CARBONATES CALLING

Laricina taking a path less travelled in its quest for oilsands success

Text: Paul Wells | Photograph: Daniel Wood

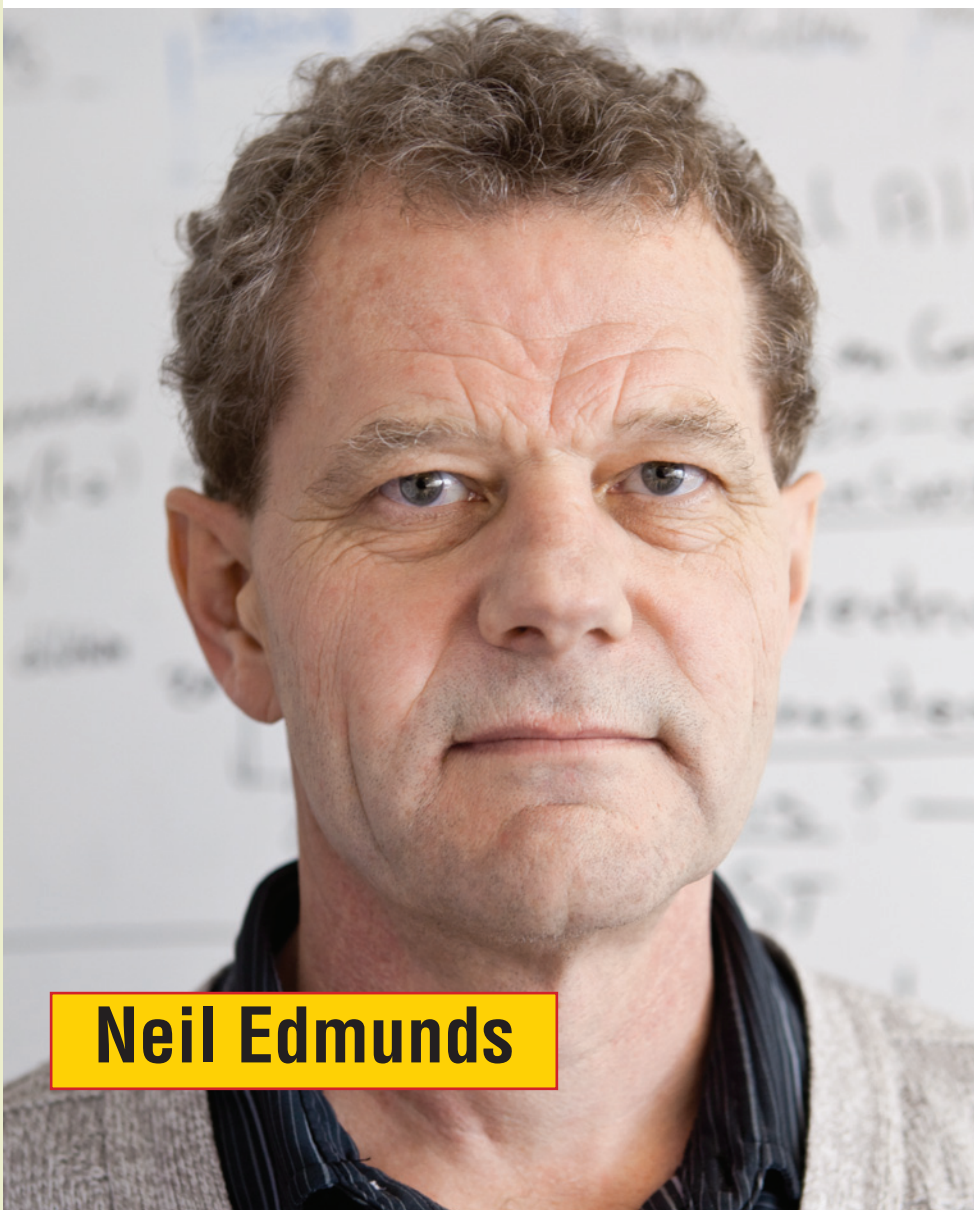
NEIL EDMUNDS CHUCKLES WHEN HE RECALLS THE REACTION FROM some of his petroleum industry brethren when it became common knowledge that he and Laricina Energy Ltd. would pursue a business plan that would include the pursuit of unlocking the vast — but difficult to extract — heavy oil resources contained in the carbonates in the Grosmont Formation.

"A lot of them thought we were a little crazy and many of them still do," Edmunds says.

That's what happens when you've identified opportunities in the oilsands where others have been unable to progress. Or if you've determined the Earth is an orb and not flat. Whatever the case and throughout the centuries, those who dare to innovate and seek alternatives to the tried and true are often vilified before being recognized for their foresight.

In Laricina's case it was because the company bucked conventional thinking and viewed the Grosmont carbonates of northern Alberta as viable targets for commercial-scale exploitation. As vice-president, Enhanced Oil Recovery (EOR) for Laricina, Edmunds brings a strong technical background with 31 years in the oil and oilsands industries, with his career focused primarily on thermal recovery of heavy oil.

And it is that experience that helped lead Laricina on its path to the carbonates. ➔



When the company started up about four years ago, Edmunds notes it had a lot of cash, but no assets.

Although the Grosmont carbonates had a history of industry interest dating back to the 1970s and 1980s, Edmunds says previous pilot tests employed "old-school technology" that used vertical wells and other methods of the day. "They tried to push the oil around as opposed to just melting it and draining it, the way we do with steam-assisted gravity drainage [SAGD]."

With cash to spend, an innovative corporate mindset and a business model to develop — in addition to their SAGD background and their belief that oilsands riches could be unearthed outside of the traditional bitumen sandbox — the Laricina team began acquiring a targeted portfolio of oilsands assets containing a variety of reservoir environments and geological character.

These assets range from the familiar oilsands in the McMurray formation to the less developed and less mature Grand Rapids and Grosmont formations, all of which offer significant resource potential.

"We initially thought we would be looking for some kind of farm-in in the Athabasca area and what happened instead is that these new areas started showing up in some of the land sales and we also posted some of the Crown land sales ourselves," Edmunds says.

"So it was the first time that people who were experienced with SAGD in the Fort McMurray area took a look at the Grosmont carbonates in particular. We started looking at the rock and the amount of oil that was there and the other geological properties, and realized it was an excellent candidate for SAGD. In fact, all those things that made [carbonate] seem so mysterious and unworkable in the 1970s were probably good things for SAGD."

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As things stand now, the company owns 73,590 net hectares of oilsands rights and has established five main development areas at Germain, Saleski, Burnt Lakes, Poplar and Conn Creek. While Laricina's Saleski project is a pure bitumen carbonate play (Grosmont play), the Germain project is a combination of oilsands (Grand Rapids) and bitumen carbonates (Winterburn play).

The company has its sights firmly set on becoming the first oilsands player to use horizontal drilling, SAGD and solvents in Alberta's carbonates, having received regulatory approval in July 2009 for its 1,800-barrel-per-day Saleski pilot project. Two horizontal well pairs are to be drilled at Saleski this winter in preparation for a 2010 pilot.

Laricina holds more than 3.9 billion gross barrels (2.9 billion net) of potential resources between two projects: 60%-owned Saleski and 96%-owned Germain. Both projects are located just over 100 kilometres southwest of Fort McMurray.

Before taking on his duties with Laricina, Edmunds was a reservoir engineering specialist with EnCana Corporation from 2000 to 2005, where he provided reservoir and operations direction for Foster Creek's vapour extraction (Vapex) and SAGD pilots, researched new recovery technologies and provided expert testimony on gas-over-bitumen issues before regulatory hearings.

Prior to the EnCana posting, Edmunds padded his stellar resumé by serving as manager, Enhanced Oil Recovery for CS Resources Limited, where he was responsible for the thermal project at Senlac, Saskatchewan, and later as vice-president, Recovery Technologies, focused on research projects for EOR. As well, since 1997 Edmunds has been principal of Clearwater Engineering, providing periodic consulting services in thermal recovery and the development of reservoir simulation software.

Earlier in his career, Edmunds was process development coordinator at the Underground Test Facility for Alberta Oilsands Technology and Research Authority (AOSTRA), and was previously senior reservoir engineer with Vikor Resources Ltd. and AOSTRA.

So despite the carbonate naysayers, tackling the puzzle that is the carbonates wasn't out of character for Edmunds, given his history in the industry. "I've always been the type of person to think outside the box — low boredom threshold, I guess you could say."

Edmunds says that SAGD, though proven, is still in many respects in its infancy, a "technologically immature [process]." As such, he notes that Laricina has opted to "accept the reality that we will be solving problems," and take a slow but steady approach to developing its asset base.

"That's why our company's strategy is to back off the large commercial projects right out of the gate, because you spend so much capital on a commercial oilsands project that you really want to get the technology tuned and refined first. By doing that, you can save hundreds of millions of dollars on the design of the project by using the knowledge that you've gained from a pilot," Edmunds says.

"So, with being in pilot mode it's been natural to be innovative because we're not building the project so much to generate cash flow as we are to generate design information."

A case in point is the company's utilization of genetic algorithms (GA), a class of computer programs that mimic the process of biological genetics in order to find the best possible solvent-steam recipe for getting the most oil out of a reservoir.

"The problem with using solvents is the number of choices you can make," explains Edmunds. "If you have a certain amount of steam and two types of solvents, for example, and let's say we're going to allow for a different injection rate every few months, and you do that for five years, you end up with more possibilities than the number of atoms in the universe."

Just prior to joining Laricina, Edmunds had read about the use of GA in other processes and thought it might have applications that could benefit SAGD. So, he set about to find out.

"I'm a bit of a programming buff and it's a fairly simple thing to do as far as the genetic algorithm itself. So I wrote a fairly simple, stripped down version, if you like, and tested it out on a couple of consulting assignments I was working on at the time and I was quite impressed by it," he says.

Edmunds explains that the program automates the process of optimizing complex and nonlinear problems and that it is essentially an implementation of some of the basic mechanisms of biological evolution. As such, an engineer creates what amounts to a "genome" that defines an arbitrary number of variables to be investigated, each with a finite range and specified number of possible values. Using the software, the genome is a simulation that reflects the particular values encoded in an arbitrary bit string of a certain length. For example, the engineer could input an objective function for a given simulation, such as minimizing supply cost, as one example out of many. The program would then calculate the "score" based on economic evaluation.

"Essentially, we're just borrowing from nature itself to find ways to get the most amount of oil for the least amount of cost and environmental impact," Edmunds explains. "It just goes to show the power of the essential idea of genetics, which is recombination and natural selection." •