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Green Point: The next big shale play?

Recent exploration in Port au Port Bay, Newfoundland and Labrador has established the presence of a rich source rock/unconventional reservoir unit within the Cambro-Ordovician Green Point formation of the Humber Arm Allochthon. Could it be the next big North American shale play?

By TAYVIS DUNNAHOE, Associate Editor

Located in Western Newfoundland, the recently drilled Shoal Point project is developing into a potentially large unconventional resource play. Joint venture partners Shoal Point Energy, Calgary, Canada; Canadian Imperial Venture Corp., St. John's, Newfoundland; and PDI Production Inc., St. John's, Newfoundland, drilled the Shoal Point 2K39 well in March 2008. According to Steven Millan, CEO, Canadian Imperial, "Our original target was a conventional reservoir comparable to the Ellenberger." At the time, Millan said that Green Point was recognized as a potential unconventional resource, but the well was optimized to test a middle Ordovician platform carbonate horizon in which oil and natural gas were discovered by Hunt in 1994, some 19 miles (30 km) to the south along trend.

The Shoal Point 2K39 deviated well was drilled to a total measured depth (MD) of 11,907 ft (3,629 m) and a true vertical depth of 8,357 ft (2,548 m) in Exploration License #1070. "Essentially, what turned out to be a dry hole in the conventional target showed very positive results to implicate the Green Point formation as an unconventional resource," Millan said. The well was plugged and abandoned but is mechanically set up to facilitate future re-entry for further evaluation.

While drilling the intermediate section of the 2K39 well between a MD of 3,511 ft (1,070 m) to approximately 5,250 ft (1,600 m), the borehole penetrated hydrocarbon-bearing rocks interpreted to correlate to the Green Point formation. Excellent gas readings generally above 200 units (2%), and up to 600 units in the best zones were recorded on the gas log across a 279-ft (85-m) stratigraphic interval along with very high rates of penetration. This established the Green Point formation as a potential candidate for future exploration and development.

Historical production

Exploration at Shoal Point is not new to Newfoundland. In 1900, several shallow boreholes were drilled and produced oil, at one point up to 24 b/d, from within 656 ft (200 m) of the surface. In 1965, Golden Eagle Shoal Point #2, which is about 0.6 miles (1 km) south of the 2K39 well, was drilled to 2,336 ft (712 m). The well had oil shows in ribbon limestones, which were interpreted as Green Point.

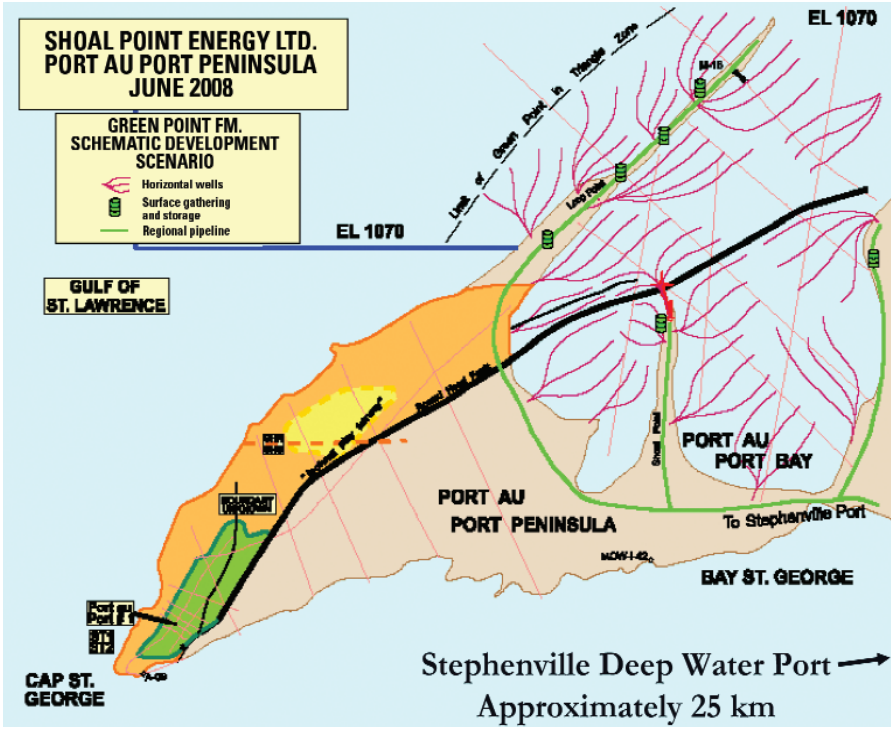
The Green Point play is enclosed by the land of the peninsula and can be entirely developed by land-based horizontal drilling. (Image courtesy of Canadian Imperial)

As recently as 1999, the Shoal Point K39 well was drilled by Hunt and PanCanadian (now EnCana), again targeting the Ordovician carbonates. This was primarily an era before shales were widely recognized as having commercial potential. Nevertheless, a closed-chamber drillstem test was carried out in the Green Point and recovered free gas. The gas-bearing zone has been correlated by logs to the best zone encountered in the recently drilled 2K39, which indicates a minimum of 0.6 miles of continuity in the Green Point in the area. In addition, cuttings analyzed from the K39 showed excellent hydrocarbon source rock characteristics over a section 1,739 to 7,120 ft (530 to 2,170 m) – MD.

Potential for a play

Operator Shoal Point Energy and its partners believe this data, in combination with the known shallow historical production from close to the surface on Shoal Point, suggest that the potentially productive section tested by the K39 may have a gross vertical thickness up to 5,250 ft (1,600 m), although the section may be locally thickened due to reverse faulting. Further evaluation awaits the processing of cuttings and further specialized log analysis from the 2K39 well. The potential in the drilled subsurface section offshore is further supported by measurements from the Green Point outcrop on the southwestern shoreline of Port au Port Bay: here, TOCs range up to more than 10% with maturation levels in the top of the oil window.

The Green Point formation was logged through intermediate casing



In addition to access through a land-based system, Shoal Point is less than 16 miles (25 km) from the nearest deepwater port at Stephenville, Newfoundland. (Image courtesy of Shoal Point Energy)

and recorded good quality gamma, neutron, and resistivity logs. Al Lye and Associates, petrophysicists in Calgary, used a technique that combined the incasing neutron, sonic, and gamma logs to provide a graphic display of potential gas pay in the rocks. Based on this analysis, the Green Point formation shows a 55% net-to-gross pay ratio over a 1,673-ft (510-m) interval, which equates to approximately 919 ft (280 m) true thickness of potential pay over this interval. It appears from this work that the potential pay is contained in the shale component, which constitutes the majority of the formation.

Although regional analysis of its extent is at an early stage, it is possible that the play extends over the balance of the area contained in Port au Port Bay and therefore would represent a major area for future exploration. The potentially productive area of Exploration Licence #1070, which is held by the three companies, may cover up to 100,000 acres in and around Port au Port Bay.

As of July 2008, estimates for the potential resource were estimated by an independent consultant at 1 to 2 Bboe in place. These original numbers were based on a potential pay thickness of ~ 230 ft (~70 m) in 2K39, based on the zone of highest gas readings in the well. Lye's report shows both net and gross potential payzones as several times thicker. The analysis commences at 3,609 ft (1,100 m) MD in the 2K39 well. These data and others suggest that this initial estimate may be conservative and that the boe in place number may be several times larger, perhaps as high as 3 Bboe. Based on the composition of the gas shows in the well and regional geochemical information, it is probable that the Green Point in this area will produce light oil rather than natural gas. Elsewhere in the basin, oil originating in the Green Point is 51° gravity with no sulfur.

There is no data at this point to support an estimate of recoverability; however, thicknesses penetrated appear to be in the range of 1,641 to 5,250 gross ft (500 to 1,600 gross m), which places it among the thickest known shale play sections in North America. In addition, the play demonstrates analogy with North America's well known productive shale basins and is approximately equivalent stratigraphically to the Utica of Quebec. Recovery factors for better known shale plays average around 10%.

Development outlook

The good news for Shoal Point is the play is enclosed by the land of the peninsula and can be entirely developed by land-based horizontal drilling. According to George Langdon, CEO of Shoal Point Energy, this is extremely important for the economics of the play. In addition, the production of oil rather than gas also has positive implications for production and transportation costs.

With further development in the Shoal Point region, pipelines and other infrastructure including roads can be constructed fairly quickly. There is an industrial port and population center within 32 miles (51 km) of Shoal Point at Stephenville. Early production would probably be trucked to Stephenville followed by a pipeline as volume increases.

Shoal Point Energy, Canadian Imperial Venture Corp., and PDI Production are currently seeking investment partners to move forward with their proof of concept. With the latest well, Shoal Point is shaping up to what appears to be an enormous opportunity.

The companies have been active in the region for more than a decade. Langdon and Millan agree: "We think the Green Point shale may actually form the keystone for further exploration in the region." EXP

Editor's note: *For more information on the geological aspects of the Green Point formation at Shoal Point, Newfoundland, visit* www.EPmag.com *to view an extensive presentation on the play.*