

MONDAY, AUGUST 25, 2003, A.M.

PLENARY SESSION — 9:00 - 12:00

Room: Grand Ballroom A and B

Chairman: A. ALLAIRE, Met-Chem Canada Inc., Montréal, Québec, Canada

INTRODUCTORY REMARKS — 9:00

PLENARY 1 — 9:10

ADVANCED MATERIALS FOR CANDU REACTORS.

D.F. TORGERSON, AECL, Chalk River, Ontario, Canada

CANDU reactor development, in common with all high technology products, is driven by the need to reduce costs and to increase performance. A critical requirement for achieving these goals is the development of advanced materials that can withstand the high temperatures, pressures, and radiation fields in the core of the reactor. This presentation discusses some of the challenges and progress made in materials development to enhance the performance of current and future generation reactors.

PLENARY 2 — 9:50

CHALLENGES FOR HYDROMETALLURGY IN ENVIRONMENTAL AND HEALTH STEWARDSHIP.

B.R. CONARD, Environmental and Health Sciences, Inco Limited, Toronto, Ontario, Canada

Consideration of environmental and human health issues in metallurgy is growing rapidly. While not all metallurgists need to have detailed expertise in environmental and health questions, they should be aware of the challenges the metals industry faces, be able to interact with colleagues in other sciences and contribute to sound metal resource management. Hydrometallurgists occupy a unique position among metallurgists because of their knowledge of the behaviour of metals in aqueous systems, which are of fundamental importance in understanding environmental chemistry and human toxicology. As a result, hydrometallurgists should more frequently and passionately lend their expertise in assessing environmental and health risks of metals and in helping to develop effective global guidelines, regulations and process and product stewardship strategies, thereby enabling metals to continue their beneficial service to society.

COFFEE BREAK — 10:30 - 10:50

PLENARY 3 — 10:50

Business Aspects and Future Outlook For Hydrometallurgy.

D. HALBE, Doug Halbe Consultant, Salt Lake City, Utah, U.S.A.

"Many are called, but few are chosen." The biblical adage applies not only to life, but also to hydrometallurgical processes. There have been, in the past, many outstanding successes with new processes - and also some dismal failures. What are the odds of success for a new process? When there have been problems, why? What can you do to make sure these problems don't occur with your process? What effect will a slow start-up have on project economics? How do banks - the people who loan your company money for the project - feel about new processes, and why? Is it possible to predict or estimate the time required to reach design parameters...and if so, how do you sell this estimate to management - and banks? Probably most important - when do you start thinking about the answers to these questions?

PLENARY 4 — 11:30

BIOTECHNOLOGY FOR SUSTAINABLE HYDROMETALLURGY

J. BOONSTRA, C.J.N. BUISMAN, Paques B.V., Balk, The Netherlands

High rate bacterial catalyzed processes can serve to improve hydrometallurgical operations. These solutions are not only economical but also environmental sustainable. With references around the globe, the value of this new approach is recognized by industry worldwide. For instance, metals can safely and economically be recovered from process and waste streams using biotechnologically produced sulfide, resulting in a valuable product instead of a waste stream for disposal. Both the natural biological sulfur and nitrogen cycles offer bacterial routes that are applied to advantage on industrial scale. The shared advantage of these processes is that waste compounds are converted in either a reusable raw material or in a harmless product. This way, natural product cycles can be closed. Sulfur cycle: Bioleaching, reduction of oxidized sulfur compounds to elemental sulfur, thiosalts regeneration, metal recovery with biogenic produced H₂S, SO₂ removal from gas streams, etc. Nitrogen cycle: Ammonia removal using the anammox-process, biological removal of NO_x from gas streams, nitrate removal from water streams, etc. Besides the applications mentioned above, bacterial processes for reduction of metals such as uranium, selenium and manganese have proven to offer great potential for clean-up of groundwater streams. The paper and presentation will contain a description of the above applications. Further, a short introduction on the fundamentals of microbial conversions, the design of engineered high rate bioreactor systems and a techno-economical description of an industrial application of biotechnology in metallurgy will be provided.

LUNCH BREAK — 12:10 - 14:00

PLENARY 5 — 14:00

IS EXTRACTIVE METALLURGY BECOMING EXTINCT?

I.M. RITCHIE, Murdoch University, Perth, Western Australia

Right across the universities of the developed world, the traditional disciplines of physics and chemistry are losing ground. Extractive metallurgy, which depends so heavily on chemistry, is also contracting despite a clear need for people with this kind of training in the mining industry. Reasons for this loss of popularity are discussed. High on the list is one of image. The extraction of metals is widely seen as a dirty, polluting sunset industry which involves working in remote and uncomfortable corners of the earth for inadequate compensation. Ways in which the image problem can be overcome are considered. It is concluded that a concerted effort needs to be made by the universities and industry to redress this situation. The importance of extractive metallurgy, both now and in the future, when a greater emphasis will be placed on sustainability and recycling needs to be stressed. In addition, training for a career path which leads on beyond extractive metallurgy, needs to be incorporated into degree courses.