

Oil and Gas Exploration and Development Activity in Ontario in 2004

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INTRODUCTION

Drilling activity in Ontario continued at the relatively low levels experienced in 2002 and 2003. World oil prices were strong throughout the year due to emerging concerns about world oil supplies, continued supply disruptions in Iraq, low inventory levels of refined petroleum products in the United States, production cutbacks by OPEC and strong demand growth in China. Natural gas prices remained at higher levels than long-term averages due to concerns about decreasing production capacity in western Canada and despite healthy inventories of natural gas in storage reservoirs.

Despite high commodity prices drilling and production activities in Ontario continued at historically low levels. Preliminary production figures compiled from annual production reports submitted to the Petroleum Resources Centre indicate annual oil production declined 18% to 153,048 cubic metres in 2004, compared to 186,140 cubic metres the previous year. Production of natural gas totaled approximately 359,448 10^3m^3 compared to 377,745 10^3m^3 the previous year. These declines are directly related to reduced levels of drilling activity both in 2004 and 2003 such that there is insufficient new production to replace reserves produced from existing wells. Approximate values of production for 2004 were \$105.2 million for natural gas production and \$51.7 million for oil production.

EXPLORATION ACTIVITY

A total of 89 licences to drill and operate new wells were issued by the Ministry of Natural Resources in 2004, compared to 117 in 2003. An additional 12 licences were issued for plugging of orphan wells and 430 existing wells were licensed for oil production from historical oil fields.

At the time of writing, drilling of new wells was reported to be complete at 80 wells consisting of 23 exploratory wells, 55 development wells, and 2 service wells. Horizontal drilling accounted for only 5 of the wells drilled in 2004. The 2004 exploratory drilling resulted in 13 wells reported as gas producers (Table 1, Figure 1) with no wells completed for production of oil. Development drilling was very successful, with 5 wells reported to be oil producers, 22 as gas producers, and 10 as private gas wells. Successful oil wells were completed in Ordovician targets, while completions in Silurian sandstone reservoirs in Norfolk, Haldimand and Elgin counties and offshore Lake Erie dominated the gas-producing wells.

Cambrian Play: Four exploratory wells were drilled to test Cambrian targets for oil and natural gas potential in 2004. Talisman Energy reported that TLM East Lake Erie 41-U-4 was completed as a gas producer in a new pool discovery.

Ordovician Play: Drilling was reported to be complete at 2 exploratory wells and 5 development wells testing Ordovician targets in 2004. In exploratory drilling GGOL #68 Blandford 8-4-XIV was reported by Greentree Gas & Oil as a potential gas producer. The Ordovician development drilling resulted in 5 new oil producers for Talisman Energy. Successful oil wells were completed in the Rochester 8-8-I EBR, Mersea 3-4-IV, Mersea 3-6-V, Gosfield South 4-G-II and Lake Erie Romney 233-L pools. All five of these wells were drilled horizontally in the reservoirs.

Silurian Carbonate Play: There were 4 exploratory tests of Silurian Guelph Formation reef and/or Salina

Formation structural trap targets in 2004. One well, REC #18 Aldborough 4-24-VII, was reported as a potential gas producer.

There were 14 development tests of Silurian Guelph–Salina targets in 2004. RHR Resources completed one well as a gas producer in the Sombra 4-16-IX gas pool, and Onco Petroleum reported 11 wells as potential gas producers in the Tilbury gas pool.

Silurian Sandstone Play: The interest in Silurian sandstone targets continued in 2004 in response to high natural gas prices. A total of 13 exploratory and 35 development wells tested Lower Silurian sandstone targets in 2004. Twelve of the exploratory wells were reported to be potential gas producers in exploratory extensions of known gas pools.

Thirty-one of the development wells were reported as potential gas producers. Successful gas wells were drilled in 6 different pools: South Walsingham 5-6-VI, Bayham, Houghton 7-17-II, Houghton 5-8-ENR, Aldborough 1-21-IV and the Lake Erie-Maitland pool. Ten of the 31 wells were completed as private gas wells in parts of the Lincoln, Welland and Haldimand gas fields.

Devonian Play: One development well was drilled to test Devonian targets. GGOL #17 Aldborough 2-2-D-VIII was reported as a potential oil well in the Aldborough 7-D-VII pool.

EXPLORATION TRENDS

Ordovician reservoirs are still the focus of exploration directed at discovery or development of oil reservoirs. Exploration for new pools has declined in this play in the past three 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 have 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 240 bcf of natural gas and 17.2 million barrels 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.

If natural gas prices remain high the economics of all the gas plays in Ontario are greatly enhanced and unconventional sources of natural gas such as organic-rich shales become attractive. There has already been an increase in drilling in the Lower Silurian sandstone play both onshore and offshore, and the platform reef play. 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 unrealised potential in fault-related structural traps in the Salina A-1 and A-2 Carbonate units in Kent, Elgin and Middlesex counties.

There is conceptual potential for a new and potentially very large unconventional gas play in the black shales of the Kettle Point Formation, analogous to the very successful Antrim shale play in Michigan and the Ohio shales in Ohio. Shows of natural gas have been reported in the Kettle Point Formation in Ontario and natural gas occurs in water wells in areas underlain by the Kettle Point Formation. The Kettle Point has never been targeted for modern exploration and no scientific studies of its potential have been completed. The Antrim Formation in Michigan has produced in excess of 2.2 Tcf of natural gas from stratigraphically-equivalent shales with similar geological features.

Table 1. Successful exploratory wells in southwestern Ontario, 2004. See Figure 1 for well locations.

Well #	Well Name	Results	Target	TD	Latitude	Longitude	TD Date
1	TLM East Lake Erie 41-U-4	GP - ACT	CAM	1235.0	42.66888333	-79.67471667	2004-03-22
2	GGOL #68, Blandford 8-4-XIV	GP - POT	ORD	876.0	43.30457500	-80.69589444	2004-11-17
3	REC #18, Aldborough 4-24-VIII	GP - POT	SAL	567.5	42.64016528	-81.59467444	2004-03-12
4	GGOL – Huron #3, Houghton 2-138-STR	GP - POT	CLI	439.0	42.75432722	-80.70935472	2004-01-27
5	Echo 41, Bayham 3 - 27 - V	GP - CAP	CLI	402.0	42.76146667	-80.75608611	2004-01-12
6	Echo 42, Bayham 5 - 23 - V	GP - CAP	CLI	435.0	42.70296944	-80.85674722	2004-06-30
7	Echo 43, Bayham 11 - 130 - STR	GP – ACT	CLI	420.0	42.73083056	-80.82533611	2004-07-02
8	Echo 44, Bayham 5 - 20 - V	GP - CAP	CLI	416.0	42.77895556	-80.79565278	2004-03-10
9	Echo 45, Bayham 5 - 11 - V	GP - CAP	CLI	387.0	42.79236944	-80.76836111	2004-01-12
10	Echo 46, Bayham 5 - 11 - IV	GP - ACT	CLI	422.0	42.68885833	-80.82153889	2004-02-23
11	Echo 47, Bayham 9 - 133 - STR	GP - ACT	CLI	436.5	42.67904444	-80.84770000	2004-07-01
12	Echo 50, Bayham 3 - 9 - IV	GP – ACT	CLI	438.0	42.69046389	-80.84294722	2004-08-31
13	Echo 51, Bayham 10 - 18 - SG	GP - CAP	CLI	402.0	42.75258333	-80.80462222	2004-08-31

Figure1. Successful exploratory wells in Ontario in 2004.

