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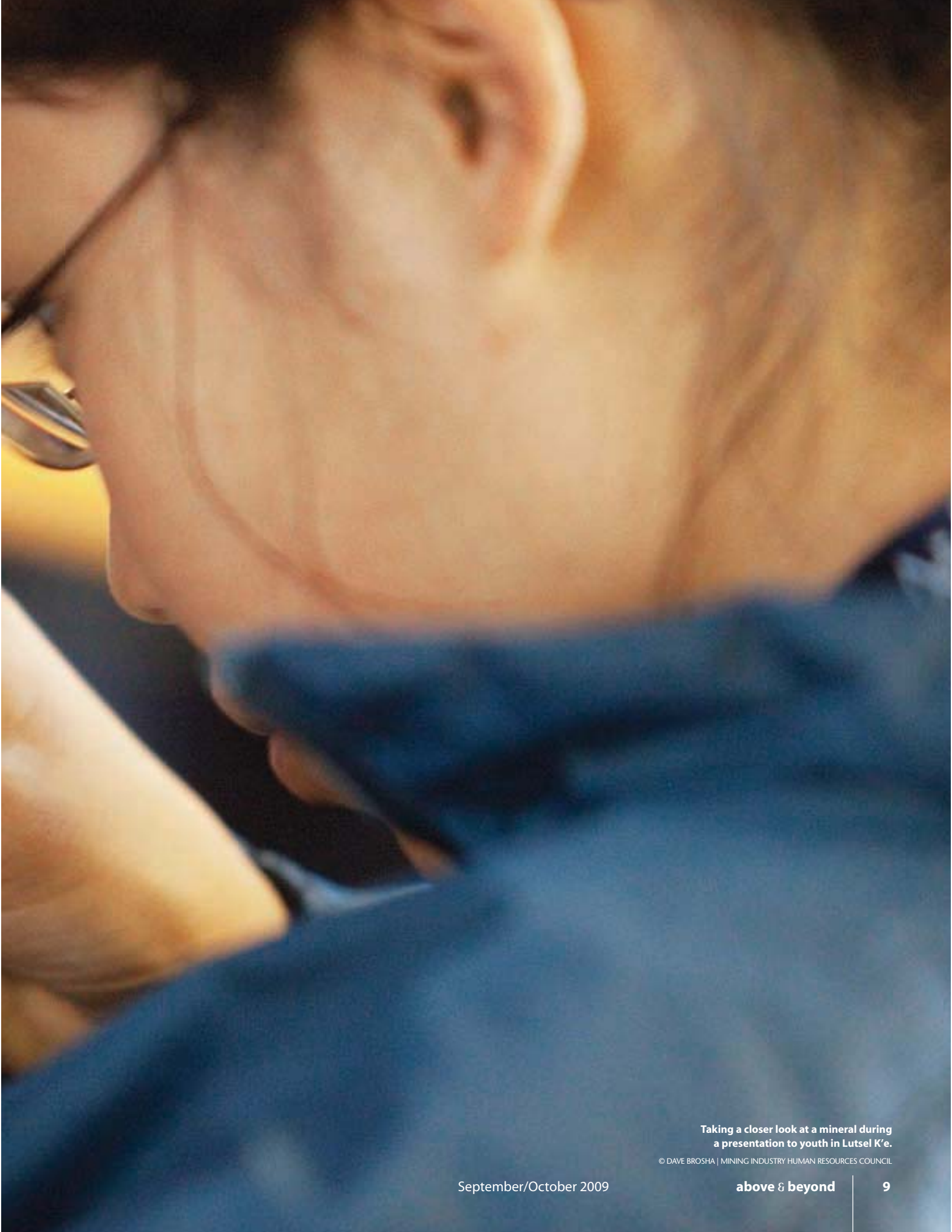
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Rare earth metals

THE NEXT BIG THING?

by Dave Brosha

The diverse land of the Northwest Territories has long been a source of wealth to those who have lived, visited, and done business within its borders. Its abundant rivers, lakes, and wildlife have nourished the Territories' aboriginal population for countless years while its plenitude of resources have fuelled generation after generation of big business and its associated migratory workers, workers who have often become permanent citizens. The Northwest Territories, especially Yellowknife, has seen its fortunes rise and fall with the cycles of the mining industry, and as each mined resource or project sees its profitable life cycle pass, it seems, almost serendipitously, that another one emerges to take its place as the driving force of the area's economy.



Taking a closer look at a mineral during
a presentation to youth in Lutsel K'e.

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Lutsel K'e youth separate mineral fragments while learning about rare earths.

Yellowknife was a city that was built on gold, and as the gold industry took what might be its last bow in the city in the 1990s, a small, hard, shiny, extremely valuable resource better known as “diamonds” recaptured the collective imagination of the city and fuelled heavy growth and a fresh wave of new faces.

Now, as diamond mining is in full production, with some area mines already nearing the downside of their life cycle, the obvious question for those in Yellowknife (not to mention across the NWT, and on Parliament Hill in Ottawa), is *what is next for the Territory?* The answer, especially to a few largely unknown exploration companies who have seen some early, yet promising, results, might be *rare earths*, a resource that has become heavily sought as electronic and renewable-energy technologies evolve. And, if their exploratory work proves fruitful, rare earths might just be the Next Big Thing to hit the Northwest Territories.



Site visitors receive a tour of scenic Thor Lake.

To understand what the economic potential might be for the Northwest Territories if the current exploration for rare earths eventually turns into full-on production, one first has to better understand what exactly rare earths *are*, and for those out there who aren't geologists or chemists, the answer to this can be a little confusing.

Rare earth elements make up 17 of the 117 elements on the periodic table: the 15 lanthanoid elements, which include gadolinium, samarium, europium, and terbium — along with scandium and yttrium. If this feels like “ium” overload, just know that these rare earth elements — which incidentally aren't particularly rare; they derive their name from the fact that *concentrated deposits* of the elements are rare, even if the elements themselves are widely found around the world — are of particular interest due to the importance they play to the world of manufacturing.

David Connelly of Ile Royale Enterprises, who juggles his international expertise in wind power generation with his role as a strategic advisor on Community and Northern Relations to Avalon Rare Metals — one of the key players in current Canadian rare earth element exploration — has a simple analogy. “If iron, lead, or zinc are the carbohydrates or proteins in the world of materials, think of rare earths as the vitamins; the rare earths are just a pinch — little bits that make significant improvements to the characteristics of a material.”

Applications of how these pinches of rare earths are used in materials are diverse. They are used in some everyday technologies such as computer monitors and plasma televisions, DVD players, cell phones, light emitting diodes (LEDs), and various glass products. One of the most important uses for rare earths is in the permanent magnets that are used in emerging green technologies such as wind turbines and hybrid cars. Rare earth permanent magnets are considered one of the strongest types of magnets, and this strength allows even relatively tiny magnets to pack a comparatively powerful punch to their traditional counterparts, resulting in greater efficiencies and increased miniaturization.

If the applications for these elements are diverse, the one “problem” (or benefit, depending on what your national alliances are) with the world market for rare earths is that almost 95 per cent of their current yearly production — with an increasingly robust appetite for their consumption — is cornered by one country, China. Connelly explains that “China had the foresight that they could dominate the market on this critical material, and set their industrial strategy to become the ‘OPEC’ of rare earths.”



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North America did have a foothold in the market a number of years ago, but that foothold has since largely dissolved resulting in the current overseas dominance. “The problem in the past,” explains Bill Mercer, Avalon Rare Metals Vice-President, speaking to why rare earth sites haven't seen as much interest in North America until recently, “is that rare earths didn't have as many applications as they do now. The time hadn't come 20 years ago, but that time is now.”

So where does Northwest Territories fit into this global equation? The NWT has several active exploration sites, the most notable of which is Avalon Rare Metals' Thor Lake project. This scenic location (and current home to a small team doing exploratory work), is found approximately 100 kilometres southeast of Yellowknife. Originally explored back in the mid-seventies, the project was never developed because the demand wasn't there. This has changed, Mercer explains, with the change in the market. “Thor Lake has a great number of the rare earths found in permanent metal magnets,” he says. Now the project has the potential to take a small chip out of China's almost sole-source dominance in the supply of rare earths, and lend itself to a greater North American presence.



Vice-President of Exploration for Avalon Rare Metals, Bill Mercer, en route to Yellowknife from Thor Lake.



Avalon actively hires workers from the area's impacted First Nation communities, including Mickey Lafferty, from Fort Resolution.

The promising results from early exploration is sparking the interest not only of the Government of the Northwest Territories (as a strong economic prospect), but of investors.

“The possibilities (with rare earths) are endless,” muses Bob McLeod, Minister of Industry, Tourism, and Investment for the GNWT. “I’m very excited about the prospects. It’s one of the few areas in the mining world that have been able to access capital.” McLeod is speaking, of course, about the current economic downturn that has impacted mining and mining exploration in the Northwest Territories particularly hard, with the estimated decrease in spending on exploration at approximately \$100 million in 2009.

McLeod’s optimism with the potential of the Thor Lake deposit is shared with many investors. In May, James Dines — a well-known investment advisor and editor of *The Dines Letter* — went as far as to pronounce rare earth elements the newest “super major bull market.”

The financial interest in rare earths is only mirroring technological purchasing trends, a prime example of which is the shift in consumer interest towards hybrid vehicles, such as the Toyota Prius. A typical hybrid vehicle contains approximately 15-16 kilograms of rare earth elements, the bulk of which originate in China today.

Although Avalon’s exploration results since they took ownership in 2005 have been positive, with a preliminary scoping study, additional exploration, and metallurgical studies all showing promise and providing enough justification to continue the progression towards full-on production, to say “a future mine is a done deal” might still be a strong assumption. Avalon Rare Metals still faces a number of potential roadblocks, including confirming the project is feasible (a feasibility study is currently in progress), navigating through a swamp of regulatory processes and permitting procedures and getting buy-in from impacted First Nations groups who lay claim to the lands including and surrounding Thor Lake.



Jan Fullerton, ED Skills Canada

On this last point, Mercer states, “community relations and Aboriginal affairs are very complicated and can take some time; the mining itself is pretty straightforward.” The importance of being open and inclusive with Aboriginal groups is not lost on Avalon, however, who have put significant efforts into building and maintaining healthy relationships with impacted First Nations.

“We have attempted to maximize First Nation’s employment in the Thor Lake exploration camp,” states David Connelly, “which has included all of the camp attendants, and more recently first aid attendants and driller helpers. Together with the Mine Training Society and Aurora College, we have sponsored a Driller Helper Training Program for 12 First Nations participants. We have also partnered with St. John Ambulance (and again the Mine Training Society) to provide Medical First Responder training for all of our camp attendants.” With these added skills, Connelly continues, “Avalon has been able to increase wages to its First Nations employees.”

The efforts of Avalon Rare Metals have been recognized. Minister McLeod recently stated in an interview that “they (Avalon) have done a great job of promoting their interests with Aboriginal groups — they have really kept people informed.” In a Territory with a sometimes spotty record on Aboriginal inclusiveness and poorly executed exploration projects, this approach is refreshing. To wit, Avalon has even invested resources in cleaning up the mess the previous owners of the Thor Lake property left behind as they undertook exploration work in past decades, providing a ‘triple-win’ for




The exploration camp is a series of white-walled tents.

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all stakeholders: the clean-up efforts have provided Aboriginal employment, have brought a much-needed facelift to the area, and have garnered Avalon Rare Metals some well-deserved kudos for their efforts.

If Thor Lake ultimately moves past this exploratory phase to becoming a producing mine — optimistic forecasts state that it could happen as early as 2013 — the benefits to the Northwest Territories could be sizeable. Mercer estimates that the mine could employ about “200 employees if it hits full production,” with “up to 500 people involved in the construction phase.” If you include the spin-off associated with this mining activity, such as the benefits to the City of Yellowknife through its role as a nearby major service centre, the economic picture could be very positive for the city for a number of years to come. Although reluctant to pin a specific lifespan on any potential Thor Lake mine, Mercer does say with confidence that “it will have a long life”.

With no guarantee of additional producing diamond mines to take the place of the three existing Northwest Territories mines, statements like this could be music to the ears of both the NWT and its capital city. It could also be the start of a new era in northern mining. 



Avalon Rare Metals Bill Mercer, David Connelly, and Don Bubar at the Thor Lake exploration site.



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