

down the hole, to provide a lower resistivity environment for optimum anode current output and to consolidate the anode column.

Now Metal and Pipeline Endurance Limited have completed on behalf of ARAMCO, the Saudi Arabian Oil Company, the development of a new cathodic protection application for platinum clad niobium anodes in deep groundbeds. The anode consists of a solid niobium rod 12 mm diameter and clad with 0.01 mm of platinum. Again, the length of the anode depends on the required current output and they have been constructed in lengths of up to 6 metres, by resistance butt welding 1.5 metre lengths. The anode, which is enclosed within a PTFE cage to provide protection during installation, is suspended from the surface of the deepwell, and electrical contact is achieved by a chlorine resistant anode cable which is clamped to the suspension rope at intervals up to ground level.

These platinum clad niobium anodes only require a drilled hole 0.15 metres in diameter, and for an equivalent capacity of 100A an

anode length of 6 metres is satisfactory. As a result, the overall drilling costs are of the order of one third of those for drilling conventional deepwell groundbeds. In addition the basic cost of the platinum clad niobium assembly is approximately one fifth that of current deepwell anode assemblies.

Apart from basic cost savings, several other advantages result from the use of platinum clad niobium anodes in deep groundbeds. These are summarised in the Table but it is worth noting that a platinum clad niobium assembly requires only minimal equipment for its installation, removal and maintenance, and does not require the purchase or installation of expensive, special grade coke backfill.

A minimum working life of twenty-five years is expected for these new platinum clad niobium anodes which, it is anticipated, will ultimately replace all conventional deepwell anode materials.

Reference

- 1 Most recently, L. L. Shreir, *Platinum Metals Rev.*, 1965, **12**, (2), 42-45; 1977, **21**, (4), 110-121; 1978, **22**, (1), 14-20

The Crucial Importance of the Platinum Metals

Platinum Group Metals—Ontario and the World, Ontario Mineral Policy Background Paper No. 7, BY THOMAS PATRICK MOHIDE, 162 pages, \$25

The production in some form or another of 18 per cent of all manufactured goods depends upon the use of platinum catalysts. The world has more food to eat and more fuel because of platinum, and our modern concerns with pollution control, energy conservation and the conquest of disease are directly served by the platinum group metals.

These are only three of the conclusions drawn in this comprehensive report prepared by the Director of the Mineral Resources Branch in the Government of Ontario's Ministry of National Resources.

Ontario is the world's third largest producer of the platinum metals after South Africa and the Soviet Union and there is a distinct element of political thinking in the approach to the subject. Despite this the review gives a valuable over-all perspective of world production and consumption statistics as well as a view of future demand, in which a very substantial

increase is foreseen by the end of the century.

After a description of all six metals of the group they are taken individually, each chapter detailing the characteristics and applications of one metal. For many readers this part of the report will be the most useful and stimulating as Dr. Mohide has been at considerable pains to cover every form of use known to technologists in industry, from the oldest established applications to the most recent developments. The crucial importance of the platinum metals to the well-being of mankind is made abundantly clear in these sections of the report.

Readers of *Platinum Metals Review* will of course have a much deeper knowledge of their own particular area of use of the platinum metals, but none the less a great deal of interesting information has been brought together here.

The report is available from the Ontario Government Bookstore, 880 Bay Street, Toronto, Ontario, Canada. L. B. H.