

Acknowledgements

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Footnotes

In September 1999, the Royal Society of Chemistry gave the Cativa™ process the "Clean and Efficient Chemical Processing" award in recognition of its positive environmental impact.

BP commissioned their first plant using the rhodium-based process in 1982 licensed from Monsanto and acquired the rights to this process in 1986.

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Jane H. Jones is a Close Plant Support Technologist with BP Chemicals. She is responsible for delivering technical support to plants operating the Cativa™ process and will be a member of the commissioning team for the Malaysian plant start-up later this year.

Platinum Excavation on the UG-2 Reef in South Africa

The enormous saucer-shaped Bushveld Complex in South Africa is the world's largest layered intrusion and the major world platinum resource (1). It comprises layers rich in platinum group metals (pgms): the Merensky Reef (the traditional main source of platinum), the underlying UG-2 Reef and the Platreef in the north. The Merensky Reef has become less important recently as fewer high grade mineral-bearing deposits remain near the surface (2).

In the 1970s mining was begun on the UG-2 Reef (typically 1 m thick) where it breaks through the surface (2). Recently, in the Rustenburg area at Kroondal, Aquarius Exploration began exploration work. Here the reef has two distinct layers, allowing greater mechanisation and some open-cast mining. At Kroondal the total resource is estimated at 20.4 million tonnes (t), of grade of 5.5 g t⁻¹ with a life of 14 years (3). Laboratory work on drill core samples indicated that a concentrate containing the bulk of the pgms could be produced by flotation at a coarse grind. The concentrate grade was high at ~ 400 g t⁻¹ but chromium content was higher than desired. A feasibility study was then undertaken with a small shaft sunk to access ore below the oxidised zone,

and Mintek executed pilot plant runs to aid design of a concentration plant. This design, unique to the platinum industry, uses a DMS (dense media separation) plant as the first step before the flotation process. The DMS upgrades the pgm-content and rejects barren waste (chromite mining technology). A single-stage rod mill is the only mill. An attritioner to treat the rougher concentrate prior to cleaning and open-circuiting of the cleaner tails enabled production of very high concentrate grade with acceptable chromium grades. Concentrate grades of over 600 g t⁻¹ were predicted at a maintained recovery at over 85 per cent (4).

Each platinum mine has some unique processing, but this new process and other technologies could help to optimise pgm operations on the more accessible UG-2 deposits and aid smaller mines to exploit pgm deposits effectively.

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