

SPOTLIGHT

on Zincor

by C.G. Hutson*

The Zinc Corporation of South Africa (Zincor) were hosts to about forty members of the Institute at their works in Springs on Friday, 25th April, 1986. The programme, designed to give an overview of the industry and the part played by Zincor, comprised an introductory talk, a technical talk, a tour of the plant, and a luncheon.

After being offered almost a plate of sandwiches each, the visitors were addressed by Mr Mike Adan, the recently appointed general manager.

Zincor and the Industry

Mr Adan briefly summarized zinc's position as a world commodity, and then focused on the situation in Southern Africa, where the Zincor works is the only refinery. Local demand, he noted, reflected the world recessionary trend and, with zinc consumption dependent on the motor and construction industries, an oversupply situation existed. Of the local consumption, 70 per cent is used in galvanizing, compared with 40 per cent worldwide, which reflects the local use of corrugated galvanized sheet steel as a cheap building material. Zinc faces competition by substitution from aluminium, magnesium, and plastic materials in diecasting, and new uses for zinc are difficult to establish, although progress is being made in zinc-aluminium alloys, thin-wall diecasting, and electric cells.

The output of the plant is closely matched to the demand, with excess production in 1980/81 and again last year, when 92 kt out of the 94 kt produced were sold, 85 kt locally. This performance marks the start of export efforts, which will be eased by the London Metal Exchange's impending adoption of a second quote for 'grade II' zinc, which is Zincor's 'run-of-plant' product.

In the export market, competition is based on US and European smelters, with concentrates coming from the USA, Canada, and increasingly from newer sources such as Peru and some Asian countries. While strategic stockpiles are less important in the zinc market, secondary zinc from recycling, comprising 20 per cent of production, is a growing influence.

Conceived in 1967, when South African concentrates from Rosh Pinah, SWACO, and Vogelstruisbult were exported for refining, Zincor produced its first zinc in 1969, and has since improved its recoveries to produce 270 t/d at current levels, resulting in savings to the country in importation costs and foreign exchange of 27 and 205 million rands respectively for 1985.

Current Performance

Mr Adan went on to expand on Zincor's current performance. In 1985, the consumption of concentrate

averaged 512 t/d, 64 per cent coming from Anglovaal's Prieska Copper Mine, 21 per cent from Iscor's Rosh Pinah, and 15 per cent from Black Mountain. The replacement of the Prieska tonnage, which was necessitated by Prieska's announced closure, is to be sourced from the new Shell Pering Mine in the north-western Cape Province and increases in production from the other existing suppliers.

Despite the current recession, the 1985 sales of 92 kt of zinc, at a cost of 142 million rands, grossed 177 million rands in revenues.

A recent fire in one of the two rectifiers powering the electrolytic recovery cells had temporarily halved the output, and imported zinc was being used to make up the supply.

The Process

At this point, Mr Adan handed over to the Plant Superintendent, Mr Gert Schoonraad, who proceeded to describe the technical aspects of the process.

In essence, the concentrates are blended carefully because of the varying copper and impurity contents of the materials from different sources, and they are then roasted to release sulphur dioxide to the acid plant, leaving an oxide calcine.

Acid produced in a conventional multi-stage catalytic converter is then used to leach the metals from the calcines in aerated leaching tanks operated in continuous series. The remaining slimes are thickened and filtered off before being retreated successively in the Hot Acid Leach Plant and the Superhot Acid Leach Plant, installed in 1976 and 1984 respectively, to enhance the overall zinc recovery. Iron is precipitated from these solutes, which then return to the primary leach, and the residues are stockpiled for later recovery of their appreciable lead and silver contents.

The leach solute is then purified of copper, cobalt, and cadmium in complex precipitation stages before going to the electrowinning section. The precipitates are upgraded and stockpiled for future metal recovery. Purified solution is then electrolysed in the Cell House, where a 40 A current at about 3 V plates the zinc onto aluminium cathodes, which are cleaned of zinc every 24 hours. The cathode zinc is then melted in induction furnaces before being cast into 25 kg slabs, which are weighed and strapped into 1 t pallets for despatch.

Mr Schoonraad went into some detail on the reaction parameters, reagents, etc., and succeeded in 'losing' one or two of the audience on the way. However, he made up for this by introducing a large number of his staff to the visitors, suggesting that they would answer any questions during the tour of the plant, which immediately followed the talks.

* Junior Mining Engineer, Anglovaal, P.O. Box 62379, Marshalltown, 2107 Transvaal.

The Tour and Luncheon

The tour proceeded in small groups, visiting all the components of the plant, and the consensus was that all the questions were handled most ably by the guides, to whom many thanks are due.

The smell of good cooking in the neighbouring hostel, cleverly arranged to cross the visitors' path past the lime-handling plant, demonstrated a unique approach to environmental control and fine-tuned their appetites for the awaiting luncheon. A marvellous spread, accom-

panied by a variety of wines, did justice to their not inconsiderable appetites, and rounded off the visit on a high note.

Mr Tom Espach, Consulting Mining Engineer, Anglovaal, concluded the meal and the visit with several apt expressions of gratitude and an amusing speculation on government policy favouring the prison system ahead of education.

It was an enlightened group who returned to Johannesburg that afternoon.

Radioactive waste in arid regions

A conference on the disposal of radioactive waste in arid areas will be held in Cape Town during the period 7th to 12th September, 1986. It is recommended that engineers and scientists avail themselves of the opportunity to familiarize themselves with this relatively new multidisciplinary field of endeavour by attending the first-ever conference of this nature to be held in South Africa. The sponsors of the Conference are the Nuclear Development Corporation of South Africa (Pty) Ltd (NUCOR), the Atomic Energy Corporation of South Africa Ltd (AEC), and the Electricity Supply Commission of South Africa (ESCOM).

The Atomic Energy Corporation has established a disposal site, known as the Vaalputs National Radioactive Waste Disposal Facility, 100 km south of Springbok in the north-western Cape Province. The results of geotechnical and allied investigations will be reported on at the Conference, and will be of interest to a wide spectrum of scientists, particularly geologists, industrial chemists, engineers, physicists, and environmentalists.

It is not generally realized that, in addition to nuclear engineering, the earth sciences play a major role in the selection of sites for nuclear facilities. At Vaalputs, investigations entailed regional and detailed geological, geophysical, geohydrological, sedimentological, geochronological, geobotanical, environmental, and engineering-geology studies. Seismic activity in the area is being monitored, and ecological programmes have been initiated to assess the impact of radioactive-waste disposal on

the environment.

In all, about 60 papers will be presented at the Conference, about 40 being contributed by overseas delegates. Pre- and post-Conference tours will enable delegates to visit the gold-uranium mines of the Witwatersrand, the Phalaborwa mining complex, various nuclear-research stations, Koeberg, and Vaalputs. It should be noted that special concessions are available for academics and students.

South Africa is justifiably proud of what it has accomplished at Vaalputs, and the geological and environmental investigations rank as some of the best carried out anywhere to date. The investigators would like to share their experience in this field with their overseas and local colleagues.

For further information, please contact

The Secretariat
Radwaste '86
Atomic Energy Corporation of South Africa Ltd
Private Bag X256
Pretoria
0001
Republic of South Africa.

Telephone: National (012) 21-3311 extension 677
(Mr S.B. Schubert)
International + 27 1221 3311

Telex: 3-22948SA.
Cable: ISOTOPE.

Iron control in hydrometallurgy

The International Symposium on Iron Control in Hydrometallurgy will be held at the 16th Hydrometallurgical Meeting, from 19th to 22nd October, 1986, in Toronto, Canada. In addition to an excellent technical programme (42 papers in 7 sessions), the Symposium will feature a trade show and two technical tours. The proceedings will be available at the meeting.

For further details contact

D.J. MacKinnon
CANMET
555 Booth Street
Ottawa, Ontario, Canada
K1A 0G1.

Telephone: (613) 995-4851
Telex: 053-3117 EMAR OTT.