



One of the world's leading primary producers of platinum and PGMs, Implats' annual primary output amounted to 1.85 million ounces of platinum and 3.55 million ounces of PGMs during the reporting period. A comprehensive growth programme is underway to increase production, both from primary and secondary sources, to 2.1 million ounces of platinum by 2007.

Our primary operations and interests are located on South Africa's Bushveld Complex. This 2000 million year-old igneous intrusion stretches across the north of the country in a 350-kilometre arc and hosts approximately 77% of the world's known platinum resources. We also have operations and interests on the Great Dyke in Zimbabwe, a layered complex similar to the Bushveld Complex but with an elongated geometry extending 550 kilometres across the entire length of that country.

Implats also has active offshore exploration projects in Canada, Brazil and Australia.

# operations at a glance

## MINING OPERATIONS

Implats' four mining operations are Impala Platinum and Marula Platinum in South Africa; and Zimplats and Mimosa in Zimbabwe.

### Impala Platinum Limited (Impala)

Impala comprises mining and mineral processing facilities outside Rustenburg in the North West Province (known as our Rustenburg operations); and Base Metals (BMR) and Precious Metals Refineries (PMR) located at Springs in the province of Gauteng (known as Refineries).

The Rustenburg operations constitute our major production unit and comprises 13 operational shaft systems and five decline projects, three of which are under construction, across a 27,573-hectare lease area. A further three shafts are planned for full production in 2006 (No. 12 North Shaft), 2008 (No. 20 Shaft) and 2009 (No. 16 Shaft) respectively; and the mineral processing (concentrating and smelting) plants.

At Refineries, the BMR produces copper and nickel while the PMR recovers the five PGMs and gold.

Mining activities are focused on two reefs, the Merensky Reef and the UG2 Chromitite Layer, which are contained in the Rustenburg Layered Suite – a well-layered igneous succession of the Bushveld Complex. Operations extend to a depth of around 1,000 metres below surface, with the majority taking place at an average depth of 635 metres. Approximately 16 million tonnes of ore are mined each year, yielding more than 1 million ounces of platinum and 1.9 million ounces of PGMs.

At 30 June 2005, these operations had total ore reserves of 17.7 million platinum ounces and total mineral resources of 59.7 million platinum ounces, allowing production at current levels to be sustained for at least the next 30 years.

Impala currently provides employment to approximately 27,405 employees and 8,345 contractors (35,750 in total).

### Marula Platinum (Proprietary) Limited (Marula Platinum)

Marula Platinum is located on the eastern limb of the Bushveld Complex, near Burgersfort in the Limpopo Province. The project comprises the farms Winnaarshoek, Clapham and a portion of the farm Forest Hill; and a portion of the contiguous Driekop property has been sub-leased and incorporated into the project. Extensive exploration drilling has been conducted in the area, where both the UG2 and Merensky reefs are present.



**The glass-lined vessels in the platinum production section of the Precious Metals Refinery, Springs.**

The mine, which will be owned jointly by Implats' and our black economic empowerment partners in this project, Mmakau Mining Limited (10%), Marula Community Trust (5%) and a consortium of local business (5%), has the potential to produce 130,000 ounces of platinum per year for at least 17 years. On-reef development commenced in October 2002 with phase one of the project – involving construction of the Clapham and Driekop decline systems on the UG2 reef, a 211,000 tonne per month concentrator, access roads and water reticulation – completed on time to allow the mining operations to be commissioned in December 2003. Full production should be achieved in the 2009 financial year, at approximately 140,000 ounces of platinum (330,000 ounces of PGMs) per year.

1,226 people are currently employed at Marula Platinum, the majority of whom are from the local community.

### Zimplats Holdings Limited (Zimplats)

Zimplats, in which Implats has a 86.9% share, is located on the Hartley Geological Complex on the Great Dyke in Zimbabwe. Listed on the Australian Stock Exchange, Zimplats' wholly owned subsidiary Zimbabwe Platinum Mines (Pvt) Limited, comprises Ngezi Platinum Mine (opencast and trial underground operations), Selous Metallurgical Complex (SMC), and the mothballed Hartley Platinum Mine (HPM) and Hartley Complex tenements.

At 30 June 2005, Zimplats had total ore reserves of 17.9 million platinum ounces and total mineral resources of 161 million platinum ounces. The opencast operations at

**Table 1:** Comparative tabulation of Implats' operating interests (mine to market refined platinum production).

	Production: refined platinum ounces (12 months to 30 June 05)	Employees (30 June 05)	Contractors (30 June 05)
Impala Platinum	1,114,600	27,405	8,345
Marula Platinum	30,900	1,226	0
Zimplats	82,400	743	1,170
Mimosa 50%	30,400	1,472	148
<b>TOTALS</b>	<b>1,258,300</b>	<b>30,846</b>	<b>9,663</b>

Ngezi Platinum Mine produce a steady 2 million tonnes a year while the mechanised underground trial mine currently produces approximately 40,000 tonnes per month. These operations are expected to achieve full production of 90,000 ounces of platinum in the new financial year, with the potential to expand incrementally to 400,000 ounces of platinum a year over time.

The SMC comprises a concentrator and smelter, which were re-commissioned almost four years ago. The base metals refinery and the HPM presently remain on care and maintenance.

Zimplats currently provides direct employment to 743 people and indirect employment to 1,170 contractors, bringing the total number of individuals working at the operations to 1,913.

#### Mimosa Platinum (Private) Limited (Mimosa)

Mimosa is wholly owned by Mimosa Investments Limited, a Mauritius-based company owned jointly by Implats and Aquarius Platinum Limited. The mine, which is situated on the Wedza Geological Complex, on the southern reaches of the Great Dyke in Zimbabwe, successfully ramped up production

to 60,800 ounces of platinum (135,000 ounces of PGMs) per year from February 2004. Mining starts at 60 metres below surface and currently extends down to approximately 200 metres.

Potential has been identified for further low-cost expansion to 135,000 ounces of platinum (250,000 PGM ounces). Total mineral resources are estimated at 5.6 million ounces.

The mine currently employs 1,620 people, of whom 1,472 are employees and 148 are contractors.

#### IMPALA REFINING SERVICES LIMITED (IRS)

IRS manages the group's toll smelting and refining as well as metal concentrate purchases from more than 30 partners and clients, involving refinement of a wide variety of materials such as flotation concentrate, smelter matte, base and precious metals refineries' residues, sweeps and salts, and industrial catalysts. Spent autocatalysts collected worldwide are delivered to Impala's mineral processing operations, where the PGMs are regenerated, making Implats one of the world's largest recyclers of autocatalysts.



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## STRATEGIC HOLDINGS AND ALLIANCES

Implats holds a sizeable stake in a number of partner companies with a view to having a material impact on the strategic operation and direction of these companies. A feature of these holdings is the long-term concentrate off-take agreements with IRS. Although Implats is not involved in the day-to-day running of these operations, it provides technological expertise and financial support.

Among the strategic holdings or partnerships are:

- An 8.6% stake in Aquarius Platinum Limited and a 20% stake in operating subsidiary Aquarius Platinum (South Africa) (Proprietary) Limited, giving an effective 24% interest in the operations. The latter owns the Kroondal and Marikana operations, as well as the Everest project
- A 45% stake in the Two Rivers Joint Venture with African Rainbow Minerals Resources.
- The Ambatovy nickel project in Madagascar, a joint venture with Canadian company, Dynatec Corporation and Sumitomo Corporation, Japan.

## POTENTIAL HAZARDS ASSOCIATED WITH THE PRODUCTION OF PLATINUM

The production of refined PGMs and base metal products results in inherent hazards for the environment, as well as the health and safety of both employees involved in the various processes and the communities surrounding our operations. The nature and scope of these hazards are well understood at Implats and are used as the foundation of our safety, health and environmental policies and procedures.

### Mining operations

Our mines are predominantly underground operations, with some opencast mining activities. The mined ore-bearing rock

is transported to the concentrator by conveyor, road or rail.

The majority of our employees work underground, and safety is the most important consideration in the management of our mining operations. This is particularly so with regard to the conditions to which our underground employees are exposed, namely heat and noise.

Some material of little value is generated as a by-product of our mining activities. This 'waste rock' is dumped on waste rock dumps close to the mine shafts.

### Concentrators

The mined ores are treated separately in our concentrators, reflecting the differences in their respective mineralogy. The ore is milled together with water to produce a fine pulp, which is pumped to the flotation section. Here chemicals are added to the pulp enabling the valuable material to be separated from the waste. The concentrate containing the minerals is sent to the smelter for further processing and the waste material (or tails) is pumped to tailings dams.

Water consumption is a major environmental issue in the concentrating process. A large quantity of water is used, a significant portion of which is lost to evaporation on the tailings dams. Several controls and initiatives are in place to improve recovery of as much water as possible from both the tails and the concentrate.

### Smelter

The concentrate is dried before being charged in submerged electric arc furnaces. Here the PGMs and other metal sulphides are separated into furnace matte from the unwanted material (or slag oxides). Iron sulphide is removed from the furnace matte by oxidation to an iron oxide slag in the converter section of the smelter, by blowing air through the molten furnace matte.

The converter matte is granulated and sent to the Refineries, while the furnace and converter slags are granulated and reprocessed in the concentrator to recover the remaining valuable metals.



**Far left: The Base Metals Refinery at Springs, viewed from the Precious Metals Refinery.**

**Left: A rock drill operator tackles the rock face at our Rustenburg operations.**

During the smelting processes, sulphur dioxide gas and dust are generated. The dust is removed from the off-gas streams by electrostatic precipitators and wet scrubbers. The furnace and converter gases are sent to sulphuric acid plants for sulphur recovery.

### Refineries

At Refineries, the converter matte is acid leached in the BMR to recover copper, nickel and cobalt. A black concentrate powder is then sent to the PMR where platinum, palladium, rhodium, ruthenium, iridium, gold and silver are extracted.

Gases and fumes such as chlorine, nitrous oxides, sulphur dioxide and ammonia may be released during the refining process. These are chemically removed by wet scrubbing processes.

A de-bottlenecking project aimed at expanding the capacity of the operation is in progress at Refineries. The incorporation of advanced scrubbing technology will ensure that the impact of the expanded facility on air quality will be lower than the current installation. The project will also lead to an estimated

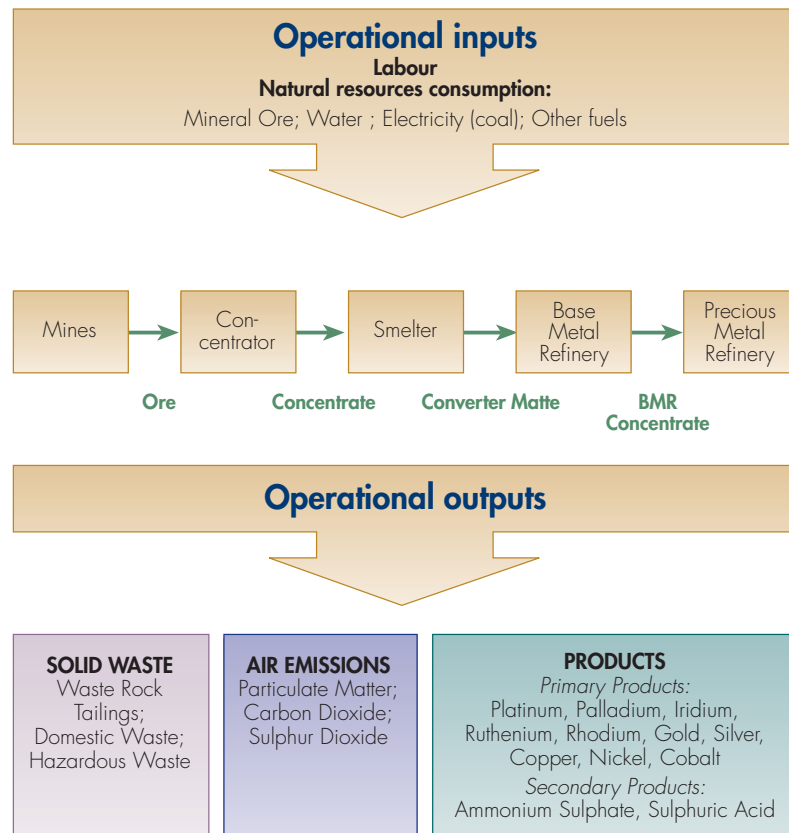
25% reduction in water consumption per year, despite the approximate 50% increase in output from the expanded plant. The project is scheduled for completion, within environmental compliance, by June 2006.

The major occupational health risk at Refineries remains potential exposure to platinum salts. This is averted successfully by strict hygiene measures and "hands-off" systems for employees exposed to the hazard. Noise generated during the refinery processes poses a further occupational health risk, which is guarded against through personal protective equipment (PPE).

### Recycling

The primary PGMs – platinum, palladium and rhodium – are used to control vehicle emissions in both gasoline and diesel engine exhaust systems. Implats' long-standing and growing association with A1 Specialized Services and Supplies Inc makes it one of the world's largest recyclers of "spent catalysts" for the automotive industry, with most being sourced from North America and Europe.

**Figure 3:** Flow chart depicting Platinum Production Process





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