

African Mineral Standards

Certificate of Analysis

**Gold, tails grade, siliceous matrix
multi-element reference material
made from the Dominion Reef, South Africa**

AMIS0045

**Recommended Concentration and two "Between
Laboratory" Standard Deviations***

Provisional Concentration

Au (Pb Collection) 0.221 ± 0.032 g/t

Certified Concentrations

U (T/ICP)	83	±	12	ppm**
U (XRF)	87	±	12	ppm**
Specific Gravity	2.76	±	0.13	g/cc

**Additional geochemical data for this material, to enable its use for method development and for the calibration of equipment, is available on request.*

**** Or, by applying a chemical conversion factor of U x 1.1793 = U₃O₈
U₃O₈ by multi acid digestion: 98 ± 14 ppm
U₃O₈ by XRF: 103 ± 14 ppm**

Intended use: AMIS0045 is suitable for monitoring the accuracy of a single analysis of gold ores hosted by siliceous rocks. The material can be used for routine quality control by inserting within a batch of samples.

Additional geochemical data for this material, to enable its use for method development and for the calibration of equipment, is available on request.

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 standard was made from Dominion Upper Reef material supplied by Uranium One from their Dominion Project situated 15km north west of Klerksdorp in the Northwest Province, South Africa.

The Dominion reefs are part of the Dominion Group (age 3.1 Ga); a sequence of sediments and volcanics underlying the Witwatersrand Supergroup (age 2.7 Ga). The Dominion succession is taken to mark the initiation of Witwatersrand Basin development on the young Kapvaal Craton and quartz pebble reefs within the Dominion are compositionally similar or identical to younger Witwatersrand reefs.

Mineral and chemical composition: The mineralization within the reef is contained principally within a quartz pebble conglomerate unit, the Upper Reef; which has been mined for its uranium and low gold content. The uranium is present mainly in the form of uraninite (UO₂); gold occurs primarily as discrete grains.

The certified major element chemical composition of this material (below), is based on predominantly XRF analyses, from 14 selected laboratories each analysing 8 samples.

Al ₂ O ₃ %	Fe ₂ O ₃ %	K ₂ O %	MnO %	SiO ₂ %	Certified Concentration
4.88 0.34	3.25 0.23	1.35 0.11	0.11 0.01	87.7 0.12	mean 2SD
CaO %	LOI %	MgO %	S %	TiO ₂ %	Provisional Concentration
0.17 0.03	0.93 0.22	0.41 0.06	0.26 0.03	0.28 0.05	mean 2SD
P ₂ O ₅ %	Na ₂ O %	Indicated			
0.065	0.026	mean			

The elemental composition of this material has also been certified for an additional 35 minor elements. Data for the major and minor elements is available on a separate certificate.

Method of preparation: The material was crushed, dry-milled and air-classified to 100% <54µm. Wet sieve particle size analysis of random samples confirmed the material was 100% <54µm. 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. Au. ICP-OES, Pb collection.
2. U, multi-acid total digestion, including HF, ICP-OES or MS.
3. U, XRF fusion.
4. SG (gas pycnometer)

Method of certification: Twenty laboratories were each given eight randomly selected packages of sample. The results from the nineteen laboratories that issued results timeously were used.

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., (Canada).
2. AGA - West Wits Laboratory, (South Africa).
3. AGA - Vaal River Laboratory (South Africa).
4. ALS Chemex South Africa (Pty) Ltd.
5. ALS Chemex, (Vancouver, Canada).
6. Amdel Limited, (Perth, Australia).
7. Ammtec Ltd., (Western Australia).
8. Anglo Research (Crown Campus, South Africa).
9. Assayers Canada, (Vancouver).
10. Genalysis Laboratory Services (Pty) Ltd., (Australia).
11. Geoservice Centre, Geolaboratory, (GTK. Finland).
12. OMAC Laboratories (Ireland).
13. Performance Laboratories, (South Africa).
14. Pt Intertek Utama Services (Intertek, Indonesia)
15. Set Point Laboratories (Pty) Ltd (South Africa)
16. SGS Lakefield Research Africa (Pty) Ltd. (Joburg, South Africa)
17. SGS Welshpool (Australia).
18. SRC Labs., (Canada).
19. Ultra Trace (Pty) Ltd. (Australia)

Assay Data: Data as received from the laboratories is set out below. A proficiency report has been sent to the managers of the participating laboratories.

Lab Code	U XRF ppm	U ICP ppm	Au, g/t g/t	SG g/cc
A		89.30	0.207	
A		87.10	0.242	
A		88.70	0.244	
A		89.70	0.209	
A		91.30	0.223	
A		93.20	0.248	
A		89.40	0.239	
A		89.80	0.219	
B			0.242	
B			0.230	
B			0.222	
B			0.230	
B			0.202	
B			0.240	
B			0.229	
B			0.233	
C		114.00	0.213	2.840
C		113.00	0.233	2.860
C		114.00	0.241	2.800
C		114.00	0.237	2.770
C		116.00	0.235	2.670
C		115.00	0.223	2.750
C		114.00	0.245	2.830
C		114.00	0.214	2.780
D			0.226	
D			0.192	
D			0.248	
D			0.233	
D			0.221	
D			0.218	
D			0.214	
D			0.227	
E	91.58		0.225	
E	89.89		0.240	
E	89.89		0.245	
E	86.50		0.260	
E	83.95		0.230	
E	89.04		0.220	
E	97.52		0.230	
E	89.89		0.230	
F			0.210	2.790
F			0.210	2.760
F			0.210	2.770
F			0.220	2.770
F			0.220	2.780
F			0.210	2.790
F			0.220	2.790
F			0.220	2.800
G			0.225	
G			0.210	
G			0.263	
G			0.216	
G			0.261	
G			0.233	
G			0.248	
G			0.209	
H		76.00	0.212	
H		79.30	0.213	
H		77.20	0.219	
H		80.20	0.220	
H		77.80	0.190	
H		76.80	0.213	
H		78.60	0.227	
H		78.50	0.231	
I		58.60	0.200	2.730
I		70.20	0.230	2.730
I		67.10	0.188	2.590
I		68.00	0.249	2.860
I		77.50	0.220	2.550
I		76.40	0.214	2.530
I		76.20	0.231	2.660
I		77.80	0.228	2.720
J	82.00	88.31	0.260	2.770
J	82.00	93.85	0.220	2.750
J	82.00	94.20	0.240	2.750
J	82.00	89.10	0.200	2.750
J	83.00	89.90	0.240	2.730
J	83.00	88.09	0.190	2.750
J	83.00	93.65	0.230	2.810
J	83.00	87.49	0.190	2.810

Lab Code	U XRF ppm	U ICP ppm	Au, g/t g/t	SG g/cc
K	75.00		0.271	
K	70.00		0.223	
K	67.00		0.222	
K	74.00		0.236	
K	70.00		0.211	
K	69.00		0.201	
K	68.00		0.222	
K	68.00		0.242	
L			0.230	
L			0.230	
L			0.230	
L			0.230	
L			0.250	
L			0.220	
L			0.220	
L			0.220	
M	89.55		0.198	
M	88.49		0.243	
M	90.85		0.189	
M	90.55		0.223	
M	92.00		0.206	
M	90.05		0.214	
M	92.73		0.230	
M	91.10		0.212	
N			0.200	
N			0.190	
N			0.220	
N			0.200	
N			0.220	
N			0.220	
N			0.220	
N			0.230	
N			0.190	
O	84.80	78.50	0.260	2.900
O	76.32	78.20	0.250	2.880
O	84.80	81.50	0.250	2.890
O	93.28	80.40	0.250	2.880
O	84.80	81.60	0.230	2.890
O	76.32	81.00	0.230	2.890
O	93.28	80.90	0.250	2.940
O	93.28	80.20	0.240	2.930
P	89.00	180.00	0.230	2.750
P	88.00	120.00	0.220	2.750
P	97.00	90.00	0.210	2.750
P	93.00	120.00	0.190	2.730
P	96.00	86.00	0.200	2.740
P	94.00	130.00	0.190	2.740
P	95.00	170.00	0.200	2.740
P	91.00	150.00	0.210	2.740
Q	89.46	80.84	0.214	2.750
Q	89.29	91.92	0.220	2.800
Q	89.80	88.17	0.202	2.760
Q	88.45	83.84	0.207	2.770
Q	90.74	83.16	0.206	2.760
Q	89.21	84.36	0.203	2.760
Q	88.79	82.01	0.220	2.760
Q	90.31	78.96	0.225	2.760
R		79.00	0.204	
R		77.00	0.187	
R		79.00	0.206	
R		79.00	0.209	
R		79.00	0.196	
R		79.00	0.193	
R		81.00	0.193	
R		78.00	0.195	
T	76.32	87.50	0.202	2.640
T	101.76	85.50	0.218	2.670
T	101.76	85.00	0.197	2.680
T	76.32	86.50	0.209	2.680
T	76.32	88.50	0.237	2.660
T	84.80	88.50	0.232	2.670
T	76.32	85.50	0.233	2.670
T	84.80	87.00	0.200	2.680

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.

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Certifying officers:



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