

Supplies, Mining and Exploration

South Africa

Supplies of platinum from South Africa are expected to grow by 8 per cent to reach 4.44 million oz in 2002. Expansion projects will contribute significant quantities of metal this year, while output is also predicted to increase at several established operations. Production of palladium is forecast to rise to 2.19 million oz, in line with the growth in platinum, while rhodium sales will increase to 483,000 oz.

South African platinum output of 4.44 million oz in 2002 will be a new record. While expansions at Anglo Platinum will account for the majority of the increase, all of the other established producers will also expand production relative to 2001.

In August 2002, exploration licences were issued by the South African government for a number of properties on the Eastern Bushveld, the rights to which were formerly held by Anglo Platinum.

Anglo Platinum

Refined platinum output increased by 4.3 per cent at Anglo Platinum during the first half of 2002, reaching 1.043 million oz. Palladium production increased to 515,000 oz during the same period but rhodium production dropped to 82,500 oz due to a build up of stocks in the refining pipeline.

The Amandelbult section performed particularly strongly during the first half of the year as the tonnage milled, head grades and efficiencies all increased. However, this was partly offset by a decline in output at PPRust, where the grade fell sharply during the mining of a lower-grade intrusion in the South Pit ore body. At Waterval a new 400,000 tonnes per month concentrator was commissioned in February and throughput increased rapidly,

although grades have been lower than initially planned. Milled tonnage increased significantly at BRPM but the grade fell, largely due to the processing of low-grade near surface ore. Underground development has been hampered by poor geological conditions at one of the shafts.

Anglo Platinum has reduced its full year production target by 100,000 oz to 2.25 million oz platinum. This, however, will still represent a substantial increase on 2001. This is to be achieved primarily through the continued growth in production from the Waterval and BRPM operations, plus a small initial contribution from Modikwa. Anglo Platinum will release an update on its plans to expand platinum output to 3.5 million oz by mid-2006 before the end of this year.

Impala Platinum

Platinum production from the Impala lease area climbed to 518,000 oz during the first half of 2002, up from 486,000 oz over the same period the previous year. The performance of the upgraded UG2 concentrator circuit improved and mill throughput was boosted by 2.5 per cent. The company is now considering further investment in its processing infrastructure to improve recoveries for Merensky Reef and to increase UG2 processing capacity. This would enable annual production to exceed 1.1 million oz of platinum. The company is also examining the economic viability of retreating old UG2 tailings.

Production at the re-opened Crocodile River mine, which Impala controls via its 83 per cent stake in Barplats, has risen during 2002. The operation produced around 39,000 oz of platinum during the financial year to the end of June 2002. Underground mining has now started and

recoveries have improved to over 70 per cent as the proportion of unoxidised ore has increased. Difficulties with recommissioning the concentrator have been overcome, and a dense media separation plant to treat the underground ore is due to be commissioned in 2003.

In August 2002 Impala announced that the Marula Platinum project (formerly Winnaarshoek) on the Eastern Bushveld would be developed using a phased approach to reduce project risk. Phase 1 will involve mining UG2 at a rate of 142,000 tonnes per month to yield 103,000 oz of platinum per annum. Mining is scheduled to start in late 2003 or early 2004, with full production expected in 2005.

In August, Impala announced the acquisition of an additional 15 per cent shareholding in ZCE Platinum, owner of Mimosa, taking its stake to 50 per cent. Impala also increased its holding in Zimplats to 36 per cent and has pre-emptive rights covering an additional 15 per cent. Impala also owns a 30 per cent share directly in Makwiro Platinum, the Zimplats subsidiary that operates the Ngezi mine and Selous Metallurgical Complex.

Lonmin

Refined platinum output at Lonmin is expected to exceed 750,000 oz this year. During the financial year to end March 2002

PGM Supplies: South Africa
'000 oz

	2001	2002
Platinum	4,100	4,440
Palladium	2,010	2,190
Rhodium	452	483



the company produced a total of 1.36 million oz of pgm, a new record.

Lonmin is aiming to reach an annual production rate of 870,000 oz of platinum in 2003 after having accelerated its expansion programmes. The new Karee "B" concentrator has performed well, and two additional concentrator streams were scheduled to be commissioned by the end of October 2002. These will initially process ore from new open pits and, at a later date, will process ore from the expanded underground operations. In addition, the company's new smelter successfully completed commissioning during the first quarter of the year.

Northam Platinum

The tonnage of ore milled by Northam Platinum fell slightly to 1.03 million tonnes during the first half of 2002, however, the volume of ore processed in the second half should be substantially higher than in the same period of last year, when a strike resulted in the loss of 32 days of underground production. Overall, platinum production this year is expected to rise by up to 15 per cent compared with 2001.

Output is expected to grow again next year as the company's accelerated underground development programme leads to improved Merensky Reef face availability.

Aquarius Platinum

Kroondal Platinum is on target to produce over 215,000 oz of pgm in 2002, equivalent to 90 per cent of planned capacity. Output over the first nine months of the year reached 101,000 oz of platinum as the ramp up in mining and processing continued, following a concentrator expansion that was commissioned in 2001.

At the Marikana project, 8 km to the east of Kroondal, the first feed of ore to the mills is expected in mid-November 2002, several weeks ahead of schedule. The first concentrate should then be delivered to Impala for refining in January 2003, with full production of around 155,000 oz per



annum by the end of the year.

The feasibility study of the Everest South project on the Eastern Bushveld is scheduled to be completed in December 2002. A 300 tonne bulk sample has been mined and is being processed, and mining is expected to begin in 2004.

SouthernEra

The first phase of mine and mill construction at Messina Platinum has continued throughout 2002, with small amounts of pgm produced from SouthernEra's Advanced Production Initiative. The main shaft at Voorspoed was commissioned in August, followed by the concentrator in September. Refined pgm output this year will be small but will build steadily throughout 2003 and 2004.

In August 2002, SouthernEra announced that it had completed a bankable feasibility study for its Messina Phase 2 project on the Doornvlei lease area (12 km east of the Voorspoed operation). The feasibility study was based on a total milling rate of 120,000 tonnes per month of a combination of Merensky Reef and UG2, yielding 173,000 oz of pgm plus gold. Also in August, the South African government awarded prospecting rights to the

Dwaalkop properties to a 50:50 joint venture between SouthernEra and Mvelaphanda Resources. The properties are located between the two phases of the Messina project.

Russia

Sales of platinum by Russia are forecast to drop below 1 million oz in 2002, more closely aligned with mine production. Shipments of palladium are forecast to plunge by over 60 per cent to just 1.6 million oz. Norilsk Nickel has maintained its pledge not to sell palladium on the spot market.

Platinum supplies from Russia in 2002 are forecast to fall to 950,000 oz. Sales of platinum from Norilsk Nickel were boosted in 2001 by metal that had been held as loan collateral by a Russian bank. This year, however, Norilsk's platinum shipments are likely to be closer to the level of production. Output of platinum from the alluvial producers at Koryak and Kondyor in the Far East of Russia is expected to be stable.

Russian sales of palladium are forecast to fall dramatically this year to 1.6 million oz, down from 4.34 million oz in 2001. Norilsk suspended spot sales of palladium in August 2001 in an effort to support the rapidly declining price and in response to faltering demand. The company has continued to abstain from spot market sales throughout 2002 to date but continues to ship some metal under existing supply contracts.

Swiss trade statistics show that around 410,000 oz of palladium were imported from Russia between January and the end of April, but since then very little metal has been shipped into Zurich. Russia also shipped around 537,000 oz to the USA during the first seven months of the year.

In September, Norilsk stated that it had repaid a loan from the Ministry of Finance dating from 1994. While details were not released, the repayment is understood to have been made by delivering substantial

PGM Supplies: Russia '000 oz

	2001	2002
Platinum	1,300	950
Palladium	4,340	1,600
Rhodium	125	65



volumes of palladium to the state stockpile (Gokhran), perhaps as much as six months' output.

Norilsk intends to sell the majority of its future palladium production under supply contracts negotiated directly with consumers, via its London-based subsidiary Norimet. Earlier this year, Norimet gained the right to market all of Norilsk's palladium output from the state pgm export agency Almaz. By the end of September, Norimet had secured supply contracts with Mitsubishi and General Motors, and said that negotiations with other major consumers were continuing. The volumes and duration of the contracts were not disclosed.

Despite the large reduction in palladium sales this year, Norilsk Nickel's cash flow will be supported by firm nickel prices and output. The company, however, reduced its capital investment budget for 2002 from \$400 million to \$265 million. Norilsk intends to make public its long-term production and marketing strategy before the end of the year.

North America

Stillwater Mining and North American Palladium will both substantially increase pgm production this year. Total North American platinum shipments are forecast to rise 4.4 per cent to 355,000 oz, while palladium output is expected to climb by almost 17 per cent to 970,000 oz. Stillwater Mining Company produced 331,000 oz of platinum and palladium during the first half of 2002 versus

247,000 oz during the first half of 2001.

Palladium output reached 255,000 oz and platinum production totalled 76,000 oz.

Milled tonnage increased substantially at the Stillwater Mine but this was partly offset by a decline in grade as lower-grade sections of the ore body were mined. The ramp up of production at the new East Boulder mine continued, yielding 54,000 oz of platinum plus palladium during the first six months of 2002.

The company's target production for the full year has been reduced from 680,000 oz to 640,000 oz pgm because of a labour dispute and delays in infrastructure development. This has required the company to renegotiate some of its financial covenants with its lenders.

North American Palladium commissioned a new 15,000 tonnes per day mill and concentrator in June 2001 and this has increased production capacity substantially. The operation milled 3.7 million tonnes of ore during the first nine months of 2002 compared to 1.5 million tonnes during the same period the previous year. As a result, palladium output jumped to 167,000 oz.

Production for the full year is expected to exceed 200,000 oz, despite the company having to take its primary crusher out of service for several weeks in September for unexpected repairs.

Production of by-product pgm from the nickel operations of Inco and Falconbridge is expected to be close to 2001 levels. Inco intends to produce 425,000 oz of pgm in 2002, including production from purchased materials. Output of pgm from Falconbridge is forecast to be broadly in line with 2001, despite an extended maintenance and vacation shutdown of its smelter during the summer.

Zimbabwe

Expansion of the Zimbabwean pgm industry began in earnest during 2002. Construction of a new plant at Mimosa has almost been completed and sinking of a new

shaft is proceeding, while Zimplats' Ngezi mine reached its target milling rate by the end of June.

Total pgm production in Zimbabwe is forecast to rise from less than 30,000 oz in 2001 to 120,000 oz in 2002.

Mimosa produced a total of 22,000 oz of pgm (12,000 oz platinum) during the first nine months of 2002, little changed from 2001. However, the planned expansion from an annual rate of 15,000 oz platinum to 65,000 oz platinum is underway. A new crushing circuit was commissioned in the third quarter of 2002 and the concentrator is due to be commissioned before the end of the year. Mill throughput is scheduled to reach the planned level of 3,100 tonnes per day in March next year, with recoveries rising through to October 2003.

Ngezi produced its first pgm during the first half of 2002, milling 662,000 tonnes of ore to produce concentrate and matte containing 43,000 oz of pgm. The processing plant was operating at its design capacity by the end of June 2002 and a further 346,000 tonnes of ore were milled in July and August.

The company is currently conducting trial underground mining at Ngezi, which has the potential to offer cost savings compared with deeper portions of the planned open pit. Trial underground mining began in September 2002 and has been authorised to produce a total of 100,000 tonnes of ore through to June 2003. This will enable Zimplats to assess ground stability and develop grade control methods, and to complete a bankable feasibility study.

PGM Supplies: North America '000 oz

	2001	2002
Platinum	340	355
Palladium	830	970
Rhodium	23	26

