SESSION 18: THIRD INTERNATIONAL SYMPOSIUM ON IRON CONTROL IN HYDROMETALLURGY (36TH ANNUAL HYDROMETALLURGY MEETING)

Zinc Operations I

Sponsor(s): Hydrometallurgy Section, The Metallurgical Society of CIM
Chair(s): T.T. CHEN, CANMET-MMSL, Canada and K. SVENS, Outokumpu Technology, Finland
Room: Salons B and C–Level B

PAPER 18.1 — 14:30
IRONING OUT THE PROCESS AT CANADIAN ELECTROLYTIC ZINC
L. ROSATO, L. CENTOMO, E. BENGUEREL, M. DUMONT and D. BEAUDOIN, Canadian Electrolytic Zinc, Canada

In the past decade, as a result of increasing iron loads, Canadian Electrolytic Zinc (CEZinc) has become a pioneer in understanding the critical factors that affect the roasting of concentrates with high pyrite contents as well as those factors governing the effects of high iron loads on the leaching circuit. De-bottlenecking efforts in the roaster and acid plant section of CEZinc have given rise to a better appreciation of the impact of iron on roaster productivity. High standards for impure solution quality, zinc recoveries and residue disposal have all led to an increased comprehension of the limits of the leaching circuit and the optimization potentials with respect to iron and ferrites. In this paper, the impact of iron on the roasting and leaching circuits of CEZinc will be reviewed and special emphasis will be given to some of the more recent process optimization and improvement activities.

PAPER 18.2 — 14:55
RECENT IMPROVEMENT IN THE HEMATITE PRECIPITATION PROCESS AT THE AKITA ZINC COMPANY
H. ARIMA, T. AICHI, Y. KUDO, K. SARUTA, M. KANNO and R. TOGASHI, Akita Zinc, Japan

The Akita Zinc Company is the only refinery which produces hematite from the iron content in the zinc leach residue. The Akita Hematite Process consists of five stages, which are SO$_2$ pressure leaching, the first neutralization stage, the de-arsenic process, the second neutralization stage and pressure hematite precipitation. In order to strengthen its cost competitiveness and stabilize its operation, the Akita Hematite Process has been modified continuously. Most recently, two process modifications were carried out. The first was an improved ability to maintain a lower arsenic concentration in the de-arsenic process, and the second was an increased throughput in the hematite precipitation autoclave. The details of these recent changes in the Akita Hematite Process are presented in this paper.

PAPER 18.3 — 15:20
BEHAVIOUR OF IRON IN THE BOLIDEN ODDA ZINC PLANT WHICH USES THE DIRECT LEACH PROCESS
C. ALLEN and S. STRAND, Boliden Norzink, Norway

In 2004, Boliden Odda underwent an extensive modernisation project targeting mainly the leaching section of the plant. Direct leach technology was introduced as part of this project. The Direct Leach process, developed by Outokumpu, is an atmospheric oxidative leach of zinc sulphide concentrate. The effects of this new processing operation on behaviour of iron in the plant are discussed. As well, the
filterability of the new residue on belt filters prior to its deposition in mountain caverns is also discussed. The solids from the direct leach process have been analysed by scanning electron microscopy, and the results of these analyses are presented.

Coffee Break — 15:45–16:00

PAPER 18.4 — 16:00
THE CURRENT IMMSA JAROSITE CIRCUIT
C. MOCTEZUMA, P. ALFARO and S. CASTRO, Industrial Minera Mexico S.A., Mexico

Since the start up of the IMMSA electrolytic zinc refinery in 1982, the dissolved iron coming from the acid attack of the ferrites has been precipitated by the jarosite process. At the beginning of operations, sodium jarosite was produced; however, the plant was converted to ammonium jarosite in 1990. The final storage of the residue is on the company’s property adjacent to the plant, over the natural surface of the land. Before the construction of the refinery, several studies were done in order to evaluate the characteristics of the ground, such as, permeability, underground water localization, etc. The results showed that the site was adequate for the storage of this kind of material. For several years, the jarosite residue was filtered on rotary drum filters and was sent as a pulp to the storage area for settling. The water from the storage pond was recycled to the re-pulp tank for the jarosite residue. These filters were replaced in 1999 by an automated filter press. Since then, the jarosite residue has had a lower water content, and the zinc recovery improved. At present, a second filter press for the jarosite circuit is in the acquisition process to diminish the soluble zinc content in the residue from the present value of 2% to < 1% Zn.

PAPER 18.5 — 16:25
IMPROVEMENTS IN ZINC LEACH RESIDUE TREATMENT BY THE WAELZ PROCESS AT THE ANNAKA REFINERY
Y. KUSUDA, T. HAGIWARA and Y. KODERA, Toho Zinc, Japan

Since 1981, the Annaka refinery has recovered zinc from zinc leach residues by the Waelz Process. The important considerations of this process are the prevention of the growth of coating accretions in the Waelz kiln and the improvement of the zinc volatilization rate. In this paper, simulation predictions and the results of the industrial operation regarding the prevention of coating accretions in the Waelz kiln and the improvement of the zinc volatilization rate at the Annaka refinery are reported and compared.

PAPER 18.6 — 16:50
CONTROL OF IRON IN THE HUDSON BAY ZINC PRESSURE LEACH PLANT
S. SHAIRP, T.R. BARTH, Hudson Bay Mining and Smelting, Canada and M.J. COLLINS, Dynatec Corporation, Canada

The first commercial application of the Dynatec two-stage zinc pressure leach process commenced operation at the metallurgical complex of Hudson Bay Mining and Smelting Co., Limited in Flin Flon, Manitoba in 1993. A key feature of the successful leaching operation is the presence of iron in solution, which facilitates oxygen transfer in the autoclaves and enables rapid oxidation of zinc sulphide minerals. At the same time, the solution from which zinc is recovered must be essentially iron free. Precipitation of iron from the solution starts in the autoclaves and is completed in subsequent atmospheric purification steps. Conveniently, these iron precipitation steps also remove nuisance elements such
as arsenic and fluoride from the solution, while producing solids with good liquid-solid separation characteristics. This paper provides an overview of the current operations in Flin Flon, with particular reference to the behaviour and deportment of iron throughout the zinc plant.