

The Deeps

How Newfoundland and Labrador know-how will be critical to ensuring Equinor's Bay du Nord oil discovery is developed

BY DARREN CAMPBELL

When you are on the cusp of doing something that's never been done before, there are always risks involved. But risks also represent opportunities, and Equinor's Bay du Nord discovery is exactly that for Newfoundland and Labrador.

The province has four producing oil fields. All of them are in the Jeanne d'Arc Basin in relatively shallow water (none are in depths below 120 metres), between 315 and 350 kilometres offshore. But the Bay du Nord discovery will be a different animal. It is in the Flemish Pass Basin, 450 kilometres northeast of St. John's and in water depths that range from 1,000-1,200 metres.

Bay du Nord contains an estimated 300 million barrels of oil. Equinor has not sanctioned the project yet, but in July 2018 it took a step in that direction when a development agreement was announced between Equinor and the Newfoundland and Labrador government. The agreement sets out how much spending and work on Bay du Nord will be done in the province, the ownership stake the government will take in the oil field and other benefits the development will provide.

With the Norwegian-based company saying it intends to make an investment decision on Bay du Nord in 2020, with first oil coming in 2025, the wheels are already turning on how to design the project so that it can be operated safely and economically. In the Bay du Nord project description filed with the Canadian Environmental Assessment Agency, Equinor says the lifespan of the field is estimated at 12-20 years with it possibly being extended to 30 years.

The estimated cost of pre-development and development of the oil field is \$6.8 billion. With so much money at stake, ensuring Bay du Nord is designed to withstand the elements it will face in the Flemish Pass means solutions to challenges will have to be found. Some of those solutions will come from Newfoundland and Labrador companies. Bay du Nord could be the catalyst for developing technology that will make the province a leader in deep-water offshore know-how that the rest of the world will covet.

Dr. Freeman Ralph, C-CORE's vice-president, oil and gas, says that has already happened due to knowledge the sector has gained from operating in the Jeanne d'Arc Basin since Hibernia became the first producing field in 1997. C-CORE is a St. John's, N.L.-based R&D company specializing in applied research and technology development. Since 1975, it has provided advisory services and technology solutions to mitigate the risks of operating in the harsh North Atlantic and helps clients improve efficiency, safety and cost-effectiveness in remote or challenging environments.

US \$60 billion

Estimated deep-water capital expenditures globally by 2022

Ralph has been a witness to how Newfoundland and Labrador technology can help oil and gas developments in other harsh, remote regions. The Memorial University graduate specializes in ice and how to manage the risks it poses for sectors operating in ice-prone waters. Gazprom's Shtokman natural gas field in the Russian portion of the Barents Sea is an example of Atlantic Canada knowledge being exported. When Gazprom was looking to develop this huge offshore field (it produced first gas in 2015), the Russian company turned to C-CORE to help it design facilities that could withstand the ice encountered in the Barents Sea at a field that is 600 kilometres offshore.

"On the East Coast you determine how much ice you expect in a season and over the course of the platform's life and you design it accordingly," Ralph says. "The expertise we developed through analyzing the data we have in terms of ice detection, we could take that experience we developed in the Grand Banks region

and use it to help Gazprom. They used our expertise here to help them understand how they should design for iceberg impacts in that area."

Unni Fjaer, Equinor's vice-president, offshore Newfoundland, says there will be challenges the company must overcome considering where Bay du Nord is located. But she says Equinor is operating in water depths of 2,000 and 3,000 metres in Brazil. It has shown it can handle deep-water projects in other parts of the world. She says the real challenge at Bay du Nord is how many environmental factors it will face as it designs a project that can extract oil safely and provide a good return on investment.

"Bay du Nord is quite far from shore. It's in deep water. It's a harsh environment with wave height, wind and more. It's the combination [of factors] that make it challenging," Fjaer says. "It's also quite a small field. The resources are not too big. This calls for a smart approach. That is what we are working on now—how to make it as good as it can get."

Because nobody knows Newfoundland and Labrador's offshore better than the companies and people who live and work here, finding ways to improve the economics of Bay du Nord will partly fall on local companies with expertise in the offshore oil sector. While innovation will occur, Ralph says the industry can build on the work and knowledge that's been accumulated over the past 20-plus years of local offshore oil production.

"Hibernia was a benchmark. We've learned so much about ice since then. It's much softer than what we once thought. The forces one would need to design for are much less than what it would be based on the knowledge we had at the time of Hibernia," Ralph says. "That doesn't mean anybody was wrong. Engineering and science are progressive. We have the opportunity to improve the basis of design for Bay du Nord. That will translate into savings for the companies that they will invest in that development."

That will be important because as Fjaer points out, Bay du Nord is not a monster field. And with it being so far offshore and in deeper water, development costs will be higher than if it was in shallower water and

closer to shore, resulting in workers, equipment and supplies being sent to the field more quickly. Energy consultant firm Wood Mackenzie issued a report in November warning about potential cost inflation for deep-water projects.

It says annual deep-water capital expenditures are expected to rise from US\$50 billion in 2018 to nearly US\$60 billion by 2022. Big projects in Guyana, Brazil and Mozambique are driving the increase in spending, and Wood Mackenzie thinks cost inflation could end a period from 2014-2016 where the average deep-water project has been completed five per cent under budget. "We believe that many cost savings are not as sticky as industry suggests and are sceptical that many will stand the test of time during a sustained cyclical uptick," Wood Mackenzie research director Angus Rodger said in the report.

That reality will force the province's offshore oil sector to innovate to keep Bay du Nord costs down. Wood Mackenzie says in the most

competitive deep-water regions like the Gulf of Mexico, Brazil and Guyana, projects are now profitable under an oil price of US\$60 per barrel. With Newfoundland and Labrador competing for investment capital with those jurisdictions and others, the cost to develop Bay du Nord cannot spiral upward.

However, Ralph is confident the province's offshore oil sector is up to the task. "We'll see the application of a lot of new technology in Bay du Nord. Equinor and other companies will make big steps in digitalization. That will mean optimized operations. A lot more automation. A lot more computers used in the controls. That is going to be a step-change from what we call conventional technology," Ralph says. "Challenges make opportunities more exciting and interesting. We are just going to do it." |nrm



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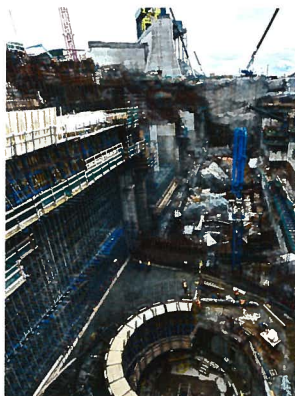
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✉ dcampbell@naturalresourcesmagazine.com

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