Mineral resource and mineral reserve estimate

Overview

This mineral resource and reserve statement conforms with the reporting standards of the South African Mineral Resource Committee (SAMREC) code and was reviewed for compliance by the international mining consulting firm Steffen, Robertson and Kirsten (SRK) in June 2005.

The Merensky reef and the UG2 are well-recognized ore bodies, whose lateral continuity is well established across the mine property. The Merensky reef displays a wide range of lateral reef type variations that are interpreted by means of prospect drilling carried out from underground development. In interpreting detailed variations on the Merensky reef, all on reef development as well as stoping faces are logged by sampling personnel and mapped geologically on an ongoing basis. In contrast, the UG2 displays no variation in terms of reef types.

The measured and indicated mineral resources are reported separately and include those mineral resources modified to produce proven and probable mineral reserves. All mineral resources are quoted as in situ resources whereas all reserves are quoted at a run-of-mine (ROM) grade and tonnages as delivered to the metallurgical processing facilities on site and are therefore fully diluted. All mineral reserves are quoted as at 30 June 2005.

All tabulated mineral resource and mineral reserve estimates are based on underground operations only.

Merensky reef

The Merensky reef is a zone of mineralisation which spans the base of the Merensky Cyclic Unit. The Merensky Cyclic Unit is divided into facies, sub facies and reef types. Two different facies types are recognized at Northam. They are the Normal Merensky Reef Facies and the Regional Pothole Facies. The Regional Pothole is further divided into three different reef types of which the NP2 and P2 are the main sources of ore. The third reef type, Footwall P2 (FWP2), although not considered to be a primary mining target due to the undulating nature of the reef, displays different characteristics in the south-western quadrant of the current mining area, from where this reef type is mined more successfully.

The measured resource is an estimate of the in situ tonnage and grade (3PGE + Au) that has been exposed through development and is accessible for immediate exploitation. The measured resource has decreased in 2005 to 2.01 Mt (509 000 oz) compared to the previous year's estimate of 2.10 Mt (541 000 oz). This equates to a decrease of 5.9%. The main influencing factor is the extraction ratio that decreased and is currently calculated at 67% on the western side and 59% on the eastern side of the current mining operations.

Furthermore, the percentage NP2 reef, being a lower grade reef, has increased towards the eastern side of the lease area whereas the FWP2 reef has increased towards the western side of the lease area and is being exploited at a lower extraction rate and grade. The interaction between the different reef types and their spatial distribution has a negative effect on mining, which results in lower extraction rates and influences the quality of the ore sent for processing. An estimated life of mine of 17 years has been calculated using current infrastructure and includes resources from above 2 level down to 14 level.

UG2 reef

Mining on the UG2 reef is successful within the limitations created by the overstoping of the Merensky reef. The emphasis on safe extraction of this reef and the prevention of falls of ground remains the main focus area. The extraction method where the stoping cut includes both the leader stringers that occur above the main member chromitite, contribute to this success. This ensures a more stable hanging wall, which resulted in a safer working environment. The consistency of the UG2 reef is remarkable and reef disturbances are currently insignificant. At present there is no basis for subdividing the UG2 reef into different facies units.

The classification of the availability of the UG2 reef includes those raises that are in de-stressed areas. UG2 raises that were developed for ventilation purposes in areas where the Merensky reef was not yet extracted, were not considered for the measured resource.

The measured resource on the UG2 has therefore increased from 1.10 Mt (169 000 oz) in June 2004 to 1.26 Mt (199 000 oz) in June 2005. This is in line with the planned development of the UG2 reef. Since the extraction rates on the Merensky reef influence the extraction of the UG2 reef based on the de-stressed areas, the estimated total resource has decreased.

Slag dump

An estimated 1 Mt of slag is available for processing at an average grade of 1.18 g/t (3PGE + Au).

Sampling techniques and data

Unless otherwise stated, the following applies to both the Merensky reef and the UG2 reef:

Sampling techniques

The sampling technique is based on obtaining a solid piece of rock cut from the stoping or development faces, using a hydro-powered angle grinder type machine, fitted with a diamond-impregnated blade. The samples are well balanced and representative in three dimensions. The rock face is segregated into the various lithological units from which the samples are cut. The samples are cut over the full width of the stoping or development face to ensure maximum exposure. Samples are cut to a width of approximately 4 cm and to a minimum length of 10 cm and 4 cm deep. The maximum allowable sample length is 20 cm. Where a sample mass may be questionable, the width of the sample is increased to 8 cm.

The sampling grid in the stoping environment is based on a 15 x 15 m grid whereas all reef development is sampled at 5 metre intervals.

A quality assurance programme and audit trail are in place to ensure the integrity of samples sent for analysis.

Audits are in the form of random checks. These include but are not limited to:

- Sample quality and sample mass.
- Numbering sequence of samples.
- High chrome content samples are flagged for laboratory identification.
- Verification of total quantity of samples to ensure that no samples were lost.
- Validating samples against samplers' field books.

The audit programme also assists in identifying problems that may exist in obtaining quality samples. Remedial action is taken in the form of follow-up inspections and re-training. Random task observations are carried out underground to ensure that the required standards are maintained.

Samples are transported in steel boxes to the assay laboratory under close supervision. The samples are counted and checked against a request sheet to ensure that no samples were lost between the point of origin and the laboratory. This procedure also eliminates any potential of sample tampering in any way whatsoever

Assay data and laboratory investigations

The assay technique is a double cupellation fire fusion process, performed in a high temperature muffle type furnace. The fluxing agent is a lead collection flux where the prill obtained is weighed to calculate the final content of the sample. No correction factor is applied to the results during any stage of the analytical process.

Each sample is analysed for 3PGE+Au content. Quality control is achieved by randomly repeating samples to corroborate the results obtained at any one time. In addition to random repeats, a control sample, of which the content is known, is also added at random to each tray of samples for additional verification.

The analytical results are captured directly into the sampling database from where the chief chemist verifies the results based on the random repeat results as well as the result of the control sample.

Verification of results

To verify the results reported by the local facility, the service of an independent laboratory, using the same method of analysis, is employed. Statistical calculations are performed, comparing the results of the two laboratories. The average results indicate no significant difference at a 95% confidence limit.

Data locations

Each sample section bears a unique identification number. Survey stations established underground are used to determine the relevant position of each sample section, whereafter the applicable positions are plotted on a plan, drawn to a scale of 1:200. The plotted positions bear reference to the sample number and are digitized to obtain their spatial position. The results are portrayed graphically in Datamine to verify the three-dimensional parameters of the sample sections whereafter any inaccuracies are corrected.

Data density and distribution

Data distribution is well spaced throughout the mining area to adequately perform any estimation required.

Sampling coverage averages 95% on a monthly basis.

Database integrity

Data is retained in a central database system, (SQL 2000) which is backed up daily, allowing for capturing of data at one appropriate site. Unauthorised access to the system is prohibited via stringent protocols and access control. An electronic link between the source of the samples and the laboratory exist to minimise transcription errors when updating the database with analytical information.

A two-stage validation process is in place for any analytical information that is accepted into the database.

Geological interpretations

The Merensky reef and the UG2 are well-recognized ore bodies, whose lateral continuity is well established across the mine property. The Merensky reef displays a wide range of lateral reef type variations related to the elevation of the Merensky Chromitite with respect to various footwall lithologies. The reef types are therefore classified according to the immediate footwall lithology and flagged appropriately to ensure that the data pertaining to one reef type is not mixed with another reef type. Consequently a homogeneous "Reef Type Database" is created. The current mining area is divided into two separate geozones on the P2 reef only as a consequence of its physical behaviour.

Prospect drilling from the footwall development infrastructure provides information from which the geological model is updated on a macro scale. The reef intersections are neither analysed for 3PGE+Au content nor are they captured into the sampling database.

In interpreting the dynamic geological model on a micro scale all on-reef development as well as stoping faces are logged by sampling personnel and mapped geologically on an ongoing basis.

Estimation and modelling techniques

Grade (3PGE+Au) estimations for all the regional pothole reef types, Merensky normal reef and UG2 reef are compiled using a geostatistical technique. Simple kriging is the most appropriate technique based on the descriptive statistics calculated for each reef type.

An assumption is made that all reef types are planar with no local potholing or variation. The sample data is calculated to conform to the required hanging wall width and stoping width, once the mining cut is decided upon.

A regular grid of 30 x 30 m is used during the estimation process. This supports the sampling grid in use for underground workings. Since the footwall stratigraphy varies in accordance with the elevation of the Merensky Chromitite, the reef types are treated separately. This procedure ensures a homogeneous data set that is verified by statistical calculations. Each sample section is calculated to conform to the planned mining cut from where the data is exported into the geostatistical evaluating programme.

Variograms are calculated for each reef type and modelled separately for each variable. The variables are 3PGE+Au, grade and stoping width where appropriate on Normal Reef and UG2. The specific gravity is no longer considered as an independent variable during the kriging process and the arithmetic mean is used.

The grade variograms indicate a high nugget effect to sill ratio, which is characteristic of platinum deposits. The range of influence varies in different directions, giving a geometric anisotropy character. The omni-directional variogram was modelled and used in the valuation process.

The variograms support the geological model and mineralisation model based on experience gained and observations made during the extraction process.

Back transformation calculations are performed to test the appropriateness and fit of all variograms. A scatter plot of the estimated grade against the original grade is plotted to determine the correlation. If necessary, the variogram parameters are edited and the process repeated.

The variables are krigged into the block models from where the measured resource is evaluated.

Cut-off grades or parameters

Most of the Footwall P2 reef cannot be mined without incurring dilution, reducing the recovered grade of this reef type. On this basis, much of the FWP2 reef is not mined. No cut-off grades are calculated for any other reef type.

Mining method

Mining is successfully conducted using a breast-stoping method, employing hydro-powered rock drills. Stope cleaning is undertaken using water-jets and scrapers, transporting broken ore to a conventional ore-pass system. Separate ore handling facilities exist to separate ore bearing material from waste as well as Merensky reef from UG2 reef.

Since the reef is not planar as assumed during the data compilation stage it is assumed that a certain proportion of external dilution will occur during the mining operations. This dilution is accounted for during the conversion from resources to reserves.

Tonnage factors

In situ densities are calculated to the equivalent of the stoping cut assumed. The data for each reef type is pooled separately and the arithmetic mean is used as a tonnage factor

Classification

Measured mineral resources are delineated between raise-lines that have been completed and sampled. Underground diamond drilling is combined with face mapping and sampling to map out reef variability between sampled localities. The remainder of the area is classified as an indicated mineral resource.

The measured resource is upgraded to the proven reserve, using the modifying factors as described under the heading “Mining factors and assumptions”. At the same time the indicated resource is upgraded to the probable reserve using the same factors

Audits or reviews

Methodologies applied in the estimation of mineral resources are reviewed annually by SRK.

Estimation and reporting of mineral reserves

Mineral resource estimate for conversion to mineral reserves

- The measured and indicated mineral resources are those mineral resources modified to produce proven and probable mineral reserves.
- All mineral reserves are quoted as at 30 June 2005.
- All mineral reserves are quoted at a run-of-mine (ROM) grade and tonnages as delivered to the metallurgical processing facilities on site and are therefore fully diluted.

Mineral resource tonnages and grades are in situ estimates. The most reasonable mining width has been assumed based on practical mining conditions. The associated principal platinum group elements (platinum, palladium and rhodium) + gold (3PGE+Au) grade as well as the specific gravity were calculated for these mining widths. Estimates, derived from kriging parameters were applied to the mining areas to estimate tonnage and metal content. An extensive database containing information pertaining to individual samples and their associated analytical information exist from which the data is drawn to derive the kriging parameters.

Damian Smith
Chief geologist

Robbie Roberts
Chief surveyor

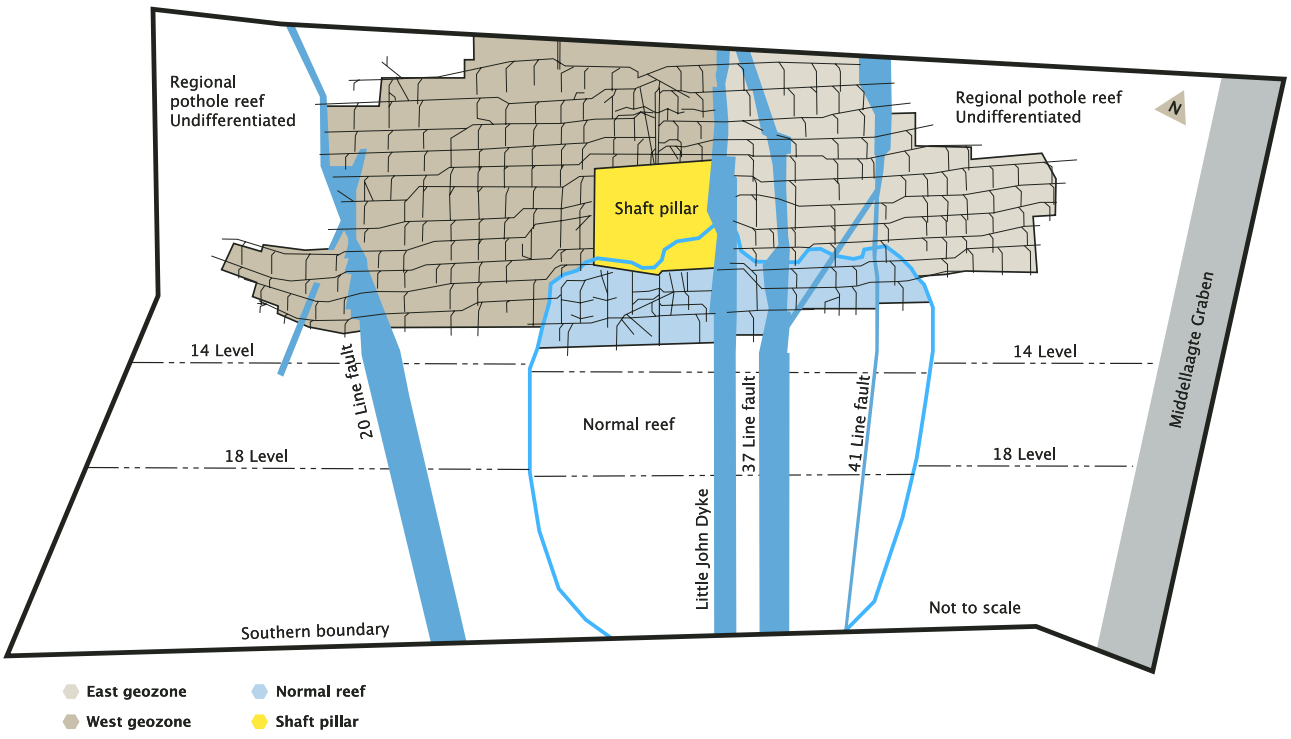
Mining factors and assumptions

Modifying factors used in converting mineral resources into mineral reserves are based on historical performance. An internal ore accounting system is in place, which provides information on all sources of ore in addition to dilution that takes place in the ore flow, from source to mill.

Modifying factors

Tonnage ratios on Merensky reef	F2002 Actual %	F2003 Actual %	F2004 Actual %	F2005 Actual %	F2006 Estimate %
Stoping	86	86	86	83	86
Other sources	4	4	4	4	4
Development	4	3	3	3	3
Survey discrepancy	6	7	7	10	7
Mine call factor	90	92	101	101	97
Block/dilution factor	99	100	98	100	100

Tonnage ratios on UG2 reef	F2002 Actual %	F2003 Actual %	F2004 Actual %	F2005 Actual %	F2006 Estimate %
Stoping	86	99	102	95	93
Other sources	3	4	4	3	4
Development	12	5	4	6	5
Survey discrepancy	–1	–8	–10	–4	–2
Mine call factor	88	80	84	91	93
Block/dilution factor	103	103	100	96	100



Audited mineral resource and mineral reserve statement

This section reflects the company's audited mineral resources and mineral reserves statement for Merensky and UG2 Reef at 30 June 2005.

The mineral resource statements are sub-divided into those mineral resources that have been modified to produce mineral reserves and those which have not been modified.

Mineral resource and mineral reserve statement

Merensky Reef

	Mineral reserve category					Mineral resource category			
	Tons Mt	MHG* g/t	Metal kg (000)	Metal oz (000)		Tons Mt	In situ g/t	Metal kg (000)	Metal oz (000)
Proved					**Measured**				
Northern boundary to 14 level	2.3	6.1	14	455	Northern boundary to 14 level	2.01	7.88	16	509
Sub total	2.3	6.1	14	455	Sub total	2.01	7.88	16	509
Probable					**Indicated**				
Northern boundary to 14 level	22.8	6.0	136	4 374	Northern boundary to 14 level	19.64	7.76	152	4 900
Shaft pillar					Shaft pillar	1.80	7.29	13	421
14 level to 18 level					14 level to 18 level	12.58	7.51	95	3 039
Sub total	22.8	6.0	136	4 374	Sub total	34.02	7.64	260	8 360
Total	**25.1**	**6.0**	**150**	**4 829**	**Total**	**36.03**	**7.66**	**276**	**8 869**

UG2 Reef

	Mineral reserve category					Mineral resource category			
	Tons Mt	MHG* g/t	Metal kg (000)	Metal oz (000)		Tons Mt	In situ g/t	Metal kg (000)	Metal oz (000)
Proved					**Measured**				
Northern boundary to 14 level	1.4	4.3	6	190	Northern boundary to 14 Level	1.26	4.89	6	199
Sub total	1.4	4.3	6	190	Sub total	1.26	4.89	6	199
Probable					**Indicated**				
Northern boundary to 14 level	54.9	4.3	239	7 672	Northern boundary to 14 level	38.30	4.89	187	6 021
Shaft pillar					Shaft pillar	12.72	4.89	62	1 999
14 level to 18 level					14 level to 18 level	2.14	4.90	10	336
Sub total	54.9	4.3	239	7 672	Sub total	53.16	4.89	259	8 356
Total	**56.3**	**4.3**	**245**	**7 862**	**Total**	**54.42**	**4.89**	**265**	**8 555**

* Mill head grade

Northam's resources and reserves statement has been compiled by a professional team comprising:
J C Roberts MSc – Chief surveyor with 14 years experience in platinum valuation.
D Smith BSc (Hons) Geology, MSc Geology, Pr. Sci.Nat. 400 323/04 – Chief geologist with ten years experience in the Bushveld Complex.