

# SUPPLIES, MINING & EXPLORATION

## SOUTH AFRICA

**Supplies of platinum from South Africa are forecast to total 5.12 million oz in 2005, up by 3 per cent compared with last year. A three month shut-down at Anglo Platinum's Polokwane smelter is expected to reduce the group's output, which is now unlikely to reach the target of 2.6 million oz. Most other producers are expected to achieve modest growth in pgm production.**

## Anglo Platinum

At Anglo Platinum's Amandelbult mine, pgm output fell sharply during the first six months of this year due to difficult geological conditions at the No.2 shaft; production also declined at the Rustenburg Merensky operations. However, these losses were offset by an increase in output from the Rustenburg UG2 project, greater production from the developing Modikwa mine (a joint venture with ARM Platinum), and by the processing of the first concentrate under the Kroondal Pool and Share Agreement (P&SA) with Aquarius Platinum. A second concentrator was commissioned at Kroondal in March 2005 and production from this plant will be refined by Anglo Platinum.

Anglo Platinum announced two new joint ventures during the first nine months of 2005. In July, a second P&SA with Aquarius was unveiled, under which the

two companies will pool mineral reserves in the vicinity of the existing Marikana operation. Under the deal, total pgm output should reach a rate of 250,000 oz per annum by the end of 2006.

In August the Mototolo joint venture with Xstrata was confirmed. A new mine on the eastern limb of the Bushveld Complex will exploit ore reserves owned by the two companies. At full production the mine is expected to produce 132,000 oz of platinum and 82,000 oz of palladium in concentrate each year; first production is expected towards the end of 2006.

Following an explosion at its Polokwane smelter in September 2005, Anglo Platinum announced that the plant would be shut for three months. Although the group currently has excess smelting capacity, and

will be able to divert much of its Polokwane feed to its Waterval smelter, the incident will result in a build-up of untreated concentrate. Unless this material is toll-processed, Anglo Platinum's output could be reduced to around 2.45 million oz of platinum this year, 150,000 oz below the previous target of 2.6 million oz. Any stocks of untreated concentrate will then be smelted and refined during the first half of 2006.

## Impala Platinum

During the first half of 2005, output of platinum from the Impala lease area rose by 4 per cent to 567,000 oz. The increase in output was principally due to higher mill throughput as production from the mechanised section at No.12 shaft improved, and the company exploited ore reserves left behind in previously mined sections. Productivity is being enhanced via an expansion of mechanised mining and the introduction of new mining technology such as drill jigs. The operation is on target to reach a production level of over 1.1 million oz of platinum this year.

Production of platinum at Impala's Marula mine on the eastern Bushveld was unchanged at 13,000 oz in the first half of 2005. The mine's slow progress has resulted from the need to change from mechanised room and pillar mining to conventional narrow-stoping methods. This has delayed the build-up of production but will ultimately result in better grades and higher annual output.

## Lonmin Platinum

At Lonmin's western Bushveld operations, mill throughput in January to June 2005 fell by 10 per cent relative to the same period in 2004, primarily because of a substantial reduction in the volume of open pit ore mined. Shallow UG2 reserves amenable to open-casting have largely been depleted, and the near-surface Merensky reserves are less attractive. The company therefore opted to reduce open-cast mining in order to focus on higher grade underground ore. Output of platinum fell 11 per cent to 457,000 oz. Stocks of unrefined metal, however, remained higher than usual during the period, following a smelter shutdown in late 2004. Lonmin expects this material to be processed before the end of 2005.

PGM Supplies: South Africa  
'000 oz

	2004	2005
Platinum	4,970	5,120
Palladium	2,510	2,600
Rhodium	576	616



In June 2005 Lonmin completed the acquisition of Southern Platinum, owner of the Messina platinum project. The Messina lease area currently hosts one mine, Voorspoed, which produced around 45,000 oz of platinum in 2004. Lonmin intends to proceed with an expansion to raise annual output to 75,000 oz by 2007.

### Other Producers

Following a difficult 2004, production at Northam recovered strongly in the first six months of this year, with platinum output rising 12 per cent to 109,000 oz. Mill throughput was up 14 per cent, largely due to a sharp increase in tonnage from the UG2 reef. There was also an improvement in Merensky production, although geological conditions remained very difficult. The average head grade declined slightly, in line with the change in the ore mix, but this was offset by an improvement in recoveries from the UG2 ore.

In addition to its Kroondal and Marikana operations, both of which are the subject of agreements with Anglo Platinum (*see earlier*), Aquarius Platinum has a third South African platinum mine currently under development at Everest South. A 250,000 tonne per month concentrator is due for commissioning in December 2005, although the first refined metal from the project will not be seen until early next year. The initial feed for the concentrator will come from two small open pits before mining subsequently moves

*An explosion at Anglo Platinum's Polokwane smelter in September will result in the group's output of refined platinum falling short of its target of 2.6 million oz in 2005.*



underground. At full production Everest South is planned to produce 225,000 oz of pgm annually.

ARM Platinum is involved in three pgm-producing joint ventures: it currently holds a 41.5 per cent stake in Modikwa (joint venture with Anglo Platinum), 50 per cent of the Nkomati nickel mine (with LionOre) and 55 per cent of the Two Rivers project (with Impala).

In June 2005, ARM and Impala Platinum confirmed their decision to proceed with the Two Rivers pgm project following a successful trial mining operation. Production is due to start in the second half of 2006, with a stockpile of around 300,000 tonnes of UG2 ore already having been established. At full capacity the operation is scheduled to produce 120,000 oz of platinum, 68,000 oz of palladium and 20,000 oz of rhodium annually.

The Nkomati nickel mine reported higher sales of by-product pgm in the first half of this year, up 8 per cent to 18,000 oz. ARM Platinum and LionOre are currently evaluating an expansion that would more than triple nickel production at Nkomati; the increase in pgm output would be proportionately slightly less.

### RUSSIA

**Sales of Russian palladium are expected to decline by 9 per cent to 3.73 million oz in 2005, with little metal being supplied by Gokhran or the Central Bank. This total includes 438,000 oz of metal that is being sold from stocks held by Stillwater Mining in the USA. Shipments of platinum and rhodium in 2005 from Russia are forecast to be 860,000 oz and 90,000 oz respectively.**

Norilsk Nickel revealed its production of platinum and palladium for the first time in September, stating that it had produced 1.483 million oz of palladium and 355,000 oz of platinum in the first six months of 2005. Sales were slightly below production levels, at 1.469 million oz of palladium and 327,000 oz of platinum. Full year production was forecast at 3.08 million oz of palladium and 730,000 oz of platinum.

We now believe that the 1.68 million oz of palladium imported into Switzerland from Russia in November and December 2004 was mainly State Fund (Gokhran) metal and was sold then or early in 2005. No such shipments have been reported to date this year. Information on stocks of pgm held by Gokhran and the

Central Bank, and details of any sales of these metals, have not been published and seem likely to remain secret for at least the immediate future.

Production of platinum from the alluvial mines of the Far East of Russia, primarily Kondyor (Khabarovsk) and Koryak (Kamchatka), can only take place in the

period May-September and the outcome for 2005 is not finalised. However, output at both locations is believed to be in gentle decline.

The 2005 Russian supply figure for palladium includes metal that will be sold by Stillwater Mining

from the 877,169 oz transferred in 2003 by Norilsk Nickel in part payment for a majority shareholding in the company. Although the metal was exported from Russia in 2003, none was sold during that year and so it was not included in our supply data. Early in 2004, Stillwater entered into agreements to sell palladium at a rate of approximately 36,500 oz per month from this stock, and is therefore expected to ship a total of 438,000 oz this year. The remaining inventory is scheduled to be sold during the first quarter of 2006.

## NORTH AMERICA

North American supplies of pgm are forecast to decline in 2005 due to lower production from both Inco and North American Palladium. Platinum shipments are expected to total 340,000 oz, down 12 per cent compared with 2004, while sales of palladium will decline by 11 per cent to 925,000 oz. The Lac des Iles open pit mine operated by North American Palladium had a difficult start to 2005. The operation produced 101,000 oz of palladium in concentrate in the first six months of this year, 60 per cent less compared with the same period in 2004. Problems with mill availability and a fall in palladium head grades to less than 2 grams per tonne were key factors in the drop in output. An underground mine is currently under development at Lac des Iles. This will exploit deeper reserves grading over 6 grams per tonne palladium, and should therefore lift overall head grades when it enters production in early 2006.

By-product pgm output from nickel-copper mines in Canada is also forecast to decrease this year. Following

a scheduled shutdown of its smelter for maintenance and upgrading, Inco now expects its pgm production to total around 380,000 oz this year compared with 422,000 oz in 2004. At Falconbridge's Sudbury operations, pgm output should be similar to last year, but production from Raglan is expected to drop a little in line with lower nickel and pgm grades.

At Stillwater Mining's operations in Montana, pgm production fell slightly in the first half of 2005. The company's total mill throughput was almost unchanged but there were declines in grade at both the Stillwater and the East Boulder mines. As a result, palladium output dropped 4 per cent to 218,000 oz in the six months to June 2005, while platinum production slipped 3 per cent to 65,000 oz.

## ZIMBABWE

Production of platinum in Zimbabwe is expected to rise by 5 per cent to 155,000 oz in 2005. A further increase should be seen next year as an upgrade of the Mimosa mine comes on-stream. However, a planned expansion at Ngezi has been put on hold until political and economic conditions improve.

At the Ngezi mine, owned by Zimplats (in which Impala has an 87 per cent share), mill throughput in the first half of 2005 was steady at 1.03 million tonnes. However, an increasing proportion of this ore came from underground, contributing to improvements in head grades and recoveries. As a result, production of pgm in concentrate rose by 5 per cent to 90,000 oz.

At the Mimosa mine (a joint venture between Impala and Aquarius) a strong increase in mill throughput and an increase in the average head grade during the first half of the year more than offset a slight decrease in recoveries. Production of pgm in concentrate rose by 20 per cent to 69,000 oz as a result. In October, work commenced on a project that will increase mill throughput by a further 25 per cent and expand the mine's annual rate of production to nearly 170,000 oz of pgm by mid-2006.

PGM Supplies: Russia '000 oz		
	2004	2005
Platinum	850	860
Palladium	4,100	3,730
Rhodium	105	90



PGM Supplies: North America '000 oz		
	2004	2005
Platinum	385	340
Palladium	1,035	925
Rhodium	17	21



PGM Supplies: Zimbabwe and Others '000 oz		
	2004	2005
Platinum	255	270
Palladium	265	285
Rhodium	16	17

