African Mineral Standards
MATRIX REFERENCE MATERIALS

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AMIS0095

Certified Reference Material

Uranium, Karoo Sandstone
Letlhakane Project, Botswana

Certificate of Analysis

Recommended Concentrations and Limits[1.]
(at two Standard Deviations)

Certified Concentrations[2.]

U M/ICP	119	±	14	ppm
U XRF	118	±	7	ppm
Specific Gravity	2.43	±	0.20	

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.*
3. *Or, by applying a chemical conversion factor of U x 1.1793 = U3O8; U3O8 by multi acid digestion: 140 ± 17 ppm, U3O8 by XRF 139 ± 8 ppm.*

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

Certified Concentrations

Al_2O_3	21.77	±	0.64	%
CaO	0.77	±	0.04	%
Fe_2O_3	2.35	±	0.10	%
K_2O	0.63	±	0.04	%
MnO	0.050	±	0.002	%
Na_2O	0.48	±	0.04	%
S M/ ICP	0.45	±	0.08	%
SiO_2	50.55	±	1.22	%
TiO_2	1.00	±	0.03	%
LOI	21.50	±	1.80	%

Provisional Concentrations

Cr_2O_3	0.045	±	0.010	%
MgO	0.29	±	0.05	%
P_2O_5	0.09	±	0.026	%

1. Intended Use: AMIS0095 is suitable for monitoring the accuracy of a single analysis of uraniferous alaskite ore. This material can be used for routine quality control by inserting within a batch of samples.

Additional geochemical data is presented for this material that will enable its use for method development and for the calibration of equipment. This comprises certified major element data (p1) and uncertified trace element data (Appendix).

The recommended mean and "Between Lab" standard deviations for this standard reflect the average 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 and this is acceptable. Good laboratories however will report results within the two standard deviation levels with a failure of <10 %.

2. Origin of Material: This material was supplied by A-Cap Ltd from their Lethakane Uranium Project 85 km south of Francistown in Botswana.

The uranium mineralisation is hosted within the basal sediments of the Karoo Super Group. These Permian to Jurassic aged sediments were deposited in a shallow, broad, westerly dipping basin, generated during rifting of the African continent. The source area for the sediments was the extensively weathered, uranium-bearing, metamorphic rocks of the Achaean Zimbabwe Craton which outcrop in the eastern portion of the license.

3. Mineral and Chemical Composition: The geology of the Letlhakane Uranium Project is relatively simple. Uranium mineralisation occurs within flat-lying sedimentary rocks of the Karroo Supergroup and the entire resource is within 70m of the surface. Importantly some of the highest-grade mineralisation occurs in a secondary zone close to surface. Two dominant styles of primary uranium mineralisation have been defined within the Letlhakane project area. The earliest phase of mineralisation consists of uranium, which is hosted by fine-grained, organic rich mudstones (with minor coaly interbeds) which are developed on the margins of sandy river channels. The carbonaceous mudstones, and hence the mineralisation, tend to be sub-horizontal and laterally continuous over large areas. The second style of primary uranium mineralisation is generated by the migration of uranium bearing groundwater (uranium sourced from basement) through the Karoo sediments and subsequent re-precipitation of uranium in suitably reductive environments. This has resulted in the development of narrow high grade, tabular zones of mineralisation within fine

sandstones. These horizons are typically enveloped with mineralised organic rich mudstones. This primary mineralisation is thought to have been developed relatively soon after the Karoo deposition and lithification.

Where the primary mineralisation moves into the active weathering environment, the rock becomes oxidized and the uranium mineralogy is altered. This mineralisation is referred to as the 'oxide' portion of the resource and has a similar distribution, in terms of both host lithology and grade, to the primary mineralisation.

Dissolution and remobilisation of the primary mineralisation along permeable fracture zones resulted in the development of secondary uranium minerals in the near surface weathering environment. These uranium minerals (predominantly uranium vanadates) occur as fine, yellow, powdery coatings on fracture surfaces and bedding planes. The youngest phase of mineralisation is the result of supergene remobilisation and re-precipitation of uranium minerals from the secondary and primary zones into surficial pedogenic calcrete. The most dominant uranium mineral observed in this style of mineralisation is carnotite. *(ref A-Cap 2010 Annual Report).*

4. Appearance: The material is a very fine Dark blueish Grey powder (Corstor colour chart – 5PB 4/1).

5. Radioactivity: Shipments of this material do not require special marking, labeling or placarding. AMIS0095 does contain U (1.5 Bq/g) and Th (0.12 Bq/g), but due to low activity concentrations it is classified as EXEMPT MATERIAL in terms of "Safety Standards Series No. TS-R-1: Regulations for the Safe Transport of Radioactive Material, International Atomic Energy Agency, 2005, para 403, Table 1".

6. 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.

7. Method of Preparation: The material was crushed, dry-milled and air-classified to <54um. Wet sieve parti**c**le 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 consensus test results were carried out by an independent statistician.

8. Methods of Analysis requested:

1. Multi-acid digest, including HF, ICP- OES or ICP-MS. Multi element scan (to include U).
2. U XRF.
3. Majors (Al_2O_3, CaO, Cr_2O_3, Fe_2O_3, K_2O, MgO, MnO, Na_2O, SiO_2, TiO_2. LOI.) XRF fusion.
4 SG (gas pycnometer).

9. 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 (not averages)
4. All results for multi-element scans to be reported in ppm.
5. All results for major elements to be reported in %.
6. Report all QC data, to include replicates, blanks and certified reference materials used.

10. Method of Certification: Seventeen laboratories were each given eight packages, comprising eight samples scientifically selected from throughout the batch. Nineteen laboratories reported results in time for certification of the economic elements. Eight of these laboratories reported results for the major elements.

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 them 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 13), 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”.

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

1. ACME Analytical Laboratories Ltd (Canada)
2. Activation Laboratories Pty Ltd (Canada)
3. ALS Chemex Laboratory Group Johannesburg (South Africa)
4. ALS Chemex Laboratory Group Perth (Australia)
5. ALS Chemex Laboratory Group Vancouver (Canada)
6. Ammtec Limited (West Australia)
7. Anglo Gold Ashanti - Vaal River Laboratory (South Africa)
8. Anglo Research (Crown Campus
9. Assayers Canada
10. Genalysis Laboratory Services (Australia)
11. Labtium Inc Finland
12. OMAC Laboratories Limited (Ireland)
13. Set Point Laboratories Isando (South Africa)
14. SGS Australia Pty Ltd (Australia)
15. SGS Mineral Services Lakefield (Canada)
16. SGS South Africa (Pty) Ltd (South Africa)
17. Ultra Trace (Pty) Ltd (Australia)

12. 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 digital data from this round robin is available on request.

Lab Order	U M/ICP ppm	U XRF ppm	SG pyc	S M/ICP %	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	MgO XRF %	MnO XRF %	Na2O XRF %	P2O5 XRF %	SiO2 XRF %	TiO2 XRF %	LOI %
A	118	40.00	2.61	0.45	22.10	0.78	0.04	2.31	0.64	0.27	0.05	0.48		51.12	1.00	20.60
A	124	30.00	2.58	0.45	22.10	0.77	0.04	2.29	0.64	0.28	0.05	0.49		51.19	1.00	20.50
A	118	30.00	2.60	0.45	22.10	0.78	0.04	2.28	0.64	0.27	0.05	0.48		51.19	1.00	20.50
A	123	40.00	2.57	0.44	22.10	0.77	0.05	2.32	0.64	0.28	0.05	0.49		51.19	1.00	20.50
A	118	30.00	2.60	0.44	22.10	0.77	0.05	2.35	0.64	0.28	0.05	0.49		51.20	1.00	20.50
A	117	30.00	2.62	0.43	22.10	0.77	0.05	2.34	0.64	0.27	0.05	0.48		51.27	1.01	20.40
A	118	30.00	2.62	0.43	22.10	0.78	0.04	2.35	0.64	0.28	0.05	0.49		51.23	1.01	20.40
A	111	30.00	2.59	0.45	22.10	0.77	0.05	2.33	0.64	0.27	0.05	0.49		51.25	1.01	20.40
B	110		2.42	0.41	21.80	0.78	0.07	2.68	0.62	0.30	0.03	0.30	0.07	50.10	0.98	22.13
B	112		2.42	0.49	21.90	0.79	0.07	2.68	0.62	0.30	0.03	0.40	0.07	50.30	0.99	22.21
B	108		2.41	0.47	21.90	0.79	0.07	2.68	0.62	0.30	0.03	0.30	0.07	50.30	0.99	22.00
B	119		2.41	0.43	21.90	0.79	0.07	2.69	0.61	0.30	0.03	0.30	0.07	50.10	0.99	22.16
B	114		2.41	0.46	21.90	0.78	0.07	2.68	0.62	0.30	0.03	0.30	0.07	50.30	0.98	22.16
B	114		2.42	0.44	21.70	0.78	0.07	2.67	0.62	0.20	0.03	0.40	0.07	50.20	0.98	22.16
B	119		2.41	0.47	21.90	0.78	0.07	2.68	0.62	0.20	0.03	0.30	0.07	50.30	0.99	22.12
B	114		2.42	0.50	21.90	0.79	0.07	2.66	0.62	0.30	0.03	0.30	0.07	50.30	0.99	22.11
C	137	123		0.47	22.20	0.76	0.04	2.40	0.64	0.28	0.05	0.50		51.30	1.02	20.30
C	131	122		0.46	22.20	0.77	0.04	2.40	0.64	0.28	0.05	0.51		51.40	1.01	20.30
C	129	125		0.46	22.20	0.75	0.04	2.39	0.64	0.28	0.05	0.51		51.40	1.02	20.30
C	130	120		0.45	22.30	0.77	0.05	2.40	0.65	0.28	0.05	0.51		51.40	1.02	20.20
C	131	122		0.46	22.30	0.76	0.04	2.41	0.65	0.28	0.05	0.51		51.30	1.02	20.20
C	127	129		0.44	22.40	0.77	0.04	2.40	0.64	0.27	0.05	0.51		51.30	1.02	20.30
C	131	120		0.44	22.20	0.76	0.04	2.42	0.64	0.28	0.05	0.51		51.40	1.01	20.30
C	128	124		0.45	22.30	0.76	0.04	2.41	0.65	0.28	0.05	0.52		51.20	1.01	20.30
D	120	120	2.39		21.70	0.74	0.04	2.28	0.62	0.34	0.05	0.47	0.10	50.30	0.99	22.30
D	120	130	2.39		21.60	0.73	0.05	2.31	0.62	0.28	0.06	0.41	0.11	50.70	1.00	22.50
D	130	120	2.38		21.50	0.73	0.05	2.33	0.61	0.29	0.05	0.42	0.10	50.30	0.99	22.60
D	130	120	2.38		21.60	0.74	0.04	2.31	0.63	0.28	0.05	0.46	0.09	50.20	1.00	22.40
D	130	120	2.38		21.60	0.74	0.05	2.35	0.61	0.27	0.06	0.45	0.11	50.80	0.99	22.30
D	130	130	2.37		21.70	0.73	0.05	2.33	0.62	0.35	0.05	0.45	0.09	50.10	0.99	22.30
D	130	120	2.39		21.70	0.75	0.04	2.28	0.63	0.35	0.05	0.49	0.11	50.50	1.00	22.20
D	130	130	2.38		21.60	0.75	0.06	2.33	0.62	0.30	0.05	0.45	0.10	50.30	0.98	22.10
E	110	118	2.39		21.70	0.77	0.04	2.33	0.62	0.32	0.05	0.49	0.09	50.20	0.99	22.31
E	110	116	2.42		21.60	0.76	0.04	2.33	0.63	0.30	0.05	0.49	0.09	50.20	0.99	22.28
E	110	117	2.46		21.90	0.78	0.04	2.34	0.63	0.30	0.05	0.48	0.09	50.70	0.99	22.26
E	110	118	2.43		21.70	0.76	0.04	2.30	0.63	0.30	0.05	0.49	0.08	50.50	1.00	22.29
E	120	116	2.39		21.70	0.76	0.05	2.30	0.63	0.31	0.05	0.50	0.10	50.00	0.98	22.26
E	110	115	2.42		21.80	0.78	0.04	2.34	0.63	0.32	0.05	0.48	0.09	50.20	1.00	22.26
E	110	115	2.39		22.10	0.76	0.04	2.34	0.60	0.30	0.05	0.47	0.09	50.50	0.99	22.21
E	110	115	2.43		21.90	0.77	0.04	2.34	0.63	0.30	0.05	0.50	0.09	50.50	0.99	22.31

Assay data (cont)

Lab Order	U M/ICP ppm	U XRF ppm	SG pyc	S M/ICP %	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	MgO XRF %	MnO XRF %	Na2O XRF %	P2O5 XRF %	SiO2 XRF %	TiO2 XRF %	LOI %
F	114			0.40												
F	114			0.40												
F	105			0.40												
F	111			0.40												
F	117			0.40												
F	102			0.40												
F	113			0.40												
F	107			0.40												
G	116	122	2.33		21.86	0.77	0.05	2.43	0.66	0.26	0.05	0.46	0.09	50.45	1.01	22.26
G	119	120	2.36		21.84	0.77	0.05	2.43	0.66	0.28	0.05	0.48	0.10	50.54	1.01	22.28
G	120	122	2.32		21.85	0.75	0.05	2.42	0.66	0.27	0.05	0.46	0.10	50.59	1.00	22.30
G	121	121	2.35		21.78	0.77	0.06	2.41	0.70	0.27	0.05	0.48	0.10	50.51	1.01	22.35
G	123	121	2.34		21.71	0.75	0.05	2.45	0.68	0.28	0.06	0.47	0.09	50.61	1.01	22.32
G	119	121	2.37		21.70	0.77	0.05	2.43	0.65	0.27	0.05	0.46	0.09	50.51	1.00	22.30
G	122	121	2.34		21.79	0.77	0.05	2.42	0.65	0.29	0.05	0.47	0.09	50.61	1.01	22.27
G	120	121	2.34		21.84	0.77	0.05	2.43	0.66	0.28	0.05	0.46	0.10	50.71	1.00	22.30
H		117			21.17	0.61	0.03	2.33	0.59	0.27	0.04	0.49	0.10	50.72	0.93	
H		118			21.17	0.63	0.03	2.36	0.60	0.27	0.04	0.49	0.08	50.50	0.93	
H		115			21.17	0.70	0.03	2.34	0.59	0.27	0.04	0.48	0.09	50.08	0.93	
H		117			21.17	0.68	0.03	2.31	0.57	0.27	0.04	0.46	0.07	49.86	0.93	
H		117			21.17	0.68	0.03	2.34	0.57	0.27	0.04	0.46	0.08	51.36	0.92	
H		122			20.98	0.70	0.03	2.40	0.57	0.27	0.04	0.47	0.07	50.72	0.93	
H		116			21.17	0.67	0.03	2.34	0.57	0.27	0.04	0.46	0.09	50.08	0.94	
H		114			20.98	0.66	0.03	2.36	0.56	0.27	0.04	0.45	0.08	50.08	0.93	
I		117			21.00	0.75			0.60	0.33		0.27		49.30	0.95	21.95
I		121			21.30	0.76			0.60	0.34		0.27		49.80	0.97	21.96
I		118			21.20	0.75			0.60	0.30		0.26		49.60	0.96	21.95
I		116			21.20	0.78			0.60	0.34		0.28		49.50	0.96	21.95
I		117			21.10	0.77			0.60	0.30		0.29		49.30	0.96	21.95
I		114			21.00	0.79			0.60	0.31		0.28		49.20	0.96	21.93
I		119			21.30	0.76			0.61	0.32		0.28		49.90	0.97	21.93
I		117			21.10	0.75			0.60	0.33		0.27		49.20	0.96	21.93
J		114	2.49													
J		114	2.52													
J		114	2.51													
J		113	2.50													
J		114	2.50													
J		114	2.44													
J		114	2.51													
J		113	2.49													
K	129	130	2.26	0.58	21.70	0.78	0.04	2.42	0.60	0.27	0.05	0.46		51.50	1.00	20.10
K	131	120	2.21	0.59	21.50	0.78	0.04	2.36	0.60	0.28	0.05	0.45		51.30	1.02	20.50
K	126	130	2.22	0.55	21.60	0.79	0.04	2.36	0.60	0.27	0.05	0.45		51.30	1.00	20.50
K	125	130	2.23	0.54	21.60	0.79	0.04	2.34	0.60	0.28	0.05	0.46		51.40	1.02	20.30
K	125	120	2.22	0.55	21.60	0.79	0.04	2.37	0.60	0.28	0.05	0.46		51.40	1.02	20.30
K	128	130	2.16	0.55	21.70	0.78	0.04	2.34	0.60	0.28	0.05	0.45		51.50	1.00	20.10
K	133	140	2.22	0.56	21.60	0.79	0.04	2.39	0.60	0.27	0.05	0.46		51.50	1.02	20.20
K	128	120	2.24	0.57	21.70	0.79	0.04	2.37	0.60	0.29	0.05	0.46		51.60	1.03	19.95
L	101	106	2.29	0.50	22.12	0.75	0.05	2.26	0.62	0.33	0.05	0.48	0.09	49.90	1.04	22.20
L	103	104	2.36	0.50	21.97	0.74	0.05	2.25	0.62	0.33	0.05	0.47	0.09	49.58	1.03	22.20
L	99	105	2.34	0.49	22.07	0.75	0.05	2.28	0.62	0.33	0.05	0.47	0.09	49.65	1.03	22.20
L	101	107	2.31	0.50	21.98	0.74	0.05	2.27	0.62	0.33	0.05	0.47	0.09	49.70	1.03	22.20
L	105	104	2.34	0.50	22.01	0.74	0.05	2.27	0.62	0.33	0.05	0.47	0.09	49.66	1.03	22.20
L	100	105	2.32	0.50	22.04	0.74	0.05	2.26	0.62	0.32	0.05	0.47	0.09	49.79	1.04	22.20
L	101	106	2.32	0.49	22.00	0.74	0.05	2.26	0.62	0.33	0.05	0.47	0.09	49.74	1.03	22.20
L	106	104	2.32	0.51	22.01	0.75	0.05	2.27	0.63	0.33	0.05	0.47	0.09	49.81	1.03	22.20
M	121	113	2.52	0.47												
M	118	111	2.53	0.46												
M	127	113	2.50	0.50												
M	125	112	2.52	0.48												
M	126	115	2.50	0.49												
M	119	112	2.52	0.47												
M	128	112	2.58	0.49												
M	123	112	2.55	0.48												
N	109			0.24												
N	114			0.28												
N	115			0.32												
N	114			0.32												
N	119			0.32												
N	115			0.33												
N	117			0.28												
N	119			0.31												
O	117	124	2.52	0.44	21.65	0.79			0.63	0.25		0.48		50.43	0.99	20.36
O	118	118	2.59	0.43	21.94	0.80			0.63	0.26		0.48		51.01	1.00	20.35
O	120	122	2.54	0.42	21.77	0.79			0.63	0.25		0.47		50.54	0.99	20.35
O	116	119	2.54	0.43	21.61	0.79			0.63	0.25		0.46		50.18	0.98	20.34
O	119	120	2.52	0.43	21.82	0.79			0.63	0.26		0.47		50.73	0.99	20.34
O	121	118	2.50	0.42	21.93	0.79			0.64	0.26		0.48		51.00	1.00	20.35
O	121	121	2.56	0.43	21.66	0.78			0.63	0.26		0.47		50.26	1.00	20.32
O	118	117	2.53	0.44	21.69	0.78			0.63	0.26		0.48		50.36	0.99	20.32
P	116		2.38	0.49												
P	119		2.36	0.48												
P	114		2.36	0.48												
P	114		2.37	0.48												
P	116		2.37	0.48												
P	116		2.36	0.48												
P	114		2.36	0.48												
P	117		2.37	0.48												
Q	110	120	2.53	0.37	24.30		0.05	2.51	0.68	0.26	0.05	0.51	0.11	54.40	1.12	22.00
Q	108	123	2.52	0.37	24.30		0.05	2.50	0.68	0.27	0.05	0.53	0.11	54.30	1.12	22.00
Q	111	119	2.53	0.38	24.30		0.05	2.51	0.67	0.27	0.05	0.51	0.11	54.30	1.13	22.00
Q	110	118	2.53	0.37	24.40		0.05	2.55	0.68	0.28	0.05	0.51	0.11	54.30	1.13	21.90
Q	110	119	2.53	0.38	24.40		0.05	2.51	0.68	0.28	0.05	0.50	0.11	54.20	1.12	21.90
Q	110	120	2.53	0.38	24.40		0.06	2.52	0.68	0.27	0.05	0.50	0.11	54.20	1.13	22.00
Q	115	118	2.53	0.38	24.30		0.05	2.51	0.68	0.28	0.05	0.50	0.11	54.20	1.12	22.10
Q	139	125	2.52	0.38	24.50		0.05	2.52	0.68	0.27	0.05	0.52	0.12	54.40	1.13	22.00

13. Measurement of Uncertainty: The samples used in the certification process were 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.

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:

Combined standard uncertainty=sqrt((between lab.var/no of labs) + (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.

Analyte	Method	Unit	S [1]	σ_L [2]	Sw [3]	CSU [4]
U	M/ICP	ppm	6.913	4.909	3.193	1.398
U	XRF	ppm	3.495	2.768	1.739	0.898
SG	pyc		0.102	0.084	0.019	0.024
S	M/ICP	%	0.040	0.037	0.013	0.013
Al2O3	XRF	%	0.318	0.266	0.085	0.081
CaO	XRF	%	0.017	0.013	0.008	0.004
Cr2O3	XRF	%	0.005	0.004	0.003	0.001
Fe2O3	XRF	%	0.053	0.052	0.020	0.018
K2O	XRF	%	0.017	0.015	0.005	0.005
MgO	XRF	%	0.024	0.018	0.010	0.005
MnO	XRF	%	0.001	0.001	0.001	0.000
Na2O	XRF	%	0.021	0.017	0.011	0.005
P2O5	XRF	%	0.013	0.014	0.006	0.005
SiO2	XRF	%	0.606	0.493	0.227	0.151
TiO2	XRF	%	0.015	0.013	0.007	0.004
LOI		%	0.900	0.796	0.086	0.240

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 Stc 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.*

14. Uncertified values: The Certified, Provisional and Informational values listed on p1 and p2 of this certificate fulfill the AMIS statistical criteria regarding agreement for certification and have been independently validated by Dr Barry Smee.

15. 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, who have maintained measurement traceability during the analytical process.

16. Certification: AMIS0095 is a new material.

17. 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.

18. Minimum sample size: The majority of laboratories reporting used a 0.5g sample size for the ICP and 20g for the XRF. These are the recommended minimum sample sizes for the use of this material.

19. Availability: This product is available in Laboratory Packs containing 1kg of material and Explorer Packs containing custom weights (from 50g to 250g) of material. The Laboratory Packs

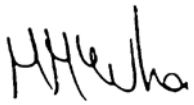
are sealed bottles delivered in sealed foil pouches. The Explorer Packs contain material in standard geochem envelopes, vacuum sealed in foil pouches.

20. 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.

21. 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.

01 June 2011

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 1. – Uncertified trace element statistics

Fifteen of the laboratories reported multi-element scan data. The iterated data is presented below for informational use.

Analyte	Method	Unit	Mean	2SD	RSD%	n
Ag	M/ICP	ppm	0.13	0.09	37.22	47
Al	M/ICP	%	11.57	0.94	4.07	86
As	M/ICP	ppm	66.60	12.78	9.59	69
B	M/ICP	ppm	31.26	16.23	25.96	14
Ba	M/ICP	ppm	509	63.20	6.21	93
Be	M/ICP	ppm	3.17	0.55	8.69	93
Bi	M/ICP	ppm	0.89	0.15	8.26	69
Ca	M/ICP	%	0.55	0.06	5.29	85
Cd	M/ICP	ppm	0.29	0.26	45.43	71
Ce	M/ICP	ppm	109	11.01	5.06	62
Co	M/ICP	ppm	17.58	2.74	7.79	88
Cr	M/ICP	ppm	259	50.77	9.79	70
Cs	M/ICP	ppm	5.48	0.74	6.72	61
Cu	M/ICP	ppm	44.47	6.51	7.32	86
Dy	M/ICP	ppm	6.33	0.62	4.91	38
Er	M/ICP	ppm	3.39	0.41	6.05	38
Eu	M/ICP	ppm	1.65	0.15	4.65	37
Fe	M/ICP	%	1.67	0.15	4.49	101
Ga	M/ICP	ppm	32.88	3.45	5.24	63
Gd	M/ICP	ppm	7.43	0.74	4.98	39
Ge	M/ICP	ppm	0.16	0.09	28.50	31
Hf	M/ICP	ppm	5.92	1.24	10.48	64
Ho	M/ICP	ppm	1.22	0.16	6.50	39
In	M/ICP	ppm	0.12	0.02	7.70	56
K	M/ICP	%	0.52	0.04	3.66	91
La	M/ICP	ppm	55.63	5.45	4.89	60
Li	M/ICP	ppm	86.70	10.36	5.97	72
Lu	M/ICP	ppm	0.45	0.08	9.15	40
Mg	M/ICP	%	0.17	0.02	4.63	82
Mn	M/ICP	ppm	394	35.58	4.51	80
Mo	M/ICP	ppm	14.12	2.26	8.01	93
Na	M/ICP	%	0.36	0.06	8.72	88
Nb	M/ICP	ppm	20.13	3.60	8.93	78
Nd	M/ICP	ppm	44.44	4.63	5.21	38
Ni	M/ICP	ppm	55.41	5.28	4.77	76
P	M/ICP	ppm	421	43.30	5.15	69
Pb	M/ICP	ppm	64.01	7.19	5.61	69
Pr	M/ICP	ppm	12.20	1.30	5.33	39
Rb	M/ICP	ppm	38.59	3.77	4.88	70
Re	M/ICP	ppm	0.05	0.01	8.58	36
Sb	M/ICP	ppm	5.87	0.77	6.52	70
Sc	M/ICP	ppm	16.34	2.47	7.57	54
Se	M/ICP	ppm	7.86	2.02	12.83	61
Si	M/ICP	%	23.94	0.47	0.97	8
Sm	M/ICP	ppm	8.21	0.70	4.25	39
Sn	M/ICP	ppm	4.98	0.49	4.95	62
Sr	M/ICP	ppm	163	11.07	3.40	75
Ta	M/ICP	ppm	1.62	0.20	6.31	63
Tb	M/ICP	ppm	1.13	0.14	6.33	38
Te	M/ICP	ppm	0.12	0.03	13.80	36
Th	M/ICP	ppm	29.31	2.40	4.09	69
Ti	M/ICP	%	0.59	0.06	4.99	77
Tl	M/ICP	ppm	0.78	0.12	7.50	78
Tm	M/ICP	ppm	0.48	0.04	4.47	38
V	M/ICP	ppm	172	15.67	4.55	92
W	M/ICP	ppm	3.81	0.87	11.37	84
Y	M/ICP	ppm	32.97	3.53	5.35	68
Yb	M/ICP	ppm	3.08	0.37	6.05	39
Zn	M/ICP	ppm	90.62	11.24	6.20	100
Zr	M/ICP	ppm	224	31.77	7.08	71