X	0.08	0.09	1.49	1.22	0.24	0.32				93	21.00				218	235		852	355		
X	0.08	0.09	1.53	1.20	0.24	0.32				92	22.00				216	238		872	359		
X	0.07	0.09	1.50	1.22	0.24	0.33				85	22.00				212	240		813	366		
X	0.07	0.09	1.50	1.22	0.24	0.33				97	23.00				212	245		891	369		
X	0.08	0.09	1.50	1.25	0.24	0.33				99	22.00				214	239		878	362		
X	0.09	0.10	1.59	1.31	0.25	0.34				94	23.00				215	240		882	363		
X	0.10	0.09	1.50	1.23	0.24	0.32				90	22.00				216	238		829	359		
X	0.07	0.10	1.58	1.26	0.25	0.33				100	22.00				214	239		886	364		
Y							0.07	1.41	1.01	123	26.00	100		64300	217	240	200	1090	436	1100	
Y							0.06	1.40	1.04	121	26.00	100		64400	224	244	200	1100	438	1100	
Y							0.07	1.42	1.07	123	27.00	100		64300	227	245	200	1110	442	1100	
Y							0.06	1.40	1.05	123	26.00	100		64400	225	241	200	1090	429	1100	
Y							0.07	1.48	1.12	128	28.00	100		64300	224	245	200	1150	445	1100	
Y							0.06	1.42	1.09	124	26.00	100		64300	225	236	200	1110	426	1100	
Y							0.06	1.41	1.12	118	27.00	100		64300	221	244	200	1070	443	1100	
Y							0.07	1.39	1.05	115	26.00	100		64300	222	242	200	1060	427	1100	
Z							0.07	1.52	1.15	120	25.00		58300		240	226		1110	393		3.40
Z							0.05	1.04	0.86	120	24.00		54900		230	224		1070	395		3.42
Z							0.06	1.04	0.87	120	24.00		56300		230	230		1070	406		3.40
Z							0.05	1.05	0.87	120	24.00		57500		230	236		1080	417		3.41
Z							0.07	1.26	0.99	110	28.00		58000		230	234		1050	408		3.43
Z							0.07	1.35	1.06	120	27.00		55600		230	234		1060	413		3.42
Z							0.07	1.36	1.06	120	24.00		59400		230	235		1130	407		3.43
Z							0.07	1.43	1.13	130	28.00		61300		230	226		1150	402		3.44
ZA										83					273			636			
ZA										84					282			640			
ZA										91					268			649			
ZA										85					266			615			
ZA										73					290			649			
ZA										84					269			675			
ZA										101					246			672			
ZA										83					254			631			

Assay Data (cont):

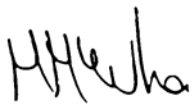
Lab Code	NiS Au g/t	NiS Ir g/t	NiS Pd g/t	NiS Pt g/t	NiS Rh g/t	NiS Ru g/t	Pb Coll Au g/t	Pb Coll Pd g/t	Pb Coll Pt g/t	M ICP Co ppm	Aq Reg Co ppm	XRF Co ppm	M ICP Cr ppm	XRF Cr ppm	M ICP Cu ppm	Aq Reg Cu ppm	XRF Cu ppm	M ICP Ni ppm	Aq Reg Ni ppm	XRF Ni ppm	SG g/cc
ZC	0.07	0.08	1.54	1.16	0.27	0.37	0.07	1.45	1.16	135	24.00		63226	65803	237	215	232	1074	394	1138	3.57
ZC	0.06	0.08	1.48	1.12	0.26	0.37	0.06	1.43	1.17	138	25.00		63107	65899	240	232	228	1099	410	1137	3.54
ZC	0.07	0.09	1.51	1.17	0.26	0.35	0.07	1.35	1.12	135	24.00		60181	65535	235	219	231	1086	398	1138	3.48
ZC	0.07	0.09	1.49	1.14	0.26	0.35	0.07	1.46	1.21	136	24.00		60779	66358	237	209	226	1088	402	1130	3.61
ZC	0.07	0.09	1.51	1.16	0.27	0.36	0.06	1.44	1.19	133	22.00		61240	66369	235	194	226	1083	366	1134	3.51
ZC	0.07	0.08	1.50	1.12	0.27	0.35	0.07	1.46	1.18	134	25.00		56738	66295	234	220	225	1073	391	1132	3.62
ZC	0.07	0.08	1.48	1.13	0.26	0.36	0.07	1.47	1.19	137	23.00		61152	66148	239	225	228	1096	390	1138	3.61
ZC	0.08	0.08	1.48	1.11	0.26	0.35	0.07	1.40	1.14	140	23.00		57017	66138	239	228	231	1103	388	1140	3.52
ZD	0.07	0.08	1.50	1.25	0.22	0.33	0.08	1.49	1.09	121	25.10		43000	62180	225	233	248	1060	400	1149	3.45
ZD	0.06	0.08	1.44	1.21	0.21	0.32	0.08	1.47	1.07	122	23.20		48900	62290	217	233	257	1090	402	1154	3.45
ZD	0.07	0.08	1.52	1.27	0.23	0.33	0.08	1.48	1.07	121	23.80		50700	62210	214	233	257	1100	398	1173	3.44
ZD	0.07	0.08	1.49	1.27	0.22	0.33	0.08	1.48	1.09	116	23.40		43600	62280	217	230	243	1070	400	1156	3.45
ZD	0.06	0.08	1.38	1.17	0.21	0.30	0.07	1.48	1.08	118	23.50		44600	62360	214	235	255	1090	399	1129	3.45
ZD	0.06	0.08	1.50	1.27	0.23	0.33	0.07	1.49	1.08	113	23.80		47900	62400	208	232	270	1100	401	1154	3.45
ZD	0.07	0.09	1.61	1.36	0.24	0.36	0.09	1.52	1.12	130	23.70		49800	62300	220	232	259	1100	401	1145	3.44
ZD	0.06	0.08	1.51	1.27	0.23	0.34	0.07	1.51	1.09	126	24.30		54100	62410	215	231	275	1130	399	1166	3.44

Availability: This product is available in Laboratory Packs containing 1kg of material and Explorer Packs containing custom weights (of <250g) of material. The Laboratory Packs are sealed bottles delivered in sealed foil pouches. The Explorer Packs contain material in standard geochem envelopes, nitrogen flushed and vacuum sealed in foil pouches.

Legal Notice: This certificate and the reference material described in it have been prepared with due care and attention. However AMIS, Set Point Technology (Pty) Ltd, Mike McWha, Dr Barry Smee and Smee and Associates Ltd; accept no liability for any decisions or actions taken following the use of the reference material.

4 February 2009

Certifying Officers:



African Mineral Standards:_____

Mike McWha
BSc (Hons), FGSSA, MAusIMM, Pr.Sci.Nat

Geochemist:_____

Barry W. Smee
BSc, PhD, P.Geo, (B.C.)

APPENDIX

Additional useful data collected during the round robin exercise includes these iterated but uncertified certified trace element statistics:

Element	Method	unit	mean	2SD	RSD%	n
Ag	M/ICP	ppm	0.106	0.025	12.9	16
Al	M/ICP	%	5.10	0.61	2.6	84
As	M/ICP	ppm	1.11	1.42	33.2	21
Ba	M/ICP	ppm	50.2	3.3	3.6	76
Be	M/ICP	ppm	0.140	0.068	19.4	28
Bi	M/ICP	ppm	0.045	0.026	17.0	24
Ca	M/ICP	%	2.76	0.22	2.3	100
Cd	M/ICP	ppm	0.046	0.016	21.4	16
Ce	M/ICP	ppm	5.82	0.81	4.2	48
Cs	M/ICP	ppm	0.183	0.040	4.7	32
Dy	M/ICP	ppm	0.640	0.086	7.3	24
Er	M/ICP	ppm	0.430	0.068	10.8	24
Eu	M/ICP	ppm	0.194	0.020	5.9	29
Fe	M/ICP	%	11.0	1.1	2.5	94
Ga	M/ICP	ppm	20.4	1.7	5.5	38
Gd	M/ICP	ppm	0.577	0.068	9.7	24
Ge	M/ICP	ppm	0.324	0.501	73.6	16
Hf	M/ICP	ppm	0.404	0.021	5.1	41
Ho	M/ICP	ppm	0.140	0.014	7.6	29
In	M/ICP	ppm	0.025	0.008	5.5	31
K	M/ICP	ppm	0.128	0.024	4.3	88
La	M/ICP	ppm	3.26	0.39	2.5	56
Li	M/ICP	ppm	3.36	1.25	13.0	56
Lu	M/ICP	ppm	0.068	0.022	10.1	23
Mg	M/ICP	%	10.7	1.4	2.0	96
Mn	M/ICP	ppm	2635	263	2.3	85
Mo	M/ICP	ppm	2.37	1.07	10.2	71
Na	M/ICP	%	0.447	0.073	3.0	92
Nb	M/ICP	ppm	3.44	0.67	4.1	49
Nd	M/ICP	ppm	2.63	0.32	3.2	24
P	M/ICP	%	0.144	0.026	4.0	87
Pb	M/ICP	ppm	3.06	2.09	15.8	53
Pr	M/ICP	ppm	0.662	0.095	4.2	31
Rb	M/ICP	ppm	4.58	0.99	5.3	48
Re	M/ICP	ppm	0.003	0.003	22.2	28
Sb	M/ICP	ppm	4.25	0.73	8.4	55
Sc	M/ICP	ppm	20.5	1.9	2.7	67
Se	M/ICP	ppm	3.04	5.09	18.3	24
Sm	M/ICP	ppm	0.567	0.085	10.2	30
Sn	M/ICP	ppm	0.861	0.356	6.0	44
Sr	M/ICP	ppm	84.3	8.9	3.3	93
Ta	M/ICP	ppm	0.245	0.333	20.2	40
Tb	M/ICP	ppm	0.092	0.023	11.7	28
Te	M/ICP	ppm	0.155	0.118	19.2	31
Th	M/ICP	ppm	0.619	0.129	7.5	52
Ti	M/ICP	%	0.201	0.025	4.4	84
Tl	M/ICP	ppm	0.028	0.009	9.2	12
Tm	M/ICP	ppm	0.064	0.011	9.5	28
U	M/ICP	ppm	0.439	0.157	9.4	64
V	M/ICP	ppm	469	50	4.9	61
W	M/ICP	ppm	0.581	0.435	16.4	32
Y	M/ICP	ppm	3.77	0.51	3.6	72
Yb	M/ICP	ppm	0.438	0.079	12.3	31
Zn	M/ICP	ppm	212	21	5.2	62
Zr	M/ICP	ppm	19.0	9.2	7.0	54