Upper Cambrian - Lower Ordovician Green Point Shale, Port au Port Bay, West Newfoundland: Evaluation and Delineation of an Offshore Allochthonous Oil-in-Shale Resource Play

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The Paleozoic rocks of West Newfoundland have been a site for periodic drilling for oil since 1867 and 1898. This drilling has been encouraged by the historical oil and gas seeps, bituminous residues and oil shales over this 200 kilometre coastline from Port au Port Peninsula to Parson's Pond. By the end of the 1930's there were about 38 shallow wells drilled in this area and there are reports that as much or more then 10,000 of barrels were produced for local consumption for use mostly in the fishing industry. Drilling since the 1960's culminated in 1994-5 with the testing of up to 1742 BOPD from the Port au Port #1 well. The next few wells were unsuccessful.

In 2008 Shoal Point Energy and partners drilled the 2K-39 well from Shoal Point in Port au Port Bay for a deeper hydrothermal dolomite play. This play was unsuccessful but high gas readings, oil shows and oil in the mud was encountered in about 500 m of the shallower Upper Cambrian-Lower Ordovician Green Point black shales. Geochemistry of the cuttings reveals that these units are in the oil window, explaining the oil shows. The same rocks units in the offsetting wells and the shoreline outcrops show consistent wide-spread, excellent oil-prone source rocks. These would be the same rocks that sourced the 410 API Port au Port #1 oil as well as all the seeps and shows in the Bay.

These Allochthonous Green Point Shales have had a very complex history where they were first transported then affected by three orogenies, Taconic, Acadian and finally the Alleghenian Orogeny which buried these good source rocks down into the oil window.

These Allochthonous rocks, as found in Port au Port Bay, consist of a series of stacked thrust sheets that are intensely fractured, faulted and folded. From the well evidence, outcrops and location of seeps these rocks are essentially rich thick black source rocks with up to 10% TOC's. Well evidence shows that these units are roughly 1000 metres thick in the middle of the bay. The 2K-39 well revealed a very good zone of about 100 m thick with very high gas readings and oil shows which might be a fracture swarm that might be common in the area. This unit is further enhanced by about 11 units of 1 to 3 metre siltstone beds that may act as carrier beds if artificially fractured.

Play analogies would be the Bakken as well as the updip oil (of gas) currently being produced in the Barnett and Eagle Ford Shales. A drilling program is being planned to produce this oil by the summer.