African Mineral Standards
REFERENCE MATERIALS FOR AFRICAN ORES

Tel: +2711 923 7000 Fax: +2711 923 7027 e-mail: info@amis.co.za web: www.amis.co.za
30 Electron Avenue, Isando, 1600. P.O. Box 856, Isando, 1600, South Africa.
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Certificate of Analysis

Uraniferous alaskite standard, from the Warmbad exploration area, Namibia

AMIS0131

Recommended Concentration and two "Between Laboratory" Standard Deviations

Certified Concentrations

U M/ICP*	294	±	26	ppm
U XRF*	313	±	8	ppm
Specific Gravity	2.68	±	0.14	
Al2O3	7.15	±	0.18	%
CaO	1.10	±	0.06	%
Fe2O3	2.23	±	0.12	%
K2O	1.54	±	0.04	%
Na2O	2.03	±	0.14	%
SiO2	85.19	±	0.76	%

Provisional Concentrations

Cr2O3	0.106	±	0.018	%
MgO	0.20	±	0.052	%
MnO	0.029	±	0.004	%

Indicated Mean

LOI	0.33	%
P2O5	0.023	%
S	0.210	%
TiO2	0.026	%

*** Or, by applying a chemical conversion factor of U x 1.1793 = U_3O_8**
U_3O_8 by multi acid digestion: 347 ± 31 ppm
U_3O_8 by XRF: 369 ± 9 ppm

Intended use: AMIS0131 is suitable for monitoring the accuracy of a single analysis of uraniferous alaskite. The 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.

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 %.

Origin of material: This reference material has been made from assay pulp reject material supplied by Xemplar Energy, from their Warmbad Property, located in the extreme south of Namibia, bordering on South Africa. Exploration has been undertaken on fourteen uraniferous alaskite bodies identified along a linear feature some 30 kms in length. The exploration model is a Rossing type uranium occurrence.

Mineral and chemical composition: Uranium mineralization is hosted by alaskitic pegmatites intruded into biotite gneiss. It consists of yellow uranium oxide, probably uranophane, which both coats the surfaces of the pegmatite and occurs as disseminations within the rock. Pitchblende has been reported in phases of the pegmatite. The major element chemistry for this material has also been determined by predominantly XRF analyses from fourteen of the laboratories and has also been certified. Additional trace element chemistry for this product is available on request.

Appearance: The material is a very fine powder. It is coloured Light Grey (Corstor 5Y 7/1).

Radioactivity: Shipments of this material do not require special marking, labeling or placarding. AMIS0113 does contain U (3.2 Bq/g) and Th (0.14 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”.

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. 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).

Method of certification: Twenty one laboratories were each given eight randomly selected packages of sample. Results from the nineteen laboratories that returned results timeously were used for the certification.

The mean and standard deviation for all data was calculated. Outliers were defined as samples beyond the mean $\pm$ 2 Standard Deviations from all data. These outliers were removed from the data and a new mean and standard deviation was determined.

Standards with an RSD of near or less than 5 % are then certified, RSD's of between near 5 % and 15 % are given Provisional Concentrations and limits, those with RSD's over 15 % are given Indicated Concentrations.

This method is different from that used to calculate the Confidence Interval shown on many Government-produced standards 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 Certified Limits published on other standards which quote a Confidence Interval.

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. Anglo Gold Ashanti - Vaal River Laboratory SA
7. Anglo Research (Crown Campus)
8. Assayers Canada
9. Genalysis Laboratory Services WA
10. Geoscience Laboratories (GEO LABS) CA
11. Intertek Utama Services (Indonesia)
12. Labtium Inc Finland
13. OMAC Laboratories Limited (Ireland)
14. Performance Laboratories SA
15. Set Point Laboratories (Isando) SA
16. SGS Australia Pty Ltd (Newburn) WA
17. SGS Lakefield Research Africa Pty Ltd (Booysens) SA
18. SGS Mineral Services Lakefield (Canada)
19. Ultra Trace (Pty) Ltd WA

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	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	LOI %	MgO XRF %	Na2O XRF %	P2O5 XRF %	S ICP %	SiO2 XRF %	Specific Gravity	TiO2 XRF %	U ppm M/ICP ppm	U ppm XRF ppm
A	7.12	1.05	0.10	2.26	1.54	0.34	0.07	2.02	0.02		84.90	2.62	0.02	240	340
A	7.15	1.04	0.11	2.23	1.51	0.39	0.06	2.09	0.02		85.30	2.63	0.03	230	340
A	7.10	1.04	0.12	2.24	1.54	0.39	0.06	2.09	0.02		84.70	2.62	0.02	250	340
A															
A	7.04	1.03	0.11	2.24	1.50	0.40	0.07	2.07	0.01		84.20	2.60	0.02	250	330
A	7.14	1.03	0.11	2.22	1.51	0.37	0.07	2.06	0.02		84.80	2.63	0.03	240	340
A	7.13	1.02	0.11	2.24	1.52	0.40	0.07	2.09	0.01		84.80	2.62	0.02	230	360
A	7.06	1.04	0.11	2.24	1.53	0.34	0.07	2.11	0.02		84.30	2.65	0.02	230	320
B	7.23	1.10	0.11	2.26	1.54	0.09	0.21	2.00		0.02	85.04	2.81	0.03	292	320
B	7.24	1.09	0.11	2.25	1.54	0.08	0.21	1.99		0.03	85.00	2.84	0.03	300	310
B	7.22	1.09	0.11	2.28	1.53	0.09	0.21	1.99		0.03	85.08	2.82	0.03	293	310
B	7.23	1.09	0.11	2.25	1.53	0.07	0.21	1.98		0.03	84.98	2.79	0.03	295	310
B	7.21	1.09	0.11	2.25	1.54	0.06	0.21	1.98		0.02	85.05	2.79	0.03	293	310
B	7.22	1.09	0.11	2.25	1.53	0.10	0.21	1.99		0.02	84.97	2.83	0.03	295	310
B	7.23	1.09	0.10	2.25	1.54	0.08	0.21	2.00		0.02	85.10	2.81	0.03	293	310
B	7.24	1.09	0.11	2.25	1.54	0.08	0.21	1.99		0.02	85.11	2.79	0.03	294	310
C	7.23	1.12	0.12	2.25	1.53	0.34	0.24	2.07	0.03	0.02	84.83	2.56	0.02	277	
C	7.19	1.13	0.11	2.26	1.54	0.34	0.25	2.08	0.03	0.02	84.90	2.64	0.02	262	
C	7.20	1.13	0.11	2.25	1.54	0.33	0.24	2.08	0.03	0.02	84.88	2.52	0.02	292	
C	7.22	1.12	0.12	2.25	1.53	0.32	0.24	2.08	0.03	0.02	85.02	2.68	0.02	299	
C	7.22	1.12	0.12	2.26	1.52	0.34	0.24	2.08	0.03	0.02	84.97	2.62	0.02	276	
C	7.16	1.14	0.11	2.24	1.52	0.35	0.24	2.06	0.03	0.02	84.98	2.53	0.02	288	
C	7.20	1.13	0.11	2.25	1.52	0.31	0.24	2.05	0.03	0.02	85.01	2.59	0.02	294	
C	7.21	1.14	0.11	2.25	1.53	0.30	0.24	2.05	0.03	0.02	85.05	2.61	0.02	283	
D	7.06	1.10	0.10	2.20	1.55		0.17	1.97	0.03		84.70		0.03		
D	7.18	1.12	0.11	2.24	1.56		0.17	2.05	0.03		85.10		0.04		
D	7.00	1.10	0.10	2.19	1.53		0.16	1.98	0.03		84.50		0.04		
D	7.01	1.09	0.11	2.18	1.56		0.16	1.97	0.03		84.60		0.04		
D	7.01	1.09	0.12	2.20	1.51		0.16	1.97	0.03		85.10		0.03		
D	7.29	1.14	0.11	2.27	1.58		0.18	2.16	0.03		85.10		0.04		
D	7.19	1.13	0.12	2.24	1.56		0.17	2.00	0.03		85.00		0.04		
D	7.13	1.11	0.11	2.22	1.58		0.17	2.00	0.03		85.20		0.04		

Assay Data (cont):

Lab Code	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	LOI %	MgO XRF %	Na2O XRF %	P2O5 XRF %	S ICP %	SiO2 XRF %	Specific Gravity	TiO2 XRF %	U ppm M/ICP ppm	U ppm XRF ppm
F	7.07	1.08			1.54	0.32	0.18	1.94		0.02	85.50	2.75	0.02	292	266
F	7.03	1.08			1.54	0.30	0.20	1.95		0.02	85.43	2.70	0.03	293	266
F	7.04	1.08			1.54	0.31	0.19	1.94		0.02	85.27	2.64	0.02	287	266
F	7.02	1.09			1.55	0.35	0.22	1.90		0.02	85.17	2.70	0.02	304	259
F	7.08	1.09			1.55	0.34	0.20	1.96		0.02	85.74	2.63	0.03	292	259
F	7.08	1.09			1.54	0.31	0.18	1.94		0.02	85.67	2.73	0.02	285	259
F	7.07	1.08			1.55	0.32	0.19	1.95		0.02	85.65	2.71	0.02	280	261
F	7.03	1.08			1.54	0.34	0.18	1.93		0.02	85.23	2.71	0.02	288	269
G	6.89	1.15	0.10	2.29		0.32	0.13	1.93	0.02		84.14	2.66	0.04	266	314
G	6.93	1.08	0.10	2.28		0.28	0.13	1.92	0.02		83.93	2.59	0.03	244	312
G	6.85	1.07	0.10	2.29		0.30	0.12	1.93	0.02		84.71	2.58	0.03	264	310
G	6.91	1.07	0.10	2.27		0.31	0.13	1.93	0.02		84.24	2.64	0.03	253	314
G	6.86	1.14	0.11	2.26		0.36	0.12	1.95	0.02		83.79	2.64	0.03	268	316
G	6.78	1.06	0.10	2.25		0.39	0.10	1.90	0.02		83.82	2.58	0.03	245	308
G	6.83	1.09	0.11	2.31		0.34	0.11	1.93	0.02		85.28	2.64	0.03	233	310
G	6.94	1.09	0.11	2.34		0.36	0.11	1.91	0.02		85.44	2.67	0.03	226	315
H	7.15	1.07		2.14	1.53	0.43	0.17	2.07	0.02	0.02	85.40		0.03	289	290
H	7.18	1.07		2.15	1.53	0.38	0.17	2.09	0.02	0.01	85.40		0.03	292	292
H	7.16	1.08		2.16	1.53	0.49	0.16	2.07	0.02	0.02	85.40		0.03	278	289
H	7.19	1.08		2.16	1.53	0.48	0.17	2.07	0.02	0.02	85.40		0.03	273	293
H	7.20	1.08		2.14	1.53	0.42	0.18	2.08	0.02	0.01	85.40		0.03	276	286
H	7.17	1.07		2.16	1.53	0.41	0.17	2.09	0.02	0.02	85.40		0.03	282	289
H	7.19	1.07		2.15	1.53	0.37	0.17	2.09	0.02	0.02	85.40		0.03	273	293
H	7.18	1.08		2.17	1.53	0.41	0.16	2.08	0.02	0.02	85.40		0.03	265	292
J	7.16	1.15		2.29	1.56	0.48	0.20	2.11	0.02		85.82		0.03		312
J	7.21	1.12		2.31	1.57	0.48	0.20	2.10	0.02		86.47		0.03		320
J	7.01	1.14		2.30	1.56	0.47	0.20	2.13	0.02		84.49		0.03		322
J	7.05	1.12		2.30	1.56	0.49	0.19	2.08	0.02		85.73		0.03		320
J	7.18	1.14		2.29	1.55	0.49	0.20	2.11	0.02		85.29		0.03		331
J	7.28	1.22		2.40	1.55	0.49	0.45	2.10	0.02		84.79		0.03		321
J	7.20	1.14		2.32	1.57	0.48	0.20	2.14	0.02		86.10		0.03		317
J	7.20	1.14		2.30	1.57	0.48	0.21	2.11	0.02		86.35		0.02		317
K	7.30	1.11	0.10		1.54	0.40	0.19	1.93	0.03		84.15		0.03	266	
K	7.23	1.11	0.10		1.53	0.50	0.18	1.91	0.03		84.16		0.03	269	
K	7.21	1.11	0.10		1.54	0.70	0.19	1.92	0.03		84.03		0.03	259	
K	7.27	1.06	0.10		1.53	0.60	0.19	1.92	0.03		84.23		0.02	267	
K	7.22	1.12	0.10		1.55	0.40	0.19	1.92	0.02		84.24		0.03	279	
K	7.38	1.10	0.10		1.54	0.60	0.19	1.98	0.04		83.84		0.03	284	
K	7.29	1.10	0.10		1.51	0.60	0.18	1.95	0.03		84.01		0.03	272	
K	7.37	1.10	0.10		1.54	0.70	0.18	1.96	0.03		83.84		0.03	273	
L										0.04				289	310
L										0.03				286	316
L										0.03				289	309
L										0.03				280	321
L										0.03				287	320
L										0.03				293	312
L										0.03				270	316
L										0.03				282	318
M	7.35	1.13	0.10	2.33	1.57	0.38	0.25	2.03	0.02		85.90	2.65	0.03	320	312
M	7.12	1.09	0.09	2.18	1.53	0.33	0.23	1.97	0.02		85.90	2.65	0.04	320	310
M	7.09	1.08	0.09	2.31	1.52	0.36	0.22	1.96	0.02		85.20	2.66	0.03	320	312
M	7.16	1.09	0.09	2.26	1.50	0.37	0.23	1.95	0.02		85.40	2.68	0.03	320	311
M	7.25	1.10	0.09	2.15	1.53	1.10	0.23	1.97	0.02		85.30	2.66	0.03	320	312
M	7.32	1.13	0.09	2.25	1.56	0.28	0.24	2.01	0.02		86.00	2.67	0.03	320	312
M	7.33	1.11	0.09	2.21	1.55	0.36	0.24	1.98	0.02		86.00	2.65	0.03	310	313
M	7.12	1.09	0.09	2.23	1.51	0.35	0.22	1.92	0.02		85.50	2.67	0.03	320	312
N	8.24	1.28	0.14	2.66	1.76	0.68	0.23	2.06	0.01	0.01	81.89		0.04	308	
N	8.05	1.24	0.14	2.59	1.72	0.65	0.22	2.02	0.02		81.70		0.03	303	
N	8.10	1.25	0.14	2.60	1.74	0.62	0.22	2.05	0.02	0.01	83.10		0.03	324	
N	8.25	1.27	0.14	2.65	1.79	0.62	0.22	2.10	0.01	0.01	81.96		0.03	330	
N	8.48	1.32	0.15	2.73	1.84	0.73	0.23	2.19	0.02	0.01	81.15		0.03	312	
N	8.54	1.32	0.15	2.74	1.83	0.71	0.23	2.16	0.02	0.02	81.10		0.03	315	
N	8.43	1.31	0.15	2.70	1.84	0.69	0.23	2.16	0.01		81.27		0.03	304	
N	8.18	1.27	0.15	2.63	1.78	0.68	0.22	2.08	0.02	0.01	82.12		0.03	317	
O	6.67	1.11	0.12	2.13	1.40	0.20	0.18	2.02		0.02	83.53		0.02	315	
O	6.51	1.04	0.12	2.08	1.38	0.22	0.17	2.06		0.02	83.81		0.02	309	
O	6.50	1.04	0.12	2.07	1.39	0.32	0.17	2.05		0.02	84.51		0.02	311	
O	6.58	1.06	0.12	2.12	1.42	0.20	0.17	2.04		0.02	82.97		0.02	313	
O	6.71	1.10	0.12	2.15	1.47	0.20	0.19	2.10		0.02	82.85		0.02	320	
O	6.77	1.08	0.12	2.14	1.47	0.26	0.17	2.07		0.02	82.63		0.02	317	
O	6.75	1.07	0.12	2.19	1.49	0.24	0.18	2.03	0.02	0.02	83.46		0.02	314	
O	6.76	1.17	0.12	2.16	1.50	0.32	0.17	2.00		0.02	82.98		0.02	315	
P	7.03	1.18	0.13	2.45	1.53	0.39		2.16	0.01	0.04	85.24	2.68	0.04	308	308
P	7.07	1.20	0.14	2.47	1.56	0.39		2.13	0.01	0.04	85.06	2.69	0.04	346	310
P	6.86	1.19	0.13	2.43	1.52	0.38		2.15	0.01	0.05	85.37	2.70	0.04	308	307
P	7.04	1.18	0.13	2.45	1.54	0.37		2.07	0.01	0.04	85.14	2.68	0.04	293	311
P	7.02	1.19	0.13	2.47	1.55	0.38		2.09	0.01	0.04	85.09	2.69	0.05	290	309
P	6.83	1.18	0.13	2.42	1.53	0.38		2.08	0.01	0.03	85.21	2.70	0.04	302	312
P	6.91	1.16	0.13	2.44	1.53	0.38		2.15	0.01	0.04	85.30	2.68	0.04	305	312
P	7.02	1.19	0.14	2.46	1.56	0.38		2.08	0.01	0.05	85.44	2.69	0.04	301	308

Assay Data (cont):

Lab Code	Al2O3 XRF %	CaO XRF %	Cr2O3 XRF %	Fe2O3 XRF %	K2O XRF %	LOI %	MgO XRF %	Na2O XRF %	P2O5 XRF %	S ICP %	SiO2 XRF %	Specific Gravity	TiO2 XRF %	U ppm M/ICP ppm	U ppm XRF ppm
Q	7.13	1.12	0.10	2.16	1.57	0.26	0.09	2.10		0.02	85.30	2.57	0.02	305	309
Q	7.14	1.12	0.10	2.14	1.56	0.23	0.08	2.10		0.02	85.40	2.60	0.03	298	308
Q	7.08	1.10	0.10	2.17	1.56	0.33	0.10	2.12		0.02	85.30	2.60	0.03	306	311
Q	7.15	1.12	0.10	2.20	1.59	0.28	0.09	2.14		0.02	85.20	2.65	0.02	296	311
Q	7.14	1.09	0.10	2.13	1.56	0.23	0.09	2.13		0.02	85.40	2.61	0.02	297	310
Q	7.06	1.10	0.10	2.17	1.57	0.28	0.08	2.11		0.02	85.40	2.63	0.02	307	308
Q	7.06	1.11	0.10	2.16	1.57	0.28	0.08	2.11		0.02	85.40	2.63	0.02	308	307
Q	7.14	1.10	0.10	2.12	1.56	0.36	0.09	2.12		0.02	85.30	2.60	0.02	300	308
R						0.31						2.78			420
R						0.33						2.78			420
R						0.33						2.80			421
R						0.34						2.79			422
R						0.31						2.80			422
R						0.31						2.79			420
R						0.24						2.80			425
R						0.28						2.78			426
S														299	
S														295	
S														297	
S														294	
S														297	
S														297	
S														298	
S														297	
T															316
T															322
T															312
T															315
T															329
T															326
T															313
T															331
U										0.03		2.53		293	
U										0.03		2.47		297	
U										0.03		2.52		297	
U										0.03		2.58		290	
U										0.03		2.49		293	
U										0.03		2.50		292	
U										0.03		2.52		303	
U										0.03		2.61		296	

Availability: This product is available in Laboratory Packs containing 1kg of material or in Explorer Packs containing client specified weights of material from 50g up to 250g. Laboratory Packs are sealed bottles delivered in sealed foil pouches. Explorer Packs contain material in standard geochem envelopes placed into foil pouches that are nitrogen flushed and vacuum sealed.

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.

8 January 2009

Certifying officers:

African Mineral Standards:_____

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

Geochemist:_____

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