

# Supplies, Mining and Exploration

## South Africa

Platinum supplies from South Africa are forecast to reach 3.92 million oz in 2000, an increase of just 20,000 oz. Palladium shipments are expected to total 1.96 million oz, while those of rhodium will reach 434,000 oz.

Several of the South African platinum mines suffered from interruptions to mining and milling during a period of heavy rainfall early this year and, as a result, refined pgm output during the first half was lower than expected. Despite the build-up of production at several new operations, we forecast that platinum supplies will be only slightly higher than last year, at 5.92 million oz.

South African supplies are predicted to rise sharply in 2001. All the existing producers have expansion projects, several of which will come on-stream next year. Beyond 2001, major new mines are to be developed at Anglo Platinum's Waterval and Maandagshoek properties and at Impala's newly acquired Winnaarshoek project. Smaller operations are planned by Aquarius at Marikana and Everest South, and by SouthernEra at Messina.

## Anglo Platinum

Anglo Platinum's output of platinum fell by 6 per cent to 870,000 oz during the first half of 2000. Production was affected by a number of factors: heavy rainfall which reduced milling rates during the first quarter, a decline in the average head grade, and problems at the Waterval Smelter. Despite new capacity at Amandelbult and Lebowa, which will come on-stream during the second half, refined platinum output in 2000 is unlikely to match last year's total

of 2.02 million oz.

In May 2000, Anglo Platinum unveiled a R12.6 billion investment programme which is intended to increase the group's platinum production capacity from 2 million oz in 1999 to around 5.5 million oz by the end of 2006. Projects are already nearing completion at Amandelbult, Middelpunt Hill and Bafokeng-Rasimone, while the construction of a mine at Maandagshoek began this year. Together these will add over 500,000 oz of platinum to Anglo Platinum's annual total.

Since May, two further projects have been confirmed. In August, it was announced that Anglo Platinum is to enter a 50:50 joint venture with Kroondal which will expand the latter's annual output by around 200,000 oz of platinum. In September, Anglo Platinum revealed plans to develop a new UG2 operation on the farm Waterval; at full capacity, expected to be achieved by the end of 2002, this will contribute 395,000 oz of platinum annually.

## Impala Platinum

Between February and April 2000, Impala's mining and milling operations were affected by exceptionally heavy rainfall in the Rustenburg area. This contributed to a 10 per cent fall in refined platinum output to 485,000 oz during the first half of 2000. Production for the full year is expected to fall short of the 1.074 million oz of platinum recorded in 1999.

Outside its existing operations in the Rustenburg area, Impala is involved in two new projects: the re-opening of the mothballed Crocodile River mine (owned by Barplats, in which Impala has an 85 per cent stake), and the development of a

### PGM Supplies: South Africa

'000 oz

	1999	2000
Platinum	3,900	3,920
Palladium	1,870	1,960
Rhodium	410	434



major new operation at Winnaarshoek in the Eastern Bushveld.

At Crocodile River, open pit mining in the Maroelabult area started in October 2000, and the sinking of a new decline shaft is due to commence in early 2001. Meanwhile, part of the existing concentrator is being rehabilitated, and should start processing ore in January 2001. Platinum output will initially be around 50,000 oz per annum, but may eventually be increased to 80,000 oz.

In June 2000, it was announced that Impala was to acquire the Canadian company Platexco, owner of the Winnaarshoek platinum project. Impala intends to proceed with the development of a new mine, which is expected to produce around 200,000 oz of platinum once it reaches full capacity.

## Lonmin Platinum

During the six months to March 2000, mill throughput at Lonmin's platinum operations rose by 10 per cent to 4.8 million tonnes of ore, lifting platinum output by 9 per cent to 506,000 oz. For the full calendar year, Lonmin's output – which has been stable at around 650,000 oz since 1997 – is expected to increase by about 5 per cent.

Lonmin is proceeding with an expansion programme which is designed to raise platinum output to 750,000 oz by 2002, and to more than 800,000 oz by 2007. A new smelter is currently under construction to alleviate a shortage of capacity; it is due to be commissioned during the second half of next year.

## Northam Platinum

During the financial year to June 2000, milled tonnage at Northam fell by 8 per cent to 1.8 million tonnes, while the head grade also declined slightly. Total output of precious metals was 270,000 oz, down 9 per cent compared with the 1999 financial year. We expect Northam's platinum production in 2000 to fall below the 190,000 oz level seen in the last two years.

In 2001, the company plans to start mining and processing significant quantities of UG2 ore for the first time. A new UG2 concentrator is scheduled to start operating early in the year, with annual output from the expansion expected to total 95,000 oz of precious metals at full production.

## Kroondal Platinum

The new Kroondal Platinum Mine produced just over 50,000 oz of platinum group metals during the first six months

of 2000. Output is expected to rise during the second half, as underground ore accounts for a higher proportion of mill feed, and grades and metallurgical recoveries improve.

Kroondal's current mine and plant are designed to achieve an annual production rate of 170,000 oz of pgm, including 100,000 oz of platinum. A tripling of platinum capacity is now planned under a joint venture agreement with Anglo Platinum, which owns mineral rights covering adjacent farms. The UG2 reef underlying these properties will be accessed from Kroondal's existing underground workings, allowing the mine to increase its throughput and extend its life. The existing concentrator will be expanded and a second plant constructed, increasing milling capacity to 5.4 million tonnes of ore per annum.

## New Projects

Aquarius Platinum, owner of a 45 per cent share in the Kroondal mine, has a number of other pgm projects on the Bushveld Complex. The most advanced of these is at Marikana, where open pit mining is planned to commence during the first half of 2001. Ore will be stockpiled until the concentrator is commissioned late next year. Annual

output is expected to average around 94,000 oz of platinum, 48,000 oz of palladium and 17,000 oz of rhodium once the project reaches full production.

In July 2000 Aquarius acquired three pgm properties from Impala: Everest South, Chieftains Plain, and a portion of Everest North. The first of these projects to be developed will be Everest South, located near Lydenburg in the Eastern Bushveld. Aquarius is carrying out a full feasibility study, and if this proves positive, the company hopes to commence production by the end of 2002.

In 1999, Impala's 54.2 per cent interest in the Messina mine was purchased by SouthernEra Resources, a diamond mining and exploration company listed on the Toronto Stock Exchange. Since then, SouthernEra has increased its stake in Messina to 70.4 per cent and has begun to redevelop the mine. Some of the underground workings have been de-watered and existing mining infrastructure has been rehabilitated, in preparation for trial mining which is due to take place during the final quarter of 2000. Full-scale production is scheduled to start in early 2005, and at full capacity, the mine is planned to produce 160,000 oz of precious metals per annum.

## Russia

Russian supplies of platinum and rhodium in 2000 are expected to rise sharply compared with last year, reaching 1.1 million oz and 280,000 oz respectively. Exports of palladium were up slightly during the first eight months of the year, but some of this metal may have been used as collateral for loans. We expect that 5.2 million oz of palladium will be supplied to the market in 2000.

The legislative restriction on exports of platinum and rhodium imposed by Clause 19 of the 1999 Russian Budget was removed early in January by an



## PGM Supplies: Russia

'000 oz

	1999	2000
Platinum	540	1,100
Palladium	5,400	5,200
Rhodium	65	280



amendment signed by acting President Putin. However, delays in the granting of export quotas and the issue of export licences continued to affect supplies of these pgm for several months. It was not until May that sales under this year's export quotas were able to commence, although it appears that special dispensation was given for a shipment of rhodium to the USA in January.

There was no interruption of Russian sales of palladium during the first eight months of 2000, although supplies were insufficient to meet market demand. Norilsk Nickel has continued to export palladium steadily, using a ten-year quota and licence granted by presidential decree in March 1999. However, the supply of palladium from government stockpiles, a major feature of recent years, has been erratic. Two possible reasons for the lack of stockpile sales are a delay in granting an export licence to the Central Bank, and the indication that much of the stockpile may have been transferred from the bank back to the Ministry of Finance during the year.

Norilsk Nickel, the principal pgm producer in Russia, has continued to progress the ten-year development plan that was approved by its board in April 1999. Recent progress includes the commissioning of new flotation cells at the Talnakh concentrator. This will enable a higher proportion of the ores mined at Talnakh to be treated locally rather than being sent to the older plant at Norilsk, and should improve recoveries.

The average base metal content of the ores mined in the Talnakh deposits has been declining in recent years and this, together with much higher palladium prices, has changed the economics of mining in the region. This has encouraged renewed exploration in the area of the Norilsk-1 deposit, where the pgm to base metal ratio is higher. An expansion of output at the Zapolyarniy underground mine is underway, and there may be potential to extend the Medvezhiy Ruchey open pit.

In its annual report for 1999, published in June this year, Norilsk Nickel reported profits before tax that were more than ten times those of the prior year. The increase was partly due to a 37 per cent rise in sales income from pgm to more than \$1 billion - despite platinum and rhodium to the value of \$300 million remaining unsold due to the export restrictions imposed by Clause 19.

While the financial position of Norilsk Nickel has been substantially enhanced by the higher world pgm prices, the same cannot be said of the alluvial platinum producers in the Far East of Russia. The artels of Kondyor and Koryak have been handicapped by their inability to sell all their metal last year, and current production is believed to be running at about two thirds of the peak levels of recent years.

## North America

Supplies of pgm from North America are forecast to increase in 2000. In Canada, higher output from Inco and North American Palladium will offset lower shipments from Falconbridge.

Output from the Stillwater mine in the USA is expected to be stable. Stillwater has encountered further delays in the expansion of its Nye mine, with ore production hampered by a lack of developed stopes and the existence of bottlenecks in underground ore handling systems. We expect platinum and

palladium output in 2000 to total around 400,000 oz, similar to last year's figure. The company intends to raise mill throughput significantly next year, and forecasts that pgm output from the Nye mine will reach 500,000 oz in 2001. Stillwater is also developing a new mine at East Boulder; the pgm-bearing J-M Reef was intersected in mid 2000, and ore samples have yielded grades similar to those at Nye.

Supplies of pgm from Canada are expected to rise in 2000, due to increases in production at North American Palladium and Inco. In contrast, shipments by Falconbridge are expected to fall sharply following a prolonged strike at its Sudbury operations; this will more than offset increasing output from the company's Raglan mine in Quebec.

Deliveries of pgm by Inco totalled 205,000 oz during the first half of this year, up 26 per cent compared with the same period of 1999, despite a reduction in nickel production from the Ontario Division. Increases in pgm output since 1998 appear to reflect the company's strategy of concentrating on higher-grade ore reserves in the Sudbury area.

At North American Palladium, higher grades boosted palladium output to 46,000 oz during the first half of 2000, up nearly 50 per cent compared with the same period of last year. The company is proceeding with an expansion that will raise the milling rate to 15,000 tonnes of ore per day, yielding 250,000 oz of palladium per annum.

## PGM Supplies: North America

'000 oz

	1999	2000
Platinum	270	285
Palladium	630	665
Rhodium	18	20

