

Oil and Gas Exploration and Development Activity in Ontario in 2009

L. Fortner¹ and T. R. Carter²

¹Sedimentary Geologist, Petroleum Resources Centre, Ministry of Natural Resources, London, Ontario

²Chief Geologist, Petroleum Resources Centre, Ministry of Natural Resources, London, Ontario

INTRODUCTION

Drilling activity in Ontario in 2009 decreased compared to 2008, with production levels also falling.

The price for light sweet crude oil began 2009 near \$40 per barrel, a dramatic drop from the \$147 peak in July of 2008. However, it climbed steadily to finish the year slightly over \$80 per barrel. The price of natural gas in North America peaked at \$13 per MMBtu in July of 2008, but it also rapidly declined thereafter, beginning 2009 at approximately \$7.00 per MMBtu. Unlike oil, the slide continued through the first half of 2009, reaching a seven-year low of under \$3.00 in August. After a recovery from the extreme low, it ranged between \$4.00 and slightly over \$6.00 for the remainder of the year. Greatly reduced industrial usage of natural gas during the current recession has resulted in less total gas consumption in North America beginning in mid-2008. In addition to this reduced consumption, new onshore supplies in North America from recently exploited shale gas have contributed to downward pressure on prices.

Production figures compiled from annual production reports submitted to the Petroleum Resources Centre indicate that annual oil production declined 5.6% to 90,535 m³ in 2009 with an estimated value of \$38.8 million, compared to 95,875 m³ valued at \$62.8 million in 2008.

Natural gas production declined 10% to 238,715 10³ m³ with an estimated value of \$42.5 million, compared to 265,172 10³ m³ valued at \$95.3 million in 2008.

The decline in oil and gas production in Ontario is directly related to reduced levels of drilling activity since 2004, such that there is insufficient new production to replace that from existing wells. The value of oil production decreased substantially from 2008 to 2009 as a result of lower crude oil prices which, although high in an historical context, remained subdued throughout 2009 relative to the peak of \$147 per barrel seen in July of 2008. The value of natural gas production decreased substantially from 2008 to 2009 as a result of the greatly deflated commodity price.

EXPLORATION ACTIVITY

A total of 46 licences to drill and operate new wells were issued by the Ministry of Natural Resources in 2009, compared to 57 in 2008. An additional 38 licences were issued for plugging of existing wells. Four existing wells were licenced for production as private gas wells. No existing wells were licenced for oil production from historical oil fields.

Drilling of 29 new wells was reported in 2009, compared to 62 wells in 2008. These consisted of 6 exploratory wells, 12 development wells and 11 service wells. The 11 service wells consisted of 8 natural gas storage wells and 3 stratigraphic tests. All 8 of the natural gas storage wells were drilled as horizontals. No other horizontal wells were drilled during the year.

Exploratory drilling in 2009 resulted in 2 wells reported as active gas producers, 1 suspended gas well, 2 potential gas wells (Table 1; Figure 1), and 1 plugged and abandoned well with oil show. Successful development drilling in 2009 resulted in 5 wells reported to be active oil producers, 2 as active gas producers, 1 as a potential gas well, 1 as a potential oil well, 1 as an active private gas well, and 1 as a suspended private gas well. In comparison, successful results in 2008 were greater, but similar, with 4 active oil producers, 3 active gas producers, 4 potential gas wells, 1 gas show, 1 capped oil well, 1 active oil and gas well, 3 active private gas wells, and 1 capped private gas well. All 5

active oil wells were completed in Devonian carbonate reservoirs in Elgin County, with the 1 potential oil well completed in Ordovician carbonate in Essex County. Successful gas completions occurred in Silurian sandstone reservoirs in Lincoln, Norfolk, and Welland counties. No wells were drilled offshore Lake Erie in 2009.

The number of successful exploration wells drilled in Ontario was down from 7 in 2008 to 5 in 2009, but equal to the 5 drilled in 2007. Metalore Resources and Ontario General Energy each drilled 2 exploration wells in 2009. Metalore reported 2 of the 5 successful 2009 wells, whereas Ontario General Energy reported one.

Cambrian Play

Onco Petroleum drilled 1 exploratory well to test Cambrian targets for oil and gas in 2009. It was reported as suspended with a gas show. There had been 2 unsuccessful Cambrian exploratory tests in 2008.

Ordovician Play

As in 2008, no exploration wells tested Ordovician targets in 2009. Tanner Engineering drilled 1 development well which was reported as a potential Ordovician oil producer. There had been no Ordovician development wells drilled in 2008.

Silurian Sandstone Play

Exploration of Silurian sandstone targets was consistent in 2009 from the previous year, but development was down, with a total of 3 exploration and 6 development wells completed, compared to 3 exploration and 14 development wells in 2008. Two of the exploration wells were reported to be active gas producers in Norfolk County. The other exploration well was reported as a potential gas producer in Elgin County, with the potential being in Silurian carbonates as opposed to the targeted Silurian clastics.

Of the 6 development wells targeting Silurian sandstones, 3 were industry wells. Two of the industry wells were reported as active gas producers in Welland and Lincoln counties and 1 as a potential gas well in Norfolk County. There was 1 active private gas well, 1 suspended private gas well, and 1 dry private gas well reported; all in Lincoln County.

Silurian Carbonate Play

Two exploratory wells were drilled to test Silurian Guelph reef and/or Salina Group structural targets in 2009, compared to 5 in 2008. One was reported as a potential gas well and 1 was abandoned with an oil show, both in Lambton County.

There were no development wells drilled for Silurian Guelph-Salina targets in 2009. This is a significant decrease from 5 development wells in 2008: 1 active gas well, 1 active oil and gas well, 1 capped oil well, 1 potential gas well and 1 dry hole.

Devonian Play

Development drilling of Devonian targets was consistent from 2008 to 2009, with a total of 5. All 5 are reported as active oil producers in Rodney Pool in Elgin County, operated by Greentree Gas & Oil Ltd. Conversely, there were no Devonian exploration wells drilled in 2009, compared with 2 drilled in 2008, both suspended with oil shows.

EXPLORATION TRENDS

Recent exploration has been focussed in the proven Silurian sandstone and carbonate reservoirs. High natural gas prices greatly enhance the economics of all gas plays in Ontario. Unfortunately, North American natural gas prices dropped dramatically during 2009, reaching a seven-year low in August.

Exploration in the Ordovician play has declined considerably in the past 5 years with a focus on extension or development drilling of known trends. Essex County and southern Kent County are still the most attractive onshore locations, but exploration will need to expand to the north and east if oil production is to be maintained. There is considerable remaining untested potential for natural gas in this play beneath the eastern basin of Lake Erie and

onshore east and north from Kent County to the Niagara Escarpment. A recent reassessment of potential in this play by the Ministry of Natural Resources indicates potential remaining undiscovered resources totalling 201 billion cubic feet (5.7 billion m³) of natural gas and 16.6 million barrels (2.64 million m³) of oil. There also may be potential for trapping of natural gas in sandy facies of the Ordovician Shadow Lake Formation over the crest of the Algonquin Arch.

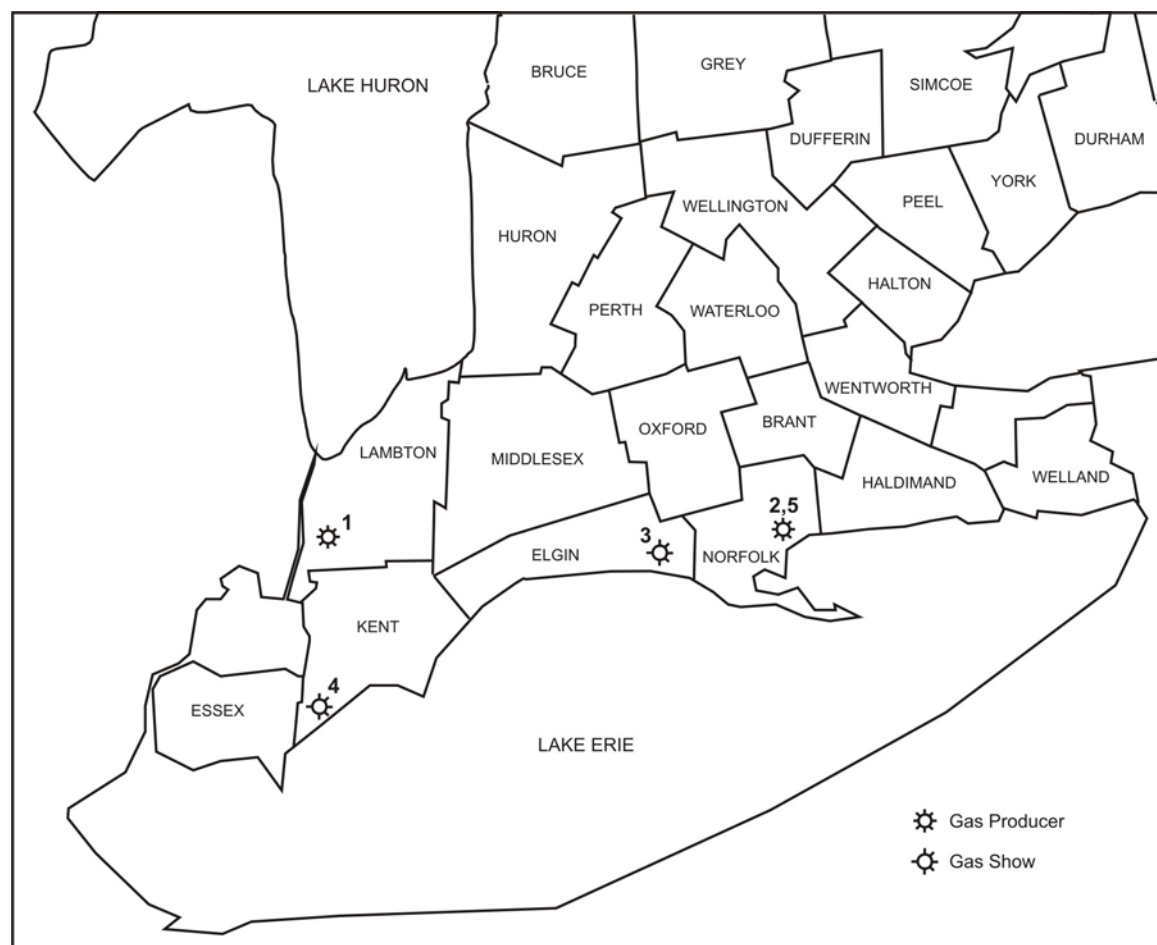
There is potential for discovery of Cambrian gas or oil pools along the pinch-out edge of the Cambrian sandstone in the subsurface, or in fault-controlled structures. There may be considerable unrealized potential in fault-related structural traps in the Salina A-1 and A-2 carbonate units in Kent, Elgin, and Middlesex counties. There was a significant increase in drilling in the Lower Silurian sandstone play in 2006, but this declined in 2007 and again in 2008.

There is also conceptual potential for a new unconventional gas play in the black shales of the Devonian Kettle Point Formation, analogous to the very successful Antrim Shale play in Michigan and the Ohio Shale in Ohio. Shows of natural gas have been reported in the Kettle Point Formation in Ontario and in water wells where the Kettle Point forms the bedrock. No scientific studies of its potential have been completed. Other formations with shale gas potential in southern Ontario include the Ordovician Blue Mountain Formation (Utica Formation shale-equivalent) and the Devonian Marcellus shale.

Table 1. Successful oil and gas exploration wells in southern Ontario in 2009 (see Figure 1 for well locations).

Well #	Well Name	Results	Target	TD	Latitude	Longitude	TD Date
1	OGE #2, Sombra 2 - 20 - XII	GP - POT	SAL	683.1	42.72593528	-82.32029500	20/05/2009
2	Metalore No. 94, Charlotteville 5 - 21 - VI	GP - ACT	CLI	355.9	42.79325000	-80.33463333	16/07/2009
3	NRG 09-04, Malahide 1 - 33 - IV	GS - POT	CLI	434.6	42.72813333	-80.87085556	26/08/2009
4	ONCO #32, Romney 6 - 31 - III	GS - SUS	CAM	583.4	42.18576111	-82.31575000	15/10/2009
5	Metalore No. 95, Charlotteville 3 - 21 - VI	GP - ACT	CLI	355.7	42.78243611	-80.33185556	23/10/2009

Abbreviations: ACT = active; CAM = Cambrian; CLI = Silurian Clinton–Cataract groups; GP = gas producer; GS = gas show; POT = potential; SAL = Silurian Salina Group; SUS = suspended; TD = total depth (in metres).


Figure 1. Successful oil and gas exploration wells in southern Ontario in 2009.