

SUPPLIES, MINING & EXPLORATION

SOUTH AFRICA

Expectations of platinum supplies in 2007 have been adjusted sharply downwards since the start of the year, with labour, safety and technical issues affecting output at most major producers. We predict this year's shipments of platinum from South Africa to total 5.2 million ounces, almost unchanged from 2006 but 7 per cent below earlier forecasts. Anglo Platinum and Lonmin have been most affected: both expect to produce significantly less pgm than last year. This will be offset by higher output from a number of ramp-up operations.

Anglo Platinum

In the first half of 2007, refined platinum production at Anglo Platinum fell 11 per cent to 1.19 million ounces, principally due to a build-up of 80,000 oz of unrefined metal in the processing pipeline. In contrast, the company benefited from pgm releases from refinery circuits during 2006, with in-process stocks of platinum dropping by nearly 180,000 oz over the calendar year.

Equivalent refined platinum production was 1.27 million ounces in the first half, with safety issues, strikes and other labour problems eroding expected production increases. Whilst Union Section reported a 7 per cent rise in equivalent refined output and the Mototolo joint venture delivered 43,000 oz of platinum in its first full six months of production, these gains were offset by falls in output from PPRust (due to lower recoveries from oxidised ore from the PPRust North pit) and Modikwa (where three weeks of production were lost due to a strike).

In its interim results, Anglo Platinum reduced its full year forecast for refined production to 2.6-2.65 million ounces of platinum, down from the figure of 2.8-2.9 million ounces predicted by the company in February.

Three major new projects were approved by the board

in the first half of 2007: expansion of the base metals refinery, an ore replacement project at Rustenburg Townlands and a UG2 expansion at Lebowa. The company continues to forecast that its total platinum production will rise at an average rate of

5 per cent annually.

Anglo Platinum announced a major black economic empowerment deal in September 2007. It will sell 51 per cent of Lebowa Platinum and 1 per cent of the Ga-Phasha project to its joint-venture partner Anooraq. Once the transaction is complete, Anooraq will hold an effective 51 per cent of both Lebowa and Ga-Phasha through a newly-created vehicle, Lebowa Holdco. Meanwhile, Mvela Resources will pay R4 billion to purchase an additional stake in Northam, along with Anglo Platinum's interest in the Booyendal project.

Impala Platinum

At Impala Platinum's lease area, refined platinum output in the first half of 2007 declined by 5 per cent to 510,000 oz, reflecting lower grades and recoveries, and high labour turnover which led to reduced efficiencies. In contrast, sales were up 85,000 oz at 549,000 oz.

The lease area operations milled slightly less ore from January to June than a year before. Shifts in the ore mix also had a negative impact on both grades and recoveries. There was an increase in the proportion of lower-grade UG2 ore, including open-cast ore from which pgm recoveries are typically poor. Meanwhile, a greater use of mechanised mining methods led to additional dilution of Merensky ore with barren rock.

At Marula, production of platinum in concentrate rose by over 50 per cent to 30,000 oz, in line with increases in tonnage and grades as the move to conventional mining methods progresses.

In May 2007, Impala completed the acquisition of African Platinum plc (Afplats) for R4.2 billion, thereby adding a 74 per cent stake in the Leeuwkop project to its portfolio. Development of this project is due to begin during the 2008 financial year. The Impala board also approved further expansions of both smelter and refining capacity which will allow Impala to treat up to 2.8 million ounces of platinum annually by 2010.

Lonmin

Lonmin had a difficult first six months in 2007, with refined production of platinum (including metal toll-refined on its behalf by Impala) falling 11 per cent to 328,000 oz, and sales (including metal sold in concentrate) plunging 19 per cent to 336,000 oz.

PGM Supplies: South Africa
'000 oz

	2006	2007
Platinum	5,290	5,220
Palladium	2,905	2,795
Rhodium	690	695



Platinum sales for the financial year to September 2007 fell below expectations at just under 800,000 oz.

Refined output was affected by a four-month shut down of Lonmin's No. 1 smelter, following the discovery in December 2006 of a leak adjacent to one of the matte tapholes. Following an extensive rebuild, the smelter was restarted in April 2007 and started processing the backlog of concentrate. The company ended its financial year with in-process platinum inventories substantially above normal, but we expect some of this metal to be refined before the end of this calendar year.

At the mines, the Marikana operation was affected by difficult geological conditions. Production of platinum in concentrate fell 9 per cent to 391,000 oz. At Limpopo, a focus on development of future reserves resulted in a 37 per cent fall in production of platinum in concentrate to 17,000 oz in the first half of 2007. In common with most other producers, Lonmin reported that high labour turnover and skills shortages had impacted all of its operations, reducing efficiencies and increasing costs.

Other Producers

At the Northam Platinum mine, difficult geological conditions affected operations during the first half of 2007, with lower tonnage from the Merensky Reef. With grades also lower than in the previous year, production of pgm in concentrate fell 15 per cent to just under 150,000 oz for the January to June period.

Aquarius Platinum's only South African operation not subject to a Pool & Share Agreement with Anglo Platinum is the Everest mine on the Eastern Bushveld. This treated less UG2 ore in the first six months of this year than in the equivalent period of 2006. Average pgm grades were also lower, but the mine benefited from improved recoveries, as more ore was sourced from underground. Production of platinum in concentrate fell slightly to 47,000 oz in the first half but we expect an increase in output for the full year, in line with the ramp-up in underground mining and higher recoveries.

ARM Platinum has stakes in three pgm-producing joint ventures: Two Rivers (with Impala), Modikwa (with Anglo Platinum; see above) and Nkomati Nickel (with Norilsk Nickel, following the latter's acquisition of LionOre in June 2007). The Two Rivers concentrator



was commissioned in August 2006, and a rapid ramp-up saw it operating close to capacity in the first half of this year, yielding 57,000 oz of platinum in concentrate. At Nkomati, sales of pgm in concentrate were 27,000 oz in the first six months of 2007, down 19 per cent on the previous year. A decision to proceed with a large scale expansion at Nkomati was confirmed in September 2007.

The Crocodile River mine, owned by the Toronto-listed company Eastern Platinum (Eastplats), produced 52,000 oz of pgm in the first half of 2007.

South African pgm output will be disappointing in 2007 due to a combination of geological and safety problems, industrial unrest and processing bottlenecks.

RUSSIA

Palladium supplies from Russia are expected to be slightly above the 2006 total at 4.24 million ounces. 1.29 million ounces were shipped from state stocks in late December 2006; in our view, it is unlikely that this metal was sold before the year end and we have therefore included it in our forecast of 2007 supplies. Platinum shipments are expected to drop to 820,000 oz: output is predicted to fall at both Norilsk and the alluvial operations.

Trade data suggests that in the first half of 2007, Russian exports of pgm – particularly platinum – were significantly below 2006 levels. The introduction in

PGM Supplies: Russia '000 oz		
	2006	2007
Platinum	890	820
Palladium	3,900	4,240
Rhodium	95	70

January 2007 of a new law abolishing export quotas resulted in some delays in the issue of export licences for platinum and rhodium (Norilsk's palladium shipments, covered by a 10 year licence, were not affected). There is also evidence that increasing quantities of pgm are exported in the form of chemical salts or other products, and are therefore recorded under different trade categories.

Production of pgm at Norilsk Nickel is expected to decline modestly in 2007. Reporting its third quarter results in October, the company predicted that total pgm output this year would reach 3.05-3.10 million ounces of palladium and 730-740,000 oz platinum; however, these figures include attributable metal from the company's newly acquired Southern African operations. (Norilsk received an 85 per cent share in Tati Nickel and a 50 per cent stake in Nkomati Nickel via its acquisition of LionOre in June 2007.) We estimate platinum output from the Russian operations to be a little over 700,000 oz this year (down from 750,000 oz in 2006). Palladium production will be around 3 million ounces, down from last year's 3.16 million ounces.

At the alluvial operations in the Far East of Russia, we forecast a reduction in output this year: both the Amur and the Koryak operations report declining platinum values at their deposits.

NORTH AMERICA

Supplies of platinum from North America are forecast to fall to 340,000 oz in 2007, principally due to lower output from Stillwater. However, palladium shipments should grow to 1 million ounces, reflecting the first full year of production from a new underground section at North American Palladium. Output of pgm as a by-product of nickel mining in Canada will be similar to last year.

In the first half of 2007, Stillwater Mining Company reported pgm production down 6 per cent to 277,000

PGM Supplies: North America '000 oz		
	2006	2007
Platinum	345	340
Palladium	985	1,000
Rhodium	20	20

oz. This decline was largely due to labour issues: a change in work schedules and negotiations over a new contract had a negative impact on productivity. A new four-year agreement was finally reached in July, but only after a seven-day strike. The

company reduced its forecast of full year pgm output to 555-585,000 oz (compared with previous guidance of 615-645,000 oz).

North American Palladium had a strong first half, with palladium output rising nearly 40 per cent to 145,000 oz. Mill throughput climbed 14 per cent, while average mill head grades rose 19 per cent. This reflects higher production from the new underground section, which contributes ore containing 5.71 grams of palladium per tonne (open pit ore at the Lac des Iles mine typically contains below 2 grams per tonne).

The existing mines at Xstrata's Sudbury site are nearing the end of their life: less mined ore was treated at the Strathcona mill in the first half of 2007 and grades fell too. However, the Raglan mine in Northern Quebec saw a 15 per cent rise in throughput.

In the first half of 2007, CVRD Inco reported a slight drop in the production of platinum from its Canadian operations, to 68,000 oz, while palladium output was up modestly to 100,000 oz. For the full year, we expect pgm production to be similar to that in 2006.

ZIMBABWE

Although rises in production were achieved at both the Ngezi and Mimosa mines in the first half of 2007, the country's economic crisis is clearly having some impact, with Mimosa

reporting delays in its latest incremental expansion. Both companies have experienced some disruption of power supplies, and are investigating the possibility of importing power directly. We expect pgm production this year to be up only slightly compared with 2006.

At Impala's Ngezi Mine, the conversion from open pit to underground mining continued during the first half of 2007. Average head grades increased, reflecting the higher pgm content of the underground ore. Sales of platinum in matte rose 12 per cent, to 50,000 oz.

Mimosa reported production of platinum in concentrate up 10 per cent, at 39,000 oz, in the first half of 2007. However, the Wedza Phase V expansion project – originally scheduled for completion in June – will only be completed in the last quarter of 2007, with the mine citing as reasons a difficult economic climate and concerns over the re-use of old equipment.

PGM Supplies: Zimbabwe and Others '000 oz		
	2006	2007
Platinum	270	280
Palladium	270	285
Rhodium	19	19