



African Mineral Standards

MATRIX REFERENCE MATERIALS

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AMIS0267

Certified Reference Material

**Gold, silver, epithermal vein ore (high grade),
Guanajuato, Mexico**

Certificate of Analysis

**Recommended Concentrations and Limits¹
(at two Standard Deviations)**

Certified Concentrations²

Au Pb Collection	9.05	±	0.70	g/t
Ag M/ICP	904	±	68	g/t
Cu M/ICP	311	±	24	ppm
Cu P	305	±	23	ppm
Pb M/ICP	142	±	11	ppm
Pb P	145	±	12	ppm
Zn M/ICP	225	±	16	ppm
Zn P	232	±	19	ppm
Specific Gravity	2.68	±	0.04	

1. Manufacturers recommended limits for use of the material as control samples, based on two standard deviations, calculated using "Between Laboratory" statistics for treatment of the data for trivial, non-trivial and technically invalid results. See sections 1, 9 and 12.

2. There is additional certified major element data presented on p2 and uncertified trace element data presented as an appendix.

Major Element Recommended Concentrations and Limits (at two Standard Deviations)

Certified Concentrations

Al ₂ O ₃	3.93	±	0.08	%
CaO	1.69	±	0.04	%
Fe ₂ O ₃	2.82	±	0.06	%
K ₂ O	1.56	±	0.02	%
MgO	2.71	±	0.08	%
MnO	0.09	±	0.004	%
SiO ₂	83.27	±	1.14	%
TiO ₂	0.17	±	0.014	%
S Comb/ LECO	0.75	±	0.04	%

Indicated Means

Cr ₂ O ₃	0.02	%
Na ₂ O	0.08	%
LOI	2.83	%

1. Intended Use: AMIS0267 can be used to check analysis of samples of fissure hosted, low-sulphidation, epithermal gold-silver quartz vein ores, with a similar grade and matrix.

It is a matrix matched Certified Reference Material, fit for use as control samples in routine assay laboratory quality control when inserted within runs of samples and measured in parallel to the unknown. Its purpose is to monitor inter-laboratory or instrument bias and within lab precision. It can be used, indirectly, to establish the traceability of results to an SI system of units.

The recommended concentrations and limits for this material are property values based on a measurement campaign (round robin) and reflect consensus results from the laboratories that participated in the round robin.

Slight variations in analytical procedures between laboratories will reflect as slight biases to the recommended concentrations (see Section 19). Good laboratories will report results within the two standard deviation levels with a failure rate of <10 %.

The material can also be used for method development and for the calibration of equipment.

2. Origin of Material: AMIS0267 is a commissioned CRM made from material supplied by SGS Minerals Services from the Guanajuato Mine Complex (GMC) located in Guanajuato State, Mexico. GMC is wholly owned by Great Panther Silver Limited through Minera Mexicana El Rosario, S.A. de C.V. The mine is located on the Central Plateau of Mexico. The City of Guanajuato, where the mines are located, is 380 km by road northwest of Mexico City. Mineralization occurs along regional scale faults, the largest of which is the 25 km long Veta Madre vein structure. The material supplied was described as “high grade ore”.

3. Mineral and Chemical Composition: The economic mineralization is hosted in quartz-carbonate-adularia veins and stockwork systems with identifiable ore-shoots that carry the bulk of the economic mineralization. The ore shoots are discontinuous, 10-40m wide and typically equal in vertical dimensions to strike length. The argentiferous mineralization is hosted in quartz veins with

gangue mineralogy of quartz, calcite, pyrite, adularia, and sericite. The principal Ag bearing mineralization is acanthite (argentite), aguilarite and naumannite while Au occurs a free Au and as electrum. The Au to Ag ratios vary from about 1:70 to 1:200. Base metal mineralization is not common; when it occurs it is observed as chalcopyrite, sphalerite and galena.

4. Appearance: The material is a very fine powder. It is colored a blueish grey (Corstor 5B 7/1).

5. Handling instructions: The material is packaged in Laboratory Packs and Explorer Packs that must be shaken or otherwise agitated before use. Normal safety precautions for handling fine particulate matter are suggested, such as the use of safety glasses, breathing protection, gloves and a laboratory coat.

6. Method of Preparation: The ore is crushed, then dry-milled and air classified to 100% <54 μ . This fine powder is mixed in a blender for 14 hours and then split down into numbered 1 kg tubs. These lots are sampled for quality control and for round robin analysis. Quality control will typically comprise sampling 30 tubs selected from the whole stream. Round robin samples are selected the same way, so that one laboratory will receive samples from the beginning, end, and from throughout the batch.

7. Methods of Analysis requested:

1. Au – Pb collection ICP-OES or ICP-MS.
2. Multi-acid digest, including HF, ICP- OES or ICP-MS. Multi element scan to include Ag.
3. Majors (Al₂O₃, CaO, Cr₂O₃, Fe₂O₃, K₂O, MgO, MnO, Na₂O, SiO₂, TiO₂. LOI.) XRF fusion.
4. S – Total Combustion.
5. SG (gas pycnometer)

8. Information requested:

1. State aliquots used for all determinations.
2. Report all results for gold in ppm.
3. All results for major elements to be reported as oxides in percentages.
4. All results for multi-element scans to be reported in ppm.
5. Report all QC data, to include replicates, blanks and certified reference materials used.
6. State and provide brief description of analytical techniques used.

9. Method of Certification: Twenty four laboratories were each given eight randomly selected packages of sample. Nineteen of the laboratories submitted results.

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 then 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 then re-calculated using all remaining data. Any analysis that fell outside of the new two standard deviations was removed from the ensuing data base. The mean and standard deviations were again calculated using the remaining data.

The “between-laboratory” standard deviation is used in the calculation to eliminate technically and statistically invalid data. Upper and lower limits are based on the standard deviation of the remaining data, which reflect individual analyses and can be used to monitor accuracy in routine laboratory quality control. This is different to limits based on standard deviations derived from grouped set of analyses (see 12), which provide important measures for precision and trueness, but which are less useful for routine QC.

Standards with an RSD of near or less than 5 % are termed “Certified”, RSD’s of between near 5 % and 15 % are termed “Provisional”, and RSD’s over 15 % are termed “Informational”.

10. Participating Laboratories: The 19 out of 24 laboratories that provided results timeously were (not in same order as in the table of assays):

1. Activation Laboratories Pty Ltd (ActLabs) CA
2. ALS Chemex Laboratory Group Johannesburg SA
3. ALS Chemex Laboratory Group Perth WA
4. Bureau Veritas (USA)
5. BV (Canada)
6. Genalysis Laboratory Services (W Australia P)
7. Intertek Utama Services (Indonesia)
8. OMAC Laboratories Limited (Ireland)
9. SGS Australia Pty Ltd (Newburn) WA
10. SGS Chelopech (Bulgaria)
11. SGS Durango (Mexico)
12. SGS Geosol Laboratories Ltda (Brazil)
13. SGS Mineral Services Callao (Peru)
14. SGS Mineral Services Lakefield (Canada)
15. SGS South Africa (Pty) Ltd - Booyens JHB
16. SGS Toronto (Canada)
17. SGS Townsville (Australia)
18. SGS Vancouver
19. Ultra Trace (Pty) Ltd WA

11. Assay Data: Data as received from the laboratories for the important certified elements listed on p1 and 2 are set out below. A proficiency report has been sent to the managers of the participating laboratories. Additional digital data from this round robin is available on request.

Assay data- Economic elements

Lab Code	Au Pb Coll g/t	Ag M/ICP g/t	Ag P g/t	Cu M/ICP ppm	Cu P ppm	Pb M/ICP ppm	Pb P ppm	Zn M/ICP ppm	Zn P ppm
A	9.25			308	320	146	155	234	241
A	9.64			300	330	143	154	224	254
A	9.14			297	329	146	155	226	252
A	9.77			292	322	143	151	223	247
A	9.14			290	326	146	155	217	254
A	9.17			293	323	141	155	218	247
A	8.72			311	324	153	154	236	246
A	8.94			311	314	147	151	235	242
D	9.95	918	908	310	310	150	150	230	240
D	9.88	965	875	310	300	140	160	230	240
D	9.43	932	906	300	310	150	140	220	240
D	9.16	937	912	300	300	150	140	230	240
D	9.10	884	912	290	310	160	150	230	240
D	9.34	848	913	280	310	130	140	210	260
D	9.04	884	929	280	310	130	150	210	240
D	9.33	930	912	310	300	160	160	230	240

Assay data- Economic elements (cont)

Lab Code	Au Pb Coll g/t	Ag M/ICP g/t	Ag P g/t	Cu M/ICP ppm	Cu P ppm	Pb M/ICP ppm	Pb P ppm	Zn M/ICP ppm	Zn P ppm
E		953		288	310	150	152	242	233
E		911		284	309	150	151	230	234
E		915		292	310	140	147	223	230
E		945		288	309	140	150	228	229
E		915		266	310	140	150	224	231
E		925		266	313	140	152	222	265
E		917		269	307	150	155	221	259
E		916		273	308	140	152	221	240
F	9.03	920	915	290	310	120	140	220	230
F	9.58	951	889	300	300	130	140	220	220
F	8.29	909	850	300	290	120	150	220	220
F	8.61	934	868	300	300	140	150	220	230
F	9.67	936	919	310	300	130	150	220	220
F	9.50	926	893	310	300	150	150	220	230
F	8.87	937	868	300	300	130	150	220	230
F	8.95	907	883	300	300	120	150	220	220
G	8.84	950		297		135		216	
G	8.82	945		304		135		225	
G	8.82	960		294		129		214	
G	9.48	911		302		135		228	
G	8.78	983		308		136		225	
G	9.60	934		307		145		238	
G	9.26	923		292		149		223	
G	9.28	963		293		145		228	
H	8.96		814	273	309	142	139	243	222
H	8.91		803	274	309	143	139	234	219
H	8.46		788	266	314	142	145	231	223
H	8.83		803	277	311	139	143	223	224
H	8.55		785	283	300	139	139	226	225
H	8.50		774	273	310	144	142	231	222
H	8.39		788	284	303	137	137	216	229
H	8.16		789	283	310	143	142	227	221
I	8.84			315	308	144	142	216	226
I	8.80			320	306	143	143	216	226
I	8.49			316	311	145	142	213	224
I	8.62			318	310	142	143	217	226
I	8.46			317	305	144	143	214	228
I	8.44			320	311	142	143	216	223
I	8.57			315	305	140	141	213	222
I	8.98			315	307	142	143	217	224
J	9.25			331	283	151	144	260	228
J	9.17			336	287	152	148	261	234
J	9.19			332	288	151	148	267	233
J	9.28			335	317	149	155	258	239
J	9.16			330	295	151	148	263	238
J	9.29			336	295	146	149	262	234
J	9.26			335	292	149	150	268	236
J	9.21			337	289	153	148	265	233
K				301	300	142	143	221	223
K				308	302	144	142	223	222
K				301	302	142	146	222	224
K				301	300	145	144	225	231
K				299	306	146	142	222	224
K				305	306	143	143	220	224
K				302	301	141	142	224	228
K				305	299	143	144	224	224

Assay data- Economic elements (cont)

Lab Code	Au Pb Coll g/t	Ag M/ICP g/t	Ag P g/t	Cu M/ICP ppm	Cu P ppm	Pb M/ICP ppm	Pb P ppm	Zn M/ICP ppm	Zn P ppm
L	8.98			308	321	136	148	231	229
L	9.37			304	308	144	143	233	224
L	9.09			300	323	142	135	232	228
L	9.12			308	314	147	137	231	227
L	8.98			299	331	136	146	228	237
L	8.91			294	327	139	145	225	231
L	9.29			302	319	133	147	223	226
L	9.23			305	322	141	145	235	229
M	8.78			318	285	138	129	208	222
M	8.97			339	278	140	134	204	215
M	8.70				283	139	132	203	219
M	9.10			327	288	143	135	213	224
M	8.89			318	284	143	133	213	220
M	9.08			324	283	139	133	210	224
M	8.79			335	286	146	136	218	226
M	8.70			322	288	144	143	213	223
O	9.05		890	308	309	145	153	239	248
O	8.89		890	306	313	148	146	240	240
O	8.86		870	304	303	141	149	231	242
O	8.78		900	302	299	145	149	236	240
O	9.06		930	304	306	146	146	235	239
O	9.30		910	308	300	149	146	237	243
O	9.08		870	306	305	144	148	233	243
O	9.19		870	311	309	144	145	232	238
P	9.27	895							
P	9.42	910							
P	9.75	895							
P	8.87	915							
P	9.17	890							
P	9.33	860							
P	9.24	895							
P	8.92	910							
R	9.16	837	37	347	300	161	144	235	220
R	10.70	854	39	317	290	141	138	230	232
R	8.84	825	39	315	300	147	142	230	238
R	9.36	802	40	297	300	137	144	240	220
R	9.42	768	39	319	290	145	140	235	230
R	8.80	760	41	310	290	143	148	230	230
R	9.05	783	42	326	295	150	140	240	238
R	9.43	830	40	304	305	142	145	240	222
S	8.90	886							
S	8.86	880							
S	8.95	870							
S	8.63	873							
S	8.84	853							
S	8.81	885							
S	8.92	863							
S	8.87	879							
T	9.74		987	325		145		231	
T	8.89		1040	322		146		228	
T	9.63		978	320		148		237	
T	8.68		968	318		148		229	
T	9.75		986	328		146		230	
T	9.22		1000	327		149		230	
T	8.62		995	331		151		241	
T	8.96		1050	333		156		255	

Assay data- Economic elements (cont)

Lab Code	Au Pb Coll g/t	Ag M/ICP g/t	Ag P g/t	Cu M/ICP ppm	Cu P ppm	Pb M/ICP ppm	Pb P ppm	Zn M/ICP ppm	Zn P ppm
U	8.62			311	300	135	148	213	236
U	9.02			315	311	138	152	225	244
U	9.23			307	328	137	158	217	254
U	9.45			316	333	134	161	221	257
U	8.41			313	330	140	160	233	256
U	9.94			307	338	135	164	214	264
U	9.14			321	317	139	157	219	250
U	9.17			319	326	136	158	222	252
V	8.44	829							
V	8.84	840							
V	7.97	843							
V	8.87	817							
V	8.10	840							
V	8.38	839							
V	8.55	850							
V	8.71	826							
X	10.10	900		304	293	139	136	222	206
X	9.38	901		319	292	135	137	220	206
X	9.45	898		315	295	140	137	218	205
X	9.53	909		323	292	131	137	222	204
X	9.54	917		311	293	139	138	223	205
X	9.37	905		307	293	137	137	232	205
X	9.94	902		313	289	143	137	229	203
X	9.53	897		315	286	140	133	228	201

Assay data (cont) – Major Oxides

Lab Code	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	MgO XRF %	MnO XRF %	Na2O XRF %	SiO2 XRF %	TiO2 XRF %	LOI XRF %	S Comb / LECO %	SG pycnometer
A	3.76	1.62	0.02	2.62	1.50	2.65	0.08	0.05	82.00	0.18	3.58	0.77	2.69
A	3.89	1.64	0.02	2.70	1.52	2.70	0.08	0.05	84.90	0.20	3.81	0.75	2.66
A	3.84	1.62	0.02	2.63	1.50	2.67	0.08	0.06	85.50	0.22	3.93	0.76	2.70
A	3.74	1.62	0.02	2.64	1.50	2.64	0.08	0.05	81.70	0.17	3.68	0.77	2.69
A	3.76	1.62	0.02	2.67	1.49	2.66	0.08	0.05	82.10	0.16	3.60	0.77	2.67
A	3.87	1.62	0.02	2.67	1.51	2.68	0.08	0.07	84.50	0.18	3.76	0.76	2.69
A	3.79	1.62	0.02	2.67	1.50	2.66	0.08	0.05	82.70	0.16	3.88	0.76	2.68
A	3.76	1.62	0.02	2.57	1.50	2.66	0.08	0.05	82.20	0.18	3.54	0.77	2.69
D												0.79	2.67
D												0.78	2.68
D												0.79	2.67
D												0.78	2.67
D												0.78	2.68
D												0.78	2.68
D												0.79	2.66
D												0.78	2.67
F	3.96	1.66	0.03	2.83	1.57	2.72	0.09	0.11	82.40	0.17	2.45		
F	3.99	1.68	0.02	2.81	1.57	2.71	0.09	0.11	82.40	0.16	2.52		
F	3.97	1.75	0.02	2.88	1.56	3.01	0.08	0.11	82.00	0.17	2.48		
F	3.96	1.66	0.02	2.80	1.56	2.73	0.09	0.10	82.40	0.16	2.50		
F	4.00	1.66	0.02	2.81	1.57	2.72	0.08	0.11	82.40	0.17	2.51		
F	4.01	1.66	0.04	2.90	1.58	2.72	0.09	0.12	82.30	0.17	2.45		
F	4.00	1.67	0.03	2.82	1.57	2.73	0.09	0.10	82.50	0.17	2.37		
F	4.00	1.70	0.03	2.81	1.58	2.71	0.09	0.11	82.30	0.17	2.49		
G	3.92	1.67	0.02	2.84	1.53	2.69	0.09	0.05	83.70	0.17	3.84		2.64
G	3.89	1.65	0.02	2.81	1.55	2.64	0.09	0.03	83.29	0.17	3.85		2.68
G	3.92	1.65	0.03	2.82	1.55	2.65	0.09	0.04	83.28	0.17	3.78		2.66
G	3.92	1.65	0.02	2.81	1.55	2.65	0.09	0.04	83.23	0.16	3.87		2.64
G	3.88	1.66	0.02	2.81	1.54	2.63	0.09	0.04	83.50	0.17	3.87		2.65
G	3.99	1.64	0.03	2.81	1.54	2.64	0.09	0.04	83.25	0.18	3.79		2.64
G	3.91	1.67	0.03	2.84	1.54	2.65	0.09	0.03	83.93	0.18	3.72		2.64
G	3.89	1.67	0.02	2.81	1.54	2.65	0.09	0.04	83.28	0.17	3.68		2.64

Assay data (cont) – Major Oxides

Lab Code	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	MgO XRF %	MnO XRF %	Na2O XRF %	SiO2 XRF %	TiO2 XRF %	LOI XRF %	S Comb / LECO %	SG pycnometer
H												0.76	2.77
H												0.76	2.76
H												0.76	2.74
H												0.76	2.89
H												0.76	2.73
H												0.75	2.76
H												0.75	2.80
H												0.76	2.70
I	3.99	1.69	0.02	2.77	1.56	2.76	0.09	0.09	83.04	0.18	3.26	0.72	2.69
I	3.97	1.70	0.02	2.79	1.60	2.75	0.09	0.08	83.35	0.18	3.35	0.77	2.68
I	3.98	1.70	0.02	2.76	1.58	2.77	0.09	0.09	83.21	0.18	3.30	0.74	2.65
I	3.92	1.71	0.02	2.76	1.58	2.76	0.09	0.09	83.04	0.17	3.24	0.76	2.69
I	3.93	1.72	0.02	2.74	1.58	2.76	0.09	0.09	83.33	0.19	3.22	0.75	2.65
I	3.95	1.71	0.02	2.74	1.59	2.77	0.09	0.10	83.35	0.19	3.33	0.75	2.68
I	4.00	1.72	0.02	2.77	1.60	2.76	0.09	0.08	83.27	0.18	3.38	0.70	2.67
I	3.97	1.72	0.02	2.77	1.60	2.78	0.09	0.10	83.18	0.18	3.39	0.76	2.68
J	3.87	1.69		2.85	1.56	2.72	0.09	0.08	83.20	0.17	2.32	0.72	
J	3.87	1.71		2.84	1.56	2.70	0.09	0.09	83.20	0.17	2.30	0.72	
J	3.88	1.70		2.85	1.56	2.70	0.09	0.08	83.20	0.17	2.23	0.73	
J	3.88	1.70		2.85	1.57	2.69	0.09	0.08	83.20	0.17	2.27	0.73	
J	3.90	1.70		2.85	1.56	2.71	0.09	0.08	83.10	0.17	2.36	0.69	
J	3.90	1.70		2.85	1.56	2.70	0.09	0.08	83.20	0.17	2.32	0.72	
J	3.89	1.70		2.84	1.57	2.70	0.09	0.08	83.20	0.17	2.26	0.74	
J	3.87	1.69		2.84	1.57	2.72	0.09	0.08	83.20	0.17	2.28	0.74	
K												0.72	2.66
K												0.73	2.68
K												0.74	2.69
K												0.74	2.66
K												0.73	2.65
K												0.74	2.65
K												0.73	2.67
K												0.72	2.66
L	3.89	1.76	0.03	2.88	1.58	2.71	0.09	0.07	83.22	0.17	2.41	0.75	
L	3.88	1.74	0.03	2.86	1.55	2.69	0.09	0.09	82.95	0.16	2.38	0.75	
L	3.91	1.74	0.03	2.79	1.56	2.71	0.09	0.07	83.21	0.16	2.38	0.73	
L	3.88	1.73	0.03	2.85	1.55	2.69	0.09	0.08	82.54	0.17	2.39	0.73	
L	3.87	1.74	0.03	2.82	1.56	2.70	0.09	0.06	82.96	0.16	2.34	0.73	
L	3.97	1.77	0.03	2.88	1.58	2.74	0.09	0.09	84.33	0.17	2.48	0.73	
L	3.88	1.73	0.03	2.80	1.56	2.73	0.09	0.09	82.88	0.16	2.41	0.76	
L	3.88	1.74	0.02	2.83	1.56	2.69	0.09	0.08	82.54	0.17	2.37	0.73	
M	3.95	1.68	0.02	2.85	1.54	2.77	0.09		84.60	0.18	3.02		
M	3.98	1.68	0.02	2.88	1.54	2.74	0.08		84.50	0.17	2.94		
M	4.01	1.69	0.03	2.91	1.55	2.76	0.09		84.70	0.17	3.04		
M	3.96	1.66	0.02	2.86	1.54	2.70	0.09		84.30	0.17	3.08		
M	3.96	1.67	0.03	2.85	1.54	2.76	0.09		84.50	0.17	2.89		
M	3.92	1.66	0.02	2.83	1.55	2.72	0.08		84.40	0.17	3.04		
M	3.88	1.66	0.03	2.83	1.54	2.75	0.08		84.20	0.17	3.03		
M	3.97	1.65	0.03	2.85	1.56	2.74	0.09		84.20	0.16	3.15		
O												0.74	
O												0.74	
O												0.74	
O												0.73	
O												0.74	
O												0.74	
O												0.74	
O												0.74	
P												0.73	
P												0.73	
P												0.74	
P												0.74	
P												0.74	
P												0.71	
P												0.73	
P												0.72	
R	3.93	1.70	0.02	2.81	1.57	2.71	0.09		83.34	0.18	2.42	0.74	2.72
R	3.94	1.69	0.02	2.80	1.57	2.69	0.09		83.23	0.17	2.40	0.74	2.71
R	3.94	1.70	0.03	2.81	1.57	2.70	0.09		83.34	0.18	2.39	0.74	2.72
R	3.91	1.69	0.02	2.80	1.56	2.71	0.09		83.31	0.18	2.42	0.75	2.71
R	3.92	1.70	0.02	2.80	1.57	2.71	0.09		83.35	0.18	2.38	0.74	2.70
R	3.92	1.69	0.02	2.80	1.57	2.70	0.09		83.28	0.18	2.38	0.76	2.72
R	3.93	1.69	0.02	2.80	1.57	2.70	0.09		83.26	0.17	2.41	0.75	2.72
R	3.93	1.70	0.02	2.80	1.57	2.70	0.09		83.24	0.17	2.42	0.77	2.71
S	3.93	1.71	0.03	2.86	1.57	2.67	0.06	0.08	84.10	0.18	2.34	0.75	
S	3.92	1.69	0.03	2.84	1.59	2.71	0.07	0.08	83.40	0.18	2.34	0.75	
S	3.89	1.67	0.02	2.83	1.55	2.71	0.06	0.09	83.70	0.18	2.37	0.75	
S	3.89	1.70	0.03	2.86	1.57	2.69	0.06	0.09	83.70	0.17	2.35	0.74	
S	3.92	1.69	0.02	2.83	1.57	2.69	0.06	0.08	83.50	0.17	2.46	0.75	
S	3.92	1.67	0.02	2.83	1.58	2.69	0.06	0.08	83.70	0.17	2.65	0.75	
S	3.92	1.69	0.03	2.84	1.56	2.68	0.07	0.08	83.60	0.17	2.32	0.75	
S	3.93	1.70	0.02	2.85	1.57	2.69	0.07	0.07	83.50	0.17	2.29	0.75	
T												0.78	2.71
T												0.78	2.70
T												0.76	2.69
T												0.76	2.71
T												0.76	2.71
T												0.77	2.69
T												0.76	2.71
T												0.78	2.69

Assay data (cont) – Major Oxides

Lab Code	Al ₂ O ₃ XRF %	CaO XRF %	Cr ₂ O ₃ XRF %	Fe ₂ O ₃ XRF %	K ₂ O XRF %	MgO XRF %	MnO XRF %	Na ₂ O XRF %	SiO ₂ XRF %	TiO ₂ XRF %	LOI XRF %	S Comb / LECO %	SG pycnometer
V	3.92	1.69	0.02	2.83	1.56	2.71	0.09	0.09	83.37	0.17	2.40	0.74	2.66
V	3.93	1.67	0.02	2.83	1.57	2.71	0.09	0.08	83.28	0.17	2.44	0.78	2.66
V	3.91	1.69	0.03	2.84	1.56	2.71	0.09	0.09	83.45	0.17	2.50	0.76	2.65
V	3.94	1.68	0.02	2.83	1.57	2.70	0.09	0.08	83.11	0.17	2.42	0.75	2.70
V	3.93	1.67	0.02	2.84	1.56	2.70	0.09	0.09	83.44	0.17	2.47	0.78	2.69
V	3.90	1.68	0.03	2.83	1.56	2.68	0.09	0.08	83.41	0.17	2.44	0.78	2.66
V	3.92	1.69	0.02	2.83	1.57	2.71	0.09	0.08	83.34	0.17	2.45	0.79	2.64
V	3.92	1.69	0.02	2.82	1.57	2.68	0.09	0.08	83.20	0.17	2.45	0.74	2.65
X	3.96	1.72	0.02	2.77	1.56	2.76	0.09		83.32	0.17	2.90		
X	3.96	1.72	0.03	2.79	1.56	2.76	0.09		83.25	0.18	2.90		
X	3.96	1.72	0.02	2.78	1.55	2.73	0.09		83.24	0.17	3.00		
X	3.98	1.73	0.02	2.78	1.56	2.76	0.09		83.30	0.17	3.00		
X	3.95	1.72	0.02	2.78	1.57	2.75	0.09		83.28	0.17	3.00		
X	3.97	1.72	0.02	2.79	1.56	2.76	0.09		83.31	0.17	2.90		
X	3.96	1.72	0.02	2.78	1.56	2.75	0.09		83.21	0.18	3.00		
X	3.95	1.71	0.01	2.76	1.56	2.74	0.09		83.30	0.16	3.00		

12. Measurement of Uncertainty: The samples used in this certification process have been selected in such a way as to represent the entire batch of material and were taken from the final packaged units; therefore all possible sources of uncertainty (sample uncertainty and measurement uncertainty) are included in the final combined standard uncertainty determination.

Analyte	Method	Unit	S ¹	σ _L ²	Sw ³	CSU ⁴
Au	Pb Coll	g/t	0.346	0.141	0.278	0.042
Ag	M/ICP	g/t	33.908	29.150	18.885	10.586
Cu	M/ICP	ppm	11.884	7.877	5.890	2.181
Cu	P	ppm	11.724	7.879	5.643	2.175
Pb	M/ICP	ppm	5.667	2.496	4.445	0.742
Pb	P	ppm	5.941	4.037	3.142	1.162
Zn	M/ICP	ppm	8.141	4.383	5.612	1.245
Zn	P	ppm	9.783	6.952	4.333	1.977
Al ₂ O ₃	XRF	%	0.037	0.027	0.023	0.009
CaO	XRF	%	0.025	0.021	0.010	0.007
Cr ₂ O ₃	XRF	%	0.005	0.002	0.004	0.001
Fe ₂ O ₃	XRF	%	0.030	0.023	0.017	0.008
K ₂ O	XRF	%	0.012	0.009	0.008	0.003
LOI	XRF	%	0.533	0.467	0.070	0.141
MgO	XRF	%	0.035	0.028	0.015	0.009
MnO	XRF	%	0.002	0.002	0.001	0.001
Na ₂ O	XRF	%	0.020	0.019	0.007	0.007
SiO ₂	XRF	%	0.570	0.404	0.330	0.127
TiO ₂	XRF	%	0.007	0.003	0.006	0.001
S	Comb / LECO	%	0.018	0.011	0.010	0.003
SG	pycnometer		0.024	0.021	0.014	0.007

1. S - Std Dev for use on control charts.
2. σ_L - Betw Lab Std Dev, for use to calculate a measure of accuracy.
3. Sw - Within Lab Std Dev, for use to calculate a measure of precision.
4. CSU - Combined Standard Uncertainty, a component for use to calculate the total uncertainty in method validation.

The uncertainty measurement takes into consideration the between lab and the within lab variances and is calculated from the square roots of the variances of these components using the formula:

$$\text{Combined standard uncertainty} = \sqrt{(\text{between lab.var/no of labs}) + (\text{mean square within lab.var /no of assays})}$$

These uncertainty measurements may be used, by laboratories, as a component for calculating the total uncertainty for method validation according to the relevant ISO guidelines.

13. Certified values: The Certified, Provisional and Indicated values listed on p1 of each certificate fulfil the AMIS statistical criteria regarding agreement for certification and have been independently validated by Dr Barry Smee, BSc, PhD, P.Geo, (B.C.).

14. 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 the majority of which are accredited and who have maintained measurement traceability during the analytical process.

15. Certification: AMIS0267 is a new material.

16. Period of validity: The certified values are valid for this product, while still sealed in its original packaging, until notification to the contrary. The stability of the material will be subject to continuous testing for the duration of the inventory. Should product stability become an issue, all customers will be notified and notification to that effect will be placed on the www.amis.co.za website.

17. Minimum sample size: The majority of laboratories reporting used a 0.5g sample size for the ICP and a 30g sample size for the fire assay. These are the recommended minimum sample sizes for the use of this material.

18. Availability: This product is available in Laboratory Packs containing 1kg of material and Explorer Packs containing custom weights (from 50 to 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.

19. Recommended use: The data used to characterize this CRM has been scrutinized using outlier treatment techniques. This, together with the number of participating laboratories, should overcome any "inter-laboratory issues" and should lead to a very accurate measure for the given methods, notwithstanding the underlying assumption that what the good inter-laboratory labs reported was accurate. However an amount of bad data might have had an effect, resulting in limits which in some situations might be too broad for the effective monitoring of a single analytical method, laboratory or production process. Users should set their own limits based on their own data quality objectives and control measurements, after determining the performance characteristics of their own particular method, using a minimum of 20 analyses using this CRM. User set limits should normally be within the limits recommended on p1 and 2 of this certificate.

20. 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.

21 June 2012

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 – uncertified trace element statistics

Analyte	Method	Unit	Mean	2SD	RSD%	n
Al	M/ICP	%	2.06	0.17	4.05	122
As	M/ICP	ppm	51.3	7.71	7.52	119
Ba	M/ICP	ppm	254	28.5	5.61	119
Be	M/ICP	ppm	1.41	0.58	20.8	82
Bi	M/ICP	ppm	0.43	0.99	114	59
Ca	M/ICP	%	1.18	0.08	3.57	121
Cd	M/ICP	ppm	1.89	0.33	8.82	111
Ce	M/ICP	ppm	5.34	8.67	81.1	36
Co	M/ICP	ppm	10.8	2.93	13.6	129
Cr	M/ICP	ppm	118	69.5	29.4	128
Cs	M/ICP	ppm	3.82	0.47	6.10	38
Dy	M/ICP	ppm	0.79	0.04	2.28	27
Er	M/ICP	ppm	0.49	0.04	3.62	28
Eu	M/ICP	ppm	0.21	0.06	12.9	32
Fe	M/ICP	%	1.97	0.19	4.71	130
Ga	M/ICP	ppm	5.98	0.99	8.27	48
Gd	M/ICP	ppm	0.79	0.13	7.93	31
Ge	M/ICP	ppm	0.69	0.74	53.5	16
Hf	M/ICP	ppm	0.28	0.17	29.8	40
Ho	M/ICP	ppm	0.19	0.10	26.0	38
In	M/ICP	ppm	0.02	0.01	19.1	31
K	M/ICP	%	1.30	0.20	7.87	120
La	M/ICP	ppm	1.70	1.54	45.4	88
Li	M/ICP	ppm	196	59.4	15.1	100
Lu	M/ICP	ppm	7.45	38.0	255	37
Mg	M/ICP	%	1.60	0.13	4.15	123
Mn	M/ICP	ppm	660	75.4	5.72	121
Mo	M/ICP	ppm	1.69	1.54	45.5	87
Na	M/ICP	%	0.06	0.02	16.7	120
Nb	M/ICP	ppm	0.71	0.37	26.0	47
Nd	M/ICP	ppm	2.50	0.21	4.25	30
Ni	M/ICP	ppm	21.8	7.04	16.1	126
P	M/ICP	ppm	119	63.3	26.6	95
Pr	M/ICP	ppm	0.54	0.07	6.04	32
Pt	M/ICP	ppm	0.01	0.01	40.0	4
Rb	M/ICP	ppm	71.4	10.1	7.09	46
S	M/ICP	%	0.00	0.00	50.0	5
Sb	M/ICP	ppm	0.75	0.05	3.59	76
Sc	M/ICP	ppm	22.2	9.21	20.7	121
Se	M/ICP	ppm	8.04	0.81	5.02	109
Si	M/ICP	%	66.5	7.19	5.40	42
Sm	M/ICP	ppm	38.8	0.67	0.87	8
Sn	M/ICP	ppm	0.74	0.17	11.4	31
Sr	M/ICP	ppm	0.92	0.76	41.3	30
Ta	M/ICP	ppm	61.69	6.27	5.09	120
Tb	M/ICP	ppm	11.13	1.28	5.76	8
Te	M/ICP	ppm	0.13	0.04	15.6	40
Th	M/ICP	ppm	0.18	0.08	21.4	35
Ti	M/ICP	%	0.24	0.21	43.8	55
Tl	M/ICP	ppm	0.10	0.03	14.2	104
Tm	M/ICP	ppm	1.32	1.44	54.4	57
U	M/ICP	ppm	0.07	0.01	10.9	24
V	M/ICP	ppm	54.2	5.26	4.85	112
W	M/ICP	ppm	12.5	26.71	107	72
Y	M/ICP	ppm	4.23	0.61	7.23	84
Yb	M/ICP	ppm	0.42	0.14	16.9	40
Zr	M/ICP	ppm	7.74	4.65	30.0	83