Intended Use: AMIS-7 is suitable for monitoring the accuracy of a single analysis of PGE, Cu and Ni ores hosted by Merensky Reef or other similar mafic rocks. The material can be used for routine quality control by inserting within a batch of samples, 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 standard was made using Merensky Reef material supplied by Anglo Platinum Limited from the Western limb of the Bushveld Complex. The Merensky Reef is a Pt/Pd ore. This specific material was collected from the Turfontein Mine ore silo.

Approximate Mineral and Chemical Composition: AMIS-7 comprises approximately 60% Merensky Reef, 30% footwall and 10% hanging wall. The Merensky Reef comprises components of feldspathic pyroxenite, pyroxenite and anorthosite. Peak PGE values are associated with a thin chromitite stringer. Mineralization in this Merensky Reef comprises 2-5% disseminated or net textured magmatic sulphides, predominantly pyrrhotite, pentlandite, chalcopyrite and pyrite. The PGE's occur as micron-sized satellite grains around but rarely within the sulphides.

Fe_2O_3 %	MnO %	Cr_2O_3%	TiO2 %	CaO %	SiO_2 %	Al_2O_3 %	MgO %	Na_2O %	K_2O%	S % (S.Q)
10.1	0.25	2.13	0.24	7.61	49.6	14.1	15.6	1.3	0.25	0.24

Appearance: The material is a very fine powder light grey (Munsell N7) to light grey (Corstor 5Y 7/1).

Method of Preparation: The material was crushed, dry-milled and air-classified to <54um. Wet sieve particle size analysis of random samples confirmed the material was 99.7% <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 the consensus test results were carried out by independent statisticians.

Method of Analysis:

1. Pt, Pd and Au. ICP-OES or ICP-MS, Pb collection with Ag as a co-collector.
2. Au, Pt, Pd, Rh, Ru and Ir. ICP-MS, nickel sulphide collection.
3. Cu and Ni. Multi-acid total digestion, including HF, with ICP-OES finish.
4. Cu and Ni. Aqua regia digestion with ICP-OES finish.
5. Specific Gravity

Information requested:

1. Aliquots used for all determinations.
2. Results for individual PGM's reported in ppb.
3. Results for base metals reported in ppm.
4. QC data, to include replicates, blanks and certified reference materials used.
5. Analytical techniques used.

Method of Certification: Twenty laboratories were each given eight randomly selected packages of sample and various results from the eighteen of those laboratories that reported back timeously were used for the determinations below. The following round robin results are displayed:

- Pt and Pd analyses by the Pb collection method;
- Rh and Ru analyses by the NiS method;
- Cu and Ni by the multi-acid (total) digestion method and
- Cu and Ni by the aqua regia (partial) digestion method.

Lab code	Pt, g/t Pb	Pd, g/t Pb	Rh, g/t NIS	Ru, g/t NIS	Cu, ppm Total	Cu, ppm Partial	Ni, ppm Total	Ni, ppm Partial
A	2.600	1.542	0.242					
A	2.876	1.427	0.224					
A	2.653	1.516	0.244					
A	2.606	1.540	0.246					
A	2.589	1.481	0.240					
A	2.587	1.545	0.254					
A	2.402	1.466	0.227					
A	2.596	1.489	0.238					
B			0.260	0.465	1250	1231	2150	1574
B			0.260	0.467	1228	1240	2119	1590
B			0.262	0.471	1237	1226	2127	1559
B			0.257	0.455	1224	1224	2084	1560
B			0.259	0.457	1214	1222	2073	1570
B			0.258	0.463	1221	1247	2086	1593
B			0.256	0.463	1220	1232	2058	1562
B			0.252	0.458	1199	1220	2046	1553
C	2.360	1.425			1545	1355	2190	1635
C	2.530	1.540			1470	1350	2130	1630
C	2.270	1.380			1520	1330	2200	1620
C	2.330	1.410			1520	1350	2200	1630
C	2.500	1.495			1465	1380	2090	1665
C	2.330	1.395			1480	1350	2110	1635
C	2.330	1.410			1500	1340	2170	1625
C	2.390	1.440			1470	1345	2110	1630

Lab code	Pt, g/t Pb	Pd, g/t Pb	Rh, g/t NIS	Ru, g/t NIS	Cu, ppm Total	Cu, ppm Partial	Ni, ppm Total	Ni, ppm Partial
D	2.600	1.515	0.237	0.427	1270	1405	1967	2059
D	2.605	1.525	0.237	0.422	1301	1375	2001	1796
D	2.600	1.505	0.236	0.423	1311	1398	1993	1766
D	2.630	1.515	0.245	0.426	1319	1386	1980	1773
D	2.670	1.540	0.236	0.423	1301	1400	1984	1771
D	2.650	1.530	0.244	0.436	1311	1369	1973	1742
D	2.650	1.535	0.247	0.430	1298	1405	1966	1765
D	2.590	1.505	0.248	0.433	1311	1403	1943	1767
E	2.563	1.493			1304	1262	2138	1625
E	2.413	1.501			1297	1238	2130	1623
E	2.380	1.493			1295	1221	2127	1591
E	2.370	1.509			1333	1257	2175	1598
E	2.398	1.440			1293	1234	2119	1583
E	2.612	1.537			1300	1219	2124	1616
E	2.543	1.495			1316	1224	2124	1602
E	2.635	1.564			1287	1215	2081	1613
F	2.28	1.39			1290	1400	2030	1770
F	2.30	1.39			1260	1280	2020	1610
F	2.29	1.42			1250	1350	2060	1680
F	2.36	1.42			1260	1330	2030	1650
F	2.34	1.43			1260	1190	1980	1450
F	2.41	1.46			1260	1220	1950	1490
F	2.35	1.41			1250	1220	1930	1510
F	2.42	1.47			1250	1295	1920	1570
G	2.410	1.260	0.170	0.329	1150	1140		
G	2.000	1.240	0.201	0.395	1320	1280		
G	2.160	1.350	0.196	0.384	1260	1260		
G	2.400	1.430	0.183	0.350	1120	1120		
G	2.190	1.350	0.203	0.391	1120	1090		
G	2.250	1.370	0.249	0.488	1170	1260		
G	2.170	1.250	0.217	0.424	1250	1100		
G	2.160	1.230	0.217	0.418	1250	1190		
H	2.530	1.570	0.230	0.450	1300	1240	1900	1700
H	2.560	1.550	0.260	0.460	1300	1270	2000	1690
H	2.560	1.560	0.240	0.450	1300	1260	1900	1700
H	2.610	1.590	0.230	0.440	1300	1260	1900	1710
H	2.590	1.580	0.240	0.430	1400	1260	2100	1720
H	2.610	1.600	0.230	0.430	1300	1270	2000	1710
H	2.620	1.600	0.250	0.450	1200	1250	1900	1720
H	2.600	1.570	0.220	0.440	1200	1280	1800	1710

Lab code	Pt, g/t Pb	Pd, g/t Pb	Rh, g/t NIS	Ru, g/t NIS	Cu, ppm Total	Cu, ppm Partial	Ni, ppm Total	Ni, ppm Partial
I	2.600	1.680	0.266		1330	1400	2010	1630
I	2.610	1.680	0.260		1320	1410	1990	1670
I	2.630	1.660	0.265		1290	1360	2010	1650
I	2.640	1.670	0.262		1340	1380	2080	1650
I	2.510	1.650	0.255		1300	1390	2020	1650
I	2.590	1.670	0.259		1300	1350	1970	1650
I	2.660	1.640	0.263		1300	1290	2020	1610
I	2.630	1.640	0.263		1340	1370	1990	1660
J	2.540	1.570			1470		2130	1780
J	2.560	1.560			1470		2130	1750
J	2.550	1.570			1480		2120	1800
J	2.510	1.560			1460		2100	1770
J	2.490	1.600			1480		2170	1750
J	2.510	1.630			1490		2150	1760
J	2.500	1.640			1500		2110	1730
J	2.660	1.570			1510		2130	1770
K	2.176	1.385	0.242	0.554	1220	1320	2000	1450
K	2.349	1.466	0.250	0.481	1230	1300	1910	1400
K	2.310	1.440	0.240	0.370	1240	1230	2200	1530
K	2.300	1.450	0.230	0.430	1280	1330	2220	1400
K	2.207	1.398	0.257	0.487	1240	1280	2170	1430
K	2.180	1.391	0.227	0.424	1220	1230	2170	1530
K	1.978	1.273	0.247	0.479	1240	1260	2150	1510
K	2.080	1.330	0.240	0.430	1240	1240	2100	1570
L			0.282	0.472	1382	1243	2194	1475
L			0.284	0.473	1383	1257	2210	1545
L			0.286	0.479	1387	1247	2232	1515
L			0.285	0.479	1391	1278	2254	1575
L			0.281	0.476	1385	1257	2226	1548
L			0.285	0.479	1391	1314	2229	1636
L			0.282	0.470	1387	1350	2205	1676
L			0.286	0.476	1379	1258	2211	1567
M	2.620	1.630			1110	1150	1880	1820
M	2.630	1.630			1300	1160	2170	1830
M	2.640	1.640			1300	1200	2170	1870
M	2.570	1.620			1330	1190	2220	1860
M	2.630	1.650			1320	1190	2180	1880
M	2.570	1.620			1330	1220	2200	1930
M	2.590	1.630			1300	1220	2150	1920
M	2.600	1.620			1330	1160	2180	1820

Lab code	Pt, g/t Pb	Pd, g/t Pb	Rh, g/t NIS	Ru, g/t NIS	Cu, ppm Total	Cu, ppm Partial	Ni, ppm Total	Ni, ppm Partial
N	2.330	1.510	0.250	0.470				
N	2.470	1.560	0.220	0.410				
N	2.430	1.540	0.230	0.430				
N	2.430	1.530	0.240	0.450				
N	2.430	1.580	0.230	0.440				
N	2.430	1.540	0.230	0.430				
N	2.340	1.490	0.250	0.460				
N	2.410	1.530	0.220	0.420				
O	2.090	1.290	0.220	0.430	1300	1400		1800
O	2.100	1.280	0.230	0.440	1300	1300		1700
O	2.370	1.410	0.240	0.440	1200	1400		1800
O	1.820	1.100	0.240	0.440	1300	1400		1800
O	2.310	1.360	0.240	0.450	1300	1400		1800
O	2.360	1.420	0.240	0.460	1300	1400		1800
O	2.240	1.350	0.230	0.450	1300	1300		1700
O	2.240	1.330	0.240	0.440	1300	1400		1700
Q			0.227	0.464				
Q			0.229	0.433				
Q			0.228	0.450				
Q			0.317	0.581				
Q			0.228	0.436				
Q			0.261	0.479				
Q			0.223	0.434				
Q			0.214	0.413				
R	2.340	1.355			1355	1400	1905	1745
R	2.410	1.400			1320	1310	1905	1660
R	2.390	1.385			1340	1385	1905	1710
R	2.420	1.405			1380	1410	2010	1755
R	2.510	1.435			1350	1455	1935	1825
R	2.510	1.445			1395	1405	2010	1725
R	2.550	1.490			1385	1360	1925	1675
R	2.370	1.375			1395	1310	1885	1625
S	2.582		0.262	0.506				
S	2.600		0.265	0.495				
S	2.516		0.255	0.476				
S	2.593		0.256	0.476				
S	2.571		0.262	0.514				
S	2.587		0.263	0.510				
S	2.571		0.252	0.477				
S	2.602		0.283	0.542				

The mean and standard deviation for all data was calculated. Outliers were defined as samples beyond the mean ± 2 Standard Deviations from all data. These outliers were removed from the data (shown in red) 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)

Anglo American Research Laboratories (Pty) Ltd. (South Africa)
ACME Analytical Laboratories Ltd. (Canada)
ALS Chemex (Canada)
ALS Chemex South Africa (Pty) Ltd
Amdel Laboratories Ltd (Australia)
Ammtec Ltd (Australia)
Anglo Platinum Research Center (ARC, South Africa)
Becquerel Laboratories Inc. (Canada)
Eastern Bushveld Research Laboratory (EBRL, Anglo Platinum)
Genalysis Laboratory Services (Pty) Ltd. (Australia)
Geoscience Laboratories (Geo Labs, Canada)
Lonmin Platinum Assay Laboratory (South Africa)
Mintek (South Africa)
Muoro Analytical Services (South Africa)
Set Point Laboratories (Pty) Ltd (South Africa)
SGS Lakefield Research Africa (Pty) Ltd. (South Africa)
SGS Welshpool Minerals (Australia)
SGS Lakefield Research (Canada)
Ultra Trace (Pty) Ltd. (Australia)
University of Toronto. (Canada)

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

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 September 2005

Certifying Officers:

African Mineral Standards:_____

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

Geochemist:_____

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