

Devonian Petroleum Resources in Western Canada Basin

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In the WCSB $3.54 \times 10^9 \text{m}^3$ or 23.56% of discovered initial in place crude oil and $1.98 \times 10^{12} \text{m}^3$ or 23.88% of discovered initial established raw natural gas occur in Devonian reservoirs. Undiscovered potential in Devonian successions is critical to continental energy supply, but there is no agreement regarding the methods or volumes. Devonian petroleum source systems are closed and numerous. Two Devonian petroleum systems were attributed an undiscovered potential of $120.34 \times 10^6 \text{m}^3$ crude oil and $141.64 \times 10^9 \text{m}^3$ natural gas (USGS). Play-based probabilistic analyses suggested expected undiscovered potentials of $2,296 \times 10^6 \text{m}^3$ initial in place crude oil and $1.96 \times 10^{12} \text{m}^3$ initial in place natural gas (GSC). About 53% of the oil resource and 71% of the natural gas resource occur in immature and conceptual plays. A different assessment discounts the gas potential of immature and conceptual plays, while inferring an initial in place gas potential of $596.12 \times 10^9 \text{m}^3$ (CGPC). The conservative estimate from the petroleum system approach draws attention to problems of that method, including uncertainties in efficiencies and a lack of direct indications for undiscovered pool sizes. Play-based sequential sampling probabilistic models have several benefits, especially the prediction of undiscovered pool sizes. Whether sequential sampling models can be extended to Systems to predict conceptual plays is debated.