

# CIM MAGAZINE

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## Fueling the future Potash and uranium

Des carburants  
pour l'avenir  
La potasse et l'uranium

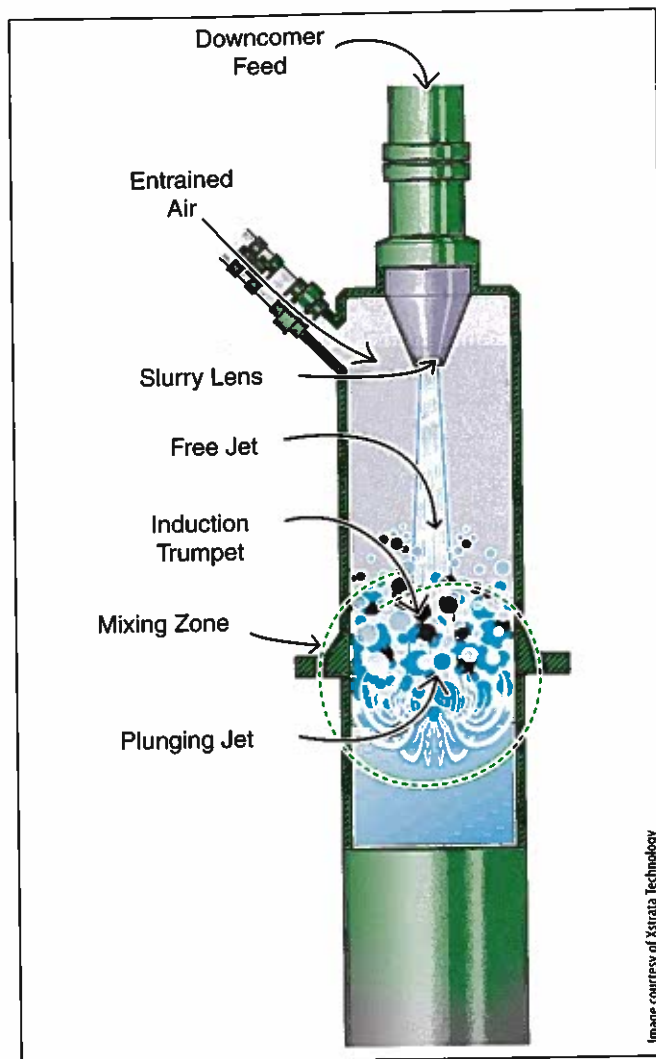
Featured mine  
Mosaic's expansion project

Mine en vedette  
Projet d'expansion  
de Mosaic

Interview with Jerry Grandey, president & CEO of Cameco  
Une entrevue avec Jerry Grandey, président et chef de la direction de Cameco

## Is Canada ready for the Jameson cell?

Rethinking potash processing for a more efficient system



Fine air bubbles and mineral particles collide and attach during the high-intensity mixing inside the Jameson cell downcomer.

**W**hile the Jameson cell, a high-efficiency flotation system, is not a new processing technology in the world's mining and industrial mineral industries, it is just now beginning to make inroads in Canada. Xstrata Technology, which markets the Jameson cell, recently opened an office in Vancouver that supports projects throughout the Americas. Pilot campaigns at potash operations in Saskatchewan are among them.

Developed in the late 1980s by Professor Graeme Jameson and his students at the University of Newcastle in Australia, and first tested onsite at Mount Isa Mines in Queensland, the Jameson cell has since been installed at operations around the world for the processing of base metals, coal and industrial minerals, including potash.

The central feature of the cell is its downcomer. Feed slurry, channeled into the downcomer through a narrowed lens, forms a jet of liquid that shears and entrains air. The removal of air creates a vacuum within the downcomer. Once the separation tank is full enough to cover the base of the downcomer, slurry is pushed up the downcomer. The intense mixing of the jet with the slurry breaks the entrained air into fine bubbles. The intensity of the system encourages the mineral particles to collide and attach to the bubbles before they exit into the separation tank and float to the top. The design also does not rely on the mechanical agitation system that conventional flotation equipment does. The only moving part is the feed pump, which reduces energy, maintenance and labour costs.

### Solid results with a smaller footprint

Currently, there are 288 Jameson cells installed worldwide, according to Xstrata Technology. Almost half are used in the recovery of coal fines; a third are used for base metal flotation. Two potash producers, Cleveland Potash Ltd. and Israel Chemicals Ltd., have had the technology installed since the 1990s.

Prior to that, Cleveland Potash, the operator of the United Kingdom's only potash mine — which now produces more than a million tons of potash for fertilizers each year — employed only conventional flotation equipment called Denver cells. These consisted of cells that used agitators requiring motors. In 1993, the company performed trials using a pilot-scale Jameson cell. Following onsite test work, the company installed a single Jameson cell with six downcomers, which replaced sixteen 2.8 m<sup>3</sup> Denver No. 30 DR flotation cells.

A paper written by Hall, of the University of Nottingham, and Harrison, of MIM Process Technologies (now Xstrata Technology) in 1995, found that the single Jameson cell that replaced Cleveland Potash's entire original slimes flotation circuit reduced the company's equipment footprint by 80 per cent. As well, the authors listed a number of economic attributes of the cell, including a simplified circuit layout, compact equipment size, a reduced number of cells per flotation stage, reduced operating manpower requirements, greater operator understanding and rapid system stabilization after startup.

Results of trials conducted by Cleveland Potash engineers Burns, Coates and Barnard (1994) were also positive. The authors noted that "immediately after commissioning very little manipulation of metallurgical parameters — such as air flow, frother addition, depth of froth bed, level of slurry in the downcomer and froth washing — was

required to establish optimum performance from the cell. Most of the test work was centred on the development of accurate sampling methods and continuous 24-hour operation with minimum supervision."

They concluded that the "Jameson cell showed net operational savings that were achieved by the additional site revenue gained from increased potash recovery and by the 80 per cent cost savings in both the ongoing maintenance and the energy drawn. A 76.6 per cent savings in energy was also realized due to the hydrodynamics of the Jameson cell downcomer, compared to the conventional cells with agitator motors of the original slimes circuit."

### Still running smoothly

"The cells at Cleveland Potash have been working very well for over 15 years with minimal maintenance," says Le Huynh, senior process engineer with Xstrata Technology, from Brisbane, Australia.

The Jameson cell is an efficient, easy-to-maintain system, says Huynh. "It's the high intensity that makes it more efficient because you are able to recover something in seconds rather than in minutes," she explains. "In potash, we look at the cleaning duties. In a lot of plants at the moment there is a cleaning and a recleaning set, two stages to get to the product with the grade they are targeting. If you are able to do that in one stage [with the Jameson cell], that's more efficient." Because one Jameson cell replaces a number of older-style cells, less maintenance and repairs are required.

Canada has been slow to adopt the Jameson cell, but Xstrata Technology is making inroads. Josh Rubenstein, a senior processing engineer in the recently opened BC office, says that besides the test work they have been doing with the Saskatchewan potash company, they have had "expressions of interest from other companies."

"The message to Canadian potash companies is to open their minds to the technology," says Huynh. "Generally, in mining people tend to be conservative but when they latch on to new technology they say 'why didn't we do it before?' Once one company does it, it becomes the standard. As for Canada, we're

starting to see a lot of interest and there currently seem to be an open minded attitude in the potash industry, with engineers keen on improving plants' performance using innovative technologies like the Jameson cell." I

Burns, M. J., Coates, G., & Barnard, L. (1994). Use of Jameson cell flotation technology Cleveland Potash, Ltd., North Yorkshire, England. *Transactions of the Institution of Mining Metallurgy*. 162-167.

Hall, S. & Harrison, M. (1995). New Jameson cell flotation of industrial minerals. *Industrial Minerals*. 61-67.

RioTinto

## Welcome.



Sam Walsh, Chief Executive Officer of Rio Tinto Iron Ore, is pleased to announce that **Zoë A. Yujnovich** has been appointed as the new President and CEO of the Iron Ore Company of Canada, effective 1 February 2010. Ms. Yujnovich has been with the Rio Tinto group since 1996. She has had a variety of roles, including engineering, business analysis, procurement, marketing and plant operations. Most recently, Ms. Yujnovich was the President of Rio Tinto Brazil.

Ms. Yujnovich holds a Bachelor of Engineering (Hons) and a Masters of Business Administration.

**The Iron Ore Company of Canada welcomes Ms. Yujnovich to her new role and extends a warm welcome to her husband and three children as they settle into Canada.**

