African Mineral Standards

REFERENCE MATERIAL FOR AFRICAN ORES

Merensky Reef (ore grade) PGE Reference Material

AMIS0034

Certificate of Analysis

Recommended Concentrations and two "Between Laboratory" Standard Deviations

Certified Concentrations

Pt (Pb Collection)	3.69	±	0.36 g/t
Pt (NIS)	3.73	±	0.38 g/t
Pd (Pb Collection)	1.63	±	0.18 g/t
Pd (NIS)	1.63	±	0.14 g/t
Cu (P)	1532	±	78 ppm
Cu (T/ICP)	1544	±	100 ppm
Cu (XRF)	1551	±	92 ppm
Ni (P)	1689	±	108 ppm
Ni (T/ICP)	2079	±	148 ppm
Ni (XRF)	2164	±	116 ppm
Co (P)	50	±	6 ppm
Co (T/ICP)	97	±	8 ppm
Cr (XRF)	6016	±	330 ppm
Specific Gravity	3.11	±	0.2 g/cc

Provisional Concentrations

Au (Pb Collection)	0.43	±	0.08 g/t
Au (NIS)	0.40	±	0.08 g/t
Rh	0.24	±	0.04 g/t
Ru (NiS)	0.48	±	0.06 g/t
Ir (NiS)	0.08	±	0.01 g/t

Indicated Means

Cu (F)	1515 ppm
Cr (T/ICP)	5222 ppm

4E = 5.99 g/t (Pt, Pd, Rh plus Au)

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SET POINT TECHNOLOGY

Intended Use: AMIS0034 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, for method development and for the calibration of equipment.

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 underground from the Boschfontein Mine.

Approximate Mineral and Chemical Composition: AMIS0034 comprises Merensky Reef hand sorted underground with minor dilution from footwall and 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.

Appearance: The material is a very fine light grey powder (Corstor colour chart - 5Y 7/1).

Chemistry: The chemical composition is set out below.

	SiO_2	MgO	Al_2O_3	Fe_2O_3	CaO	Na_2O
%	49.92	16.45	12.46	10.24	7.02	1.01
2SD	0.76	0.48	0.66	0.28	0.30	0.08
	Certified	Certified	Certified	Certified	Certified	Certified
	Cr_2O_3	TiO_2	K_2O	MnO	P_2O_5	LOI
%	0.90	0.27	0.22	0.16	0.04	0.93
2SD	0.04	0.02	0.02	0.02		
	Certified	Certified	Certified	Certified	Indicated	Indicated

The major element composition of this material has been certified. Information is available on a separate certificate.

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 100% <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 for both homogeneity and the consensus test results were carried out by independent statisticians.

Method of Analysis:

1. Pt, Pd, Au and Ru. Nickel sulphide collection, ICP-OES or ICP-MS.
2. Pt, Pd and Au. Pb collection with Ag as a co-collector, ICP-OES or ICP-MS.
3. Pt, Pd, Au, Rh, Ru, Ir. NiS collection, ICP-OES or ICP-MS.
4. Co, Cu and Ni. Multi-acid total digestion, including HF, ICP-OES or ICP-MS.
5. Cr, Co, Cu and Ni. Fusion, ICP-OES or ICP-MS
6. Co, Cu and Ni. Aqua regia digestion with ICP-OES or ICP-MS.
7. Cr, Co, Cu and Ni. Fusion or Pressed Pellet, XRF.
8. SG. Gas pycnometer.

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: Thirty one laboratories were each given nine samples, comprising eight packages of sample scientifically selected from throughout the batch and, one sample of a different certified reference material for QC purposes. Various results from the twenty six laboratories that reported back timeously were used for the determinations. The following round robin results are displayed:

- 4E PGE (the sum of Pt, Pd, Au by Pb collection and Rh);
- Pt, Pd and Au analyses by the Pb collection method;
- Pt, Pd, Au, Ru and Ir analyses by the NiS collection method;
- Rh analyses by NiS and Fire Assay;
- Cu, Co and Ni by the Fusion (F) method.
- Cu, Co and Ni by the aqua regia (partial- P) digestion method.
- Cu, Co, Ni and Cr by the multi-acid (total -T) digestion method;
- Cu, Co, Ni and Cr by XRF;
- Specific gravity by water or gas Pycnometer.

The 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 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 calculated using all remaining data. Any analysis that fell outside of the mean ±2 standard deviations was removed from the ensuing data base. The mean and standard deviations were again calculated using the remaining data. This method is different from that used by Government agencies 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 Confidence Limits published on other standards. Standards with an RSD of near or less than 5 % are certified, RSD’s of between near 5 % and 15 % are Provisional, and RSD’s over 15 % are Indicated.

The tables below represent raw data received from the laboratories.

AMIS0034 PGE Merensky

Lab Code	4E PGE g/t 1+2+3+4	Pb Coll Pt, g/t 1	Pb Coll Pd, g/t 2	Pb Coll Au, g/t 3	NiS Pt g/t	NiS Pd g/t	NiS Au g/t	Rh 4	NiS Ru g/t	NiS Ir g/t	F Cu ppm	P Cu ppm	T Cu ppm	XRF Cu ppm	F Co ppm	P Co ppm	T Co ppm	XRF Co ppm	F Ni ppm	P Ni ppm	T Ni ppm	XRF Ni ppm	T Cr ppm	XRF Cr ppm	SG g/cc
A	6.07	3.81	1.62	0.40	3.71	1.66	0.42	0.243	0.47	0.08		1560	1580	1494		48	100	134		1670	2130	2208	6350	6233	2.86
A	6.23	3.80	1.76	0.43	2.87	1.68	0.43	0.234	0.48	0.08		1580	1580	1494		50	100	126		1690	2140	2208	6400	6219	2.96
A	5.96	3.69	1.64	0.39	3.65	1.63	0.42	0.235	0.48	0.08		1580	1550	1494		48	100	126		1680	2120	2208	6400	6199	2.97
A	6.29	3.88	1.70	0.47	3.79	1.67	0.45	0.242	0.51	0.09		1560	1570	1478		50	100	126		1710	2120	2200	6250	6213	2.95
A	5.89	3.60	1.63	0.42	3.88	1.64	0.43	0.236	0.49	0.09		1560	1550	1494		50	100	126		1700	2130	2200	6350	6206	2.91
A	6.30	3.80	1.80	0.46	3.87	1.65	0.43	0.239	0.49	0.08		1590	1600	1502		50	100	134		1710	2160	2200	6200	6219	2.95
A	6.24	3.70	1.87	0.43	4.00	1.67	0.45	0.241	0.48	0.09		1570	1600	1494		50	105	126		1680	2170	2216	6350	6219	2.94
A	6.27	3.90	1.70	0.43	3.81	1.66	0.41	0.236	0.49	0.09		1570	1570	1502		50	100	134		1730	2150	2224	6300	6274	2.98
B																									
B																									
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B																									
B																									
B																									
C	5.60	3.45	1.55	0.41	3.45	1.54	0.37	0.196	0.46	0.21	1605				103				1787				6276		
C	5.66	3.49	1.55	0.42	3.56	1.54	0.39	0.203	0.47	0.21	1550				95				2024				6113		
C	5.69	3.50	1.57	0.42	3.66	1.56	0.36	0.206	0.48	0.25	1506				90				1972				6150		
C	5.67	3.45	1.53	0.44	3.80	1.70	0.35	0.258	0.48	0.16	1605				101				1921				6455		
C	5.48	3.34	1.50	0.41	3.51	1.58	0.38	0.235	0.48	0.15	1560				98				1987				6248		
C	5.71	3.42	1.58	0.48	3.57	1.57	0.34	0.237	0.47	0.19	1671				84				2063				5930		
C	5.59	3.36	1.55	0.43	3.44	1.56	0.34	0.246	0.47	0.22	1475				82				1967				5816		
C	5.40	3.27	1.48	0.41	3.51	1.53	0.35	0.238	0.47	0.21	1435				100				2015				5954		
D		3.57	1.56	0.47																					
D		3.46	1.45	0.53																					
D		3.40	1.33	0.46																					
D		3.40	1.31	0.35																					
D		3.38	1.48	0.43																					
D		3.52	1.46	0.46																					
D		3.45	1.43	0.49																					
D		3.60	1.61	0.43																					
E		3.97	1.66	0.40									1480				110				2060				
E		3.87	1.63	0.41									1480				110				2050				
E		3.78	1.65	0.44									1440				110				2020				
E		3.79	1.65	0.43									1460				110				2030				
E		3.60	1.48	0.38									1450				110				2060				
E		4.06	1.72	0.47									1530				110				2110				
E		3.81	1.58	0.42									1540				110				2120				
E		3.73	1.57	0.35									1520				110				2100				
F	6.00	3.66	1.65	0.44	3.99	1.63		0.254	0.40	0.10		1490	1530			54	100	107		1660	2170	2240	2900	6210	3.01
F	6.08	3.69	1.63	0.49	3.19	1.87		0.268	0.38	0.10		1500	1560			55	97	110		1630	2130	2190	2910	6320	3.03
F	6.16	3.83	1.65	0.45	3.36	1.50		0.234	0.38	0.09		1450	1530			53	96	105		1660	2130	1940	2920	6130	3.12
F	5.82	3.57	1.54	0.46	3.96	1.61		0.255	0.41	0.09		1510	1510			55	96	107		1680	2110	2040	2950	6100	3.08
F	6.12	3.79	1.65	0.42	3.80	1.68		0.262	0.41	0.10		1470	1500			54	95	107		1650	2080	1970	3050	6180	3.12
F	6.18	3.85	1.67	0.40	3.96	1.66		0.256	0.41	0.09		1480	1570			53	101	107		1670	2110	2420	2820	6210	2.97
F	6.24	3.84	1.69	0.45	4.08	1.67		0.262	0.39	0.10		1440	1510			53	94	108		1660	2110	2210	2790	6190	3.12
F	6.02	3.73	1.62	0.42	3.71	1.63		0.248	0.37	0.09		1480	1550			55	101	107		1720	2230	2120	2870	6070	3.03
G	5.86	3.55	1.62	0.44	3.62	1.57	0.37	0.246	0.46	0.08	1541	1544	1531		104	50	97		2131	1728	1926		4385		3.29
G	5.95	3.59	1.61	0.50	3.71	1.62	0.36	0.252	0.46	0.08	1553	1567	1533		102	52	97		2205	1765	1912		4670		3.21
G	5.75	3.49	1.61	0.41	3.56	1.59	0.45	0.251	0.45	0.08	1507	1539	1516		106	51	96		2078	1725	1892		4507		3.22
G	5.77	3.54	1.58	0.40	3.80	1.58	0.43	0.252	0.48	0.09	1537	1543	1510		105	50	93		2160	1735	1858		4771		3.21
G	5.79	3.47	1.61	0.45	3.97	1.64	0.41	0.259	0.48	0.09	1525	1579	1530		98	52	94		2142	1771	1905		4724		3.25
G	5.78	3.49	1.67	0.38	3.69	1.61	0.43	0.248	0.47	0.08	1535	1577	1510		95	50	95		2105	1769	1873		4517		3.16
G	5.75	3.50	1.59	0.40	3.93	1.65	0.48	0.253	0.49	0.09	1503	1532	1502		107	50	92		2160	1714	1859		4474		3.13
G	5.91	3.56	1.60	0.50	3.82	1.62	0.38	0.248	0.49	0.09	1524	1578	1513		105	51	93		2204	1759	1878		4927		3.12
H					2.98	1.51	0.39	0.228	0.47	0.08				1516				98				1968		6649	
H					2.87	1.53	0.35	0.238	0.51	0.08				1484				99				1936		6647	
H					3.39	1.61	0.37	0.247	0.48	0.08				1486				99				1950		6666	
H					3.17	1.51	0.35	0.230	0.49	0.08				1510				101				1952		6637	
H					3.13	1.44	0.48	0.207	0.44	0.08				1486				101				1940		6609	
H					3.38	1.53	0.33	0.238	0.50	0.08				1496				98				1959		6649	
H					3.29	1.51	0.39	0.232	0.50	0.08				1513				102				1939		6645	
H					3.14	1.53	0.38	0.231	0.47	0.08				1518				99				1975		6563	
I		3.47	1.56	0.43								1575	1635	1580		51	98	100		1675	2160	2130	4570	6080	2.92
I		3.65	1.60	0.45								1595	1605	1600		50	97	100		1705	2090	2140	4320	6090	2.87
I		3.75	1.61	0.45								1560	1605	1590		52	98	100		1655	2110	2150	4350	6070	3.18
I		3.69	1.63	0.42								1540	1630	1580		52	100	100		1640	2130	2150	4330	6120	3.05
I		3.57	1.60	0.47								1550	1545	1600		50	99	100		1620	2040	2150	4330	6080	3.04
I		3.63	1.58	0.45								1530	1570	1570		50	97	100		1640	2060	2150	4350	6120	3.08
I		3.37	1.46	0.39								1535	1530	1590		52	95	100		1660	2000	2150	4360	6090	3.23
I		3.63	1.60	0.41								1540	1675	1580		51	100	100		1635	2170	2140	4520	6120	3.12
J	5.94	3.58	1.67	0.45	3.98	1.58	0.37	0.242	0.47	0.09		1550	1420	1576		49	100			1710	2020	2183		5973	
J	6.09	3.68	1.67	0.50	3.96	1.57	0.45	0.243	0.49	0.09		1530	1440	1537		49	97			1680	2010	2197		5973	
J	6.07	3.68	1.67	0.48	3.87	1.59	0.37	0.243	0.48	0.09		1550	1450	1573		49	96			1690	2010	2203		5943	
J	5.93	3.62	1.65	0.40	4.32	1.73	0.52	0.263	0.50	0.09		1540	1480	1555		48	98			1690	2050	2170		5989	
J	5.98	3.66	1.64	0.42	4.14	1.69	0.44	0.258	0.49	0.09		1540	1430	1565		49	96			1690	2000	2187		5981	
J	5.90	3.57	1.65	0.42	4.19	1.71	0.56	0.261	0.50	0.09		1510	1430	1552		50	96			1660	2000	2168		5956	
J	5.99	3.62	1.65	0.46	3.96	1.69	0.47	0.254	0.48	0.09		1530	1430	1563		47	96			1660	1990	2189		5963	
J	6.11	3.74	1.65	0.46	4.36	1.71	0.51	0.258	0.51	0.09		1520	1410	1566		52	98			1650	1970	2180		5941	
K		1.88	1.01	0.36								1544	1573			54	95			1714	2143		4374		
K		3.86	1.61	0.41								1539	1561			53	96			1699	2140		4501		
K		3.92	1.68	0.43								1552	1547			53	94			1710	2122		4049		
K		3.77	1.60	0.45								1534	1575			54	99			1704	2131		3987		
K		0.41	0.26	0.13								1542	1571			53	96			1700	2147		4065		
K		3.87	1.64	0.46								1549	1545			54	95			1713	2120		4602		
K		3.95	1.61	0.47								1541	1577			53	96			1717	2160		4832		
K		4.07	1.65	0.48								1551	1554			55	95			1707	2134		4022		
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Lab Code	4E PGE g/t 1+2+3+4	Pb Coll Pt, g/t 1	Pb Coll Pd, g/t 2	Pb Coll Au, g/t 3	NiS Pt g/t	NiS Pd g/t	NiS Au g/t	Rh 4	NiS Ru g/t	NiS Ir g/t	F Cu ppm	P Cu ppm	T Cu ppm	XRF Cu ppm	F Co ppm	P Co ppm	T Co ppm	XRF Co ppm	F Ni ppm	P Ni ppm	T Ni ppm	XRF Ni ppm	T Cr ppm	XRF Cr ppm	SG g/cc
N		3.73	1.76	0.51							1404	1525	1492		105	52	94		2207	1667	1953				
N		3.97	1.79	0.66							1462	1429	1479		106	46	95		2023	1556	1929				
N		3.22	1.60	0.37							1416	1473	1485		101	45	93		2171	1611	1889				
N		3.61	1.72	0.36							1481	1441	1478			44	94		2143	1562	1903				
N		3.72	1.81	0.41							1474	1477	1499			46	93		2323	1576	1904				
N		3.56	1.75	0.38							1401	1479	1502		101	49	94		2107	1601	1876				
N		3.78	1.86	0.40							1418	1445	1500			46	95		2047	1555	1811				
N		3.62	1.73	0.37							1434	1458	1453			44	90		2182	1571	2004				
O		4.08	1.87	0.47								1370	1580				88			1280	1910				3.02
O		3.87	1.72	0.43								1390	1570				86			1260	1950				4.18
O		4.27	1.81	0.43								1360	1600				91			1210	1950				3.24
O		4.00	1.75	0.46								1390	1640				90			1340	1970				3.15
O		4.14	1.80	0.44								1390	1610				90			1320	1980				3.23
O		4.21	1.83	0.47								1370	1530				88			1290	1940				3.17
O		4.05	1.76	0.44								1380	1710				87			1280	2050				4.87
O		4.11	1.76	0.47								1360	1560				88			1280	1940				3.19
P		3.76	1.61	0.44				0.21					1381				89				1975		2579		
P		3.51	1.58	0.41				0.21					1447				91				2059		2721		
P		3.58	1.59	0.35				0.20					1503				94				2147		3226		
P		3.76	1.61	0.45				0.17					1479				94				2098		3226		
P		3.60	1.58	0.40				0.19					1472				95				2108		3192		
P		3.55	1.58	0.38				0.20					1444				92				2062		2940		
P		3.59	1.57	0.40				0.19					1491				95				2139		2951		
P		3.66	1.59	0.40				0.18					1437				93				2049		2924		
Q				0.41						0.08								111				2160		6470	
Q				0.46						0.07								111				2110		6390	
Q				0.45						0.08								111				2090		6390	
Q				0.44						0.07								111				2150		6430	
Q				0.48						0.08								110				2090		6370	
Q				0.39						0.08								110				2090		6380	
Q				0.40						0.08								108				2110		6290	
Q				0.48						0.08								108				2070		6240	
R					3.50	1.49	0.37	0.228	0.45	0.08	1546				108				2076						
R					3.42	1.45	0.34	0.223	0.44	0.08	1546				110				2059						
R					3.47	1.46	0.34	0.223	0.44	0.08	1545				111				2066						
R					3.41	1.45	0.38	0.223	0.44	0.08	1553				108				2036						
R					3.42	1.46	0.37	0.223	0.44	0.08	1559				115				2055						
R					3.51	1.47	0.40	0.223	0.44	0.08	1576				124				2027						
R					3.40	1.47	0.34	0.224	0.44	0.08	1563				109				2031						
R					3.42	1.46	0.36	0.223	0.45	0.08	1570				110				2030						
S																									
S																									
S																									
S																									
S																									
S																									
S																									
S																									
T	6.23	3.85	1.70	0.40	3.79	1.73	0.41	0.280	0.45	0.12	1600		1400	1390			96	101	2200	1700	2000	2042	5700		3.07
T	6.12	3.75	1.64	0.42	3.82	1.72	0.41	0.310	0.43	0.13	1600		1500	1371			97	102	2200	1720	2000	2012	5600		3.07
T	6.31	3.87	1.70	0.43	3.86	1.75	0.45	0.310	0.47	0.13	1500		1500	1387			110	104	2200	1710	2100	2034	5800		3.07
T	6.22	3.81	1.69	0.44	3.77	1.70	0.44	0.280	0.44	0.11	1500		1600	1375			100	103	2200	1700	2300	2025	5700		3.06
T	6.15	3.71	1.70	0.46	3.87	1.68	0.43	0.280	0.47	0.12	1400		1500	1381			110	99	1900	1700	2000	2024	5600		3.07
T	6.23	3.80	1.71	0.44	3.90	1.72	0.38	0.280	0.43	0.12	1500		1400	1394			99	97	2100	1660	2000	2060	5800		3.06
T	6.28	3.87	1.70	0.42	3.69	1.67	0.45	0.290	0.46	0.11	1300		1700	1387			110	102	1900	1680	2300	2038	5600		3.06
T	6.25	3.81	1.70	0.47	3.79	1.66	0.41	0.270	0.47	0.12	1400		1500	1390			98	107	2000	1670	2100	2041	5700		3.06
U		3.91	1.72	0.47								1730	1520							1765	2020		3950		
U		4.01	1.72	0.44								1660	1560							1720	2080		4430		
U		4.06	1.73	0.41								1690	1530							1755	2030		4410		
U		4.02	1.72	0.44								1690	1650							1750	2200		4780		
U		3.79	1.72	0.44								1680	1550							1735	1980		4170		
U		4.10	1.74	0.42								1750	1610							1770	2080		4590		
U		4.04	1.72	0.45								1700	1610							1760	2290		5020		
U		4.04	1.71	0.48								1690	1580							1735	2060		4580		
V	6.04	3.72	1.61	0.46	3.99	1.70	0.43	0.256	0.51	0.09		1580	1577	1504		52	111	92		1758	2154	1945	5300	5800	3.11
V	5.92	3.61	1.68	0.39	3.82	1.66	0.44	0.247	0.49	0.09		1568	1497	1488		54	103	101		1762	2051	1924	5100	5800	3.13
V	6.02	3.61	1.69	0.46	4.01	1.69	0.45	0.270	0.51	0.08		1568	1415	1485		52	96	100		1753	1959	1932	4500	5800	3.11
V	5.81	3.56	1.64	0.37	3.78	1.66	0.44	0.247	0.50	0.08		1567	1396	1481		53	94	90		1756	1932	1925	4700	5800	3.13
V	5.93	3.65	1.64	0.35	3.85	1.70	0.46	0.295	0.53	0.08		1592	1527	1491		54	98	95		1795	2063	1937	5200	5700	3.12
V	5.73	3.50	1.63	0.35	3.86	1.63	0.44	0.252	0.52	0.08		1583	1513	1482		54	96	93		1769	2049	1912	5100	5700	3.12
V	6.47	3.95	1.77	0.50	3.91	1.75	0.47	0.255	0.51	0.09		1452	1596	1488		49	106	87		1650	2123	1922	5000	5800	3.12
V	6.24	3.85	1.69	0.44	3.92	1.60	0.45	0.264	0.53	0.09		1629	1570	1474		54	106	89		1842	2112	1924	5100	5800	3.12
W		3.76	1.65	0.41				0.140						1600								2200			3.18
W		3.71	1.58	0.39				0.240						1610								2200			3.17
W		3.68	1.63	0.39				0.240						1600								2190			3.18
W		3.68	1.60	0.40				0.250						1590								2180			3.17
W		3.70	1.59	0.40				0.240						1600								2210			3.17
W		3.74	1.66	0.41				0.230						1600								2210			3.17
W		3.79	1.65	0.41				0.240						1600								2200			3.17
W		3.73	1.60	0.38				0.130						1580								2170			3.18
X		3.16	1.48					0.215						1139								2241			3.15
X		3.83	1.60					0.242						1136								2241			3.19
X		3.52	1.42					0.227						1545								2168			2.98
X		3.45	1.49					0.218						1537								2163			3.15
X		3.42	1.52					0.235						1557								2130			3.16
X		3.69	1.57					0.239						1534								2171			2.98
X		3.73	1.51					0.226						1557								2132			3.14
X		3.79	1.58					0.224						1536								2157			3.18
Y		3.68	1.68	0.47									1580	1600			93	100			1780	2200	4910	6200	3.22
Y		3.72	1.64	0.45									1590	1600			91	100			1790	2200	5000	6200	3.21
Y		3.66	1.60	0.46									1610	1600			94				1820	2200	5160	6200	3.17
Y		3.76	1.63	0.45									1510	1600			90	100			1740	2200	4910	6200	3.23
Y		3.64	1.61	0.46									1670	1600			95	100			1870	2200	5230	6200	3.27
Y		3.75	1.68	0.44									1590	1600			94	100			1790	2200	4880	6200	3.22
Y		3.77	1.68	0.48									1680	1600			97	100			1880	2200	5240	6200	3.25
Y		3.68	1.68	0.41									1590	1600			91	100			1790	2200	4970	6200	3.24
Z		3.91	1.62	0.42								1480	1550			50	90		1691	1720	2140		6301		2.83
Z		3.81	1.60	0.42								1480	1580			50	100		1692	1700	2180		6226		2.78
Z		3.67	1.50	0.43								1500	1560			50	90		1689	1680	2140		6274		2.92
Z		3.82	1.62	0.48								1480	1550			50	90		1670	1620	2130		6267		2.92
Z		3.88	1.68	0.42								1490	1550			50	90		1666	1670	2120		6288		2.59
Z		3.83	1.64	0.44								1480	1540			50	90		1661	1700	2120		6247		3.01
Z		3.64	1.48	0.39								1490	1530			50	90		1651	1660	2090		6199		2.96
Z		3.88	1.57	0.45								1480	1600			50	100		1685	1660	2160		6137		2.78

Lab Code	4E PGE g/t 1+2+3+4	Pb Coll Pt, g/t 1	Pb Coll Pd, g/t 2	Pb Coll Au, g/t 3	NiS Pt g/t	NiS Pd g/t	NiS Au g/t	Rh 4	NiS Ru g/t	NiS Ir g/t	F Cu ppm	P Cu ppm	T Cu ppm	XRF Cu ppm	F Co ppm	P Co ppm	T Co ppm	XRF Co ppm	F Ni ppm	P Ni ppm	T Ni ppm	XRF Ni ppm	T Cr ppm	XRF Cr ppm	SG g/cc
ZA												1722				33				2241						
ZA												1752				36				2298						
ZA												1690				32				2383						
ZA												1872				36				2196						
ZA												1673				32				2312						
ZA												1743				37				2229						
ZA												1629				34				2195						
ZA												1867				31				2204						
ZB																										
ZB																										
ZB																										
ZB																										
ZB																										
ZB																										
ZB																										
ZB																										
ZC		3.73	1.59	0.44								1510	1570	1540	120	51	100			1630	2100	2200		5900		
ZC		3.77	1.60	0.48								1560	1640	1550	130	50	103			1670	2180	2200		5800		
ZC		3.87	1.65	0.49								1520	1580	1590	130	50	103			1620	2130	2200		6000		
ZC		3.81	1.63	0.44								1550	1610	1580	120	50	105			1660	2170	2200		6000		
ZC		3.80	1.65	0.50								1550	1630	1600	140	53	107			1650	2200	2200		6000		
ZC		3.87	1.62	0.48								1570	1620	1600	120	51	101			1680	2170	2200		6100		
ZC		3.75	1.66	0.43								1560	1620	1610	150	50	104			1660	2180	2300		6100		
ZC		3.89	1.64	0.49								1510	1610	1630	130	48	103			1630	2170	2200		6000		
ZD		3.25	1.35	0.44								1320	1530			41	101			1360	2080					
ZD		3.35	1.38	0.49								1350	1520			42	97			1380	2060					
ZD		3.50	1.32	0.43								1390	1540			43	103			1410	2090					
ZD		3.45	1.33	0.42								1360	1550			43	99			1380	2110					
ZD		3.15	1.30	0.43								1410	1530			45	98			1440	2070					
ZD		3.15	1.31	0.41								1390	1540			44	99			1420	2100					
ZD		3.30	1.30	0.49								1450	1540			45	100			1480	2100					
ZD		3.20	1.32	0.43								1420	1530			45	101			1450	2090					
ZE					3.65	1.55	0.38	0.28	0.50	0.10	1540								2270							
ZE					3.59	1.54	0.45	0.28	0.50	0.11	1530								2220							
ZE					3.72	1.58	0.43	0.29	0.51	0.13	1520								2200							
ZE					3.78	1.58	0.42	0.29	0.51	0.12	1570								2250							
ZE					3.80	1.59	0.41	0.29	0.51	0.11	1550								2240							
ZE					3.76	1.60	0.40	0.30	0.52	0.12	1530								2200							
ZE					3.78	1.62	0.42	0.30	0.52	0.12	1530								2200							
ZE					3.78	1.64	0.44	0.31	0.52	0.13	1530								2220							

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. Alex Stewart (Assayers) Limited, (ASA, Johannesburg, 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 Platinum, Eastern Bushveld Regional Laboratory (South Africa).
9. Anglo Research (Crown Campus, South Africa).
10. Anglo Research (Germiston Campus, South Africa)
11. ASA - OMAC Laboratories Limited, (Ireland).
12. Assayers Canada, (Vancouver).
13. Barplats Laboratory, (South Africa).
14. Becquerel Laboratories, (Canada).
15. Genalysis Laboratory Services (Pty) Ltd., (Australia).
16. Geoscience Laboratories, (Geo Labs, Sudbury, Canada).
17. Geoservice Centre, Geolaboratory, (GTK. Finland).
18. Impala Mineral Processes Laboratory
19. Nkomati JV Laboratory
20. Pt Intertek Utama Services (Intertek, Indonesia)
21. Set Point Laboratories (Pty) Ltd (South Africa)
22. SGS Lakefield Research (Canada)
23. SGS Lakefield Research Africa (Pty) Ltd. (Joburg, South Africa)
24. SGS Welshpool (Australia).
25. Ultra Trace (Pty) Ltd. (Australia)
26. Zimplats Assay Laboratory (Zimbabwe)

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.

20 August 2007

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Geochemist:_____

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