

DEER LAKE Oil & Gas Inc.

ONSHORE NATURAL GAS MARKET DEVELOPMENT on the ISLAND of NEWFOUNDLAND

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January 3, 2010**

INTRODUCTION

Before describing the potential markets for natural gas on the Island of Newfoundland and some ways by which they can be developed, it needs to be emphasized that oil targets (particularly shallow oil targets) remain a key focus in the Deer Lake Basin.

And it is also important to stress, that the shale gas and the conventional oil and gas hunts are entirely complementary.

Indeed, while most shale gas plays in North America are located in basins whose conventional oil and gas resources have largely been exhausted, in the case of the Deer Lake Basin, the hunt for both conventional oil and gas and for shale gas has just begun.

Newfoundland's Onshore Natural Gas : an emerging resource

To date most public and private attention on the use of natural gas in Newfoundland has understandably focused on the very large commercially stranded gas resources associated with the development of the oil resources of the Hibernia, Terra Nova and White Rose fields and the Jean d'Arc Basin generally (said to total some 6.6 tcf) and the gas resources offshore Labrador which have been similarly commercially stranded since the 1970's and early 1980's (4.2 tcf).

Given technological requirements and development and transportation costs, both these resource bases require large scale developments and export markets to justify commercialization. And it has been assumed that any Newfoundland natural gas usage could only be achieved as part of a large offshore development.

However, several recent developments suggest that the potential role of our onshore natural gas resources in Newfoundland's internal energy mix could override that assumption.

As described below, the chief advantages of such onshore natural gas resources is that they can be commercially developed even at very low levels of production (i.e. even

small fields are not stranded), can be commercially brought on stream in an incremental and flexible manner.

Electrical Generation using Natural Gas

As fuel for electrical generators, natural gas is the environmentally friendly and expanding technology of choice throughout much of North America.

For example, it can back out the use of the environmentally undesirable heavy fuel oil presently being used at Nalcor's Holyrood generating station.

When operating at full capacity, Holyrood burns 18,000 bbls of 0.7 % sulfur heavy fuel oil a day presently costing about \$65 per barrel based on a \$75 bbl crude price or some \$1,170,000 per day.

Replacement of the Holyrood generating capacity operating at full capacity would require some 100 million cubic feet per day or 36.5 billion cubic feet (bcf) year. This would come to 730 bcf over 20 years which is a typical life of field planning period.

Such a reserve requirement is not excessive relative to the projected natural gas potential onshore Western Newfoundland; indeed it is quite conceivable that the Deer Lake Basin alone could contain the required reserves.

At the other end of the scale, two wells each producing 360,000 cubic feet of natural gas per day can fuel two 1.2 megawatt Solar brand Saturn 20 gas fired turbines located at or near the field.

Even such a "pilot project" scale development, using leased turbines, would put 2.4 megawatts into the existing Provincial grid which in effect constitutes a "natural gas pipeline" throughout the province.

Using larger sized combined cycle turbines, additional energy would be gained utilizing the first stage waste heat.

Consequently, Deer Lake Oil & Gas Inc, as an immediate goal, aims at finding sufficient natural gas reserves to fuel a 50% efficiency 50 megawatt natural gas fired plant located at or near Deer Lake where the provincial grid is quite robust.

Such a plant would require 10 million cubic feet per day and reduce the Provincial heavy oil consumption by 1,800 bbls of heavy fuel oil per day worth \$117,000 per day or \$42.7 million per year.

Over the projected 20 year life of the project, the required total field output would be 73 bcf, a quite modest find given the source rock endowment for conventional gas and the basin's wealth of shale gas potential.

Additional economic benefits in the form of carbon credits mirroring the environmental benefits of a switch from heavy fuel oil to natural gas.

Such gas fired turbine generators are a well established technology with a broad range of applications (eg. a 747 plane engine or Nalcor's 50 megawatt generating station at Hardwoods just outside St. John's).

Generating capacity can easily be scaled up from the 2.4 megawatt pilot project level in line with expanding field production levels and turbine manufacturers such as Solar (a Caterpillar subsidiary) offer a comprehensive package of engineering design, installation, operation and financing services (including leasing).

For the smaller explorer looking for small to medium scale early cash flow, this option can constitute an attractive option as an interim step to bringing on a senior partner for a large scale project.

Trucked Compressed Natural Gas (CNG)

Natural gas in compressed form (CNG) can be safely and economically trucked using long established and widely used technology and can competitively replace heavy fuel oil and propane over a broad range of current uses in the Province.

In the trucked CNG sector, as demonstrated by the experience of Junex in the development of the Galt natural gas field in Quebec's Gaspé peninsula, commercial development is possible even at the single well 300,000 cubic feet per day production level.

In the Galt natural gas development case, the markets served included, in turn, a smelter, a shrimp processing plant and a regional hospital. This project ([link here](#)) is a clear demonstration of range of markets available and the flexibility of the trucked CNG option.

Many current users of heavy fuel oil or propane are potential trucked CNG consumers.

Summary: The Current Market Generally

So, together, the gas to electric and the trucked CNG forms of delivery, allow natural gas to carve out a major role in our Provincial energy mix.

In the case of Deer Lake Oil & Gas Inc (and other west coast explorers), the on island market is sufficiently large to allow very significant early sales, cash flow and dividends long before the level of production dictates the need for export capacity.

This has been the case for many years and Deer Lake Oil & Gas has considered these market factors as an integral part of its commercialization strategy.

However, recent developments in the shale gas field have caused many to consider that a far greater market may exist for natural gas via CNG as car and truck fuel throughout North America and this is as true on the island of Newfoundland as anywhere.

The Rise of Shale Gas in North America and worldwide

The widespread industry interest in a variety of shale gas plays, particularly in the United States but increasingly in Canada and indeed worldwide, has continued to evolve at a very fast pace, signaling a significant opportunity for the Corporation.

Indeed, the rise of shale gas as a viable source of hydrocarbon energy over the last decade is nothing short of phenomenal.

The difference between conventional gas and shale gas

The “conventional” natural gas supply that the world has been exploiting for well over 150 years represents that very small part of the total natural gas that was originally generated within an organically rich but extremely “tight” shale sequence which has managed to “escape”.

Some part of that small amount later found its way into a rock far more permeable than the home shale deposit where the gas under pressure was free to flow to the surface upon being drilled into.

Meanwhile, the vast part of the total natural gas generated stayed trapped in the shale under pressure unable to get out.

The world’s shale gas endowment is vast by any measure.

A 2009 study by Dr Stephen Holditch of Texas A&M put the Shale Gas in Place in “easily accessible basins” at 16,000 trillion cubic feet or 2,500 billion barrels of oil equivalent (in energy terms) ([link here](#)). Of this, approximately 20% is located in the United States and 20% in China.

So far shale gas expertise has been very heavily concentrated in the United States where the original pioneering work was done by Mitchell Energy in the Fort Worth area ([link here](#)).

But the shale gas story has just begun and as nations around the world start refocusing on their hydrocarbon resource bases, very large increases in even this astronomical number can be reasonably anticipated.

Moreover, as more and more companies, research institutions and nations focus on shale gas, rapid associated technological advances can be expected.

In particular, reductions in the average cost of extraction and an increase in the percentage of total gas in place recovered can be expected.

As an example, whereas just four years ago a recovery rate of 10% was more than acceptable now many projects shoot for a 50% recovery. On the cost side, ever lowering average costs of shale gas extraction have put virtually all conventional natural gas supply in North America under severe pressure.

Of many possible examples, three major events in late 2009 demonstrate the extent of this development.

On the world scale, on December 14th, Exxon announced a takeover bid of XTO , a major Fort Worth TX based shale gas explorer and producer at a cost of \$41 billion US with the announced intention to use XTO as a platform to build a worldwide shale gas business unit.

The blessing of the shale gas sector by Exxon after much study is a major step forward in the expansion and recognition of the shale gas sector as a major source of future worldwide hydrocarbon supply.

On the Eastern Canada scale, in early December, Corridor Resources announced that it had farmed out its Sussex / Elgin largely shale gas play in southern New Brunswick with Apache Canada to invest up to \$125 million to earn a 50% working interest in 118,000 acres.

The target Mississippian aged lacustrine Fredericks Brook Formation is equivalent to the 45 Brook Formation in the Deer Lake Basin and provides an excellent demonstration of the superior hydrocarbon character of rift / lacustrine systems (such as Deer Lake) even in basins with relatively small areas.

The full shale gas potential of various Western Newfoundland areas of exploration have not been inventoried but **as outlined by the Geological Survey of Canada in its Open File 6174 Resource Assessment Report released in October 2009, the Deer Lake Basin is one area of significant shale gas potential.**

Moving to an example of a shale gas led transportation fuel breakthrough that seems to be just around the corner, early in December 2009, Encana Resources (Canada's largest natural gas producer) confirmed it had been in discussion with the Federal Government regarding the expenditure of \$1 billion by Ottawa on the construction of hundreds of Compressed Natural Gas (CNG)

fueling stations along Canada's busiest highway between Windsor, Ontario (Detroit) through Toronto and Montreal to Quebec City.

Such a commitment to the wide scale use of CNG in the transport field would have major market implications for shale gas in Canada and would mirror initiatives already underway throughout the United States where 50 States have passed various tax and grant incentive programs in support of CNG as vehicle fuel.

A simple Google of "CNG vehicles USA" will demonstrate the burgeoning developments to the south including an expanding market for cost effective home refueling kits and services using the widespread home natural gas supply system.

Of course, North America is relatively late coming to the CNG car and truck party.

Major development of the technology to use CNG as a transport fuel took place in the 1980's and there are currently over 9,000,000 CNG powered car and trucks in use worldwide with heavy usage in Brazil, Argentina, Pakistan, India, China and Italy.

And CNG has a key advantage that no alternative fuel existing or within contemplation can boast

The current fleet of hundreds of millions of gasoline and diesel powered cars and trucks can easily and cheaply be converted to CNG use.

Given that a family's automobile is often second only to the home as a capital investment, this is not only a major saving for the consumer but would represent a major saving in environmental terms considering the environmental burden that the manufacturing of replacement alternative fuel vehicles would represent.

Overall Potential Impact of CNG as a transport fuel

For many North American explorers, the rise of shale gas has been a mixed blessing.

A combination of increased shale gas supply and the economic downturn has resulted in depressed natural gas prices, reduced company income and constrained exploration budgets. The current and projected short term relatively low natural gas prices reflect in part the fact that it has been competitively replacing relatively low priced coal a trend that Exxon's recent projection of energy trends to 2030 sees as escalating.

However, if natural gas (shale gas) becomes a serious fuel alternative in the transport sector then a very large new and higher priced market sector will have been opened up.

The rapidity of such market development for CNG in the North American context remains to be seen but the technology is off the shelf with widespread use in many jurisdictions and growing support in the United States.

So it could rapidly become a significant factor in conventional frontier and shale gas exploration planning decisions.

In the Corporation's case, the increased use of CNG in the transport sector would be an excellent additional future market to its current "ready to go" opportunity to create early cash flow via gas to electric projects and non transport CNG usages.

Conclusion

Significant markets exist for natural gas on the Island of Newfoundland, the development of which would benefit the producer, the consumer and the environment.

Newfoundland is isolated from the North America natural gas pipeline system and the cost of a pipeline link with the mainland is high relative to local needs.

Without an indigenous source of natural gas, Newfoundland will likely remain isolated from the relatively low priced natural gas revolution that is sweeping North America and indeed the world with commensurate economic disadvantages.

The introduction of such a new internal energy resource would add hundreds of millions of dollars per year to the gross provincial product particularly in the elimination of the cost of heavy oil imports at Holyrood.

The rise of shale gas and CNG for the transport sector may fundamentally change energy consumption worldwide and in the Province.

The cash flow generated to local oil and gas explorers from early natural gas development would go far in funding an expanded search for both oil and gas in Western Newfoundland with commensurate provincial and regional economic benefits.

The search for and development of onshore natural gas in Western Newfoundland should be a high priority for both public and private bodies in the Province.