



THE MINERAL DEPOSIT RESEARCH UNIT'S FINDINGS TRANSLATE INTO MORE EFFECTIVE MINING — AND A NEW GENERATION OF SCIENCE-SAVVY MINERS



DIGGING DEEPER

Like a lot of discoveries, finding a simple tool to explore for mineral resources was an unintended byproduct of other research. When the people at UBC's Mineral Deposit Research Unit (MDRU) discovered a new way to find silver, that wasn't what they were trying to do.

"One of the research associates was waiting for an instrument to cycle up," explains MDRU Director Dick Tosdal. "He flipped on a UV light and fluorescent minerals appeared in samples collected around silver-bearing veins. Fluorescence of minerals has been known since the early part of last century. It's been used to explore for tungsten, but not silver or zinc. We stumbled upon it. You get a lot of interesting research results through serendipity. Of course there's a lot of hard slugging, and well thought-out science, but there is always an element of surprise."

It's one of the few random aspects of MDRU, set up in 1989 as a cooperative venture between British Columbia's mining industry and UBC. Mining is the biggest industry in the province. But its economics

don't allow for much research and development, partly because its elemental aspects — exploration, extraction and processing — can be severely capital- and labor-intensive. MDRU's mission is two-fold: undertaking necessary research no single mining company could afford, and training successive new generations of researchers and scientists that will keep the mining industry vital.

"Very few of the metal exploration companies do their own research today," Tosdal says. "They come to others, including us. It's not contract research; the primary business of MDRU and the university is training the next generation of mining researchers and scientists, and in doing so, the training allows for a better understanding of the formation and controls on mineral deposits, in particular, copper, gold, silver, diamonds and platinum group elements."

MDRU's research addresses the mining industry's most pressing questions, and gives the university a way to collaborate with the industry to help them keep working at their best.

"MDRU provides quality geological

research and is undoubtedly one of the best collaborative research institutions in the world," says Barrick Gold chief geologist (now retired), C.J. Hodgson. "It not only delivers critical training to new explorationists, it improves the ore deposit models that guide our exploration."

MRDU's mission also includes short courses and seminars to keep people working in the mining business up to date. Mining companies financially support the unit and its research, and they get access to information, knowledge and techniques that would likely never be discovered otherwise. It's a model that's the first of its kind in North America, and one of the best in the world.

"MDRU is its own business unit; we're completely self-funded," Tosdal says. "The University provides us space, logistical support and has contributed to an endowment, but everybody working at MDRU is paid by MDRU. Faculty members within the department are important participants in MDRU projects, but the research staff generates its own salary and its own financial support."

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"MDRU plays a vital role in advancing research within the Faculty of Science at UBC," says UBC Vice President Research John Hepburn. "It also serves to strengthen UBC's ties with industry by providing valuable data and research that benefits both the university community and the exploration and mining industry. MDRU continues to play an integral role in the Faculty's research activities."

In the 17 years since its inception, MDRU's reputation, influence and scope have expanded. From its base in British Columbia, its people are at work throughout North and South America, Africa, Asia and Australia on six broad research themes.

Examining hydrothermal systems yields crucial information about how mineral deposits are formed: what kinds of resources are there, similar or ancillary resources that could also be present, as well as understand-

ing how metalliferous fluids move. That research is currently being conducted in British Columbia, Nevada, Mongolia, Peru, Chile, Argentina, El Salvador, Australia, Tanzania and Turkey. Studying tectonics, MDRU's researchers find out how the structures of mineral deposits take shape, and that, in turn, helps mining companies know where to look, and where not to. In probing magmatic ore deposits, researchers find out how iron, titanium, chromium, copper, nickel and platinum were formed billions of years ago during the Archean and Proterozoic geologic eras. There's the methodology of exploration, determining which techniques and tools can offer the greatest accuracy with the most efficiency, including making detailed 3-D models of the subsurface from data collected from the surface. As Canada grows into the third-largest diamond producer on the planet, understanding the kimberlite pipes that bring diamonds closer to the surface is essential. Knowing which minerals occur along with diamonds and how they're distributed are crucial, too. Finally, there's work being

done on sustainability and containing greenhouse gases using waste rock and mine tailings.

Tosdal is on top of all of it: "I am a voyeur in the sense that I am interested in everything and involved in everything." He says he doesn't have the time he'd like to get intimately involved with the nuts and bolts of each research initiative, because the demands of running MDRU mean he has to be aware of everything the unit does. "We're running over \$2 million of research funds annually. Somebody has to monitor it and make sure all the reports go out and make sure that it's all done at a high level of academic excellence. And then, at the same time, we have to be looking one or two years down the road at the next opportunity, the next project." As active research projects are completed, fresh, highly-trained graduate students become available to the market for employment: the majority of these are employed in B.C. and in Canada. In doing so, MDRU will help maintain the long-term feasibility of the exploration and mining culture that is intrinsic to our economy. ■