

# Oil and Gas Exploration and Development Activity in Ontario in 2010

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## INTRODUCTION

Drilling activity in Ontario in 2010 decreased compared to 2009, with production levels also falling. The price for light sweet crude oil began 2010 around \$80 per barrel and averaged about \$70 for the year. This was significantly higher than the average for 2009. The price of natural gas in North America ranged between \$6 and \$3 per MMBTU in 2010, finishing the year over \$4. Greatly reduced industrial usage of natural gas during and following the recent economic recession has resulted in less total gas consumption in North America since mid-2008. In addition to this reduced consumption, new onshore supplies in North America from recently exploited shale gas continue to suppress natural gas prices.

Production figures compiled from annual production reports submitted to the Petroleum Resources Centre indicate that annual oil production declined 7.5% to 83,779 m<sup>3</sup> in 2010 with an estimated value of \$42.6 million, compared to 90,535 m<sup>3</sup> with an estimated value of \$38.8 million the previous year. Natural gas production declined 2% to 233,987 10<sup>3</sup> m<sup>3</sup> compared to 238,715 10<sup>3</sup> m<sup>3</sup> in 2009.

The decline in oil production 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 cash value of production decreased substantially from 2008 to 2009, but increased again in 2010 with oil prices stabilizing at a level consistently above the 2009 low.

## EXPLORATION ACTIVITY

A total of 15 licences to drill and operate new wells were issued by the Ministry of Natural Resources in 2010, compared to 46 in 2009. An additional 33 licences were issued for plugging of existing wells. Nine existing wells were licenced for oil production and one for injection in historical oil fields.

Drilling of 24 new wells was reported in 2010, compared to 29 wells in 2009. These consisted of 6 exploratory wells, 9 development wells and 9 service wells. The 9 service wells consisted of 2 natural gas storage wells, 5 stratigraphic tests, 1 brine disposal well and 1 observation well. One of the natural gas storage wells was drilled horizontally, as was one of the stratigraphic tests. No other horizontal wells were drilled during the year.

Successful development drilling in 2010 resulted in 1 well reported to be a potential oil producer, 1 suspended natural gas well, 1 capped well with gas show and 6 active private gas wells. Successful development drilling in 2009 was materially better, with 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. The 3 commercial development wells drilled in 2010 were located in Elgin and Welland counties. No wells were drilled offshore Lake Erie in 2010.

Exploratory drilling in 2010 resulted in 1 well reported as an active gas producer, 1 active oil producer, 2 potential oil wells and 1 potential gas well (Table 1; Figure 1), and 1 dry hole. In comparison, exploration results in 2009 were more gas-weighted, with 2 wells reported as active gas producers, 1 suspended gas well, 2 potential gas wells, and 1 plugged and abandoned well with oil show. The number of successful exploration wells drilled in Ontario was equal to 2009 at 5. Three wells were drilled by Ontario General Energy in Lambton County, one by Clearbeach in Lambton County, and one by NRG in Oxford County.

## **Cambrian Play**

One exploratory well was drilled in Oxford County to test Cambrian targets for oil and gas in 2010. It was reported as a potential oil producer. There had been 1 potentially successful Cambrian exploratory test in 2009 reported as suspended with gas show.

One development well was drilled into the Cambrian in Elgin County and reported as a potential producer with oil show. There had been no development wells drilled to Cambrian targets in 2009.

## **Ordovician Play**

As in 2009, no exploration wells tested Ordovician targets in 2010. There were also no development wells drilled in 2010. There had been 1 development well reported as a potential Ordovician oil producer in 2009.

## **Silurian Sandstone Play**

No exploration wells tested Silurian sandstone targets in 2010. In 2009, 2 exploration wells were reported to be active gas producers from Silurian sandstones in Norfolk County.

Eight development wells were drilled for Silurian sandstones in 2010, compared to 6 in 2009. Six were private gas wells, all currently active; and 2 were commercial wells: 1 reported as suspended in Welland County and the other as a capped well with gas show in Elgin County.

Of the development wells targeting Silurian sandstones in 2009, there were 2 commercial wells reported as active gas producers and 1 commercial well reported as a potential gas well. There was also 1 active private gas well and 1 suspended private gas well drilled.

## **Silurian Carbonate Play**

Five exploratory wells were drilled to test Silurian Guelph reef and/or Salina Group targets in 2010. These resulted in 1 active oil well, 1 active natural gas well, 1 potential producer with oil show, 1 potential producer with gas show, and 1 dry hole, all in Lambton County.

In 2009, 1 exploratory well was reported as a potential gas producer and 1 well was abandoned with an oil show in Lambton County. A third exploration well was reported as a potential gas producer in Elgin County.

As in 2009, there were no development wells drilled for Silurian Guelph–Salina targets in 2010.

## **Devonian Play**

No exploration or development wells tested Devonian targets in 2010. There were 5 Devonian development wells all reported as active oil producers in 2009, but no exploration wells drilled in 2009.

## **EXPLORATION TRENDS**

Recent exploration has been focussed on 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 and remained relatively low throughout 2010. Exploration activity focussing on oil has not increased in spite of consistently robust oil prices in 2010.

Activity in Ontario has been reduced to a minimum by the constraints of commodity prices. Consistently low natural gas prices have clearly restricted exploration and development operations in the province. Ironically, sustained higher oil prices also negatively impact activity in Ontario by increasing the attractiveness of larger and more expensive projects in other provinces as well as internationally. Recommendations for future exploration have not changed in this report for several years and will remain unchanged until exploration activity increases and new plays and fairways are tested by industry.

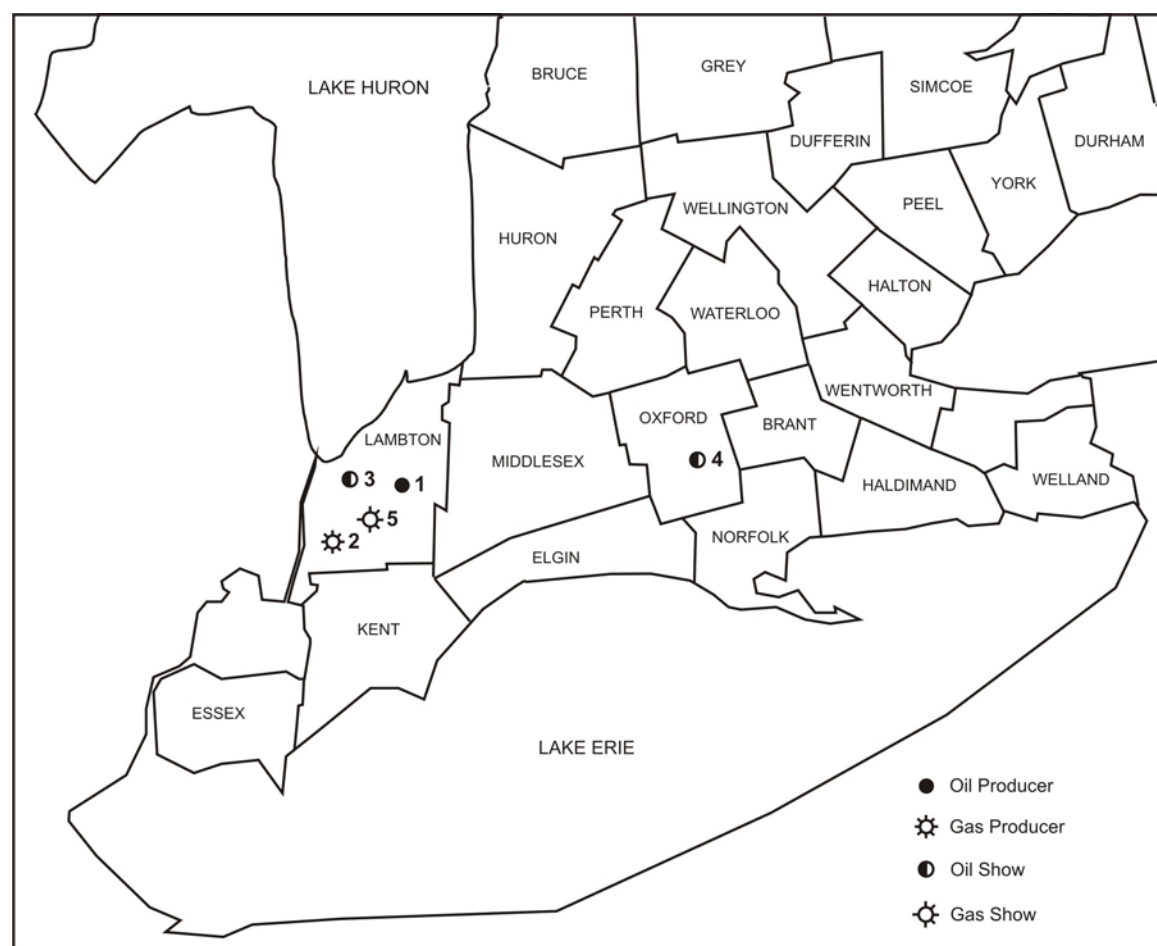
Exploration in the Ordovician play has declined considerably in the past several years with a focus on extension or development drilling of known trends. Essex County and southern Kent County are still the most attractive onshore locations, but exploration will need to expand to the north and east if 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 2005 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 m<sup>3</sup>) of natural gas and 16.6 million barrels (2.64 million m<sup>3</sup>) 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 that activity has declined from 2007 onward.

**Table 1.** Successful oil and gas exploration wells in southern Ontario in 2010 (*see* Figure 1 for well locations).

| Well # | Well Name   | Results  | Target | TD    | Latitude    | Longitude    | TD Date    |
|--------|---|----------|--------|-------|-------------|--------------|------------|
| 1      | OGE #4, Brooke 4 – 5 – XIV                                | OP – ACT | SAL    | 663.0 | 42.92329083 | -81.97064861 | 04/05/2010 |
| 2      | OGE #5, Sombra 6 – 21 – XIV                               | GP – ACT | SAL    | 670.0 | 42.74404278 | -82.31454833 | 24/08/2010 |
| 3      | OGE #3, Plympton 3 – 3 – II                               | OS – POT | SAL    | 750.0 | 42.95211250 | -82.21551000 | 12/02/2010 |
| 4      | NRG 10-01 Oxford on the Thames, East Oxford 6 – 20 – VIII | OS – POT | CAM    | 997.6 | 43.03751389 | -80.71781944 | 16/12/2010 |
| 5      | Clearbeach et al #39, Enniskillen 5 - 14 – III            | GS – POT | SAL    | 626.0 | 42.78798167 | -82.13692444 | 03/12/2010 |

**Abbreviations:** ACT = active; CAM = Cambrian; GP = gas producer; GS = gas show; OP = oil producer; OS = oil show; POT = potential; SAL = Silurian Salina Group; TD = total depth (in metres).


**Figure 1.** Successful oil and gas exploration wells in southern Ontario in 2010.