

SUPPLIES, MINING AND EXPLORATION

SOUTH AFRICA

Supplies of platinum from South Africa are forecast to rise by 140,000 oz to 3.82 million oz in 1999, principally due to higher output at Amplats. Palladium shipments will increase to 1.89 million oz, but supplies of rhodium will fall to 394,000 oz.

Over the last two years, higher platinum prices in rand terms and confidence in demand growth have encouraged existing producers to plan expansions, and have attracted new entrants to the industry. In 1999, three new projects have added to production, and others are expected to come on-stream soon.

At Amplats' PPRust mine, concentrator capacity has been raised by 70 per cent. The upgraded plant will add to platinum output this year, with full production being achieved in 2000. During 1999, Amplats' new Bafokeng Rasimone Platinum Mine started to mine from an open-pit. The concentrator there will not be commissioned until the end of this year, but some ore is being processed at Rustenburg and will contribute to platinum production during the second half of 1999. Outside the Amplats Group, the Kroondal Platinum mine also entered production this year, delivering its first concentrate to Impala in August.

Output at these three mines will continue to build up next year. In addition, there will be an increase in platinum production at Lonmin, which is currently upgrading its concentrator and smelter capacity, while expansions at Lebowa and Amandelbult will also come on-stream.

Amplats

Milled tonnage at Amplats rose by 6 per cent in the first half of 1999. This was partly offset by a 3 per cent decline in the overall head grade. Refined pgm output was also affected by a temporary technical problem at the precious metals refinery, leading to an increase in pipeline stocks. Platinum and palladium production fell by 3 per cent to 928,000 oz and 464,000 oz respectively, while that of rhodium dropped by 14 per cent to 76,500 oz. Refined output is likely to be higher in the second half of 1999, as the build-up in pipeline stocks is reversed. In addition, some open-cast ore from the new Bafokeng Rasimone Platinum Mine (BRPM) is being milled at Rustenburg, and will make a small contribution to pgm production this year.

Current expansion projects will add significantly to Amplats' production next year. The newly-expanded concentrator at PPRust operated at around 85 per cent of capacity during the first half of 1999; full milling capacity should be reached by the end of 2000. At BRPM, the concentrator is due to be commissioned at the end of this year. The new plant will be used to process open-cast ore, which is being mined during the development of the underground mine. Refined platinum output at BRPM is planned to exceed 100,000 oz next year: at full production, scheduled for 2002, this will rise to 250,000 oz. A further 93,000 oz of platinum output will be added by expansions in UG2 mining at Amandelbult and Lebowa, both of which are expected to reach full production during 2000.

PGM Supplies: South Africa



'000 oz

	1998	1999
Platinum	3,680	3,820
Palladium	1,820	1,890
Rhodium	400	394

Impala Platinum

Impala milled 14.64 million tonnes of ore during the financial year to June 1999, an increase of 1 per cent on the previous year. Platinum output rose by 13,000 oz to reach 1.065 million oz. Rhodium production was up 12 per cent to 125,000 oz, with the processing of old residues supplementing production from newly-mined ore. However, refined palladium output fell by 7 per cent to 516,000 oz; production was unusually high in the previous financial year after the commissioning of the new precious metals refinery resulted in a reduction in pipeline stocks of this metal.

The company is developing a series of decline shafts from existing underground infrastructure. These will provide access to replacement ore reserves that should permit annual platinum output from Impala's current mining operations to be maintained at around 1.1 million oz.

Impala is considering a resumption of operations at the



mothballed Crocodile River mine, with the results of a feasibility study due in 2000. The company is also evaluating its Everest South prospect on the eastern limb of the Bushveld Complex.

Lonmin Platinum

Total pgm production at Lonmin was little changed, at 564,000 oz, during the six months to March 1999. For the calendar year, platinum output is expected to be similar to last year's 630,000 oz.

The company is undertaking an expansion programme that is expected to raise annual platinum production to 700,000 oz by 2002. This involves an upgrade of the company's smelting and concentrator plants, giving Lonmin the capacity to process around 9.7 million tonnes of ore per annum. Underground development to access the additional ore reserves required for the expansion has begun, while commissioning of the enhanced smelter complex is due to take place during the second half of 2000.

Northam Platinum

During the financial year to June 1999, Northam operated at full capacity, milling 1.8 million tonnes of ore - up 3 per cent on the previous year. Production of precious metals in concentrate, at 333,000 oz, was up by a similar amount.

The future of the mine appears more secure following an agreement with Amplats, announced in September 1999, under which Northam is to acquire mineral rights adjoining its existing lease area. In return, Amplats will receive 46 million shares in Northam, giving it a holding of around 20 per cent in the company. The new reserves can be accessed from existing infrastructure, and will delay the need to deepen the mine.

Other

At Kroondal Platinum, mining of underground and open-cast ore began in early 1999 and the company delivered its first concentrate to Impala for refining in August. The amount of pgm refined this year will be small, but the project is planned to reach full production of around 100,000 oz of platinum during 2000.

Aquarius Platinum, which holds a 45 per cent stake in Kroondal, has a wholly-owned platinum prospect at Marikana, south of Lonmin's Karee mine. A feasibility study on this project commenced in July 1999.

Also in July, Impala sold its 54.2 per cent interest in the partly-developed Messina platinum project to SouthernEra Resources. As a condition of the sale, SouthernEra is required to undertake a feasibility study on the project, which was partly developed before being mothballed in 1992.

At the Winnaarshoek platinum project, owned by Trojan Platinum (a subsidiary of the Canadian company Platexco), a feasibility study commenced in September 1999 and is due for completion in May next year.

RUSSIA

Russian sales of platinum and rhodium have been severely restricted this year by the impact of legislation passed in late December 1998. Our estimates of sales in 1999 of 800,000 oz platinum and 80,000 oz rhodium assume this legislation will be amended before the year end. A presidential decree in March has enabled sales of palladium by Noril'sk Nickel to proceed steadily and exports in 1999 are forecast to be 5 million oz.

In March it was announced that President Yeltsin had signed a decree giving Noril'sk Nickel a ten-year quota for palladium exports. Although it was initially reported that this decree also covered other pgm, this proved not to be so. Exports of platinum and the minor pgm became stalled by Clause 19 of the bill 'On the top priority measures in the budget and taxation policy', which was passed into law in December 1998. This clause restricts exports of pgm to specially authorised 'State Organs' only, but neither Almaz nor any other Russian organisation precisely fits this definition. As a consequence, exports of pgm, with the exception of palladium, ceased after the first few months of 1999. Although efforts are being made to amend the law, they may not be successful in time for exports to resume before the end of the year; forecasts of Russian sales in 1999 are thus highly uncertain.

Despite its inability to export platinum and rhodium,

PGM Supplies: Russia		JM	
	1998	1999	
'000 oz			
Platinum	1,300	800	
Palladium	5,800	5,000	
Rhodium	110	80	

Noril'sk Nickel's financial situation has improved this year. Most of the company's income is in hard currency, and has been enhanced by the devaluation of the rouble since the August 1998 financial crisis in Russia. In April, the board of Noril'sk Nickel approved a new ten-year plan for the company that will involve major changes in its operations. The plan will involve a total investment estimated at \$3-5 billion, which will be spent on mining, ore concentration, metallurgy and infrastructure. For the first five years the main emphasis is to be put on mining and ore concentration. The main thrust of the new scheme is to reduce costs rather than to increase production.

Mining operations at Noril'sk have already undergone some restructuring. At the original Noril'sk-1 deposit, work is underway to increase the amount of ore produced from the open pit and the underground Zapolyarniy mine. At the newer Talnakh operations, the two oldest mines, Mayak and Komsomol'skiy, have been combined with the newest mine, Skalistiy, in a single operational unit.

During 1998 the output of the alluvial platinum deposits at Kondyor and Koryak in the Far East Region of Russia was bought, and subsequently exported, by Gokhran and Noril'sk Nickel respectively. It is not clear what arrangements have been put in place in 1999, with the restrictions on exports of platinum due to 'Clause 19' preventing any purchaser from realising dollar income through overseas sales.

NORTH AMERICA

Supplies of pgm from North America are expected to decline by 5 per cent in 1999, largely due to lower production at Stillwater.

Stillwater Mining is currently undertaking a substantial expansion project, with the aim of tripling its production by 2001; this involves a 50 per cent increase in output at the existing Nye mine and the development of a new operation at the nearby East Boulder prospect. However, productivity and grades at Nye were affected by expansion work during the first six months of 1999, and pgm output fell to 206,000 oz, 6 per cent lower than in the same period of 1998. The mine recently stated that throughput had not increased in the July to September quarter, and we therefore expect refined pgm production for 1999 to be lower than last year.

At Falconbridge, by-product output of pgm is expected to rise this year, as the new Raglan nickel mine contributes to refined pgm production for the first time. Inco is rationalising its nickel mining operations to reduce costs, but pgm output is not expected to change significantly in 1999. Mill throughput at

PGM Supplies: North America



'000 oz

	<u>1998</u>	<u>1999</u>
Platinum	285	275
Palladium	660	620
Rhodium	16	18

North American Palladium was unchanged during the first half of 1999, but pgm output was affected by the processing of lower-grade ore. As a result, palladium production fell by 18 per cent to 31,000 oz during this period.

ZIMBABWE

Mining at Hartley Platinum was suspended in June 1999, and the entire operation has been put into care-and-maintenance. The mine had encountered many problems since it began production in 1995, and had reached only around a third of its planned underground mining rate.

At the end of May 1999, BHP entered an agreement to sell its 67 per cent interest in Hartley Platinum and its 61 per cent stake in the Mhondoro project to its joint venture partner Zimbabwe Platinum Mines (Zimplats), formerly part of Delta Gold, for around \$3 million. We estimate that refined pgm output from Hartley in 1999 will be almost 150,000 oz. This consists of metal refined from ore mined during the first half, supplemented by the processing of a concentrate stockpile that had accumulated during a smelter shut-down in 1998.

At Zimplats' wholly-owned Ngezi project, a feasibility study on an open-pit mine was completed during the first half of 1999. At the proposed mining rate of 2 million tonnes of ore, annual platinum production would be around 100,000 oz.

The closure of Hartley leaves Mimosa as the only platinum mine currently in production in Zimbabwe. Annual output from this operation, at about 350,000 tonnes of ore, yields 15,000 oz of platinum.

PGM Supplies: Others



Includes Zimbabwe

'000 oz

	<u>1998</u>	<u>1999</u>
Platinum	135	165
Palladium	120	160
Rhodium	4	8