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## International Research Team heads north to Alaska

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An international research team from universities in Australia and Canada has just headed to the Alaskan wilderness to investigate and enhance the practical use of 'froth and bubbles' at a remote mine site.

The research campaign, sponsored by the world's biggest zinc producer Teck Cominco, is serious business aimed at making money and advancing science.

The focus is on froth flotation, a process used to separate valuable mineral from the unwanted gangue waste material after mining.

Campaign team members Marco Vera and Kym Runge of the University of Queensland's Julius Kruttschnitt Mineral Research Centre said a lot of

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A team of ten researchers from three universities have come together at Teck Cominco's Red Dog mine, located inside the Arctic circle in northern Alaska, to conduct optimisation studies in froth flotation inside the mine's lead-zinc concentrator.



JKMRC researchers Kym Runge, left, and Marco Vera, look over the team's Gantt chart prior to departure for Alaska from their base in Australia.

Mr Vermeir, mineral research centre said a lot of effort had gone into the research program being undertaken in Alaska.

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The campaign is part of the international JKMRC-AMIRA P9 project - the world's longest running mineral processing research project - and the more recent P541A project involving the Ian Wark Research Institute at the University of South Australia and the JKMRC.

The team will conduct their research from June to August 2002 at Teck Cominco's Red Dog mine, located inside the Arctic circle in northern Alaska.

Mr Vera said the team of ten researchers from three universities, including McGill University's mineral processing group from Montreal, would take more than a thousand samples of lead-zinc product during the research period.

The sampling would be timed in such a way so as not to disrupt Teck Cominco's ongoing mineral extraction and processing at the mine.

He said the campaign demonstrated university collaboration working effectively in an industrial setting aimed at achieving the concomitant benefits of adding value to a mining operation - in this case the Red Dog mine - as well as developing the skills and knowledge of postgraduate researchers.

"Essentially the three institutions coming together are bringing with them their own areas of specialisation dealing with one key aspect of mineral processing - that being the froth flotation process."

These areas of specialisation include the JKMRC's flotation circuit modelling and simulation, Ian Wark Research Institute's surface chemistry, and McGill University's development of sensors to measure gas dispersion in flotation cells.

Kym Runge said the Red Dog campaign follows a similar exercise at Northparkes mine in New South Wales during August 2001, which also involved participation from McGill University's mineral processing group.

She said the Northparkes' experience helped the Australian and Canadian teams get to know



Researchers from McGill University and the JKMRC came together in 2001 to work on-site in Australia at Rio Tinto's Northparkes mine. From left are Brigitte Comley, Jorge Torrealba, Cesar Gomez, Kym Runge and Edy Sanwani. The two research institutions have since joined with the Ian Wark Research Institute to investigate froth flotation applications at Teck Cominco's Red Dog mine in Alaska.

each other's 'stylistic' approaches to applied research.

"It's always difficult having many people on site, but we got to appreciate each other's skills," Kym said. "Each team member had something special to bring to the project that we alone at the JKMRC would not have had."

Marco Vera said the experience gained at Northparkes helped put the much larger Red Dog campaign together.

"Our Gantt chart might look simple, but it will be a major task to coordinate all of these people on site," he said. "We are going to be in such an isolated location that we can't really afford to go there and be impromptu."

According to Kym Runge, who is a previous visitor to Red Dog, the mine is so remote that straying too far from base runs the unwary the real risk of being eaten by a bear.

The mine is located 150 kilometres from Kotzebue - an ancient arctic Alaskan town of about 2000 people - and about 50 kilometres from the Bering Strait

When the strait is frozen over it means it's possible, but highly improbable, to walk to Russia from the mine during winter.

Teck Cominco Research Senior Research Engineer Dr Barun Gorain said his company planned to use the knowledge from the joint AMIRA P9 and P541 campaign to develop a comprehensive model for its new Red Dog VIP flotation circuit.

"The successful modelling of a flotation circuit is only possible when experts in flotation circuit modelling, froth chemistry and cell measurements work together in a plant environment to understand the process from different viewpoints," he said.

"Significant financial benefits will be realised if the models and strategies developed from this campaign can be used to improve plant metallurgical performance."

Dr Gorain said the work would also help Red Dog develop a better flotation operating strategy based on the application of new techniques emanating from the projects.

He said the campaign would provide an opportunity for Red Dog plant personnel to observe new

technologies like JKFrothCam and the McGill bubble size and gas velocity measurement devices in action.

"It should help operators to obtain different viewpoints and increase technical awareness leading to quicker implementation of new technologies in the plant," Dr Gorain said.

"Teck Cominco would also like to see the Red Dog campaign contributing to the research team's efforts in advancing the science of flotation."

Ms Runge said the team was in no doubt that their main aim was to help optimise Red Dog's new zinc plant in order to increase revenue.

"At the end of the day, the mining company wants to increase grade and recovery, as well as reduce costs so they can make more money for their shareholders."

But as a senior researcher and PhD candidate herself, Ms Runge says an important net gain from the research team's perspective will be enhanced postgraduate experience.

"These researchers are at the cutting edge in flotation research, at least in modelling, measuring and surface chemistry."

She said the PhD and Masters students involved in the campaign would gain invaluable industrial experience, while working alongside the best in the business of flotation research.

After the campaign is over, each postgraduate will return to their respective universities with enhanced knowledge and new data to add towards the completion of their higher degrees.

The Red Dog campaign will commence after the completion of the AMIRA-JKMRC P9M review meeting in Brisbane, Australia from 3-6 June, 2002.