New opportunities for oil exploration in Western Newfoundland offshore: Call For Bids NL13-03 Parcels 1 to 4, Magdalen and Anticosti Basins

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Presentation Content

• 2013 Call for Bids
• Western NL Offshore Land Situation
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2013 Call for Bids in three areas:
- Flemish Pass Basin
- Carson Basin
- Western Newfoundland

Call for Bids NL13-03 Western NL consists of four parcels comprising 1,004,482 hectares (2,482,075 acres) located in the shallow waters of the Gulf of St. Lawrence.
Western NL Offshore Land Situation

- 7 active ELs
- Two Paleozoic basins
  - Magdalen
  - Anticosti
- Two Operators
  - Corridor
  - Black Spruce
- All in shallow water less than 400 m
- Discovery (Port au Port #1) was recorded in 1995 and is today part of the Garden Hill South oil field

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There are seven active Exploration Licences in Offshore Western Newfoundland that were previously issued under jurisdiction of the C-NLOPB totalling 10,638 km² (2,628,798 acres). Several are approaching end of 1st Exploration Term.

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Geology Reminder

Expanded geological and procedural information can be found at

http://www.nr.gov.nl.ca/nr/invest/CNLOPB13-03.pdf
http://www.nr.gov.nl.ca/nr/invest/enachescuNL11-01anticosti.pdf
http://www.nr.gov.nl.ca/nr/invest/callforbidsnl09-03_1.pdf
http://www.nr.gov.nl.ca/nr/invest/callforbidsnl09-03.pdf
http://www.nr.gov.nl.ca/nr/invest/cfb_nl06_03_anticosti.pdf
• Early Paleozoic Anticosti Basin located in the foreland of the Appalachian Belt
• Late Paleozoic Magdalen Basin is a successor basin overlying the Anticosti Basin
• Both basins located onshore and offshore Western Newfoundland
• The offshore contains least deformed extensional and compressional features
Geology Reminder

• **Area:** Anticosti Basin covers 14,000 km² (~3,500,000 acres) offshore NL; Magdalen Basin has an additional 7,000 km² (~1,700,000) acres. The two basins occupy the entire Gulf of St. Lawrence (25,000 km²)

• **Type:** Paleozoic extensional, transtensional and compressional area developed during the Early-Mid Paleozoic Appalachian Orogeny
  
  – Anticosti Basin is characterized by the presence of a faulted Carbonate Platform deepening toward the southeast where it is overthrusted by Appalachian nappes
  
  – Magdalen Basin is a younger, successor basin formed as a pull-apart depression and superimposed on the Anticosti Basin

• **Sediments Age:** Cambro-Mid-Ordovician platform with Late Ordovician to Devonian clastics cover in Anticosti Basin in north-central CFB area. Superimposed Late Carboniferous to Permian clastics and marine successions for the Magdalen Basin which underly the southern part of the CFB area
## West Newfoundland Offshore Wells

<table>
<thead>
<tr>
<th>Well No</th>
<th>Well Name</th>
<th>TD (m)</th>
<th>Status</th>
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<tbody>
<tr>
<td>1</td>
<td>Long Point M-16</td>
<td>3810</td>
<td>D&amp;A</td>
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<td>D&amp;A</td>
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<td>D&amp;A</td>
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<td>Man-O'War I-42</td>
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<td>D&amp;A</td>
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<td>5</td>
<td>Shoal Point K-39</td>
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<td>6</td>
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<td>Shallow</td>
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<td>8</td>
<td>Glori E-67</td>
<td>10.6</td>
<td>Location</td>
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<td>9</td>
<td>Shoal Point 3K-39</td>
<td>1735</td>
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</tbody>
</table>

Yellow = Deep wells; Purple = Shallow well; Orange = Location only; Blue = Side track

![Location of main offshore and onshore to offshore exploration wells, concentrated around the Port au Port Peninsula.](image)

Courtesy of DNR

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## West Newfoundland Offshore Wells

<table>
<thead>
<tr>
<th>Exploration Well</th>
<th>Year</th>
<th>Operator</th>
<th>Partners</th>
<th>WD (m)</th>
<th>TD (m)</th>
<th>TD in Form/Gr</th>
<th>Core</th>
<th>DST</th>
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<td>CanOxi, Oilexco, Vinland</td>
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<td>Shoal Point</td>
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<td>36</td>
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<td>Glori E-67</td>
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<td>CIVC, Shoal Point</td>
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<td>Suspended</td>
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</table>

Yellow = 4 deep wells; Purple = 1 Shallow well; Orange = 2 Location only; Blue = 3 Side track; N/A = Not applicable

Only 4 Wells are deep and significant for correlating the offshore geology; Only St. George A-36 was a true offshore well

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Newfoundland Geology Map and Significant Petroleum Shows

**PAP** = Port au Port #1 Oil Discovery

**SP** = Shoal Point oil detected in Green Point shales

**FB** = Flat Bay wells that intersected tight oil zone

**WA** = West Adventure #1 limited gas flow

**PAC** = Port au Choix exhumed oil field

**PP** = Nalcor’s Parsons Pond wells with gas shows

**More than 20 years of effort**

Modified after GSC

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Seismic Coverage
Pre and Post-1991 Seismic Coverage

Except for the BHP program collected in 1990, data was recorded with short streamers, is poor imaging and unmigrated.

Recorded with longer streamer, better imaging and migrated.

No recent coverage for parcels 1, 3 and 4.

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Offshore Western Newfoundland Seismic Coverage

Underexplored region with 14,906 line kms of 2D seismic data and one small (500 sq km) exploration 3D survey

Post-1990 coverage
Hunt Oil -1990
Mobil Canada -1991

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NL13-03 Exploration Opportunities

Legend

- Oil and Gas
- Planned Wells
- Recent Exploration Well
- Well
- Exploration Permit
- Production Lease
- Exploration Licence
- Calls For Bids 2013

Anticosti Basin

Parsons Pond

Newfoundland

Magdalen Basin

Deer Lake

Flat Bay

Four Large Parcels

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## NL13-03 Exploration Opportunities

<table>
<thead>
<tr>
<th>Parcel</th>
<th>Basin</th>
<th>Area ha</th>
<th>Area Acres</th>
<th>GOM tracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anticosti</td>
<td>215,254</td>
<td>531,893</td>
<td>92.3</td>
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<tr>
<td>2</td>
<td>Anticosti</td>
<td>241,788</td>
<td>597,458</td>
<td>103.7</td>
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<tr>
<td>3</td>
<td>Antic/Magd</td>
<td>272,510</td>
<td>673,372</td>
<td>116.9</td>
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<tr>
<td>4</td>
<td>Magdalen</td>
<td>274,930</td>
<td>679,352</td>
<td>117.9</td>
</tr>
</tbody>
</table>

- Call for Bids issued May 2013
- Parcels approx 100 times larger than GOM tract
- Shelfal Drilling. Water Depth ranging from 90 to 330 m
- Minimum Work Commitment Bid $250,000 CAD
- Closing date to be published on C-NLOPB website under “What’s New!”
Anticosti Basin Representative Line
Parcel 2

Line source: C-NLOPB

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Anticosti Basin Representative Line
Parcel 1

Line source: C-NLOPB

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Look-alike with Fields in Appalachian Belt and Foredeep and EL 1120

Red Oak field, Arkoma Basin, Arkansas, 2 TCF

EL 1120, W NL offshore

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Geological Cross-Section Anticosti Basin

- Offshore play is structurally simple in all parcels
- Carbonate platform and sandstone reservoirs in rotated blocks
- Also possible stratigraphic traps (karst, HDT lenses)

Location of Parcels 1, 2 and 3

Carbonate reservoir-outcrop

Modified after Atkinson and Wright, 2006
Anticosti Basin Play Types

- Cambro-Ordovician Carbonate Platform horsts and rotated fault blocks containing hydrothermal dolomite and karsted limestone reservoirs of the St. George Group are the main play types in Anticosti Basin.

- Limestones of Port au Port and sandstone of Labrador Group trapped in rotated fault blocks forms a secondary play type.

- Hydrocarbon traps are multi-fault bounded, 25 to over 100 km$^2$ (~ 6,200 to 25,000 acres) in size.
Magdalen Basin Representative Line
Parcels 3 and 4

Line source: C-NLOPB

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Magdalen Basin Play Types

- Main play types are thrust fault anticlines and salt anticlines containing Carboniferous sandstone trapped against and above salt diapirs
- Deeper play involves Carbonate Platform reservoirs in inverted or extensional structures
- Superimposed reservoirs are possible
- Large compressional and salt anticline, and deeper extensional traps are 25 to over 100 km² in size
Strike Line Along the W NL Offshore

Numerous tilted blocks, horsts, roll-over and slightly inverted structures are interpreted in the Carbonate Platform sequence on a strike line along the Western NL Anticosti Basin

Line source: Ptarmigan

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Discussion

• Last significant well drilled in 1999
• Last 2D Regional seismic program in 1991
• Active petroleum systems proven in both Anticosti and Magdalen basins, but still underexplored frontier areas
• Area needs a revival of activities and infusion of new operators with financial capability to carry a complete exploration program to fruition
• The C-NLOPB 2013 Western Newfoundland Call for Bids provides an occasion for sizeable operators to obtain large frontier acreage near oil markets
Conclusions

- Four large parcels in Paleozoic Anticosti and Magdalen basins offered at NL13-03 CFB
- Proven petroleum systems with both oil and gas source rocks
- Large structural traps as big as 100 km\(^2\)
- Structures capable of holding hundreds of mmbbls or 2-3 Tcf
- Excellent opportunity for new entrants in NL O&G exploration
Thank You for Attention!

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Pictures From
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