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## Energy -- Oil and Gas, Exploration and Production

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### UTICA SHALE PLAY IN QUÉBEC – FOREST OIL ANNOUNCED NEW TREND

#### Company could be exposed to 4 Tcfe of net recoverable shale gas

We continue to see new shale gas plays emerging in North America; the latest is the Utica Shale in Québec. Forest Oil (FST : NYSE | Not rated) announced on April 1, 2008, that it had made a significant discovery. The company successfully drilled and fracture stimulated two shale gas wells: the Bécancour #8 (with Junex Inc., JNX : TSX-V | Not rated) and the Saint François du Lac #1 (with Gastem Inc., GMR : TSX-V | Not rated).

#### The Utica Shale in Québec has attractive attributes

From the parameters released by Forest Oil, the Utica Shale appears to have the right mineralogy, porosity, and maturity; in addition, the shale is extensive. Forest has proved that these shales can be fracture stimulated and generate initial production rates as high as 1 mmcf/d. We find the terms attractive at 10 years, and the royalty rates look reasonable at 10% to 12%. Logistically, the region is attractive with gentle topography and year-round drilling. There are pipelines in place to supply nearby consumers with potential exports, and the gas should get a premium pricing to NYMEX.

#### Three horizontal wells in Québec; Gastem plans to extend the Utica Play in New York

The company now plans to drill three horizontal wells in 2008 to twin the locations drilled in 2007. These early wells are expected to cost \$2.5 million to \$4.0 million, and costs should decline to \$2.5 million per well in the development phase. Forest Oil plans to produce the horizontal pilot wells in 2009 and 2010, and will likely launch a full-scale drilling program in 2010. Gastem Inc. is extending this play into New York State and plans to drill five vertical wells and one horizontal well prior to January 16, 2009, along with partner Utica Energy LLC.

## FOREST OIL - UTICA SHALE TESTS IN QUÉBEC

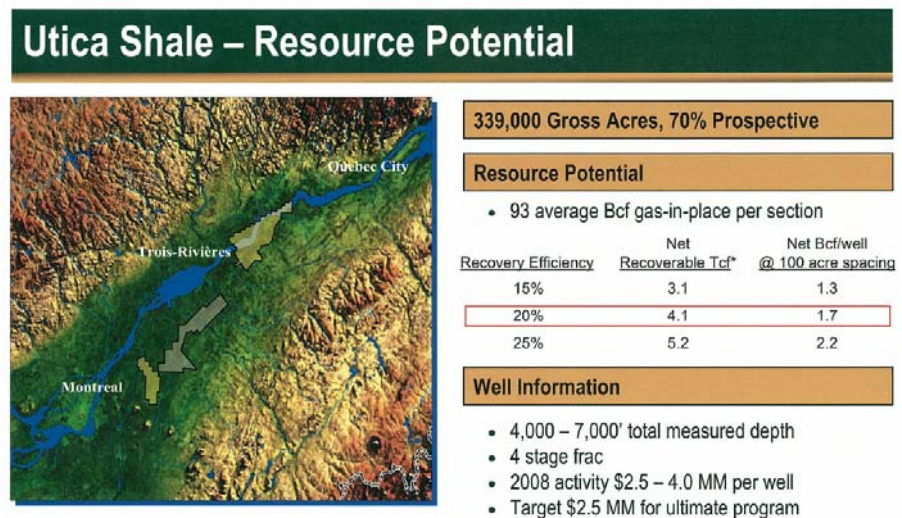
Forest Oil (FST : NYSE | Not rated), a \$4 billion market cap, Denver-based producer, announced on April 1, 2008 that it had made a significant resource play discovery: Utica Shale in the Québec region. Forest did some preliminary assessments of gas recoverable under its footprint of 339,000 gross (269,200 net acres). Using 20% recovery efficiency, Forest believes that it has 4.1 Tcfe of net recoverable gas under its land base.

Forest Oil's assumptions are reasonable for a preliminary estimate, in our opinion. However, to more accurately assess the real potential of the play, we need three pieces of information:

- Delineating of the areal extent of the play;
- Determining the optimal development spacing and method;
- Productivity of each well.

We expect to see more wells drilled within Forest's acreage in the coming months, demonstrating that the shale is productive throughout the entire trend. In addition, longer-term production tests would be needed to define a typical decline curve for this play.

**Figure 1: Forest Oil's Utica Shale footprint in Québec**



Source: Forest Oil

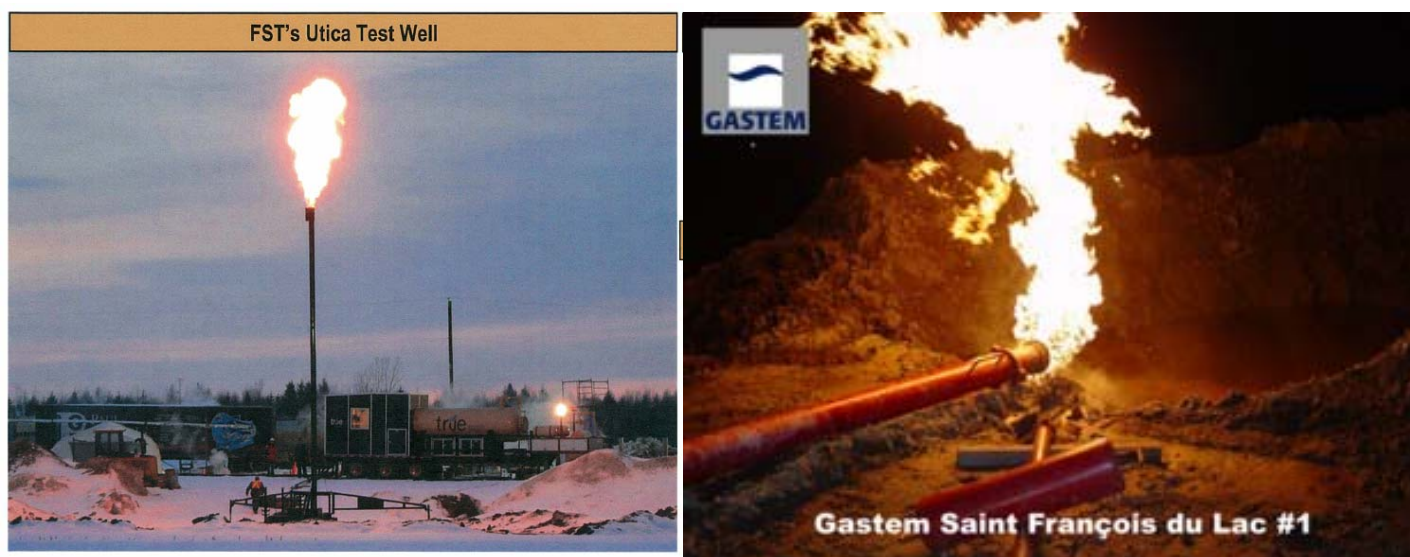
## FOREST OIL ACQUIRED ACREAGE THROUGH FARM-INS WITH GASTEM AND JUNEX

Forest Oil spent 2005 identifying the play, and built an acreage position through joint venture partnerships during 2006 and 2007. The two key partners are Junex Inc., based in Québec City and Gastem Inc., based in Montreal. The company also spent more than a year, in 2006 and 2007, doing all the geotechnical work in preparation for three vertical wells.

The three vertical wells are:

1. Bécancour #8 (drilled in 2006-2007, fracture stimulated in 2007, partner is Junex).
2. Saint François du Lac #1 (drilled summer of 2007, fracture stimulated in December 2007, partner is Gastem)
3. Gastem Saint Louis #1 (was not fracture stimulated, partner is Gastem).

**Figure 2: First two vertical wells testing the Utica Shale**



Source: Forest Oil and Gastem Presentations

## THE UTICA SHALE HAS POSITIVE ATTRIBUTES

We continue to see new shale gas plays emerging in North America, in addition to the traditional established plays such as the Barnett, the Woodford, and the Fayetteville. We are very encouraged by new plays being developed in Western Canada and Eastern Canada.

While the Utica Shale has been a known source rock and producer in Québec and New York, a number of recent developments make this play appear economically feasible.

The strengthening of North American gas prices, technologic innovation with horizontal drilling and completion of tight sands and shales, and more extensive pipeline structure have contributed to a renewed focus on the Utica Shale.

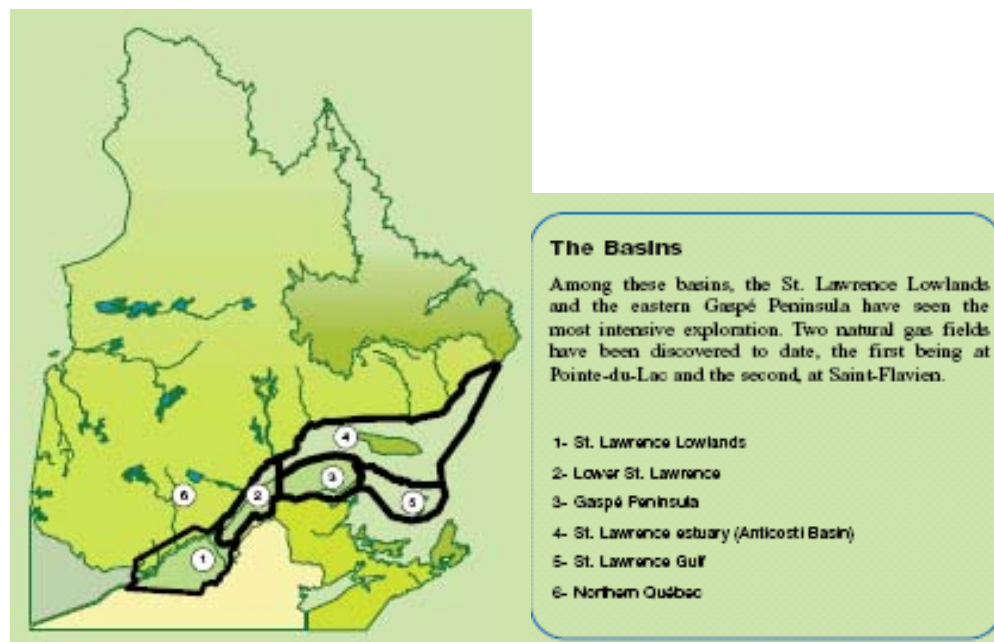
We believe that the Utica Shale play in Québec is attractive for these reasons:

- It has the right mineralogy, porosity, maturity, and the shale is extensive.
- Forest has proved that these shales can be fracture stimulated, and generate initial production rates as high as 1 mmcf/d. There are at least two prospective shale intervals.
- Royalty rates look attractive at 10% to 12%.
- The terms are 10 years, which gives plenty of “elbow room” for producers to execute their exploration and development plans.
- Year-round drilling and gentle topography around the St. Lawrence lowland.
- There are pipelines in place to supply nearby consumers with potential exports, and the gas should get a premium pricing to NYMEX.
- The gas is pure, with BTU at 1,027 to 1,236, less than 1% inert gas, and 88% to 87% methane.

## HISTORY OF OIL AND GAS EXPLORATION IN QUÉBEC

Oil and gas exploration in Québec has been ongoing for the last 140 years. The discoveries thus far are conventional: the Pointe-du-Lac Gas Field discovered in the mid-1950s and the St. Flavien Gas Field discovered in the mid-1960s. While there are plenty of oil seeps in the Gaspé Peninsula, the most significant oil discovery is the 1995 Port-au-Port oil discovery in Newfoundland.

**Figure 3: Major productive basins in Québec**



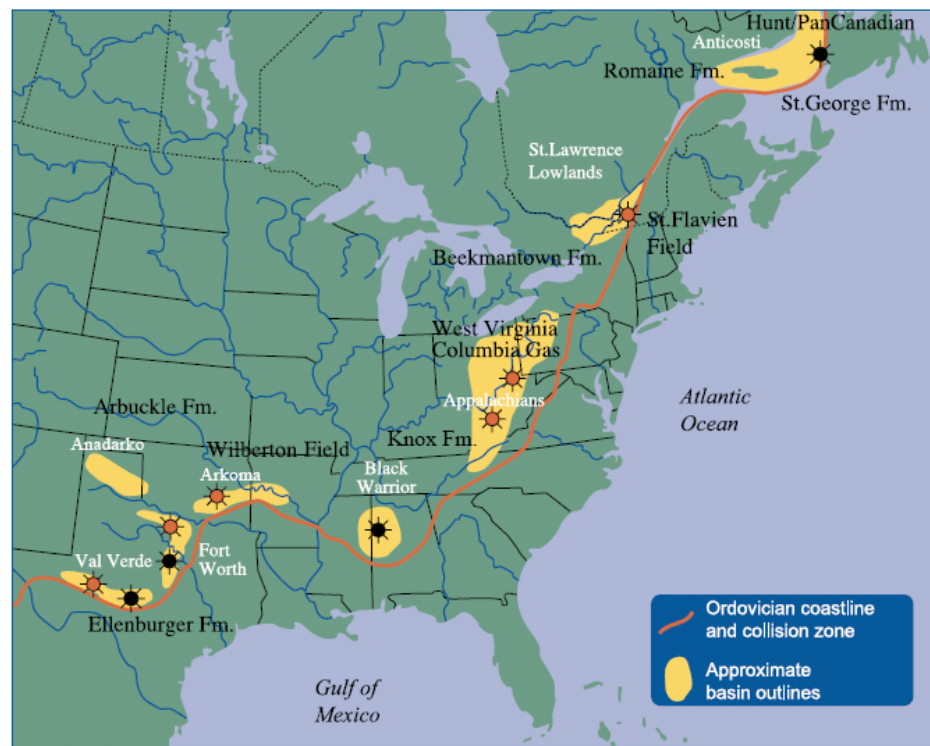
Source: Ministère des Ressources Naturelles Québec: Oil and Gas Exploration in Québec

## QUÉBEC COULD HAVE LOOK-A-LIKES IN THE US

Most of the sedimentary rocks in Québec are of Paleozoic age, and are related to a number of prolific Cambrian-Ordovician trends in the US. The geology is extremely complex, and in certain areas, the sediments are highly deformed. The conventional exploration targets have been the carbonates of Ordovician age.

**Figure 4: The Cambro-Ordovician Basins in Eastern US and Canada**

ANCIENT CAMBRO-ORDOVICIAN COASTLINE

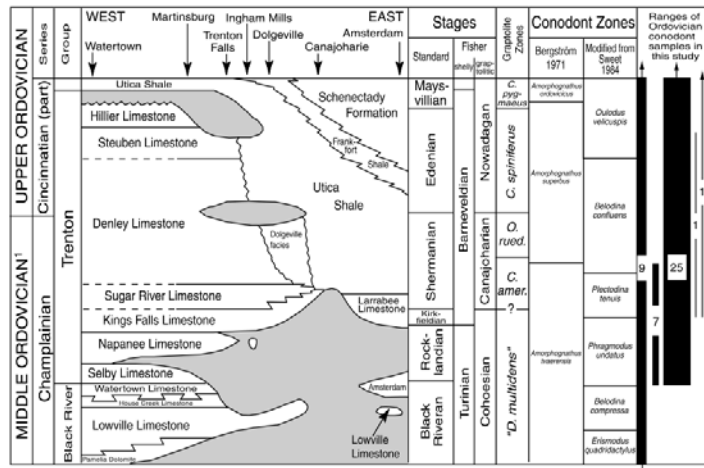


Source: Claude Morin, 2001, Government of Québec brochure: Québec: A Petroleum Region to be Discovered

## THE UTICA SHALE IS ORDOVICIAN AGE

The Utica Shale is a member for the Ordovician Trenton Group. This highly organic black shale is the source rock for oil and gas accumulation in the region. The Utica Shale was deposited extensively within the Appalachian Basin. The Utica Shale is present in Pennsylvania, New York, and Québec. Thickness varies from 1,000 feet to 9,000 feet. The shale was formed in an anoxic (oxygen-starved) marine environment and therefore is very organically rich.

Figure 5 Stratigraphic chart of the Ordovician in New York



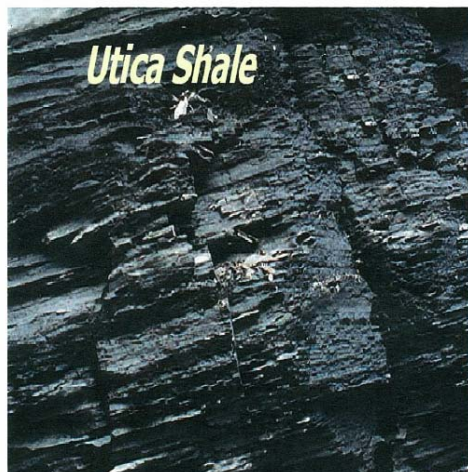
<sup>1</sup>Due to the recent decision of the International Commission on Stratigraphy (Webby, 1998), the entire Black River and Trenton Groups would now be considered Upper Ordovician. We follow the traditional Series assignments here to be consistent with longtime usage.

Figure 2. Stratigraphic relationships of the Black River and Trenton Groups in New York with ranges of conodont sample collections recovered in this study. Numbers in black bars indicate number of samples representing each range, total = 43. Stratigraphy from Bergström (1986, Fig. 2)

Source: USGS Open File Report 00-496

While the Utica Shale is much older than the Mississippian-Devonian age Barnett Shales and Woodford Shales, it has similarly attractive attributes for gas production in Québec. The Total Organic Content (TOC) is high, the clay content is low, the shales respond well to fracture stimulation.

Figure 6: Characteristics of the Utica Shale



	Utica	Barnett
Depth (ft)	2,300 – 6,000	4,500 – 9,000
Thickness (ft)	500	150 – 700
Clay Content (%)	15 – 26	15 – 30
TOC (%)	1.0 – 3.1	3.5 – 5.0
Gas-Filled Porosity (%)	3.2 – 3.7	3.0 – 4.8
Pressure Gradient (psi/ft)	.45 – .60	.46 – .50
Maturity (Ro)	1.3 – 2.0	1.0 - 2.2
Gas Price (\$)	NYMEX + 1.05	NYMEX - 0.53

**“Rock Properties Comparable To The Barnett Shale But With Premium Gas Price”**

Source: Forest Oil

**Figure 7: A Comparison of various prospective shale gas plays in North America**

Comparison of US Gas Shale Plays	Vertical Michigan	Horizontal Oklahoma	Horizontal Arkansas	Horizontal Fort Worth (non-core)	Vertical Nova Scotia	Vertical Quebec
	Antrim	Woodford	Fayetteville	Barnett	Horton	Utica
Geologic Age	Devonian	Devonian	Mississippian	Mississippian	Mississippian	Ordovician
Depth (ft)	600-2,400	6,000-12,000	1,500-6,500	6,000-9,000	1000-3300	2,300-6,000
Gross thickness (ft)	160	100-900	10-400	200-800	600	500
Net thickness (ft)	70-120	100-220	NA	50-400	NA	NA
Bottom-hole temperature (°F)	75	NA	NA	200	NA	NA
Total Organic Carbon (TOC %)	0.3-24	3-10	4-9.5	3-8	10	10
Vitrinite reflectance (%R <sub>o</sub> )	0.4-0.6	1.1-3.0	1.5-4.0	1.2-2.0	1.53 to 2.07	1.30 to 2.00
Total porosity (%)	9	NA	NA	4-5	NA	NA
Gas-filled porosity (%)	4	3-6.5	3-5.5	3-5.5	NA	3.2-3.7
Water-filled porosity (%)	4	NA	NA	1.9	NA	NA
Minerology/Silica Content (%)	NA	60-80	40-60	40-60	52	NA
Permeability thickness [Kh (md-ft)]	1-5,000	NA	NA	NA	NA	NA
Gas content (scf/ton)	40-100	NA	NA	300-350	7.0-190	NA
Adsorbed gas (%)	70	20-40	50-70	20-40	NA	NA
Reservoir pressure (psi)	400	NA	NA	3,000-4,000	NA	NA
Pressure gradient (psi/ft)	0.35	0.52	0.44	0.43-0.44	NA	0.45-0.60
Well costs (\$1000)	180-250	2,500	1,000-1,500	1,700-1,800	1,000-1,500	1,500
Completion costs (\$1000)	25-50	2,500	1,500-2,000	900-1,000	500-1,000	1,000
Water production (b/d)	5-500	0	0	0	0	0
Initial Gas production (mcf/d)	40-500	2,300	1,400-3,500	2,300-2,500	30 -300	1,000
Well spacing (ac)	40-160	80	80	60-80	NA	100
Recovery factor (%)	20-60	20	NA	20-30	NA	20
Gas in place (bcf/section or bcf/640 acres)	6-15	40-120	55-65	30-40	89-109	93
Gross Reserves (mmcf/well)	200-1,200	3,000	1,200-1,800	1,500-3,000	NA	1.7
Historic production area basis for data	Otsego County	Western Arkoma	Eastern Arkoma	Johnson County North Texas	Nova Scotia Canada	St. Lawrence Lowland Canada
Key Producers	DTE, LTR, BBEP	NFX, DVN, CHK Antero (private)	SWN, CHK	DVN, XTO, CHK, EOG ECA, COP, RGO, DNR KWK	TPLM, CEX-V	FST, JNX-V, GMR-V

Source: Curtis, AAPG-NOV 2002. Warlick 2006, plus company presentations

Source: Canaccord Adams and other industry and company sources

## **NEXT STEP – THREE HORIZONTAL WELLS IN 2008**

The company now plans to drill three horizontal wells to twin the locations drilled in 2007. These early wells are expected to cost \$2.5 million to \$4.0 million, and costs should decline to \$2.5 million per well in the development phase.

These horizontal wells will have 2,000-foot lateral lengths, with 4-stage fracs per well. Forest Oil plans to produce the horizontal pilot wells in 2009 and 2010, and will likely launch a full scale drilling program in 2010.

In our opinion, this play looks promising in the next 12 to 18 months.

The companies will have a number of parameters to sort out and determine:

- The dominant fracture orientation and design of the azimuth of the horizontal wells to optimize production; seismic acquisition might be needed.
- The optimal spacing between the horizontal wells, and the best way to fracture stimulate individual wells or a group of wells.
- Logistics: how to get all the necessary equipment and material into Québec in a cost-effective manner.
- The sweet spot within the acreage and which shale interval would be the target for horizontal drilling.

We believe that the key challenge from this point onward is to optimize production and minimize costs. Notionally, with reserves at 1.7 bcf per well and drilling-completion costs at \$2.5 million, the finding cost is about \$1.50/mcfe. If the producers can keep the cost side of the equation down, and optimize production per well, this project could have attractive economics.

## **GASTEM EXTENDING THE UTICA SOUTHWARD**

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Gastem (GMR : TSX-V | Not rated) is a C\$100 million market cap producer based in Montreal, Canada. Gastem gained access to 120,000 acres in the Yamaska area in the St. Lawrence lowland through a farm-in with Calgary based Questerre Energy Corp. (QEC : TSX | Not rated). Questerre has a market cap of C\$160 million. Under the terms of the farm-in, Questerre will be carried for \$13 million, and retain a 7.5% royalty which can be converted into a 20% working interest.

Gastem in turn farmed out the package to Forest Oil, which will earn 60% of the 120,000 acres by drilling and testing the earlier wells and paying for the expenses. If Questerre decides to exchange its 7.5% royalty, then the ownership of the 120,000 acres would be 60% Forest Oil, 20% Gastem and 20% Questerre. Therefore, Gastem's net claim to the Yamaska project can range from 24,000 to 48,000 net acres.

The company is not just focused on Utica Shale in Québec; Gastem has signed a farm-in agreement with a private company, Utica Energy, LLC. The company will drill five vertical wells and one horizontal well prior to January 16, 2009, to earn a 65% interest in 29,000 acres plus other leases to be obtained in 2008. The partners currently have acquired 36,000 acres and they are targeting a total of 50,000 acres. The main target will be the Ordovician Utica Shale, with the Devonian Marcellus Shale as a secondary target.

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## JUNEX HAS ABOUT A MILLION NET ACRES IN THE SAINT LAWRENCE LOWLANDS

Junex (JNX : TSX-V) Not rated) is based on Québec City and has a market cap in excess of C\$75 million, no debt and C\$10 million cash on its balance sheet. The company listed on the TSX Venture exchange in June 2001 and has four business segments: Oil and Gas production, Natural Gas Storage, Drilling Services and Natural Brine production. Junex has a large footprint in Québec of 6 million acres.

If we assume that Forest Oil's 4 Tcfe assessment is reasonable, then in the Bécancour and Contrecoeur areas, Junex could be exposed to 600 bcfe of shale gas resources.

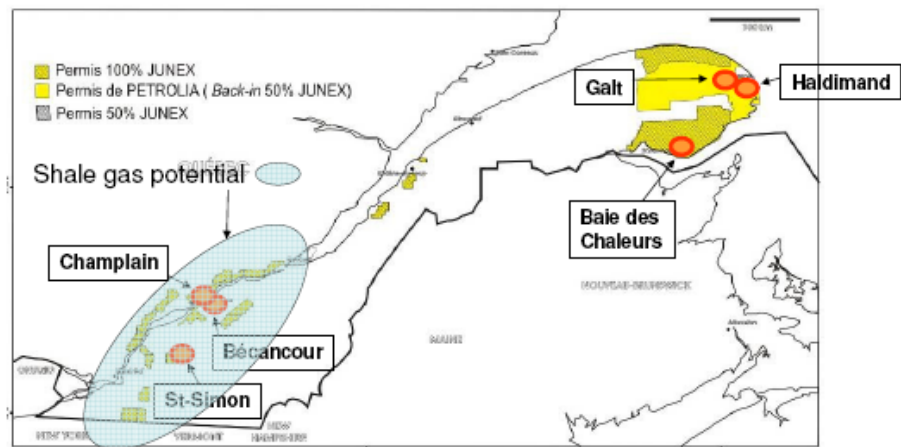
Even after the deal with Forest, the company will still retain a 15% interest in the acreage in the Bécancour area (plus 5% overriding royalty) and a 40% interest in the acreage in the Contrecoeur area. The company still has 937,305 net acres in St. Lawrence lowland.

While we do not expect the entire land base to be prospective, this is still a large area to explore for the Utica Shale within the Trenton-Black River play.

**Figure 8: Junex's footprint in Québec**

### *Oil and Gas Exploration rights*

Rights in more than 6 million acres



Source: Junex Inc.

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	509	100.0%	

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