Ontario

Expert System for Evaluating Mining Effluent Processes

"The purpose of the Wastewater Technology Centre is to create profitable enterprises by demonstrating and commercializing effective environmental technologies, and by providing expert scientific and engineering services in Canada and around the world. This expert system exemplifies WTC's efforts to market innovative, knowledge-based products for environmental performance management."

Bruce Jank
Chief Executive Officer
Water Technology International Corporation
Burlington, Ontario

THE COMPANY

Environment Canada established the Wastewater Technology Centre in 1971 as a research and development laboratory. It has become a world leader in the development and evaluation of technology for treating and disposing of municipal and industrial wastewater and residues. Today, the centre is operated by Water Technology International Corporation (WTIC).

At present, the WTIC employs 120 engineers, scientists and support staff. Research and development work is performed by five business units - pollution prevention, pollution control, site remediation, residue management and environmental chemistry. WTIC has worked for or collaborated with more than 150 clients around the world on a broad range of environmental projects.

The centre's role is to support government and other organizations by identifying and resolving environmental problems. The centre also:

- evaluates new technologies;
- conducts research into new products and process technologies;
- promotes these products and process technologies to Canada and the world;
- assists strategic allies within the Canadian environmental industry in commercializing and exporting these technologies for the benefit of Canadians.

THE CHALLENGE

The gold mining process usually generates effluent with high levels of cyanide. Mining companies must treat this effluent before discharging it into local waterways. The problem is that finding and putting into practice the most cost-effective treatment strategy requires knowledge of a variety of disciplines including cyanide recovery and destruction processes, tailings pond design and regulatory requirements.

At present, this information is scattered in sources ranging from textbooks to government files. To put it together involves meshing many disciplines such as cyanide speciation chemistry, reaction kinetics, mathematical modelling, process control, separation processes and costing. Further, the knowledge, experience and insight gained by various government and industry people remains largely untapped.

With today's powerful micro-computers and related software, it is now practical to build expert systems containing the knowledge, rules and regulations which normally only the best available professionals in the field would have. With such systems decision-makers can process complex information in a consistent and efficient manner.

TECHNOLOGY DESCRIPTION

The WTIC has developed METEX for the mining industry. This is an expert system for designing as well as evaluating processes and estimating costs for cyanide effluent treatment systems. The system provides the conceptual design of effluent management systems for various regions in Ontario and has the potential of expanding to include other regions of Canada. The program is easy to use so that corporations may make decisions from the early stages of project planning to the final stages of design and costing.

In the early stages of evaluating a technology, the company can use METEX for a quick overview and comparison of available technologies. In the later stages, the company can use METEX to review technologies in detail. In addition, the system will produce reports on:

- process flow sheets;
- applicable regulations;
- equipment specification;
- capital and operating cost details;
- technical references.

METEX will help decision makers in government and industry to process complex information quickly. That means they will be able to evaluate and to select the most practical and cost-effective effluent management system as well as to set appropriate regulations and guidelines for specific gold mining or milling projects.

RESULTS

To-date, the WTIC has sold METEX to a number of mining companies around the world including Omai Gold Mines Limited of Guyana, Ashanti Goldfields Co. Ltd. of Ghana, Anglo American Research Laboratories (Pty) Ltd. of South Africa and Teck Corporation of Canada.

Geo Pacific Ltd. of Australia contracted the WTIC to use METEX to predict the performance of a tailings pond at a mine site in Fiji. Geo Pacific used the report generated from the METEX study to complete an environmental assessment report.

The centre is upgrading the METEX program o expand its application for various climatic regions. WTIC is negotiating sales with companies in Australia, Brazil and South Africa.

TECHNOLOGY OPPORTUNITIES

Market opportunities for METEX include consultants, industries, universities and governments. The program is presented as a decision support and training tool for those who are involved in the assessment, designing and costing of treatment processes. To-date, the primary market has been the industrial sector in countries with gold mines such as Canada, United States, Peru, Brazil, Guyana, South Africa and Australia.

PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION

The development and demonstration of this technology was partially funded by the Ontario Ministry of Environment and Energy and the federal government's Departmental Advisory Committee on Artificial Intelligence.

Industrial companies located in Ontario may seek ministry/industry services which will help them:

- reduce, reuse and recycle solid waste;
- effectively remediate historic pollution and destroy hazardous contaminants;
- reduce or eliminate liquid effluent and gaseous emissions;
- use energy and water more efficiently.

Equipment and services supply companies may benefit from the information provided on technologies identified for business development.

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FOR FURTHER INFORMATION, PLEASE CONTACT:

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MINISTRY OF ENVIRONMENT AND ENERGY SERVICES

For information on Ministry of Environment and Energy assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax (416) 327-1261

For more project profiles and other publications, visit the ministry's website at http://www.ene.gov.on.ca

Printed on recycled paper

500 - 01 - 97 PIBS 3354E35