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

## Witwatersrand Gold Standard High Ore Grade Reference Material

AMIS0029

### *Certificate of Analysis*

Recommended Concentration and two “Between Laboratory”  
Standard Deviations\*

#### *Certified Concentrations*

Au (Pb Collection)	15.79	+-	0.80	g/t
U (T/ICP)**	867	+-	72	ppm
U (XRF)	890	+-	28	ppm
Specific Gravity	2.78	+-	0.18	g/cc

#### *Indicated Mean*

Ag (T) 2.1 +- 0.6 ppm

*\*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 = U<sub>3</sub>O<sub>8</sub>  
U<sub>3</sub>O<sub>8</sub> by multi acid digestion: 1022 ± 85 ppm  
U<sub>3</sub>O<sub>8</sub> by XRF: 1050 ± 33 ppm**

**Intended use:** AMIS0029 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 grade-sorted pulp rejects sourced from Anglo Gold Ashanti mine assay laboratories in South Africa. It represents sample material from the basal contacts of the Vaal Reef and the Carbon Leader Reef collected during routine underground sampling.

**Radioactivity:** Shipments of this material require special labeling and placarding. AMIS0029 contains U (11.1 Bq/g) and Th (1.09 Bq/g) and is classified as EXCEPTED 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".

**Mineral and chemical composition:** The major gangue mineral is quartz with minor pyrite, uraninite and thucolite. Gold occurs primarily as discrete grains.

The chemical composition of this material (below), is based on predominantly XRF analyses, from 12 selected laboratories each analysing 8 samples.

SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	S %	MgO %	K <sub>2</sub> O %	CaO %	TiO <sub>2</sub> %	Certified Concentrations	
84.08	5.42	5.252	1.52	0.74	0.695	0.316	0.237	mean	
1.36	0.22	0.212	0.16	0.04	0.042	0.016	0.018	2SD	
							MnO %	LOI %	Provisional Concentrations
							0.038	2.37	mean
							0.006	0.24	2SD
							Na <sub>2</sub> O %	P <sub>2</sub> O <sub>5</sub> %	Indicated means
							0.16	0.04	

**The minor element composition, including Rare Earths, has also been determined. Data for the major elements, minor elements and rare earths, including full statistical reports, is available on request.**

**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 and Ag. Multi-acid total digestion, including HF, ICP-OES or MS.
3. U, XRF fusion.
4. SG ( gas pycnometer )
5. Multi-acid total digestion, including HF, ICP- OES or ICP-MS.
6. Multi element XRF scan ( to include Ag, U & rare earth elements ).

**Method of certification:** Twenty five laboratories were each given eight randomly selected packages of sample. The results from the twenty one 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. 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. Activation Laboratories Ltd., (ActLabs, Ancaster, ON, Canada).
3. AGA - West Wits Laboratory, (South Africa).
4. AGA - Vaal River Laboratory (South Africa).
5. ALS Chemex South Africa ( Pty ) Ltd.
6. ALS Chemex, (Vancouver, Canada).
7. Ammtec Ltd., (Western Australia).
8. Anglo Research (Crown Campus, South Africa).
9. Assay Analytical Services ( South Africa )
10. Assayers Canada, (Vancouver).
11. Genalysis Laboratory Services ( Pty ) Ltd., (Australia).
12. Geoservice Centre, Geolaboratory, (GTK. Finland).
13. Performance Laboratories, (South Africa).
14. Pt Intertek Utama Services (Intertek, Indonesia)
15. Set Point Laboratories ( Pty ) Ltd (South Africa)
16. SGS Lakefield Research (Canada)
17. SGS Lakefield Research Africa ( Pty ) Ltd. (Joburg, South Africa)
18. SGS Mineral Services - Barberton, (South Africa).
19. SGS Welshpool (Australia).
20. SRC Labs., (Canada).
21. 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	Au (Pb Collection) g/t	U (T/CP) ppm	U (XRF) ppm	Specific Gravity g/cc
A	15.70	862	941	2.68
A	15.80	863	925	2.72
A	16.10	853	925	2.72
A	15.90	855	950	2.69
A	15.40	870	916	2.64
A	16.10	871	933	2.69
A	16.20	859	950	2.70
A	16.00	862	941	2.70
B	14.95	924		
B	13.78	903		
B	16.64	914		
B	13.66	918		
B	15.04	928		
B	14.54	917		
B	14.57	914		
B	14.80	922		
C	15.80	900	894	
C	15.80	860	883	
C	15.60	840	886	
C	15.40	860	887	
C	15.80	890	886	
C	15.60	870	888	
C	16.10	840	887	
C	15.80	880	888	
D	15.60	830	800	2.72
D	14.90	840	800	2.71
D	15.60	820	800	2.71
D	15.20	870	800	2.73
D	15.80	820	700	2.72
D	15.70	840	800	2.72
D	15.60	840	900	2.72
D	16.00	840	600	2.72
E	15.50	868	890	2.91
E	15.70	871	890	2.95
E	15.60	876	882	2.94
E	15.80	882	865	2.97
E	15.60	881	873	2.96
E	15.50	871	865	2.97
E	15.60	871	865	2.94
E	15.80	888	873	2.96
F	16.41	941	859	2.83
F	15.82	992	876	2.78
F	15.70	907	864	2.79
F	15.81	886	874	2.79
F	15.82	925	861	2.79
F	15.60	866	883	2.79
F	16.67	842	867	2.80
F	16.74	850	870	2.79
G	15.50			
G	16.00			
G	16.20			
G	15.60			
G	16.10			
G	15.80			
G	16.10			
G	15.60			
H	16.10			
H	15.70			
H	16.60			
H	16.30			
H	15.70			
H	15.80			
H	15.90			
H	16.40			
I	15.40	901	909	
I	15.40	816	895	
I	15.50	822	907	
I	15.70	837	897	
I	15.50	812	896	
I	16.30	834	899	
I	15.90	829	900	
I	15.50	711	897	
K	16.17	827	879	2.90
K	16.40	832	891	2.81
K	16.47	871	885	2.82
K	16.44	850	885	2.81
K	16.45	854	886	2.85
K	16.28	872	884	2.88
K	16.72	835	888	2.80
K	16.42	828	886	2.82
L	15.07	844		
L	15.02	856		
L	14.90	833		
L	14.71	831		
L	15.59	800		
L	15.29	844		
L	15.44	823		
L	15.52	821		

Lab	Au (Pb Collection) g/t	U (T/CP) ppm	U (XRF) ppm	Specific Gravity g/cc
M				
M				
M				
M				
M				
M				
M				
N	15.40			2.82
N	14.80			2.83
N	15.20			2.82
N	15.20			2.82
N	15.20			2.83
N	15.40			2.82
N	15.10			2.82
N	15.00			2.82
O	14.80	839		
O	14.30	808		
O	14.80	827		
O	15.10	843		
O	15.50	802		
O	15.90	844		
O	15.00	823		
O	14.50	848		
P	14.95	890		
P	15.85	920		
P	15.65	910		
P	16.15	980		
P	15.10	800		
P	15.65	1000		
P	15.15	930		
P	15.55	860		
Q	16.11		898	
Q	15.92		893	
Q	16.15		891	
Q	16.09		897	
Q	16.10		901	
Q	16.15		915	
Q	15.98		914	
Q	16.17		914	
R	16.40	860	900	2.67
R	15.90	860	900	2.51
R	15.75	910	900	2.81
R	15.95	920	900	2.85
R	16.15	900	900	2.81
R	15.90	890	900	2.75
R	15.55	870	900	2.69
R	15.55	890	900	2.81
S	16.02			
S	16.13			
S	15.70			
S	15.77			
S	15.43			
S	16.00			
S	16.23			
S	15.95			
T	15.50	924	894	2.77
T	15.80	910	899	2.72
T	15.20	927	883	2.66
T	15.60	907	889	2.62
T	15.90	900	884	2.57
T	15.40	900	885	2.62
T	15.90	915	889	2.64
T	15.10	905	888	2.67
U	16.25			2.55
U	16.57			2.57
U	15.70			2.53
U	15.82			2.52
U	16.25			2.48
U	16.71			2.41
U	15.77			2.54
U	15.72			2.44
V	16.49			
V	15.96			
V	15.98			
V	16.28			
V	16.64			
V	15.62			
V	16.34			
V	15.79			
W	16.32			
W	16.40			
W	16.16			
W	16.16			
W	16.08			
W	15.72			
W	15.00			
W	15.80			

**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.

28 May 2007

**Certifying officers:**



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