

News about publications

1. Journals

● *Quarterly Journal of the International Tin Research Institute*, edited by Colin J. Evans and published by the Institute, Fraser Road, Greenford, Middlesex UB6, 7AQ, England. 'Tin and its uses' no. 138 is now available. It contains articles, among others, on 'Wave soldering surface-mounted components', 'Tinplate and the environment', 'Old and new crafts in an historical setting', and 'The widening scope of tin research'.

● *Engineering, building and construction law review*, edited by P. C. Loots and published every two months by Construction Law Review (Pty) Ltd (P.O. Box 78020, Sandton 2146, Transvaal), R63,00 per year.

This review reports crisply and clearly on the latest Court decisions, arbitration awards, and disputes in its specific fields of business, and it is an information source for executives involved with the South African engineering, building, and allied industries.

2. Publications of the Mineral Policy Sector

The following reviews of the activity and developments during 1982 in respect of the chief minerals produced or consumed in Canada are now available. Prepared by members of the Mineral Policy Sector staff, they are for sale at \$1.25 per copy. Requests for copies should be addressed to Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Canada K1A 0S9.

- *Nepheline syenite and feldspar* by B. W. Boyd
- *Potash* by G. S. Barry
- *Selenium and tellurium* by D. A. Cranstone
- *Sodium sulphate* by G. S. Barry
- *Tungsten* by G. G. Law-West

3. Mintek reports

The following publications are available free of charge from Mintek, Private Bag X3015, Randburg, 2125 South Africa.

● Report M114

Analytical methods associated with the recovery of uranium.

This report summarizes various approaches made to the analysis of materials arising from the processing of Karoo deposits for uranium. These materials include head and residue samples, aqueous solutions and organic solvents and, finally, the precipitated cakes of the elements recovered, i.e. uranium, molybdenum, and arsenic. Analysis was required for these elements and also vanadium, carbon, sulphur, and carbonate in the head and residue samples. The concentration of uranium, molybdenum, and arsenic, other than in the precipitated cakes, ranges from 1 to 2000 $\mu\text{g/g}$, and that of carbon, sulphur, and carbonate from 0,1 to 5 per cent. The analysis of cakes necessitates the determination of silver, arsenic, iron, copper, calcium, magnesium, manganese, molybdenum, lead, tin, titanium, and vanadium within

the range 1 to 1000 $\mu\text{g/g}$, and of sodium and silica within the range 10 to 20 000 $\mu\text{g/g}$.

The methods used include combustion methods for carbon, sulphur, and carbonate, and atomic-absorption, X-ray-fluorescence, and emission methods for the other analytes. The accuracy of the analyses is within 10 per cent.

● Report M117

An assessment of the merits of various types of balls in the milling of ores.

Ball milling frequently becomes necessary in the gold-mining industry when the geological characteristics of the ores are such that adequate supplies of pebbles are not available for tube milling. This adds substantially to the milling costs, particularly in view of the high consumption of balls in the milling of quartzite, which is severely abrasive. In recent years, white-iron balls with a chromium (Cr) content of 12 to over 30 per cent were found to be cost-effective in the milling of many types of ores. The work described here was undertaken to show whether balls of such types could be cost-effective in the milling of gold ores. If they could, benefits would also accrue to the local ferrochromium industry.

Initially, 14 different types of balls obtained from various sources were tested in a small mill (0,6 m by 0,6 m) using a washed quartzite gravel. At low milling rates, the ball consumption was high, and the performance obtained with the best type of ball was only about 50 per cent better than that of the standard, plain carbon-steel drop-forged ball. Under the known economic conditions there did not appear to be any hope that Cr white-iron balls would be cost-effective.

The testwork continued at higher feed rates with the grinding balls that had yielded the best results. Although the consumption of balls per ton of ore milled was substantially reduced, there was also a marked decrease in the relative superiority of the best balls over the standard balls. An increase in the total ball load in the mill did not affect the relative performances of the different types of balls but changed the sieve analysis of the product from the mill. Major changes in the density of the pulp flowing through the mill did not affect the relative performances of the different types of balls and, unexpectedly, it appeared that, in the grinding of quartzite, the consumption of balls was related only to the flowrate of the quartzite through the mill and was not affected by the degree of dilution of the pulp.

Tests were then carried out with the same types of grinding balls on the milling of three different base-metal sulphide ores. With these softer ores, the performance of the best type of Cr white-iron balls was much better than that of the standard balls, this improvement in performance becoming steadily greater with increasingly softer ores. A performance index of 850 per cent was obtained for the softest ore (Palabora) as compared with an index of 150 per cent for quartzite.

● Report M121

The determination of trace elements in coal by atomic-