



Mineral Reserves and Resources 2009



# **CONTENTS**

Salient Features F2009

F2009 Mineral Resource/Reserves Summary

**03** General Statement

Competence

### ARM FERROUS

Manganese Mines Iron Ore Mines Chrome Mine

### ARM PLATINUM

Nkomati Nickel/Copper/Cobalt/PGM/Chrome Mine Two Rivers Platinum Mine Modikwa Platinum Mine Kalplats Platinum Projects

# ARM COAL

Goedgevonden Coal Project

### ARM EXPLORATION

Otjikoto Gold Project Konkola North Copper Project Mwambashi Copper/Cobalt Project Kalumines Copper Project

30 Definitions



# **COMPETENT PERSON'S REPORT ON ORE RESERVES AND MINERAL RESOURCES**

This report is issued as the annual update of resources and reserves to inform shareholders and potential investors of the mineral assets held by African Rainbow Minerals Limited (ARM).

# Salient Features F2009

Khumani	Production through the plant started in mid-2008, ramp-up to full production in progress. Reserves increased due to re-design of open pits at higher iron ore prices. Feasibility study to increase annual production from 10 mt to 16 mt.
Beeshoek	Reserves increased due to the inclusion of the Village pit. Feasibility study on Village pit in progress.
Nchwaning	Development into Graben area expedited and this will increase knowledge of geological structure.
Gloria	Drilling in progress to increase geological knowledge to the west.
Dwarsrivier	Geological model re-build using Datamine process SURFIP resulting in an increase in Resources and Reserves.
Nkomati	Current Resource/Reserve statement reflects the annual depletion. Re-evaluation and pit optimisation in progress.
Two Rivers	➤ 15 additional boreholes were drilled – awaiting assay results for re-evaluation.
Kalplats	➤ Extensive exploration drilling increased the Mineral Resources at Kalplats by 60 mt.
Goedgevonden	➤ Production increased by 56% as the mine ramps up to full production.

# F2009 Mineral Resource/Reserves Summary

Platinum	l ,	sured and Indicated) (Proved and Probable) ineral Resources Mineral Reserves		,	
	Mt	PGM+Au	Mt	PGM+Au	Moz
Two Rivers					
UG2	54.09	4.71 (6E)	37.29	3.98 (6E)	4.78 (6E)
Merensky	18.7	3.55 (6E)	_	_	_
Modikwa					
UG2	145.7	5.86 (4E)	56.0	4.71 (4E)	8.49 (4E)
Merensky	72.0	2.78 (4E)	_	_	_
Nkomati	234.0	0.93 (4E)	159.7	0.83 (4E)	4.26 (4E)
Kalplats	56.6	1.49 (3E)	_	_	_

6E = Pt + Pd + Rh + Ru + Ir + Au 4E = Pt + Pd + Rh + Au 3E = Pt + Pd + Au

Nickel	(Measured and Indicated) Mineral Resources		(Proved and Probable) Mineral Reserves	
	Mt	Ni%	Mt	Ni%
Nkomati – Total MMZ+PCMZ	234.0	0.38	159.7	0.32

Manganese	(Measured and Indicated) Mineral Resources		,	ved and Proba	,	
	Mt	Mn%	Fe%	Mt	Mn%	Fe%
Black Rock						
No 1 Seam	130.6	45.1	9.04	109.4	45.1	9.04
No 2 Seam	180.8	42.4	15.5	_	_	_
Gloria						
No 1 Seam	53.3	38.2	5.5	41.0	38.2	5.5
No 2 Seam	29.4	29.9	10.1	_	_	_

Iron ore	(Measured and Indicated) Mineral Resources		,	d Probable) Reserves
	Mt	Fe%	Mt	Fe%
Beeshoek	109.7	63.71	45.2	64.95
Khumani				
Bruce	253.2	64.64	235.4	64.64
King	379.7	64.51	330.4	64.39

Chromite	(Measured and Indicated) Mineral Resources		, ,	
	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr₂O₃%
Dwarsrivier	53.2	39.56	39.6	39.5
Nkomati	1.82	33.6	2.9	31.0

Coal	(Measured and Indicated)	(Proved and	d Probable)
	Mineral Resources	Mineral Reserves	Saleable
	Mt	Mt	Mt
Goedgevonden	522	368	197.9



# **General Statement**

ARM's method of reporting Mineral Resources and Mineral Reserves conforms to the South African Code for Reporting Mineral Resources and Mineral Reserves (SAMREC Code) and the Australian Institute of Mining and Metallurgy Joint Ore Reserves Committee Code (JORC Code).

The convention adopted in this report is that Mineral Resources are reported inclusive of that portion of the total Mineral Resource converted to a Mineral Reserve. Resources and reserves are quoted as at 30 June 2009. External consulting firms audit the resources and reserves of the ARM operations on a three- to four-year cycle basis.

Underground resources are in-situ tonnages at the postulated mining width, after deductions for geological losses. Underground Mineral Reserves reflect milled tonnages while surface Mineral Reserves (dumps) are in-situ tonnages without dilution. Both are quoted at the grade fed to the plant. Open-cast Mineral Resources are quoted as in-situ tonnages and Mineral Reserves are tonnages falling within an economic pit-shell.

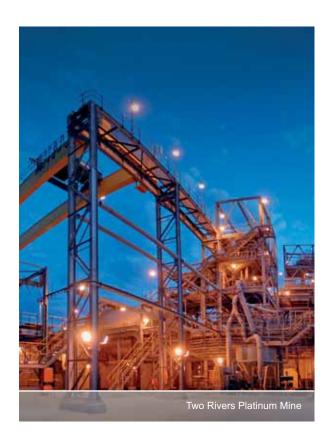
The evaluation method is generally Ordinary Kriging with mining block sizes ranging from 10 x 10 metres to 100 x 100 metres to  $250 \times 250$  metres in the plan view. The blocks vary in thickness from 2.5 to 50 metres. The evaluation process is fully computerised, generally utilising the Datamine software package.

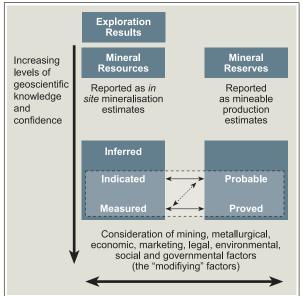
The Mineral Resources and Mineral Reserves are reported on a total basis regardless of the attributable beneficial interest that ARM has on the individual projects or mines. When the attributable beneficial interests on a mine or project is less than 100%, the actual percentage of the attributable interest is specified.

Maps, plans and reports supporting resources and reserves are available for inspection at ARM's registered office and at the relevant mines.

In order to satisfy the requirements of the Minerals and Petroleum Resources Development Act, ARM's operations will have to obtain new mining rights for all properties required to support the planned operations over the next 30 years. The act is effective from 1 May 2004 and the new rights must be obtained within five years from then. The operations are at various stages of application.

Rounding of figures may result in computational discrepancies.





# Competence

The competent person with overall responsibility for the compilation of the Mineral Reserves and Resources Report is Paul van der Merwe, PrSciNat, an ARM employee. He consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

Paul van der Merwe graduated with a BSc (Hons) in Geology from Free State University. He spent four years as an exploration geologist for FOSKOR. He then joined the Uranium Resource Evaluation Group of the then Atomic Energy Corporation of South Africa for 12 years. While employed there he studied geostatistics and spent some time at the University of Montreal, Canada. In 1991 he joined Anglovaal Mining (now ARM) in the Geostatistics Department and evaluated numerous mineral deposit types for this group in Africa. In 2001, he was appointed as Mineral Resources Manager for the Group. He is registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist in the field of practice of geological Science, Registration Number 400498/83, and as such is considered to be a Competent Person.

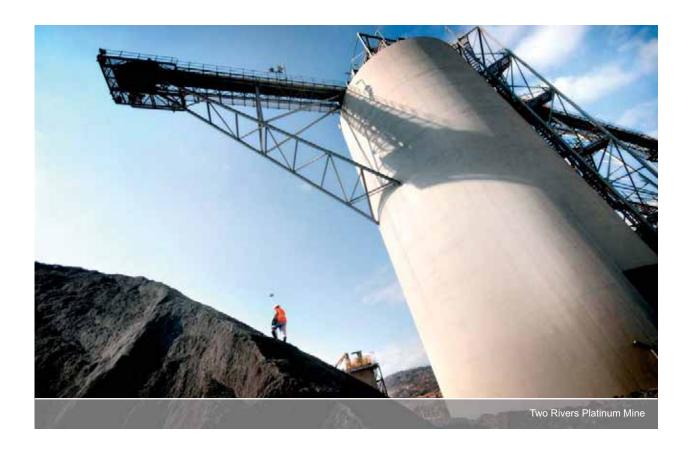
All competent persons at the operations have sufficient relevant experience in the type of deposit and in the activity for which they have taken responsibility. Details of the ARM's competent persons are available from the Company Secretary on written request.

The following competent persons were involved in the calculation of Mineral Resources and Reserves. They are employed by ARM or its subsidiaries and joint venture (JV) partners:

M Burger, PrSciNat / S v Niekerk, PrSciNat	Iron
B Rusive, PrSciNat	Manganese
A Pretorius*, PrSciNat	Chrome
M Davidson, PrSciNat	Nickel

J Woolfe, PrSciNat	Nickel/Platinum
R van Rhyn, PrSciNat	Platinum
C Schlegel, PrSciNat	Gold/Copper
S Kadzviti, PrSciNat	Nickel

#### P J van der Merwe 7 October 2009



<sup>\*</sup> External consultant.



#### **ARM Ferrous**

#### **Assmang Limited Operations**

ARM's attributable beneficial interest in Assmang's operations is 50%. The other 50% is held by Assore Limited.

#### **Manganese Mines**

#### Locality

The manganese mines are situated in the Northern Cape province in South Africa, approximately 80 kilometres North-West of the town of Kuruman. Located at latitude 27°07'50"S and longitude 22°50'50"E, the site is accessed via the national N14 route between Johannesburg and Kuruman, and the provincial R31 road.

#### History

In 1940, ARM Ferrous acquired a manganese ore outcrop on a small hillock known as Black Rock. Several large properties underlain by ore were subsequently found and acquired. Today the Black Rock area is considered to be the largest and richest manganese deposit in the world. Manganese ore operations were extended and today include the Gloria and Nchwaning underground mines. Manganese ore is supplied locally to Assmang-owned smelters, but is mainly exported through Port Elizabeth to Japanese and German customers.

#### Mining authorisation

The Nchwaning mining lease (ML10/76) comprises an area of 1 877.0587 hectares and is located on the farms Nchwaning (267), Santoy (230) and Belgravia (264). An application for the conversion to a new order mining right was submitted during the 2008 financial year.

The Gloria mining lease (ML11/83) comprises an area of 1 713.1276 hectares and is located on portion 1 of the farm Gloria (266). An application for the conversion to a new order mining right was submitted during the 2008 financial year.

#### Geology

The manganese ores of the Kalahari Manganese field are contained within sediments of the Hotazel Formation of the Griqualand West Sequence, a subdivision of the Proterozoic Transvaal Supergroup. At Black Rock, Belgravia and Nchwaning, the Hotazel, Mapedi and Lucknow Formations have been duplicated by thrusting. The average thickness of the Hotazel Formation is approximately 40 metres.

The manganese orebodies exhibit a complex mineralogy and more than 200 mineral species have been identified to date. The hydrothermal upgrading has resulted in a zoning of the orebody with regard to fault positions. Distal areas exhibit more original and low-grade kutnohorite + braunite assemblages, while areas immediately adjacent to faults exhibit a very high-grade hausmannite ore. The intermediate areas exhibit a very complex mineralogy, which includes bixbyite, braunite and jacobsite

amongst a host of other manganese-bearing minerals. A similar type of zoning also exists in the vertical sense. At the top and bottom contacts it is common to have high iron (Fe) and low manganese (Mn) contents while the reverse is true towards the centre of the seam. This vertical zoning has given rise to a mining practice where only the centre 3.5 metre-high portion of the seam is being mined. At the Gloria mine the intensity of faulting is much less, which also explains the lower grade.

Two manganese seams are present. The No 1 seam is up to 6 metres in thickness, of which 3.5 metres are mined, using a manganese marker zone for control. There is, therefore, minimum dilution.

#### **Nchwaning Mineral Resources and Ore Reserves**

Measured Resources at Nchwaning are based on the two-thirds of the semivariogram sill range. Areas where the borehole spacing is greater than this distance and up to the sill range are classified as Indicated. There are no Inferred resources at Nchwaning. Measured/Indicated Resources were converted to Proved/Probable Reserves by a LOM scheduling exercise done by Snowden Mining Consultancy. Geological losses are built into the grade models. Measured Resources at Gloria are classified as material available up to 50 metres in front of the mining faces. Material situated further than 50 metres from the face and up to a boundary string around the dense drilled area on Gloria is classified as Indicated resources. The rest of the property with limited drill information is classified as Inferred. In the coming year an increase in the Measured resources by in-fill drilling is anticipated. At Gloria a 23% pillar loss is accounted for in moving Measured /Indicated resources into Proved/ Probable reserve.

The Nchwaning mine was diamond drilled from surface at 330 metre centres and the data are now captured in a Geological Database Management System (GDMS) developed by Datamine SA for the manganese mines. The core was logged and 0.5-metre-long, half-core, diamond-saw cut samples were submitted to Assmang's laboratory at Black Rock for X-ray fluorescence (XRF) analyses. Mn and Fe values were checked by Wet Chemical analyses. Several standards were used to calibrate XRF equipment, and results are compared with other laboratories on a regular basis.

At Nchwaning a total of 341 boreholes for the No 1 orebody and 372 holes for the No 2 orebody, as well as a total of 26 087 face samples were considered in the grade estimation. The available data for an area was optimised over a thickness of 3.5 metres and exported into data files for computerised statistical and

geostatistical manipulation to determine the average grades of Mn, Fe, silica (SiO<sub>2</sub>), calcium (CaO) and magnesium (MgO).

Ordinary Kriging interpolation within Datamine was used to estimate the grade of each  $50 \times 50 \times 3.5$  metre block generated within the geological model.

Sub-cell splitting of the 50 x 50 metre blocks was allowed to follow the geological boundaries accurately. The relative density of Nchwaning manganese ore was taken as  $4.3t/m^3$ .

Trackless mechanised equipment is used in the board and pillar mining method. Mining in the eastern extremity of Nchwaning occurs at a depth of 200 metres while the deepest (current) excavations can be found at a depth of 519 metres below surface. Gloria Mine is extracting manganese at depths that vary between 180 and 250 metres below surface.

Ore from Nchwaning No 2 mine is crushed underground before being hoisted to a surface stockpile via a vertical shaft. Similarly, ore from the Nchwaning No 3 mine is crushed underground before being conveyed to a surface stockpile via a declined conveyor system. Ore is withdrawn from the surface stockpile

and forwarded to two stages of crushing, dry screening and wet screening to yield lumpy and fine products.

At the Gloria mine, ore is crushed underground before being conveyed to a surface stockpile via a decline shaft. At both plants the finer fractions are stockpiled while the coarser fractions are extracted from the respective product boxes into road haulers, sampled, weighed and stored on stacks ahead of despatch. Samples from each stack are analysed for chemical content and size distribution. This ensures good quality control and enables the ore control department to blend various stacks according to customer demand.

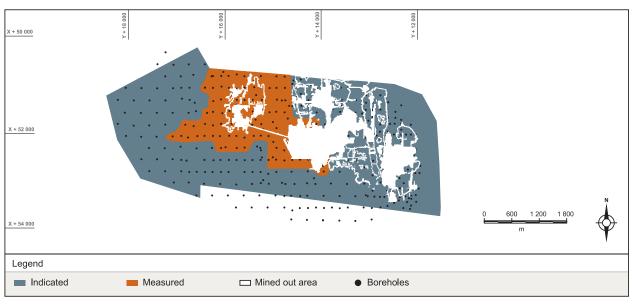
#### Nchwaning year-on-year change

The 2009 Mineral Reserves for the Nchwaning No 1 orebody changed from 115.3 million tonnes in 2008 to 109.4 million tonnes. The Mineral Resources at Nchwaning No 1 orebody decreased by 7.1 million tonnes to 130.6 million tonnes (137.7 million tonnes). The decrease in resources/reserves is mainly due to depletion. The Mineral Resources at Nchwaning No 2 orebody decreased slightly to 180.8 million tonnes from 185.2 million tonnes. There is still no market for this ore type.

Nchwaning Mine: 1 Body Manganese Resources and Reserves

	Mineral Resources		Mineral Reserves		es
	Mt		Mt	Mn%	Fe%
Measured	42.7	Proved	36.7	46.0	9.9
Indicated	87.9	Probable	72.7	44.6	8.6
Total Resources 1 Body 2009	130.6	Total Reserves 1 Body 2009	109.4	45.1	9.04
Total Resources 1 Body 2008	137.7	Total Reserves 1 Body 2008	115.3	44.7	8.83

#### Nchwaning borehole locality map showing the Mineral Resource classification

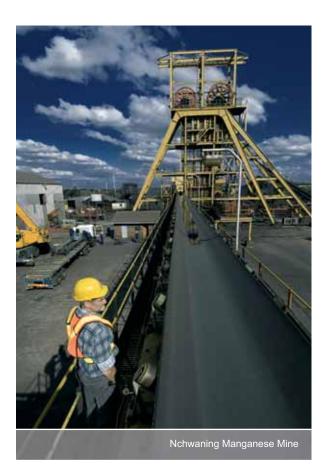




#### Nchwaning Mine: 2 Body Manganese Resources

Mineral Resources	Mt	Mn%	Fe%
Measured	53.4	42.0	16.3
Indicated	127.4	42.6	15.2
Total Resources 2 Body 2009	180.8	42.4	15.5
Total Resources 2 Body 2008	185.2	42.5	15.4

Measured resources are based on two-thirds of the semivariogram sill range rule. Areas outside this distance are classified as Indicated. Proved Reserves = Measured Resources used in LoM scheduling by Snowden. Probable Reserves = Indicated Resources used in LoM scheduled by Snowden.



#### Gloria Mineral Resources and Ore Reserves

Procedures for drilling and assaying at Gloria mine are the same as at Nchwaning. A total of 107 boreholes and 6 439 face samples were considered in the evaluation of the Gloria 1 Body mine. The wide-spaced borehole interval puts some limitation on the evaluation in areas away from current mining faces. A total of 6 400+ underground sampling values were used in evaluating areas close to current mining. The boreholes were optimised over a stoping width of 3.5 metres and the relative density was taken as 3.8t/m<sup>3</sup>. The seams were evaluated by means of statistical and geostatistical methods to determine the average grades of Mn, Fe, SiO<sub>2</sub>, CaO and MgO. Ordinary Kriging interpolation within Datamine was used to estimate the grade of each 50 x 50 x 3.5 metre block generated within the geological model. Sub-cell splitting of the 50 x 50 metre blocks was allowed to follow the geological boundaries.

#### Gloria year-on-year change

The 2009 Proved Reserves at Gloria No 1 Body increased to 9.1 million tonnes (6.8 million tonnes) due to re-evaluation and movement of reserves from the Probable to the Proved category. The Probable reserves decreased from 33.6 million tonnes to 31.9 million tonnes. The Mineral Resources at Gloria No 2 Body stayed the same. No markets exist for Gloria 2 Body ore at this point in time.

Gloria Mine: 1 Body Manganese Resources and Reserves

	Mineral Resources		М	ineral Reserve	s
	Mt		Mt	Mn%	Fe%
Measured	11.8	Proved	9.1	38.0	4.9
Indicated	41.5	Probable	31.9	38.3	5.6
Total Resources 1 Body 2009	53.3	Total Reserves 1 Body 2009	41.0	38.2	5.5
Total Resources 1 Body 2008	52.5	Total Reserves 1 Body 2008	40.4	38.3	5.54
Inferred 2009	128.3				
Inferred 2008	132.3				

Gloria Mine: 2 Body Manganese Resources

	Mt	Mn%	Fe%
Measured	_	_	_
Indicated	29.4	29.9	10.1
Total Resources 2 Body 2009	29.4	29.9	10.1
Total Resources 2 Body 2008	29.4	29.9	10.1
Inferred 2009	132.3	_	_
Inferred 2008	132.3		

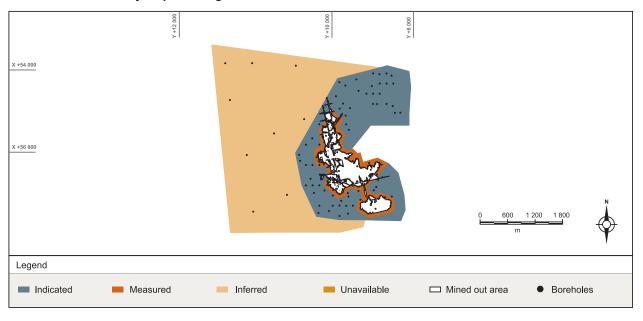
Measured Resources = immediately available tonnes up to 50 metres in front of mining faces.

Indicated Resources are as per dense drilling area (see map).

Proved Reserves = Measured Resources less 23% pillar loss.

Probable Reserves = Indicated Resources less 23% pillar loss.

### Gloria borehole locality map showing the Mineral Resource classification



# Historical manganese production at Nchwaning and Gloria Mines

Saleable product Year	Nchwaning Mt	Gloria Mt
2004/2005	1.97	0.15
2005/2006	2.83	0.13
2006/2007	2.49	0.43
2007/2008	2.71	0.41
2008/2009	2.63	0.51



#### **Iron Ore Mines**

#### Locality

The iron ore division is made up of the Beeshoek mine located on the farms Beeshoek 448 and Olynfontein 475. The iron ore resources on the farms Bruce 544, King 561, and Mokaning 560, which were formerly known as the BKM Project, are now known as the Khumani iron ore mine. All properties are in the Northern Cape approximately 200 kilometres west of Kimberley. The Beeshoek open-pit operations are situated 7 kilometres west of Postmasburg and the new Khumani open pits are adjacent to, and south-east of, the Sishen mine, which is operated by Kumba Resources. Located at latitude 28°30'00"S/longitude 23°01'00"E, and latitude 27°45'00"S/longitude 23°00'00"E respectively, these mines supply iron ore to both the local and export markets. Exports are railed to the iron ore terminal at Saldanha Bay.

#### **History**

Mining of iron ore (mainly specularite) was undertaken as early as 40 000 BC on the farm Doornfontein which is due north of Beeshoek. The potential of iron ore in this region was discovered in 1909, but, due to lack of demand and limited infrastructure, this commodity was given little attention. In 1929 the railway line was extended from Koopmansfontein (near Kimberley) to service a manganese mine at Beeshoek. In 1935 The Associated Manganese Mines of South Africa Limited (Assmang) was formed, and in 1964 the Beeshoek iron ore mine was established, with a basic hand sorting operation. In 1975 a full washing and screening plant was installed and production increased over the years to the current level of approximately 9 million tonnes a year.

#### Mining authorisation

The Beeshoek mining lease (ML3/93) comprises an area of 5 685.64 hectares and is located on the farms Beeshoek (448) and Olynfontein (475). An application for the conversion to a new order mining right was submitted during the 2009 financial year.

The Khumani mining lease comprises an area of 7 388.02 hectares and is located on the farms Bruce (544), King (561), Mokaning (560) and McCarthy (559). Mining rights were granted during the 2007 financial year.

#### Geology

The iron ore deposits are contained within a sequence of early Proterozoic sediments of the Transvaal Supergroup deposited between 2 500 and 2 200 million years ago. In general two ore types are present, namely laminated hematite ore forming part of the Manganore Iron Formation and conglomerate ore belonging to the Doornfontein Conglomerate Member at the base of the Gamagara Formation.

The older laminated ore types occur in the upper portion of the Manganore Iron Formation as enriched high-grade hematite bodies. The boundaries of high-grade hematite orebodies crosscut primary sedimentary bedding, indicating that secondary hematitisation of the iron formation took place. In all of these, some of the stratigraphic and sedimentological features of the original iron formation are preserved.

The conglomeratic ore is found in the Doornfontein Conglomerate Member of the Gamagara Formation and is lenticular and not persistently developed along strike. It consists of stacked, upward fining conglomerate-gritstone-shale sedimentary cycles. The lowest conglomerates and gritstones tend to be rich in sub-rounded to rounded hematite ore pebbles and granules and form the main orebodies. The amount of iron ore pebbles decreases upwards in the sequence so that upper conglomerates normally consist of poorly sorted, angular to rounded chert and banded iron formation pebbles.

The erosion of the northern Khumani deposit is less than that in the southern Beeshoek area. The result is that Khumani is characterised by larger stratiform bodies and prominent hangingwall outcrops. The down-dip portions are well preserved and developed, but in outcrop the deposits are thin and isolated. Numerous deeper extensions occur into the basins due to karst development. A prominent north-south strike of the ore is visible. The southern Beeshoek orebodies were exposed to more erosion and are more localised and smaller. Outcrops are limited to the higher topography on the eastern side of the properties. Down dip to the west, the ore is thin and deep. The strike of the orebodies is also in a north-south direction, but less continuous.

Haematite is the predominant ore mineral, but limonite and speccularite also occur.

Mining operations are all open pit, based on the conventional drill-and-blast, truck-and-shovel operations. Run-of-mine ore is crushed and stored as high or normal grade on blending stockpiles. Ore from the stockpiles is either sent to the wash-and-screen plant or, if contaminated, to the beneficiation plant. The washing and screening plant consist primarily of tertiary crushing, washing, screening, conveying and stacking equipment. The beneficiation plant consists of tertiary crushers; scrubbers; coarse and fine jigs or Larcodems; fine crushing; elutriators and upward flow classifiers; lumpy, fines and scaw product stockpiles; and a rapid load-out facility. No chemical is being used in any of the treatment plants.

#### **Mineral Resources and Ore Reserves**

In the iron ore operations, the following table shows how the search ellipse (i.e. the ellipsoid used by the Kriging process to determine if a sample is used in the estimation of a block) is used to classify the Mineral Resource:

	Minimum No of samples	Maximum No of samples	Search ellipse settings XYZ (m)
Measured	6	30	100 x 100 x 10
Indicated	5	30	200 x 200 x 20
Inferred	4	30	400

Only Measured and Indicated Resources are converted to Proved and Probable Reserves respectively. Modifying factors were applied to these resources and financially optimised. The financial outline is used to define the optimal pit by means of the Lersch-Grossman algorithm. The resources within this mining constraint are defined as reserves. These are categorised into different product types, destined for the different plant processes and scheduled for planning.

The methodology followed to identify targets is initiated with geological mapping, followed by geophysics (ground magnetics and gravity). Percussion drilling is used to pilot holes through overlying waste rock down to the iron ore bodies. Diamond drilling is the next phase, which is usually on a 200 x 200 metre grid. Further infill drilling is carried out at spacing ranging from 100 x 100 metres to 25 x 25 metres, depending on the complexity of the geological structures. Numerous exploration programmes were completed in the last 40 years. A total of 2 832 holes (1 315 holes on Khumani and 1 517 holes on Beeshoek) were

drilled. Core samples were logged and split by means of a diamond saw and the half-core is sampled every 0.5 metres. Before submission for assaying, the half-cores were crushed, split and pulverised. Samples with values larger than 60 percent are included in the definition of the orebodies. Any lower-grade samples inside the orebody are defined as internal waste and modelled separately. Each zone is modelled per section, and then wireframed to get a three-dimensional (3D) model.

Ordinary Kriging interpolation within Datamine was used to estimate the grade of each 10 x 10 x 10 metre block generated within the geological model. Density in the resource model is calculated using a fourth degree polynomial fit applied to the estimated Fe grade. Densities range from 4.38 t/m3 (60 percent Fe) to 5.01 t/m<sup>3</sup> (68 percent Fe). A default density of 3.2 is used for waste.

At Beeshoek all blast holes are sampled per metre, but composited per hole. All holes are analysed for density and blast







Beeshoek Iron Ore Mine: Resources and Reserves

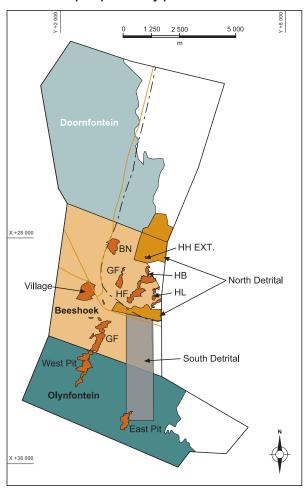
	Meas	ured	Indic	ated	Inferred		Total Resource no Inferred		Proved Reserve		Probable Reserve		Total Reserve	
Pit/Area	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
BN	19.89	63.47	0.01	62.67	-	_	19.90	63.46	13.10	64.02	_	-	13.10	64.02
HF/HB	16.64	64.3	0.30	63.85	_	_	16.94	64.30	2.55	65.24	0.03	66.45	2.58	65.25
BF	6.95	63.29	0.22	63.58	_	_	7.17	63.30	1.93	63.81	_	_	1.93	63.81
East Pit	9.14	64.61	0.03	64.19	_	_	9.17	64.61	1.89	65.66	_	_	1.89	65.66
Village	40.80	63.56	0.09	64.64	_	_	40.89	63.57	24.23	65.53	_	_	24.23	65.53
GF	3.13	63.81	0.09	61.80	_	_	3.22	63.81	_	_	_	_	-	_
HH Ext	0.28	62.63	_	_	_	_	0.28	62.63	_	_	_	_	_	_
HL	3.05	65.17	_	_	_	_	3.05	65.17	0.93	65.70	_	_	0.93	65.70
West Pit	9.06	62.74	_	_	0.05	61.87	9.06	62.74	0.58	64.45	_	_	0.58	64.45
Detrital	_	_	_	_	3.70	60.0	_	_	_	_	_	_	-	_
<b>TOTAL 2009</b>	108.94	63.71	0.74	63.61	3.75	60.0	109.68	63.71	45.21	64.95	0.03	66.45	45.24	64.95
TOTAL 2008	113.67	63.74	6.65	60.44	3.75	61.87	120.38	63.55	28.0	64.16	0.62	64.03	28.62	64.16

holes in ore are sampled and analysed for Fe, potassium oxide (K<sub>2</sub>O), sodium oxide (Na<sub>2</sub>O), silica (SiO<sub>2</sub>), aluminium oxide (Al<sub>2</sub>O<sub>3</sub>), phosphorus (P), sulphur (S), CaO, MgO, Mn and barium oxide (BaO). Every fifth blast hole is geologically logged per metre, which is used to update the geological model. The chemical results of these holes are used to update the ore block model. Approximately 45,000 blast holes are drilled a year and 9,000 blast holes are used every year to update the models. The major analytical technique for elemental analyses is XRF spectroscopy. Volumetric titration is used as verification method for the determination of total iron in the ore. International standards (e.g. SARM11) and in-house iron standards are used for calibration of the XRF spectrometer. The Beeshoek laboratory participates in a round robin group that includes seven laboratories for verification of assay results.

#### Beeshoek year-on-year change

The 2009 Mineral Resources at Beeshoek mine decreased from 113.7 to 108.9 million tonnes, due to the annual production drawdown. The Mineral Reserves at Beeshoek increased from 28.0 million tonnes to 45.2 million tonnes. The higher iron ore prices were taken into account in the re-evaluation of the Village pit and reserves were declared for this deposit. A feasibility study is to be finalised. Ore Reserves at the BN, WEST and the BF pits were depleted to meet sales requirements. The Khumani mine took over the Beeshoek export production in mid-2008.

#### Beeshoek open-pit locality plan



#### Khumani year-on-year change

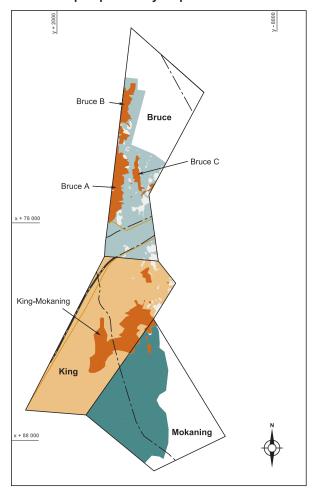
At the Khumani mine the 2009 Ore Reserves at Bruce C decreased to 23.85 million tonnes (30.4 million tonnes) due to the production start-up at this open pit. The mineral resources/ reserves at the other 3 orebodies stayed the same, and it is being

prepared for production. A re-look at the open pit designs at higher iron ore prizes caused an increase in Total Reserves from 510.9 Mt to 565.7 Mt. A feasibility study to increase production from 10 Mt to 16 Mt per annum at Khumani is in progress.

#### Khumani Iron Ore Mine: Resources and Reserves

	Meas	sured	Indic	cated	Inferred		Total Measured and Indicated		Proved Reserve		Probable Reserve		Total Reserve	
Area	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
Bruce A	23.5	64.91	99.0	64.54	0.8	63.37	122.5	64.61	111.06	64.61	0.09	64.38	111.15	64.61
Bruce B	21.1	65.71	77.0	64.06	8.7	64.64	98.1	64.41	88.01	64.41	4.20	63.92	92.21	64.39
Bruce C	24.95	65.34	7.66	65.66	1.6	64.80	32.61	65.41	23.85	65.37	8.15	65.68	32.0	65.45
King/Mokaning	255.8	64.53	123.9	64.48	17.7	63.98	379.7	64.51	258.4	64.43	71.94	64.26	330.4	64.39
Khumani	_	_	_	_	12.0	60.00	12.0	60.00	_	_	_	_	_	_
Detrital														
<b>TOTAL 2009</b>	325.4	64.70	307.6	64.42	40.8	62.97	632.9	64.56	481.4	64.51	84.4	64.26	565.7	64.49
TOTAL 2008	337.9	64.73	306.8	64.43	40.8	62.97	644.7	64.59	274.3	64.64	236.6	64.36	510.9	64.51

#### Khumani open-pit locality map



#### Historical production at Beeshoek and Khumani mines

Saleable product Year	Beeshoek Mt	Khumani Mt
2003/2004	6.3	
2004/2005	6.0	
2005/2006	6.2	
2006/2007	6.7	
2007/2008	5.3	2.0
2008/2009	2.66	6.65



#### **Chromite Mine**

#### Locality

Chromite operations at Dwarsrivier mine form part of the chrome division of Assmang Limited. The mine is situated on the farm Dwarsrivier 372KT, approximately 30 kilometres from Steelpoort and 60 kilometres from Lydenburg, in Mpumalanga province in South Africa. Located at longitude 30°05'00"E/latitude 24°59'00"S, Assmang purchased the farm from Gold Fields Limited, together with all surface and mineral rights in October 1998.

#### **History**

Neighbouring properties to the north and south of Dwarsrivier had existing chrome mining operations at the time of purchase. The feasibility study of the plant, tailings dam and designs for the opencast and underground mines then commenced. After the completion of the consolidated assessment, approval to proceed with the final design and construction work was given in July 1999.

Chromite was obtained from the opencast mining areas at a rate of approximately 0.9 million tonnes a year and these areas were mined out within five years. Underground mining commenced in 2005 at a rate of 1.2 million tonnes a year. Dwarsrivier mine is specifically geared to deliver high quality metallurgical grade chromite to the Machadodorp smelter. In addition, the plant has been designed to produce chemical and foundry grade products.

#### Mining authorisation

An old order Mining Licence 21/99 was granted in October 1999. It was granted for the mining of chrome and platinum group metals. An application for the conversion to a new order mining right was submitted during October 2007.

#### Geology

Dwarsrivier mine is situated in the eastern limb of the Bushveld Complex, which comprises persistent layers of mafic and ultramafic rocks, containing the world's largest known resources of platinum group metals, chromium and vanadium. The mafic rocks termed the Rustenburg Layered Suite, are approximately 8 kilometres thick in the eastern lobe, and are divided formally into five zones.

The rocks of the Marginal Zone at the base of the succession consist mainly of pyroxenites with some dunites and harzburgites. Above the Marginal Zone, the Lower Zone comprises mainly pyroxenites, harzburgites and dunite, and is present only in the northern part of the Eastern Lobe, and only as far south as Steelpoort. The appearance of chromitite layers marks the start of the Critical Zone, economically the most important zone. The layers are grouped into three sets termed the Lower, Middle and Upper groups. The sixth chromitite seam in the Lower Group (LG6), is an important source of chromite ore and is the orebody being mined at Dwarsrivier mine. In the Eastern Lobe, in the vicinity of Dwarsrivier, the strike is nearly north-south, with a dip of approximately 10 degrees towards the west. Average thickness of the LG6 seam is about 1.86 metres in the Dwarsrivier area. Pipelike dunite intrusions are evident in the area, as well as dolerite dykes that on average strike northeast-southwest. No significant grade variation is evident, especially not vertically in the ore seam. Small, insignificant regional variations do, however, exist.

#### **Mineral Resources and Ore Reserves**

Information was obtained from boreholes with a 300 to 150 metre grid spacing.

Resources were determined with a decreasing level of confidence.

- Measured Resource (150 metres drill grid spacing);
- ▶ Indicated Resource (300 metres drill grid spacing); and
- Inferred Resource (drill grid spacing greater than 300 metres).

All possible resources down to a mineable depth of 350 metres below ground level have been considered.

A strategy to ensure the availability of adequate information ahead of mining activities is in place. The strategy is to ensure all mining areas falling within the first five years of the life of mine plan contain proved reserves. Vertical diamond drilling holes are used, except where information is needed to clarify large-scale fault planes. The Mineral Resource at Dwarsrivier mine is based on a total of 230 diamond drill holes that have been used for grade estimation and orebody modelling purposes. The drill core is NQ size and is geologically and geotechnically logged. The collar position of the drill holes is surveyed, but no down-hole surveys are done, and the holes are assumed to have minimal deflection.

The chromitite seam is bounded above and below by pyroxenites. As such, the ore horizon is clearly defined. The core is sampled from the top contact downwards at 0.5 metre intervals. The core is split and half is retained as reference material in the core sheds. The other half is crushed and split into representative samples, which are crushed and pulverised for chemical analysis. The samples are analysed fusion/ICP-OES for chrome oxide (Cr<sub>2</sub>O<sub>3</sub>), SiO<sub>2</sub>, FeO, Al<sub>2</sub>O<sub>3</sub>, MgO and CaO. Three laboratories, all ISO 17025 accredited for this method, are used. Every tenth sample is analysed in duplicate. SARM 8 and SARM 9 standards, as well as in-house reference material (CRI), are included every 20 to 30 samples in each batch. The density for each sample is measured using a gas pycnometer.

The Datamine process SURFIP is now employed to accurately follow the LG6 chrome seams' upper and lower contacts and generate wireframes of the ore zone. A cut-off value of 35 percent Cr<sub>2</sub>O<sub>3</sub> was used to distinguish between ore and waste. Mineral Resources have been calculated using Ordinary Kriging,

where  $Cr_2O_3$ -, FeO-,  $Al_2O_3$ -, MnO and MgO-contents of the LG6 seam and densities were determined, using block sizes of 50  $\ensuremath{x}$ 50 x 4 metres.

During mining, a slightly diluted run of mine ore is fed to the beneficiation plant. This decreases the average grade from approximately 40 percent Cr<sub>2</sub>O<sub>3</sub> to 37 percent Cr<sub>2</sub>O<sub>3</sub>. An addition of approximately 9 percent of waste material results in this 3 percent  $\mathrm{Cr_2O_3}$  grade decrease. In the dense media separation part of the plant, the coarse fraction is upgraded to 40 percent Cr<sub>2</sub>O<sub>3</sub>, with a yield of 80 percent. In the spiral section of the plant the finer fraction is upgraded to 44 percent  $\mathrm{Cr_2O_3}$ , and 46 percent  $Cr_2O_3$  respectively, for metallurgical grade fines and chemical grade fines. Foundry sand is also produced with a similar grade to that of the chemical grade fines. A 67 percent yield is achieved in the spiral circuit.

#### Year-on-year change

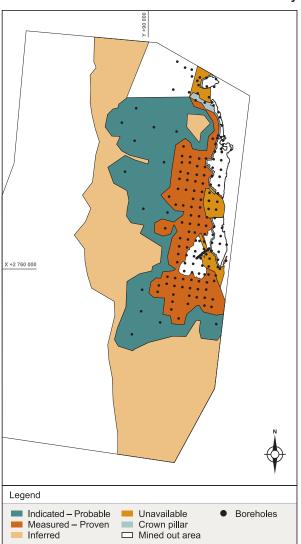
When compared to 2008, the 2009 Mineral Reserves increased by 3.2 million tonnes to 39.6 million tonnes (36.4 million tonnes) and the Mineral Resources show an increase of 9.2 million tonnes to 53.2 million tonnes (44.02 million tonnes). The reason for the change is the more accurate delineation of the seam by means of the Datamine process SURFIP. Excluded from this plan are the Inferred Mineral Resources and material deeper than 350 metres below ground level.

#### **Historical production at Dwarsrivier Chrome Mine**

Year	Mt
2004/2005	0.92
2005/2006	0.82
2006/2007	1.01
2007/2008	1.24
2008/2009	1.03

The current life of mine of the Dwarsrivier Chrome Mine is more than 30 years. Excluded from this plan are the Inferred Mineral Resources and material situated deeper than 350 metres below ground level.

#### **Dwarsrivier Mineral Reserves and Resources locality**



#### Dwarsrivier Chrome Mine: Chrome Resources and Reserves

	F	Resources			Reserves				
	Tonnes Mt	Cr <sub>2</sub> O <sub>3</sub> %	FeO%		Mt	Cr <sub>2</sub> O <sub>3</sub> %	FeO%		
Measured	21.30	39.80	23.27	Proved	13.9	39.78	23.23		
Indicated	31.90	39.39	23.04	Probable	25.7	39.40	23.0		
Total Measured and Indicated 2009	53.2	39.56	23.11	Total Reserves 2009	39.6	39.5	23.1		
Total Measured and Indicated 2008	44.02	39.16	22.79	Total Reserves 2008	36.4	39.16	22.79		
Inferred	53.11	39.00	22.71						

# **ARM Platinum**

# Nkomati Nickel-Copper-Cobalt-PGM-Chromite Mine

#### Locality

The Nkomati Mine is situated some 300 kilometres east of Johannesburg in Mpumalanga province in South Africa. Situated at latitude 25°40'S and longitude 30°30'E, the site is accessed via the national N4 highway between Johannesburg and Machadodorp, the R341 provincial road and the R351 tarred road.

#### **History**

Nickel, copper, cobalt, PGM and chromite mineralisation is hosted by the Uitkomst Complex, a layered mafic-ultramafic, Bushveld satellite intrusion. The Uitkomst Complex outcrops on two farms, Slaaihoek 540JT and Nkomati 770 JT (a consolidation of portions of Uitkomst 541 JT and Vaalkop 608 JT). In 1929, the mineral rights on Slaaihoek were purchased by ETC, an Anglovaal subsidiary, to mine gold at the old Mamre and Slaaihoek mines. In the early 1970s, an Anglo American/INCO Joint Venture began exploring Uitkomst for nickel. In 1990, Anglo American (AAC) completed a feasibility study on an open-pit operation exploiting the large disseminated sulphide resource on Uitkomst, with negative results. Exploration on Slaaihoek by Anglovaal began in earnest in 1989, and in 1991, the first holes were drilled into the massive sulphide body (MSB). In 1995, the Nkomati JV between Anglovaal (75 percent) and AAC (25 percent) was formed and in January 1997, production of the MSB began. In 2004, Anglovaal acquired AAC's 25 percent interest and in 2005, a 50:50 JV was formed between ARM and LionOre, a global nickel producer and owner of the Activox technology. In February 2006, Nkomati approved an interim, Phase 1 expansion project which planned to exploit the MMZ, a disseminated sulphide body, by underground and open-pit mining. The project was completed in 2007 and the mine is currently processing MMZ ore at a rate of 112 000 tonnes per month, maintaining nickel production at approximately 5,000 tonnes a year, the MSB orebody has now been completely mined out. In the same year Norilsk Nickel, the Russian Nickel giant, acquired Lion Ore in totality, resulting in Nkomati being a 50:50 joint venture between ARM and Norilsk Nickel.

In June 2006, following a trial mining operation, a feasibility study on mining the oxidised massive chromitite was completed and approval was given for a 60,000-tonne per month mining and processing operation. This has grown to a planned production of saleable product (lump and chips) of approximately 110 000 tonnes a month for the new financial year. Work has commenced on a Chrome Washing Plant to treat chromitite fines and chips and is anticipated to be commissioned in August 2008. Oxidised PCR, a low grade chromitite bearing ore overlying the MMZ and PCMZ is planned to be stockpiled to feed this plant in the future.

A feasibility study for a Phase 2 expansion phase was completed in 2007 and the project has been released. The project plans to build a 375 000 tonnes a month MMZ plant and to convert the current 100 000 tonnes a month MMZ plant to process 250 000 tonnes a month of PCMZ. The PCMZ, a disseminated chrome-bearing sulphide body overlying the MMZ, will be treated separately to liberate the chromitite fines. At full production in January 2011, Nkomati will produce approximately 1 600 tonnes of nickel a month.

#### Mining authorisation

Old order Mining Licences, numbers 3/2001 and 27/2003, exist on the farms Slaaihoek and Nkomati respectively for the mining of nickel, copper, cobalt, platinum group metals (PGMs) and chromite. An application for the conversion to a new order mining right was approved during 2009.

#### Geology

The Uitkomst Complex is a Bushveld-age layered, maficultramafic body intruded into the basal sediments of the Transvaal Supergroup, which lies unconformably on an Archean granitic basement. The complex is a long linear body, which outcrops in the Slaaihoek valley for approximately 8 kilometres and dips below an escarpment where it has been drilled at depth for an additional 4 kilometres. The complex, which dips at approximately 4 degrees to the northwest, is still open-ended.

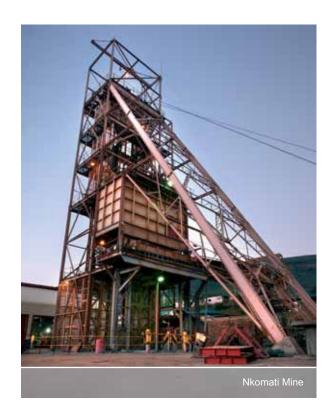
From the base to top, the stratigraphy of the Uitkomst Complex comprises the Basal Gabbro Unit (up to 15 metres thick), the Lower Pyroxenite Unit (average 35 metres), the Chromititic Peridotite Unit (30 to 60 metres), the Massive Chromitite Unit (up to 10 metres), the Peridotite Unit (330 metres), the Upper Pyroxenite Unit (65 metres), the Gabbronorite Unit (250 metres), and the Upper Gabbro Unit (50 metres). The complex and surrounding sediments are intruded by numerous diabase sills up to 30 metres in thickness.

There are five main sulphide zones in the Uitkomst Complex: the MSB, situated at and below the base of the complex, which has been the main producer for the underground mine since 1997; the BMZ within the Basal Gabbro; the MMZ, occurring within the Lower Pyroxenite, which is currently being mined from both underground and open pit; the PCMZ, which occurs with the Chromititic Peridotite (PCR) and is not currently being mined, and the PRDMZ, which occurs in the Peridotite Unit. In addition, the Massive Chromitite Unit (MCHR) is currently being mined where it is fully oxidised (weathered) in the open-pit area. The dominant sulphide minerals are pyrrhotite, pentlandite and chalcopyrite; cobalt is mostly in solid solution in the pentlandite, and the PGMs occur as separate minerals, merenskyite being dominant.

#### **Mineral Resources and Ore Reserves**

There have been numerous diamond, percussion and RC drilling campaigns since 1972 totalling over 162,000 metres in more than 1,000 boreholes. Consequently, various sampling and assaying protocols as well as varying standards of QA/QC have been used. Core sizes have been mainly NQ and TNW. Before 1990 (Anglo American holes), half core samples over widths ranging from 1m to 5m were taken. Samples were assayed at Anglo American Research Laboratory (AARL) for total nickel, copper and cobalt using AA and for "sulphide" nickel using a peroxide leach/AA finish. Composite samples were assayed for platinum and palladium by Pb-collection fire assay/ICP, S by combustion, and a range of major elements by fusion, and RD using the Archimedes bath method. Between 1990 and 1997 (Anglovaal holes), assays were carried out at the Anglovaal Research Laboratory (AVRL), with internal standard checks. Nickel analyses were also carried out by the partial digestion methods and comparisons between AARL and AVRL to ensure that the data was compatible. In 2003, a 50m spaced drilling programme was carried out in the shallow open pit area. Samples from this drilling were analysed at AVRL for nickel, copper cobalt using an aqua regia partial extraction/AA finish. Platinum, palladium, rhodium and gold were analysed by Pbcollection fire-assay/AA finish. Analyses also included Cr<sub>2</sub>O<sub>3</sub>, MgO, FeO, S and RD. Duplicates and internal standards were used and a suite of referee samples were analyzed at Genalysis Laboratory in Perth. Comparisons indicated good correlations between laboratories. In 2005, it was decided to resample many of the Anglo American drill holes to improve the sample density for PGEs in the open pit area. Drill core was resampled (quarter core) at 1 metre intervals. Assays were carried out by SGS Laboratory in Johannesburg for Pt, Pd and Au by Pb-collection fire assay/AA and for Ni, Cu and Co by aqua regia leach/AA. Blanks, duplicates and AMIS standards were included. The new data was incorporated into the borehole database.

The underground MMZ Mineral Resources are based on surface and underground diamond drilling and sidewall sampling. Underground holes are spaced 10 metres apart and the drill core is sampled at 1 metre intervals. The Nkomati mine



laboratory analyzes samples for Ni, Cu and Co using aqua regia leach/ICP, while the PGE assays are carried out by SGS and Mintek Laboratories in Johannesburg. Both laboratories use blanks, standards and check assays for quality control.

The resources for the open pit MMZ and PCMZ are based on surface diamond drilling, mostly at 100 metre spacing, except in the shallow open pit area, where the drill spacing is 50 metres and occasionally 25 metres. Geological wireframe models are generated from the entire borehole database in Datamine but only diamond drill holes are used for the variography and grade estimation by ordinary kriging. Block sizes for the resource model is 50 metres x 50 metres x 2.5 metres.

2009 Mineral Resources, Nkomati Mine

		Measure	d Mine	ral Res	ources		Indicated Mineral Resources						
	Mt Cut-off (Ni%)	Tonnes	Ni%	Cu%	Co%	4E g/t	Cut-off (Ni%)	Tonnes	Ni%	Cu%	Co%	4E g/t	Tonnes
BMZ (underground)	0.35	30 000	0.62	0.36	0.04	1.60	0.35	200 000	0.47	0.33	0.02	1.20	230 000
MMZ (underground)	0.35	950 000	0.54	0.19	0.03	1.71	0.30	48 100 000	0.48	0.21	0.03	1.03	49 050 000
MMZ (open pit) Pits 2 & 3							0.24	82 000 000	0.43	0.19	0.03	1.08	82 000 000
PCMZ (underground)							0.30	19 900 000	0.38	0.12	0.02	0.77	19 900 000
PCMZ (open pit) Pits 2 & 3							0.20	82 800 000	0.26	0.08	0.01	0.75	82 800 000
Total 2009 Mineral Resource		980 000	0.54	0.20	0.03	1.71		233 000 000	0.38	0.15	0.02	0.93	233 980 000
Total 2008 Mineral Resource		1 000 000	0.54	0.20	0.03	1.09		235 850 000	0.38	0.15	0.02	0.93	236 850 000



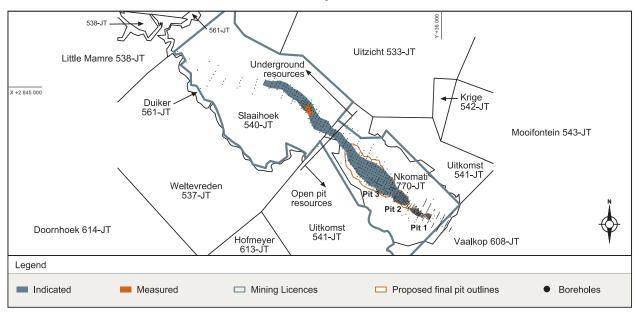
#### Oxidised Massive Chromitite Resource

	Indicated Reso		Inferred R	desources
	Tonnes	Cr <sub>2</sub> 0 <sub>3</sub> %	Tonnes	Cr <sub>2</sub> 0 <sub>3</sub> %
Chromitite (at 30% Cr <sub>2</sub> 0 <sub>3</sub> cut-off)	1 820 000	33.56	100 000	31.71

### Oxidised Chromitiferous Peridotite

	Indicat	ed Mineral Re	source	Inferred Resources				
	Tonnes	Tonnes Cr <sub>2</sub> 0 <sub>3</sub> %		Tonnes	Cr <sub>2</sub> 0 <sub>3</sub> %	S		
Oxidised PCR	5 200 000	16.41	0.04	8 700 000	16.04	0.12		

### Nkomati Mine - Mineral Reserves and Resources locality



#### 2009 Mineral Reserves, Nkomati Mine

	Proved Mineral Reserve						Probable Mineral Reserve						
	Cut-off (Ni%)	Tonnes	Ni%	Cu%	Co%	4E g/t	Cut-off (Ni%)	Tonnes	Ni%	Cu%	Co%	4E g/t	Tonnes
NMZ (underground)							0.35	6 900 000	0.59	0.22	0.03	1.07	6 900 000
MMZ (open pit) Pits 2 & 3							0.24	67 100 000	0.42	0.18	0.03	1.08	67 100 000
PCMZ (open pit) Pits 2 & 3							0.16	85 700 000	0.22	0.06	0.01	0.62	85 700 000
Total 2009 Mineral Reserve								159 700 000	0.32	0.12	0.02	0.82	159 700 000
Total 2008 Mineral Reserve		200 000	0.55	0.23	0.03	1.19		164 540 000	0.32	0.12	0.02	0.82	164 740 000

<sup>4</sup>E means platinum + palladium + rhodium + gold

#### Oxidised Massive Chromitite Reserve (with depletion by production as at 30 June 2009)

Chromitite	Tonnes	Cr <sub>2</sub> 0 <sub>3</sub> %
Probable Mineral Reserve (30% Cr <sub>2</sub> 0 <sub>3</sub> cut-off)	2 900 000	31.0

#### Oxidised PCR (with depletion by production as at 30 June 2009)

Oxidised PCR	Tonnes	Cr <sub>2</sub> 0 <sub>3</sub> %	s
Probable Mineral Reserve (10% Cr <sub>2</sub> 0 <sub>3</sub> cut-off)	5 000 000	17.50	0.04

#### Year-on-year change

There have been minor changes in the mineral resources and reserves reported from 2008, mainly due to depletion.

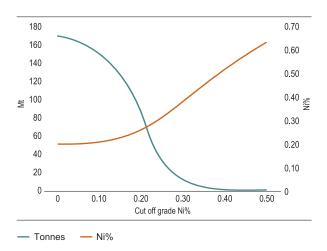
- The Mineral Resources decreased by 2.87 Mt from 236.85 Mt to 233.98 Mt due to depletion
- The Ore Reserves decrease by 5.04 Mt from 164.74 to 159.7 Mt. This is mainly due to depletion of MMZ pits 1+2, as well as a change in the mining method of the underground operation.
- ▲ The Mineral Resources for the PCMZ and MMZ for Pits 2 and 3 remain the same, and are illustrated in the graphs below.

Mining operations to date comprise a mechanised underground and open pit mining operation which feeds two concentrators producing concentrate containing PGMs, nickel, copper and cobalt. Final products are transported to various third parties for toll treatment. Chrome products are sold to local and export markets.

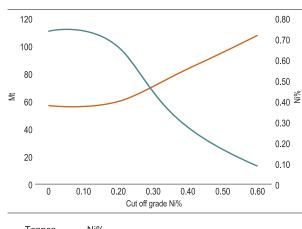
#### **Historical Ni production at Nkomati Nickel Mine**

Financial year	Tonnes Ni ore milled
2004/2005	346 000
2005/2006	377 000
2006/2007	359 000
2007/2008	1 070 000
2008/2009	1 258 818

#### Grade - tonnage curves for PCMZ in pits 2 and 3 area



#### Grade - tonnage curves for MMZ in pits 2 and 3 area





#### Two Rivers Platinum Mine

ARM's attributable beneficial interest in Two River's operations is 50%. The other 50% is held by Impala Platinum.

Mining operations to date comprise a mechanised underground and open pit mining operation which feeds two concentrators producing concentrate containing PGMs, nickel, copper and cobalt. Final products are transported to various third parties for toll treatment. Chrome products are sold to local and export markets.

#### Locality

Two Rivers Platinum Mine is located within the southern sector of the eastern limb of the Bushveld complex, on the farm Dwarsrivier 372KT. Situated at longitude 30°07'00E and latitude 24° 59'00S, the UG2 and Merensky reefs are present on the farm.

#### **History**

Exploration, development and production history in the area dates from the early 1920s. During 1929, Lydenburg Platinum Areas Limited started mining activity. No records are available. Following the acquisition by Gold Fields Mining and Development Limited, exploration started up again in 1987 and was mainly directed at the Merensky Reef. Assmang acquired the farm in September 1998 primarily to exploit the LG6 Chromitite. During 2001, Avmin acquired the PGE rights on the Dwarsrivier farm from Assmang and targeted the UG2 Reef.

In June 2005, following a full feasibility study and a period of trial underground mining, the joint venture announced the release of a 220 000 ounce-per-year PGM mine. As a result an underground mine was established. The plant was commissioned in July 2006.

#### Mining authorisation

Two Rivers holds an old order Mining Licence no. 4/2003 on Dwarsrivier 372KT relating only to the PGEs contained in the Merensky and UG2 reefs. An application for a new order conversion of the mining licence was submitted in July 2007. This application is still pending.

#### Geology

The UG2 Reef outcrops in the Klein Dwarsrivier valley over a north-south strike length of 7.5 kilometres, dipping to the west at between 7 degrees and 10 degrees. The extreme topography results in the UG2 occurring at a depth of 935 metres on the western boundary.

The following reef facies have been defined for the UG2 at Two Rivers:

'Normal' UG2 with an average thickness of 120 centimetres.

- This is overlain by up to three chromitite 'leaders' collectively termed the UG2A chromitites;
- 'Split Reef' in the southern, west-central and north-eastern parts, characterised by a pyroxenite or norite lens up to 6 metres thick which is developed within the UG2 and typically resulted in a lower chromitite layer that is thicker than the upper chromitite layer; and
- 'Southern facies' comprising a second pyroxenite/norite lens situated approximately one-third from the base of the UG2. This facies has been intersected in seven drill holes in the extreme south-western area.

The UG2 is usually bottom loaded with peak PGM values occurring in the basal 10-centimetre sample.

The Merensky Reef consists mainly of orthopyroxene with lesser amounts of plagioclase and clinopyroxene. Thin chromitite layers, usually 1 to 4 millimetres thick generally, occur near the upper and lower contacts of the reef.

#### **Mineral Resources and Ore Reserves**

The majority of resources at Two Rivers are classified as Indicated Mineral Resources, and it is only the open-pit area in the north and the area around the underground mine that are classified as Measured Resources due to the more closely spaced drilling in this area.

A total of 218 surface diamond boreholes had intersected the UG2, of which 35 were drilled by Gold Fields of South Africa and 18 by Assmang. This provided a total of 409 individual UG2 reef intersections, with an average spacing grid of 500 metres over the whole property and 250-metre grid spacing over the area planned for the first five years of mining. The drill hole spacing in the area of the open pit is 50-metres on dip and 100 metres on strike. It was standard for Two Rivers to drill three nondirectional deflections off each mother hole.

The holes were halved by diamond saw and the half-core sampled at 20 centimetres. Samples were crushed and split and submitted for assaying. All samples were assayed by Ni-sulphide collection fire-assay with an ICP-MS finish to determine Pt, Pd, Rh, Ru, iridium (Ir) and Au values. Base metals (Ni, Cu, Co) were also assayed by aqua regia digestion/OES finish. Duplicate samples and check analyses were carried out. The earlier Gold Fields and Assmang samples were assayed by Pb-collector fire-assay with gravimetric finish. In order to combine the data, some of the original core samples were re-assayed by means of Ni-sulphide collection fire-assay and a regression equation was derived at to re-cast the original Pb-collection data as Ni-sulphide assay 'equivalents'. The Merensky Reef resource is based on a total of 81 surface

diamond drill holes. The same sampling protocol was used as for the UG2, but assays were carried out by Pb-collection fireassay with ICP-MS finish for Pt, Pd Rh and Au.

Ordinary Kriging interpolation within Datamine was used to estimate the grade of each 50 x 50 x 1-metre block generated within the geological model. The UG2 was wireframed and estimated as two units based on the Pt:Pd ratio as observed in the drill hole database. Sub-cell splitting of blocks was allowed to follow the geological boundaries accurately. Relative density was calculated for each sample and determined by Kriging in the resource model.

Total in-situ resources were decreased by 30 percent to account for geological losses due to potholes, faults, dykes and replacement pegmatoids.

The resource to reserve conversion was done using the Mine2-4D optimisation software package to select the optimum economic cut subject to the geological, geotechnical and trackless mining constraints. Unplanned and off-reef dilution

factors, followed by a 95 percent mine call factor, have been applied to the output from the optimiser to provide the fully diluted mill head grade of the reserves.

#### Year-on-year change

Overall the 2009 UG2 Resources decreased from 56.5 million tonnes to 54.1 million tonnes. This 2.4 million tonnes reduction is the result of depletion by mining. The Measured Resources were decreased by 0.97 million tonnes when compared to the previous year. The Indicated Resources decreased by 1.41 million tonnes.

The Ore Reserves decreased by 2.2 million tonnes from 39.5 to 37.3 million tonnes.

#### Mineral Resources UG2

(UG2 + Internal Pyro	Grade								
	Mt	Pt g/t	Pd g/t	Rh g/t	Au g/t	(3PGE+Au) g/t	(5PGE+Au) g/t	Pt M oz	6E Moz
Measured	13.81	2.52	1.55	0.47	0.05	4.59	5.48	1.12	2.43
Indicated	40.28	2.05	1.22	0.38	0.04	3.69	4.45	2.65	5.76
Total 2009	54.09	2.17	1.30	0.40	0.04	3.91	4.71	3.77	8.19
Total 2008	56.47	2.18	1.31	0.41	0.04	3.94	4.74	3.96	8.60
Inferred	8.1	2.17	1.29	0.39	0.05	3.90	4.68	0.57	1.22

**3PGE** = Pt + Pd + Rh; **5PGE** = Pt + Pd + Rh + Ir + Ru; **6E** = 5PGE + Au

#### Mineral Resources Merensky Reef

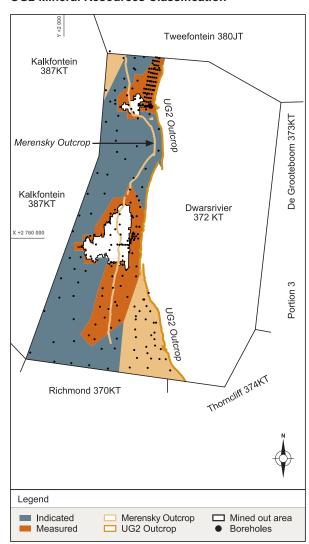
Top zone	Mt	(3PGE+Au) g/t	6E g/t	Pt g/t	Pt Moz	6E Moz
Measured	_	_	_	_	_	_
Indicated	18.7	3.34	3.55	2.06	1.20	2.06
Inferred	3.9	3.16	3.36	1.95	0.24	0.41

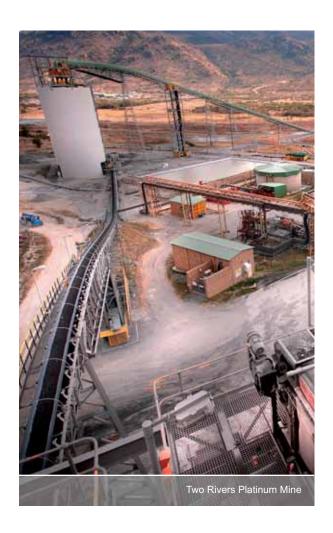
#### Mineral Reserves UG2

(UG2 + Internal Pyrox									
	Mt	Pt g/t	Pd g/t	Rh g/t	Au g/t	(3PGE+Au) g/t	(5PGE+Au) g/t	Pt Moz	6E Moz
Stockpile	0.15	1.88	1.19	0.35	0.04	3.46	4.13	0.009	0.02
Proved	9.93	2.04	1.24	0.37	0.04	3.69	4.47	0.66	1.44
Probable	27.22	1.76	1.04	0.33	0.03	3.16	3.81	1.54	3.33
Total 2009	37.29	1.83	1.10	0.34	0.03	3.30	3.98	2.19	4.78
Total 2008	39.51	1.85	1.10	0.35	0.03	3.33	4.02	2.35	5.11



### Two Rivers Platinum (Pty) Ltd – Dwarsrivier 372 KT **UG2 Mineral Resources Classification**





# **Historical production at Two Rivers Platinum Mine**

Financial year	Mt
2005/2006	1.00
2006/2007	1.28
2007/2008	2.33
2008/2009	2.69

#### Modikwa Platinum Mine

ARM's attributable beneficial interest in Modikwa's operations is 50%. The other 50% is held by Anglo Platinum.

#### Locality

Modikwa platinum underground mine is situated some 15 kilometres north of Burgersfort and 15 kilometres east of Steelpoort, along the border between the Mpumalanga and Limpopo provinces in South Africa. Located at longitude 30°10'E and latitude 24°40'S, the site is accessed via the R37 road between Polokwane and Burgersfort.

#### **History**

Exploration in the area started in the mid 1920s with the discovery of the Merensky Reef. During the late 1980s further drilling was completed on the UG2 and Merensky reefs. In the late 1990s a feasibility study was completed on the exploitation of the UG2. During 2001 a 50:50 JV agreement was signed between Rustenburg Platinum Mines and ARM Mining Consortium Limited. ARM's effective stake in Modikwa is 41.5-percent, through its 83 percent ownership of the ARM Mining Consortium. The other 8.5 percent is held by the Mampudima and Matimatjatji community companies through their 17 percent shareholding in the ARM Mining Consortium.

#### Mining authorisation

During June 2001, an old order mining licence was issued to ARM Mining Consortium and Rustenburg Platinum Mines over the properties Onverwacht 292KT, Portion 1 and R/E Winterveldt 293KT, Driekop 253KT, Maandagshoek 254KT and Hendriksplaats 281KT. An application for new order rights is in preparation and was submitted in March 2009.

#### Geology

The igneous layering at Modikwa mine is north-northwest striking with an average dip of 10 degrees to the west. Both the UG2 and Merensky reefs are present. The UG2 occurs as a chromitite layer with average thickness of approximately 60 centimetres. Three leader chromitites occur above the main seam. Gentle undulations of the UG2 with amplitudes of less than 2 metres are pervasively developed across the mine area. Potholes of varying size appear to be randomly distributed within the North shaft area. Potholes are less abundant in the South shaft area, which is more disturbed by faulting. The Onverwacht Hill area is characterised by the presence of several large ultramafic pegmatoid intrusions that disrupt and locally replace the UG2.

#### **Mineral Resources and Ore Reserves**

The Mineral Resource and Reserve classification is based primarily on the proximity to drilling and underground sampling data and uses the semivariogram range, and the number of

samples used, to estimate a block to determine the category. Measured Mineral Resources are classified if a block is within 66 percent of the range of the semivariogram from the nearest sample and six to 30 samples are used in the estimation process. Indicated Mineral Resources are classified when a block is within the range of the semivariogram and 10 to 30 samples are used in the estimation process. Inferred Mineral Resources are classified if a block falls outside the range of the semivariogram and 30 to 100 samples are used to estimate a block.

The mineral resource is based on over 700 surface diamond drill holes and over a 1 000 underground channel samples. These logs and values are kept in separate electronic databases and combined for estimation purposes after rigorous data validation. The 4E grades are capped at 13 grams per tonne based on statistical analyses.

Samples are submitted to Anglo Platinum Research Centre and analysed at Anglo American Research Laboratories. Analyses are completed using two fire-assay techniques to provide individual assay grades for Pt, Pd, Rh and Au, while wetchemical techniques are used to determine Ni and Cu grades.

The UG2 mining cut is divided into three units comprising the UG2 chromitite layer, the hangingwall and the footwall. Estimation of the three sub-units in the mining cut is carried out separately and independently. Two-dimensional block models with block sizes of 250 x 250 metres and 500 x 500 metres, depending on the drill hole spacing, are created. Pt, Pd, Rh, Au, Ni and Cu grades are interpolated using Ordinary Kriging for the UG2 and inverse distance squared for the hanging and footwall units. The width of the chromitite and the density are also interpolated into the block models. The average density at Modikwa mine is 3.72t/m<sup>3</sup>. Discount factors are applied to tonnages ranging from 10 percent (for measured Mineral Resources) and up to 30 percent to account for loss of ore due to pegmatoidal intrusions, faults, dykes and potholes.

#### Year-on-year change

The Mineral Reserves at Modikwa decreased to 56.0 million tonnes (58.3 million tonnes) when compared with the 2008 statement. The Measured and Indicated Mineral Resources increased from 115.2 to 145.7 million tonnes due to conversion of resources (Measured and Indicated) to reserves and reevaluation. Resources and Reserves were adjusted to reflect June 2009 status.

A minimum mining cut of 102 centimetres is used to calculate the amount of footwall waste that is included in the mining cut. Where the hangingwall and the main seam thickness are greater than 102 centimetres, an additional 5 centimetres of footwall waste is included. The basal contact of the UG2 layer



is typically high-grade and it is important that this contact is not left in the footwall during mining. The UG2 is accessed via two primary declines from surface – and a fleet of mechanised equipment is used for the mining operations. Run-of-mine tonnage is processed at the Modikwa concentrator and the PGE rich concentrate is transported to Anglo Platinum's Polokwane smelter and refining facilities.

#### Mineral Resources and Reserves UG2

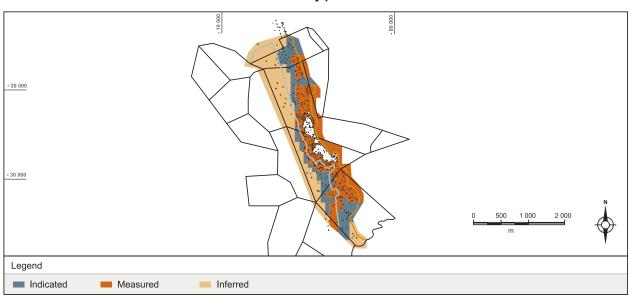
		Resources					
	Mt	3PGE+Au g/t	M oz		Mt	3PGE+Au g/t	Moz
Measured	52.33	5.85	9.84	Proved	18.14	4.73	2.76
Indicated	93.40	5.86	17.6	Probable	37.87	4.71	5.73
Total Measured and Indicated 2009	145.73	5.86	27.44	Total	56.01	4.71	8.49
Total Measured and Indicated 2008	115.6	5.61	20.76		58.03	4.71	8.84
Inferred	76.11	6.19	15.15				

3PGE = Pt + Pd + Rh

#### Mineral Resources Merensky Reef

	Mt	3PGE+Au g/t	Moz
Measured	17.95	2.94	1.70
Indicated	54.05	2.73	4.74
Total Measured and Indicated 2009	72.00	2.78	6.44
Inferred	136.84	2.65	11.66

### Modikwa Resources classification and borehole locality plan



### Historical production at Modikwa Platinum Mine (ROM)

Financial year	Mt
2004/2005	2.46
2005/2006	2.51
2006/2007	2.32
2007/2008	2.26
2008/2009	2.45

### Kalplats Platinum Projects

ARM's attributable beneficial interest in Kalplats' operations is 90%.

#### Locality

The Kalplats platinum projects are situated 330 kilometres west of Johannesburg and some 90 kilometres southwest of Mafikeng in the North West Province of South Africa. Situated at latitude 26°30'S and longitude 24°50'E, the project area is accessed from Stella on the N14 national road linking Mafikeng and Vryburg.

#### **History**

Anglo American discovered the Kalplats platinum deposits in the early 1990's and Harmony Gold Mining Company Limited acquired the project from Anglo in 1999. Subsequently ARM acquired the project as part of the merger of the Anglovaal, ARM and Harmony assets in 2004. Pre-2004, exploration comprised a combination of rotary air blast (RAB), reverse circulation (RC) and diamond drilling. Anglo drilled a total of 6 000 metres in 133 holes, while Harmony drilled a total of 40 000 metres in 862 holes. Harmony commissioned a feasibility study in 2003 and excavated a 500 tonne bulk sample for metallurgical test work. The study assessed the viability of both an open pit and underground mining operation. The feasibility study was completed early in 2004.

In 2005, ARM Platinum entered into two joint venture agreements with Platinum Australia Limited (PLA), one over the "Kalplats Project" in which ARM Platinum has a 90 percent share and which provides for PLA to earn up to 49 percent by completing a bankable feasibility study and making the Panton metallurgical process available at no cost. The other joint venture agreement covers the "Kalplats Extended Project" (Extended Project) in which ARM Platinum and PLA each has a 50% share and contributes equally to the exploration expenditure. Both projects are managed by PLA.

#### **Prospecting rights**

In September 2006, ARM Platinum was granted a new order prospecting right (PR492 of 2006) over the Kalplats Project covering portions of the farms Groot Gewaagd 270, Gemsbok Pan 309, Koodoos Rand 321 and Papiesvlakte 323 (approximately 3,810 hectares). In April 2007, a new order prospecting right (DME1056) (approximately 62,985 hectares) was granted to ARM Platinum over the Extended Project area which covers an additional 20 kilometre of strike to the north and 18 kilometres to the south of the Kalplats Project area.

#### Geology

PGE mineralization is hosted mainly by magnetite-rich gabbros within the Stella Layered Intrusion (SLI), a 3.0 billion year old layered complex intruded into the Kraaipan Greenstone Belt.

Mineralisation is contained in seven separate, subvertically dipping zones known as Crater, Orion, Vela, Sirius, Crux, Serpens North and Serpens South, each with strike lengths of between approximately 500 and 1 000 metres and widths of between 15 and 45 metres. In addition, drilling has outlined at least four additional deposits known as Scorpio, Tucana, Pointer, and Mira.

Three main sub-parallel reef packages within each zone have been recognised. They are the Main Reef (the highest grade reef), Mid Reef and LG Reef. The area is structurally complex, and thrusting has caused duplication of reefs in some cases.

#### Mineral Resources and Ore Reserves

Definition drilling by Platinum Australia (PLA) on the Kalplats Project was completed in November 2008. 17 300 metres were drilled during the year bringing PLA's total to 93,100 metres. Geological modelling and resource estimation by Coffey Mining have been finalized on four of Kalplats' seven main deposits. Results to date have significantly increased the mineral resource at Kalplats and have upgraded some of the resource to a measured category.

PLA is currently finalizing a bankable feasibility study on an open pit mining operation. PLA is also carrying out a soil geochemical survey on the Kalplats "Area of Influence". An initial drilling programme has been completed and target grade mineralization has been intersected over a strike length of approximately 2 kilometres.

#### Year-on-year change

When compared with the 2008 statement the Measured and Indicated Mineral Resources increased from 7.12 million tonnes to 56.7 million tonnes due to the additional PLA drilling. Independent resource estimations were carried out by Coffey Mining consultants using this information.

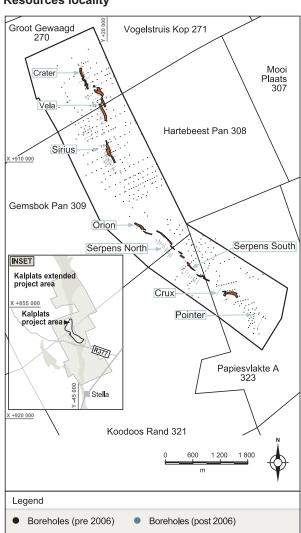


#### Mineral Resources

	Measured	2PGM+	Indicated	2PGM+	Measured +	2PGM+		Inferred	2PGM+
Deposit	Mt	Au g/t	Mt	Au g/t	indicated Mt	Au g/t	Moz	Mt	Au g/t
Orion	4.2	1.57	4.01	1.56	8.211	1.565	0.41	3.644	1.61
Crux	7.77	1.54	10.991	1.39	18.761	1.45	0.87	10.34	1.24
Crater	1.457	1.84	6.438	1.86	7.895	1.856	0.47	19.543	2.06
Vela	_	-	21.7	1.36	21.7	1.36	0.95	14.872	1.32
Measured +		i		!			·		
Indicated	13.43	1.58	43.14	1.46	56.57	1.49	2.7	_	_
Sirius		i		!			·	9.77	1.37
Serpens N		i		1 			·	8.94	1.37
Serpens S				1 				10.76	1.34

2PGM = Pt + Pd

# Kalplats Platinum Projects – Mineral Reserves and **Resources locality**





### **ARM Coal**

#### Goedgevonden Coal Project

ARM's attributable beneficial interest in Goedgevonden's operations is 50%. The other 50% is held by Xstrata.

#### Locality

The Goedgevonden project is situated in the Witbank Coalfield about 7 kilometres south of the town of Ogies in Mpumalanga province in South Africa.

#### History

A total of 548 surface diamond boreholes were drilled during 1964 to 2004 by Duiker Mining and Xstrata SA. Anglo Coal supplied an additional 102 boreholes for the Zaaiwater area. Most boreholes were drilled down to basement to define the seam locality and basement topography. Owing to the different campaigns, the database had to be validated to produce a consistent set of data.

#### Mining authorisation

New order mining rights were granted during the year under review.

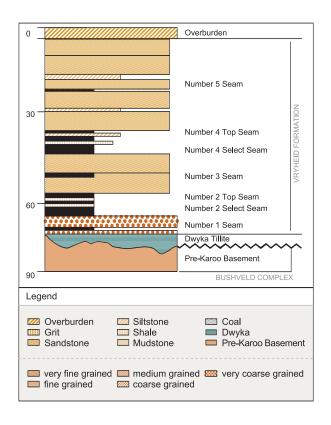
#### Geology

The stratigraphy of the Witbank Coalfield consists of five seams numbered from oldest to youngest: No 5 to No 1 seam. The seams vary in thickness from less than 0.5 metres to over 6 metres and do not exceed 300 metres in depth from surface. The coal seams dip at less than 5 degrees. However, coal seam morphology and qualities may be locally influenced by basement topography, surface weathering and intrusion of dolerite dykes and sills. The coal qualities vary both within and between individual coal seams. Low quality coals, suitable for the local steam coal market, have a calorific value of between 18 to 22Mj/kg, whereas the high quality export steam coal has a calorific value of greater than 27Mj/kg. The proposed Goedgevonden open-cut mine is expected to produce about 3.2 million additional tonnes annually for export and 3.4 million tonnes a year for domestic thermal generation coal. The planned stripping ratio is between 3.35:1 and 1.85:1 in the early years of production. Using a mining contractor, Xstrata SA started mining on the Goedgevonden property at a rate of 1 million tonnes a year (run-of-mine).

All five coal seams are developed on Goedgevonden (See Figure). The No 1 seam is of low quality, thin and only developed in paleo-low areas. The No 2 seam is extensively developed and is of good quality and is, on average, 5.5 metres thick. The No 3 seam at Goedgevonden is of good quality but, with an average thickness of only 0.3 metres, is uneconomic. The No 4 seam, being closer to surface and although of the same thickness as the No 2 seam, is influenced by weathering and is not as extensively developed. The No 5 seam is of good quality,

but is preserved as erosional remnants on the high ground only and thus not extensively developed over the area. No major faults, structural disturbances or intrusives were observed in the boreholes drilled to date.

Wireframes for the seam composites for the No 2, 4 and 5 seams were generated in Datamine. Two-dimensional block models were generated with block sizes of 50 x 50 metres. All estimations of the individual blocks were done using inverse distance cubed with an isotropic search. Other software packages used in the evaluation are 'Washproduct' and 'Xpac'.



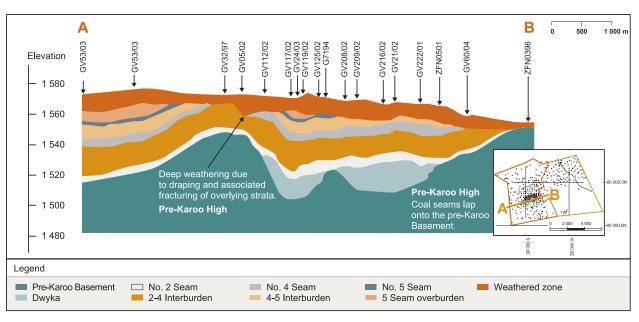


The following table with regard to Goedgevonden Coal Resources and Reserves was obtained from Xstrata, reflecting the status as at June 2009. Mineral Resources and Reserves of the Xstrata mines are the responsibility of the Xstrata SA Resources and Reserves team. No ARM employee is involved in the compilation of Xstrata SA's Mineral Resources and Reserves.

#### Resources and Reserves

Seam No	Measured	Indicated	Inferred	Proved	Probable	Saleable
Resources within Mine Plan						
2	107.9	_	_	94.8	_	58.7
	85.5			75.1		31.2
4	95.5	_	_	83.9	_	51.4
	89.9	_	_	79.1	_	36.6
5	39.9	_	_	35.0	_	20.0
Total	418.7	_	_	367.9	-	197.9
Resources outside of Mine Plan						
2	27.7	4	_	_	_	_
	12.7	15	_			
4	29.3	4	28	_	_	_
	18.1	5	29			
5	15.7	1	11	_	_	_
Total	103.5	29	68	_	_	_
Overall	522.2	29	68	367.9	_	197.9

# Section showing Goedgevonden Coal Seams



### Historical production at Goedgevonden

Financial year	Mt
2006/2007	1.6
2007/2008	1.6
2008/2009	2.8

# **ARM Exploration**

ARM's attributable beneficial interest in exploration ventures is 50%. The other 50% is held by Vale.

ARM Exploration is a new Division with its main objective to identify and assess exploration and mineral business opportunities for base metals, PGM's and coal. The Division will focus on opportunities in Sub Sahara Africa where it has established expertise and relationships.

ARM Exploration (Africa) will also co-oversee the development of the Vale/ARM joint venture assets in Zambia and the DRC in accordance with the Vale/ARM joint venture arrangement.

#### Vale/ARM Joint Venture

TEAL Exploration & Mining Incorporated (TEAL) announced on 23 March 2009 the conclusion of a transaction whereby African Rainbow Minerals Limited (ARM) and Companhia Vale do Rio Doce (Vale) acquired all outstanding common shares of TEAL not already owned by ARM, and concurrently with this closure formed a 50:50 joint venture between ARM and Vale for the future development of the assets. TEAL Minerals (Barbados) Limited is the newly created holding company of the assets, jointly owned by VALE International SA (a company registered in Switzerland) and TEAL Exploration & Mining(B) Incorporated (a company registered in Barbados), an indirectly owned subsidiary company of ARM.

#### Zambia

The Konkola North Copper Project is located within the Greater Konkola Area of the Zambian Copperbelt and consists of a large scale mining license covering an area of approximately 44 square kilometers.

The Vale/ARM joint venture intends to focus initially on the development of the northern portion of the deposit, known as the South and East Limb areas and the re-equipping of the existing infrastructure at the South Limb, which includes a 423 meter vertical shaft, two ventilation shafts and three ore haulage levels. At the East Limb, the Company is considering the sinking of a decline shaft to access the mineralization.

A feasibility study for the Konkola North East/South Limb ore bodies has been completed. The study envisages a ROM production of 2, 5 Mtpa for +/- 45,000 Cu tpa production.

Additional work is required to fulfill the joint venture partner's requirements for a bankable feasibility study and thereby increasing the confidence limits for the project. Additional work includes further resource conversion drilling, geotechnical and hydrological studies, a review of operating and capital costs and the finalization of off-take agreements and power supply agreements. It is envisaged that a final study will be presented to the Board of Directors in the second quarter of 2010.

Konkola North's Area 'A' hosts a potentially world-class resource, with approximately 220 Mt of ore at grades of 2.64% copper. The

Company has completed a first phase definition drilling phase of Area 'A'. Following the geological data processing and interpretation, another drilling programme will be planned to further define the copper resources in this area. It is anticipated that drilling will commence in the next financial year.

#### **Democratic Republic of Congo (DRC)**

Situated in the DRC in close proximity to the city of Lubumbashi, the Kalumine Copper-Cobalt Project, a joint venture with La Générale des Carrières et des Mines (Gécamines), comprises approximately 77 square kilometers. The mining license area hosts numerous deposits, including the Lupoto, Kasonta, Kasonta South, Niamumenda and Karavia prospects.

Exploration drilling commenced in March 2007. At Lupoto a small-scale mining operation was commissioned in 2008 and a total of 2.25 Mt of copper ore with an average grade of 4.5% Cu was mined and upgraded through a screening and sorting process. A total of 1,663 tonnes of lumpy ore at a grade of 22.46% Cu and 15,931 tonnes of fine ore material at a grade of 12.69% Cu was produced and sold to third parties. The remainder of the ore comprises a stockpile of 1.1 Mt with an average grade of 4.5% Copper. All mining and processing related work has now stopped, and the copper furnace previously commissioned is on care and maintenance. The company will focus on exploration and resource definition work.

In February 2008 written notification was received from the Minister of Mines in the DRC informing the Company of the outcome of the DRC Mining Contracts Review Commission. Numerous meetings were held with the DRC authorities and an agreement was reached in December 2008. In March 2009, however, a further amended requirement was tabled by the DRC authorities and the Company proceeded with further discussions. It is anticipated that a final agreement will be reached during Q3 2009.

#### Namibia

The Otjikoto Gold Project is situated within the Company's 100% owned Otavi Exploration Area, which totals 3,800 square kilometers in north-central Namibia.

Environmental Impact Assessment study is advanced and a mine technical study and financial evaluation has been completed.

The joint venture has decided to re-focus its priorities to the development of its copper assets and will divest its interest in the Otjikoto Gold Project through a selected tender process.



#### Mineral Resources

The Otjikoto Gold Project is an evaluation and exploration project situated in the Otavi region in Namibia.

Mineral Resources at a 0.4 G/T Au cut-off grade

	Mt	g/t Au	Moz
Measured	_	_	_
Indicated	28.4	1.34	1.22
Inferred	17.2	1.28	0.71

#### The Konkola North Copper Project is situated on the Zambian Copperbelt.

Mineral Resources at a 1% total copper cut-off grade

	Mt	% TotCu	Mt Con- tained Cu
		1	
Measured South Limb	10.00	2.23	0.22
Indicated South Limb	22.20	2.13	0.47
Total South Limb	32.20	2.16	0.69
Inferred South Limb	16.20	2.22	0.36
Measured East Limb	7.10	2.34	0.17
Indicated East Limb	11.70	2.87	0.34
Total East Limb	18.80	2.67	0.51
Inferred East Limb	10.70	2.83	0.30
Total Measured and Indicated 2009	51.00	2.35	1.20
Inferred (mainly area A)	219.50	2.64	5.79

The Mwambashi Copper Project lies in the Zambian Copperbelt on the western edge of the Chambishi Basin.

Mineral Resources at 0.5% total copper cut-off grade

	Mt	%TCu	Mt Con- tained Cu
Measured	10.54	1.84	0.19
Indicated	1.896	1.17	0.02
Total Measured and Indicated 2009	12.44	1.74	0.21
Inferred	1.77	2.10	0.04

### Kalumines Properties (DRC) - Mineral Resources

		Mt	%TCu	Mt Con- tained Cu
Lupoto	Measures	_	_	_
	Indicated	15.09	2.32	0.35
	Inferred	9.1	2.09	0.19
Kasonta	Inferred	20.9	1.13	0.24
Kasonta south	Inferred	5.1	1.66	0.08
Niamumenda	Inferred	2.2	2.36	0.05
Stockpile		1.1	4.15	0.05

# **Gold: Harmony**

ARM holds a 14.8% stake in Harmony Gold. Harmony, South Africa's third largest gold producer, is separately run by its own management team. Resources and Reserves of the Harmony mines are the responsibility of the Harmony team and are published in Harmony's Annual Report.

# **Definitions**

#### The definitions of Resources and Reserves, quoted from the SAMREC Code, are as follows:

A 'Mineral Resource' is a concentration [or occurrence] of material of economic interest in or on the earth's crust in such form, quality or quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a mineral resource are known, estimated from specific geological evidence and knowledge, or interpreted from a well constrained and portrayed geological model. Mineral Resources are subdivided, in order of increasing confidence in respect of geoscientific evidence, into inferred, indicated and measured categories.

An 'Inferred Mineral Resource' is that part of a mineral resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that may be limited or of uncertain quality and reliability.

An 'Indicated Mineral Resource' is that part of a mineral resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.

A 'Measured Mineral Resource' is that part of a mineral resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

A 'Mineral Reserve' is the economically mineable material derived from a measured and/or indicated mineral resource. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, including consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified. Mineral Reserves are sub-divided in order of increasing confidence into probable Mineral Reserves and proved Mineral Reserves.

A 'Probable Mineral Reserve' is the economically mineable material derived from a measured and/or indicated mineral resource. It is estimated with a lower level of confidence than a proved mineral resource. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, including consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified.

A 'Proved Mineral Reserve' is the economically mineable material derived from a measured mineral resource. It is estimated with a high level of confidence. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, including consideration of, and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified.