

Oil and Gas Exploration and Development in Ontario, 2003

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INTRODUCTION

Drilling activity in Ontario continued at the relatively low levels experienced in 2002. Oil prices were strong throughout the year due to supply concerns related to the Iraq conflict and low inventory levels of refined petroleum products in the United States. Natural gas prices did not reach the record highs of 2002 due to healthy inventories of natural gas in storage reservoirs and normal winter temperatures, but still remained at levels appreciably higher than long-term averages.

Despite high commodity prices preliminary figures indicate production of oil and natural gas declined significantly in 2003. Oil production in 2003 totalled 186,000 cubic metres compared to 214,000 cubic metres the previous year. This is due primarily to decreased exploration effort in the Ordovician oil play. Preliminary figures for natural gas indicate production declined to 378 million cubic metres compared to 425 million cubic metres in 2002, due primarily to lower production from wells on Lake Erie. Estimated value of production was \$50.2 million for oil and \$112.5 million for natural gas.

EXPLORATION ACTIVITY

A total of 117 licences to drill and operate new wells were issued by the Ministry of Natural Resources in 2003, compared to 105 in 2002. An additional 18 licences were issued for plugging of orphan wells and 4 existing wells were licensed for private use.

At the time of writing, drilling was reported to be complete at 87 wells consisting of 33 exploratory wells, 49 development wells, and 5 service wells. Horizontal drilling accounted for 13 of the 87 wells drilled in 2003. Exploratory drilling resulted in 23 wells reported as gas producers (Table 1, Figure 1) with an additional 3 wells reported as potential gas wells. Development drilling was very successful, with 7 wells reported to be oil producers, 19 as gas producers, 8 as private gas wells and 1 well completed for production of both oil and natural gas. An additional 14 wells were suspended pending further testing. Successful oil wells were completed in Ordovician and Devonian targets, while completions in Silurian sandstone reservoirs in Norfolk, Haldimand and Elgin counties dominated the gas-producing wells.

Cambrian Play: Three wells were drilled to test Cambrian targets for oil and natural gas potential in 2003. Greentree Gas & Oil reported that GGOL Huron #1 Aldborough 4-C-VII was completed as a gas producer in a new pool discovery. The two other Cambrian tests were drilled by Cameron Petroleum Inc. in or near the Gobles oil and gas pool and were suspended at the time of writing.

Ordovician Play: Drilling was reported to be complete at 4 exploratory wells and 4 development wells testing Ordovician targets in 2003. TLM No.1 (Horiz #1) Gosfield South 4-G-II was reported to be completed as an oil producer in a new pool discovery. Two other exploratory wells were plugged and abandoned with no indication of hydrocarbons and one well was suspended pending further evaluation.

The Ordovician development drilling resulted in 3 new oil producers with 1 well still under evaluation. Successful oil wells were completed in the Romney 5-15-I, Mersea 3-4-IV and Lake Erie Romney 194-TRS pools.

Silurian Carbonate Play: There were 4 exploratory tests of Silurian Guelph Formation reef and/or Salina Formation structural trap targets in 2003. All four wells were plugged and abandoned.

There were 15 development tests of Silurian Guelph–Salina formation targets in 2003. Eight wells were drilled on

offshore targets in Lake Erie by Talisman Energy Inc to develop natural gas reservoirs in the Morpeth and Silver Creek platform reefs. Four of these wells were completed for production of natural gas and the remaining four were plugged and abandoned. In onshore activity, Cameron Petroleum Inc completed a well for production of natural gas in the Otter Creek East pool. R.G. Bryant Associates recompleted an existing well in the Euphemia 8-18-IV pool for production of oil and natural gas and RHR Resources deepened an existing well in the Sombra 4-16-IX gas pool.

Silurian Sandstone Play: The interest in Silurian sandstone targets continued in 2003, as higher natural gas prices improved the economics of this basin-centered tight gas play. A total of 23 exploratory and 25 development wells tested Lower Silurian sandstone targets in 2003. Twenty-two of the exploratory wells were reported to be gas producers or potential gas producers in exploratory extensions of known gas pools in Bayham, Houghton and Aldborough townships.

Thirteen of the development wells were reported as gas producers or potential gas producers. Successful gas wells were drilled in 6 different pools: Hemlock, Bayham, Houghton, Houghton 5-8-ENR, Aldborough 1-21-IV and the Lake Erie-Maitland pool. Eight other wells were completed as private gas wells in parts of the Lincoln, Welland and Haldimand gas fields.

Devonian Play: One exploratory and 3 development wells were drilled to test Devonian targets. Greentree Gas & Oil completed 3 development wells as oil producers in the Aldborough 7-D-VII pool. The exploratory well was plugged and abandoned.

EXPLORATION TRENDS

Ordovician reservoirs are still the focus of exploration directed at discovery or development of oil reservoirs in Ontario, but exploration for new pools has declined in this play in the past two years with a focus on extension or development drilling of known trends. Exploration to date has been focussed in Essex County and southern Kent County. Most of the Ordovician strata in Ontario to the north and east of this core area are prospective for natural gas but are largely untested. Natural gas has been discovered and produced from Trenton or Black River formations at Arthur, Acton, Hornby, Hepworth, Egremont and most recently in the Blenheim 8-13-X gas pool near Innerkip.

A paper presented by Bruce Bailey at the 2003 annual conference of the Ontario Petroleum Institute proposed that the productive sandstone reservoir of the Innerkip gas pool is correlative with the middle Ordovician Shadow Lake Formation and not the upper Cambrian as previously believed. This has significant implications for exploration for similar reservoirs as the prospective area would cover the entire crest of the Algonquin Arch. The Arthur gas pool occurs on the crest of the arch 60 km north of Innerkip and may be another example of this pool type.

If natural gas prices remain high the economics of all the gas plays in Ontario are greatly enhanced, in particular the Lower Silurian sandstone plays both onshore and offshore, and the platform reef play offshore Lake Erie. 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. Silurian pinnacle and incipient reefs in Lambton County are also gas-prone and have the additional advantage of potential conversion to natural gas storage.

Table 1. Successful exploratory wells in southwestern Ontario, 2003. See Figure 1 for well locations.

Well #	Well Name	Results	Target	TD	Latitude	Longitude	TD Date
1	GGOL Huron #1, Aldborough 4 - C - VII	GP - CAP	CAM	1241.0	42.54595194	-81.73039611	2003-01-14
2	Wise, Aldborough 2 - 21 - VII	GP - ACT	CLI	541.0	42.62899111	-81.61647750	2003-07-22
3	REC #17, Aldborough 8 - 24 - IV	GP - CAP	CLI	544.6	42.63661222	-81.61080528	2003-08-18
4	Pifher 13, Houghton 5 - 14 - WNR	GP - POT	CLI	412.2	42.70806389	-80.71313889	2003-02-18
5	Pifher 14, Houghton 6 - 16 - WNR	GP - POT	CLI	411.5	42.72161944	-80.71278056	2003-02-10
6	Pifher 17, Houghton 2 - 5 - LRCN	GP - CAP	CLI	439.0	42.61559167	-80.68898889	2003-08-20
7	Pifher 19, Houghton 4 - 137 - STR	GP - CAP	CLI	407.0	42.74836389	-80.71576111	2003-09-26
8	GGOL #55, Houghton 5 - 137 - NTR	GP - POT	CLI	448.5	42.76275194	-80.71615194	2003-06-10
9	Echo 25, Bayham 3 - 27 - V	GP - POT	CLI	419.1	42.70868611	-80.72635833	2003-03-12
10	Echo 26, Bayham 5 - 23 - V	GP - POT	CLI	418.2	42.70906944	-80.74632222	2003-03-14
11	Echo 27, Bayham 11 - 130 - STR	GP - POT	CLI	411.5	42.73998611	-80.75062500	2003-03-20
12	Echo 28, Bayham 5 - 20 - V	GP - CAP	CLI	418.2	42.71243611	-80.76010278	2003-04-12
13	Echo 30, Bayham 5 - 11 - V	GP - CAP	CLI	415.0	42.72399167	-80.80708333	2003-07-07
14	Echo 31, Bayham 5 - 11 - IV	GP - CAP	CLI	427.6	42.70561111	-80.80762222	2003-05-24
15	Echo 34, Bayham 9 - 133 - STR	GP - CAP	CLI	413.0	42.74061944	-80.73516667	2003-08-28
16	Echo 32, Bayham 3 - 9 - IV	GP - CAP	CLI	417.0	42.71250833	-80.81657222	2003-09-29
17	Echo 33, Bayham 10 - 18 - SG	GP - POT	CLI	417.9	42.72870556	-80.77037500	2003-06-16
18	Echo 36, Bayham 3 - 11 - III	GP - CAP	CLI	425.2	42.69187500	-80.80741667	2003-06-12
19	Echo 35, Bayham 3 - 4 - I	GP - CAP	CLI	435.6	42.66284722	-80.84152500	2003-06-13
20	Echo 37, Bayham 8 - 135 - STR	GP - CAP	CLI	408.1	42.73967500	-80.72464722	2003-09-29
21	Echo 38, Bayham 18 - 119 - STR	GP - CAP	CLI	422.0	42.73731667	-80.80443611	2003-12-06
22	Echo 39, Bayham 17 - 121 - STR	GP - CAP	CLI	421.0	42.73787222	-80.79532222	2003-09-02
23	Echo 40, Bayham 12 - 125 - STR	GP - CAP	CLI	415.0	42.74263333	-80.77439722	2003-09-26

Figure1. Successful exploratory wells in Ontario in 2003.

