Hydrocarbon Resource Assessment of the Trenton-Black River Hydrothermal Dolomite Play in Ontario

2005

Printed in London, Ontario, Canada

ONTARIO OIL, GAS AND SALT RESOURCES LIBRARY

Hydrocarbon Resource Assessment of the Trenton-Black River Hydrothermal Dolomite Play in Ontario

by

Golder Associates Ltd.

2005

This project was part of the Targeted Geoscience Initiative II under the Consolidating Canada's Geoscience Knowledge Program, funded by Natural Resources Canada.

FOREWORD

In October, 2003, the Ontario Oil, Gas and Salt Resources Library, the Ontario Ministry of Natural Resources, Ontario Geological Survey and Natural Resources Canada entered into a partnership under the Targeted Geoscience Initiative to complete a two-phase project known as Southern Ontario Hydrocarbon Resource Evaluation and Regional Stratigraphic Synthesis. The two phases of work comprise; 1) Hydrocarbon resource evaluation of the Ordovician Trenton-Black River hydrothermal dolomite play in southern Ontario, and 2) Regional stratigraphic correlations.

PART 1 – HYDROCARBON RESOURCE EVALUATION
The objective of this part of the Work is to update the evaluation of Ontario's resources of oil and natural gas which was completed by the Ontario Geological Survey in the early 1980's. The present study is focussed on assessment of the resources contained in pools discovered in rocks of Ordovician age from 1981 to the end of 2002 and an update of resource additions in previously discovered pools. Most of this phase of the Work was contracted to Golder Associates Ltd with contributions by staff of the Ontario Oil, gas and Salt Resources Library and the Ministry of Natural Resources.

PART 2 – REGIONAL STRATIGRAPHIC CORRELATIONS
The objective of this part of the Work is to produce and publish an updated report based on Paper 67-2 of the Ontario Department of Energy and Resources Management entitled "Guide to the subsurface Palaeozoic stratigraphy of southern Ontario". This phase of the Work is a cooperative effort of the Ontario Geological Survey, the Ontario Oil, gas and Salt Resources Library and the Ministry of Natural Resources.

This report summarises the results of Phase 1 of the project, an evaluation of the potential oil and gas reserves contained in the Ordovician Trenton-Black River hydrothermal dolomite play in southern Ontario. No attempt has been made to edit the report, the technical content of which is entirely the responsibility of the authors. Discrepancies may occur for which the Oil, Gas and Salt Resources Library does not assume responsibility.

REPORT CONTENTS

This report is published on CD. A hard-copy report can be produced on demand by contacting the Oil, Gas and Salt Resources Library at www.ogsrlibrary.com. The CD contains the following files and or folders;

Golder report.pdf: This file contains a number of reports including; geological play analysis and resource assessment with 8 tables, 27 figures and 3 exhibits, a reserves report, production decline analysis charts and graphs for each well in the play drilled since 1981 and for each pool discovered in that time period, pool maps for 7 oil and gas pools, 4 structural cross-sections through representative pools

Additional cross-sections: This folder contains 4 .pdf files and 3 .tiff files of seven structural cross-sections through representative pools.

Ordovician monthly production: This folder contains a spreadsheet with tabulated monthly production of oil, natural gas and water from 1983 to the end of 2002 for every Ordovician well in Ontario

Powerpoint: this folder contains a powerpoint file of a paper presented at the 2005 annual conference of the American Association of Petroleum Geologists held in Calgary.

Readme: This folder contains a text file named “report guide” with an overview and background information about the report and directions for its use.

Golder Associates Ltd.

2390 Argentia Road
Mississauga, Ontario, Canada L5N 5Z7
Telephone: (905) 567-4444
Fax: (905) 567-6561

REPORT ON

SOUTHERN ONTARIO HYDROCARBON RESOURCE EVALUATION

Submitted to:
Petroleum Resources Centre
Ministry of Natural Resources
659 Exeter Road
London, Ontario N6E 1L3

DISTRIBUTION:

3 Copies - Petroleum Resources Centre, Ministry of Natural Resources
2 Copies - Golder Associates Ltd.

TABLE OF CONTENTS

Section **Page**

List of Appendices

Abstract

The assessment of Middle Ordovician recoverable oil and gas reserves in southwestern Ontario involved geological delineation and statistical evaluation, using the truncated discovery process model, of the established mature play. Results of the assessment suggest that total Middle Ordovician recoverable gas and oil resources is in the order of 7,960 $106m^3$ (281 bcf) and 6,313,671 m^3 (39.7 MMbbls) respectively. Eighty-five per cent of this gas volume 6,799 $106m^3$ (240 bcf) and 43 per cent of this oil volume 2,733,296 m^3 (17.2 MMbbls) remains to be discovered. This indicates that the play still has a significant upside potential with respect to undiscovered oil and gas volumes, particularly in that area between the current area of exploration and development activity and the eastern most point of the Niagara Escarpment.

1.0 INTRODUCTION

The role of the Southern Ontario Hydrocarbon Project is to create a modern synthesis of fully accessible digital forms of data fundamental to oil and gas exploration, resulting in consistent stratigraphic correlation and an updated assessment of energy potential. The last full assessment of Ontario's hydrocarbon resources was completed in the early 1980's: since that time over 3000 petroleum wells have been completed and new targets identified. Understanding the stratigraphic framework of the Paleozoic succession is essential for promoting the continued development of these resources. In addition, underground storage of gas in depleted reservoirs is critical to Ontario's economy each year. Digitized, easily-manipulated and publicly-accessible data in GIS-based formats will initiate new evaluation of various targets areas and stratigraphic horizons, leading to renewed exploration and major economic impact.

The project objectives and priorities are:

- Promote renewed exploration, enhanced exploration strategies and major economic impact through investment in resource development.
- Compile and map new pools, production data, pressure data, reserve estimates, geological and engineering data, and all hydrocarbon plays.
- Use these data to compile and publish an updated assessment of remaining undiscovered oil and gas resources and an updated oil and gas pools and pipelines map. Update and standardize the terminology used to describe and correlate the subsurface Paleozoic strata of southern Ontario.
- Complete a set of scanned and digitized well logs as a series of published stratigraphic reference cross-sections, and include key outcrop and core measured sections and drill cuttings to produce detailed descriptions of important productive strata. Publish an updated "Guide to subsurface Paleozoic stratigraphy of southern Ontario".
- Update Oil and Gas Pools and Pipelines Map of Ontario.

- Update a Guide to the subsurface Paleozoic stratigraphy of southern Ontario.

The objectives and focus of the project are to contribute to an updated evaluation of Ontario's resources of oil and natural gas. The last update was completed by the Ontario Geological Survey in the early 1980's. The project focuses on oil and gas pools discovered from 1982 until the end of 2001 with a focus on oil and gas in Ordovician strata. This includes interpretation and mapping of pool boundaries for major pools, calculation on in-place and recoverable reserves, tabulation of reservoir characteristics, and estimation of potential hydrocarbon resources on the Ordovician strata of southern Ontario.

A primary objective of the Southern Ontario Hydrocarbon Resource Evaluation and Regional Stratigraphic Synthesis project is to compile and publish an updated assessment of the discovered and undiscovered recoverable oil and gas reserves hosted in Ordovician Trenton-Black River carbonate rocks of southern Ontario. Previous published assessments were completed by Hutt et al (1973) and Bailey Geological Services Ltd. and Cochrane (1984) prior to the discovery of the prolific Dover 7-5-V East and Hillman fields in 1983. Osadetz et al (1996) prepared preliminary assessments using early results of post 1983 drilling activity based on updated recoverable reserve data prepared by Trevail (1995). The substantial increase in recoverable oil and gas reserves discovered in the intervening time period and a desire to encourage exploration for additional new reserves in relatively untested areas of the province provided the impetus to undertake this new assessment.

The project partners for the study are:

- Geological Survey of Canada
- Ontario Ministry of Natural Resources
- Ontario Geological Survey
- Ontario Oil, Gas and Salt Library

This Project contributes to the Earth Sciences Sectors Consolidating Canada's Geoscience Knowledge Program and is part of the Targeted Geoscience Initiative. The terms of reference for the study were developed by Terry Carter of the Petroleum Resources Centre, Ministry of Natural Resources. The scope of work to address the terms of reference was provided in Golder Associates proposal dated December 2003.

The key members of the project team are: Golder Associates Ltd., Mr. Bob Trevail, and Energy Objectives Ltd. (Mr. Phil Walsh, Mr. Joe Gorman, Mr. Ed Welychka). Golder Associates acted as the project manager for this study. Energy Objective was responsible for calculation of reserves and pool characterization. Mr. Bob Trevail was responsible for estimation of remaining resources and preparation of the main text of this study. The study was carried out under the direction of Mr. Terry Carter.

The format of this report closely follows that of Reinson et al (1993) with the addition of a narrative describing the discovery history of the known pools and fields. The assessment process was comprised of two parts:

- A geological review of the reservoirs utilizing pool/field structure and boundary delineation maps as well as recoverable reserve estimates and reservoir parameters prepared in an earlier phase of the project; and
- A statistical analysis of recoverable reserve estimates using the Truncated Discovery Process Model (TDPM) Excel spreadsheet program currently used to by the Canadian Gas Potential Committee (CGPC) to assess undiscovered hydrocarbon potential.

The following supporting information is provided in Appendices:

- Appendix A Continuous Summary Statistics for Resource Assessment
- Appendix B Reserve Report (Energy Objective Ltd.)
- Appendix C Pool Summaries for Reserve Report (Joe Gorman, Energy Objective Ltd.)
- Appendix D Pool Maps and Geological Cross-sections

2.0 GEOLOGICAL FRAMEWORK

2.1 Tectonic Framework

Middle Ordovician carbonates occupy an area of 133 x 10^3 km^2 and encompass much of southwestern Ontario as well as adjacent eastern portions of the St. Lawrence Platform (also known as the Ottawa Lowlands). The main area of interest in this study is located west of the Frontenac Arch because the carbonates of the Ottawa Lowlands are not particularly prospective due to faulting and lack of hydrocarbon shows (Bailey and Cochrane, 1984).

Southwestern Ontario lies along the axis of the periodically reactivated southwest trending Algonquin and Findlay arch complex between the Michigan and Appalachian basins. The present day location of these structural components is shown in Figure 2. Relative movement between the arches and basins had a controlling influence on the depositional patterns of the various carbonates, shales, evaporites, and sandstones that make up the approximately 1500 metres of Cambrian to Mississippian rocks present in the subsurface today (Sanford et al, 1985). The Paleozoic section is underlain by Precambrian rocks belonging to the Grenville Province and crops out against the western side of the northwest trending Frontenac Arch (Carter and Easton, 1990).

Sanford et al (1985) suggested that that reactivation of a pre-existing Precambrian fracture framework (Figure 3) played a major role in the formation of many of the hydrocarbon reservoirs,

Cambrian through Devonian in age, found in southwestern Ontario. Vertical movement on these faults affected the areal distribution of sedimentary facies and opened conduits through which diagenetic fluids were able to flow, an aspect that is especially important in the formation of Trenton-Black River dolomitized reservoirs.

2.2 Regional Stratigraphy

The conventional subsurface stratigraphic nomenclature used by industry is illustrated in Figure 4 along with a geophysical log showing the corresponding typical gamma ray and neutron log curves. The strata are subdivided into two main assemblages, the Black River Group and Trenton Group in ascending order respectively. The Middle Ordovician transgression in southern Ontario represents an overall deepening upward depositional sequence from supratidal and tidal flat carbonates, through lagoonal and shoal carbonates into offshore and finally deep shelf carbonates (Kobluk and Brookfield, 1982) deposited on a gentle ramp that lay northwest of the Taconic foreland basin. The sequence is unconformably underlain by subcropping rocks of Upper Cambrian and Precambrian age.

2.2.1 Black River Group

The Black River Group ranges in thickness from 10 metres near the outcrop belt to over 150 metres in southwestern Lake Erie (Figure 5). It is comprised in order of oldest to youngest of the Shadow Lake, Gull River, and Coboconk Formations.

The onset of the Middle to Upper Ordovician marine transgression is represented by the relatively thin siliciclastic rocks of the Shadow Lake Formation. Because the source of the sediments varied locally and deposition occurred on an irregular unconformity surface there is no uniformity of lithology or thickness on a regional basis (Sanford, 1961). Generally, the rocks are fine to coarse grained and poor to well sorted sandstones of varying green and brown colours. A distinctive feature in many areas is the presence of frosted and pitted coarse grains of quartz.

The Gull River Formation, generally the thickest unit of the Black River Group, conformably overlies the Shadow Lake and represents the onset of shallow water carbonate deposition. Main lithologies include lime mudstone, bioclastic-intraclastic wackestone, and minor amounts of bioclastic packstone-grainstone. Oolitic beds sometimes occur near the base of the formation. The Gull River was deposited in low-energy supratidal, tidal flat, and lagoonal environments.

The Coboconk consists of light brown peloidal-pelletal lime mudstone containing calcispheres, rare gastropods, and scattered coral, crinoid, brachiopod, and bryozoan fragments. Chert nodules are often present 5 to 6 metres below the contact with the overlying Kirkfield Formation. The rock is slightly burrowed and exhibits minor bedding.

2.2.2 Trenton Group

The Trenton Group ranges up to over 170 metres thick in central southwestern Ontario (Figure 6) and is comprised of the Kirkfield, Sherman Fall, and Cobourg Formations in ascending order. The onset of deposition of Trenton rocks is characterized by an initial influx of terrigenous material and abrupt deepening of water on the carbonate ramp possibly the result of platform downwarping due to emplacement of overthrust loads on the cratonic margin to the southeast during the Taconic orogeny (Beaumont et al, 1988).

Over much of the study area the Kirkfield and Sherman Fall Formations represent two upward shallowing sequences that exhibit similar lithologies, a lower unit of argillaceous nodular wackestone composed of lime mud, pellets and minor skeletal fragments overlain by a cleaner unit of skeletal packstone/grainstone beds (see gamma ray curve in Figure 4) composed of crinoids, bryozoans, gastropods, trilobites and brachiopod fragments interbedded with lime mud wackestone. Deposition occurred in relatively deeper water on the lower shoreface to outer platform. The packstone/grainstone units were deposited following storm events as water depth decreased.

The Cobourg Formation conformably overlies the Sherman Fall and consists of slightly argillaceous light to medium brown pelletal lime mudstone to skeletal wackestone interbedded with lenses of light to medium brown skeletal packstone. The wackestone is contains a fauna of brachiopods, crinoids, trilobites, gastropods, bryozoans, and pelycepods. The somewhat nodular appearance is attributed to in-situ differential submarine cementation of the sediment modified by bioturbation that disrupted the original bedding. The top 5 to 8 metres of Cobourg in the current exploration area of southwestern Ontario typically consists of ferroan dolomite and is referred to as the “cap dolomite” (see Figure 7 for distribution). Origin of the ferroan dolomite is unknown but may be related to dewatering of the overlying Blue Mountain shales (Taylor and Sibley, 1986).

In the Bruce Peninsula area a unit of organic-rich interbedded shale and limestone named the Collingwood Member, not shown on the stratigraphic column, comprises the upper part of the Cobourg (Russell and Telford, 1983). The contact between the Trenton Group and the shale of the overlying Blue Mountain is gradual where the Collingwood Member is present and sharp where absent (see Figure 7).

2.3 Trap Style

At the present time, the primary exploration and development area for Ontario’s Trenton-Black River Group oil and gas reservoirs is in Essex and the western part of Kent counties (Figure 8). These pools are members of the diagenetic trap family of oil and gas reservoirs in which the trap boundaries are due to postdepositional diagenetic processes which can create new reservoirs or

new seals and are largely independent of the original depositional environment (Vincelette et al, 1999).

Best known as hydrothermal dolomite reservoirs or simply HTD, they are recognized to occur in western Canada, Saudi Arabia, Australia, northeastern United States and southern Ontario. HTD reservoirs are closely associated with faults, in particular strike-slip faults, with localized movement of hot (thermal) mineralized water (hydro) fluids through limestone bedrock deep in the subsurface. This "hydro-thermal" fluid has altered the limestone and locally replaced it with dolomite. The process of dolomitization has also created porosity in the bedrock which has subsequently trapped oil and natural gas. This porosity is vertically confined beneath thick non-porous shales of the Blue Mountain Formation and laterally confined by non-porous limestone, forming a reservoir or pool. Figure 9 is a conceptual 3-D block model showing the typical spatial distribution of dolomitized reservoir rock. Fractures within the dolomite play a major role in enhancing production. Where several pools occur on the same dolomitized fault structure it is referred to as a field. In Ontario, oil and gas pools of this type are long narrow features 400 to 1200 meters in width and up to several kilometers length.

These reservoirs are seismically characterized, as shown in Figure 10, by:

- Development of a seismically-recognizable depressions above the hydrothermal dolomite zone;
- Diffraction patterns occurring at the anomaly boundaries delineating the transition from reservoir dolomite and porosity to regional non-porous limestone;
- Isochron thickening between the Rochester and Trenton seismic markers; and
- Precambrian marker appears as a low or disappearing altogether due to misstacking of events, both characteristics due to increased travel times through the reservoir relative to regional rock.

Preferred drilling sites are often located in these depressions. There is a heterogeneous distribution of dolomite and porosity within these fault trends and within the boundaries of individual oil and gas pools. This is a well-known feature of this reservoir type and accepted practice is to map pool boundaries to the known edges of the dolomitized zone unless it has been proven to be unproductive by drilling.

3.0 HISTORY OF THE PLAY

This section was prepared by Mike Dorland, Ontario Oil, Gas & Salt Resources Library, under the direction of Terry Carter, Subsurface Geologist, Petroleum Resources Centre, Ministry of Natural Resources.

3.1 Discovery History of Trenton-Black River Pools in Ontario

The application of seismic techniques after 1980 initiated a new round of Trenton-Black River exploration in Ontario that resulted in new oil pool discoveries starting in 1983. It is convenient to divide the discovery history of Trenton-Black River pools in Ontario into two exploration phases, historical and modern. The Historical Exploration Phase discusses all discoveries prior to 1983 and the Modern Exploration Phase from 1983 to present.

3.1.1 Historical Exploration Phase (pre 1983)

Williams (1937) speculated, based on earlier accounts, that Jesuit missionaries who traveled to Manitoulin Island in 1649 probably knew of the presence of oil springs near the eastern end of the island. The first documented indication of hydrocarbons in the Trenton-Black River in Ontario occurred on Manitoulin Island in 1860. Oil shows were reported from at least two localities on Manitoulin Island but no commercial production was established. The first commercial discovery in the Trenton-Black River in Ontario occurred in 1900 near the village of Hepworth in Bruce County (Sanford, 1960).

Hepworth Pool

The first production of natural gas from the Ordovician Trenton-Black River in Ontario occurred in the year 1900 (Sanford, 1960). It came from a well completed by Grey and Bruce Oil and Gas Company Ltd. in the township of Amabel, near the village of Hepworth, Bruce County. The initial open flow of the discovery well is unknown but Clapp (1915) reported production from 428.2 m depth with a rock pressure of 2,930 kPa. Subsequent wells drilled in the area reported initial open flows up to 2.7 $10^3m^3/d$ (80 Mcf/d) (Sharp, 1963). Drill cuttings are not available for any wells completed in the Hepworth Pool but from drillers records and examination of more recent wells drilled nearby it can be reasonably assumed that much of the production came from either the Coboconk Formation or the upper part of the Gull River Formation. (Sanford, 1960). Natural gas from the Hepworth Pool was used locally for many years but cumulative production for the pool is unknown (Sanford, 1960).

Dover Pool

In 1917, by sheer wildcatting, the Dover Pool was discovered by the Union Gas Company of Canada Ltd (Lauriston, 1961). On May 12th, the Union Gas-Dover No.1 well encountered gas at 945 m depth in the Black River Group with an initial flow of 5.7 $10^3m^3/d$ (200 Mcf/d). With a further 15 m of drilling flow increased to 57 $10^3m^3/d$ (2 MMcf/d). The well reached total depth at 966 m with an open flow of between 142 and 156 $10^3m^3/d$ (5 and 5.5 MMcf/d) and 8,450 kPa (1,225 psi) pressure. The well was in production soon after discovery and by late November of

1917 the well was turning into an oil well, with between 10 and 13 m^3/d (60 and 80 bbls/d) and around 57 $10^3m^3/d$ (2 MMcf/d) of gas production (Lauriston, 1961).

Williams (1918, 1919, and 1920) is believed to be one of the first people to recognize the presence of a low or syncline on the Trenton surface at Dover, an observation that was to become one of the defining characteristics of these reservoirs.

According to Caley (1945), by 1919 eight wells were producing significant quantities of oil and gas from the pool but subsequent drilling around the pool, as defined at that time, resulted in many dry wells. It was not until 1935 that the Dover Pool was delineated as a narrow, linear, east-west trending reservoir and in that year 10 productive and 2 dry holes were drilled (Sanford, 1960). From 1938 to 1940 five more producers were drilled. At least 10 wells had initial open flows between 85 $10^3m^3/d$ (3 MMcf/d) and 198 $10^3m^3/d$ (7 MMcf/d) and 25 other wells were from 1.5 to 57 $10^3m^3/d$ (50 to 2000 Mcf/d). Initial flows of oil were from 0.6 to 15.9 m^3/d (4 to 100 bbls/d) and one well came in with 32 m^3/d (200 bbls/d).

Since 1940, 4 wells have been completed in the pool bringing the total number of completions to over 40 wells. Currently 5 wells are active in the pool, 4 gas producers and 1 oil producer. To the end of 2003, the Dover Pool had produced 43,900 m^3 (276,000 bbls) of oil and 386 10^6m^3 (13.6 Bcf) of gas.

Minor Pools

Following the discovery of the Dover Pool and prior to 1983, 18 Trenton-Black River pools were discovered sporadically throughout Ontario. Of these pools, 6 are still on production; Colchester, Malden, Gosfield South and Malden 3-41-IV pools produce oil; Arthur and Aldborough 7-18-IV pools produce gas. Small quantities of gas were produced from Acton, Dover 7-10-VI, Hornby and Picton pools and the gas wells at Egremont were plugged with no record of production. A small amount of oil was produced from Aldborough 4-A-VIII, Dover 1-11-V E, Gosfield North 5-13-IX, Malden 25, Manitoulin, Ruscom River and Stevenson pools.

3.1.2 Modern Exploration Phase (1983-Present)

The application of seismic techniques after 1980 initiated a new round of Trenton-Black River exploration in Ontario. In 1983, new discoveries of oil were made at the Dover 7-5-V E Pool in Dover Township of Kent County and the Hillman Pool in Mersea Township of Essex County. These prolific discoveries resulted in a renewed interest in exploring for Trenton-Black River reservoirs. The majority of wells drilled for Trenton-Black River targets over the past 20 years have been concentrated in Essex and Kent Counties, drilling seismic features similar to the 1983 discoveries. Trenton-Black River pools currently account for 74% of Ontario's annual oil production of approximately 188,000 m^3 (1.2 MMbbls) and an increasing proportion of the

natural gas, with cumulative production of over 3.2 10^6m^3 (20.3 MMbbls) of oil and 1.0 10^9m^3 (35.3 Bcf) of natural gas to the end of 2003.

The Trenton-Black River play in Ontario is an extension of the giant Lima-Indiana trend to the south, with trapping relationships analogous to the Albion-Scipio oil field in Michigan.

DOVER FIELD

The Dover Field includes 4 pools, Dover, Dover 7-5-V E, Dover 7-10-VI E and Dover 1-11-V E. All pools are located in Dover Township with a portion of the Dover Pool extending into Raleigh Township. Both townships are located in Kent County. The Dover, Dover 1-11-V E and Dover 7-10-VI E pools were discovered prior to 1983 and are not discussed below. The Dover pool was described above.

Dover 7-5-V E Pool

The Dover 7-5-V E Pool was discovered by E.P. Rowe Ltd. and partner Ram Petroleums Ltd. in February, 1983, with the Rowe/Ram #1 Dover 7-5-V E well. The discovery well is located approximately 1.5 km north of the Dover oil and gas pool and reported an initial oil flow of $49m^3/d$ (308 bbls/d).

Development drilling of the Dover 7-5-V E pool continued through to mid 1992 with the completion of 23 wells. Currently, 16 wells are active in the pool, 8 gas producers and 8 oil and gas producers. The pool had cumulative production of 197,000 m^3 (1.24 MMbbls) of oil and 235 10^6m^3(8.3 Bcf) of gas to the end of 2003.

Since discovery, the Dover 7-5-V E pool has been operated by 5 different companies: E.P. Rowe Oil Limited from discovery to the end of 1986, Paragon Petroleum Corporation from 1987 through 1997, CanEnerco Ltd. from 1998 to April, 2001, Columbia Natural Resources Canada Ltd. from May, 2001 to October, 2002 and Veteran Resources Inc. from November, 2002 to present.

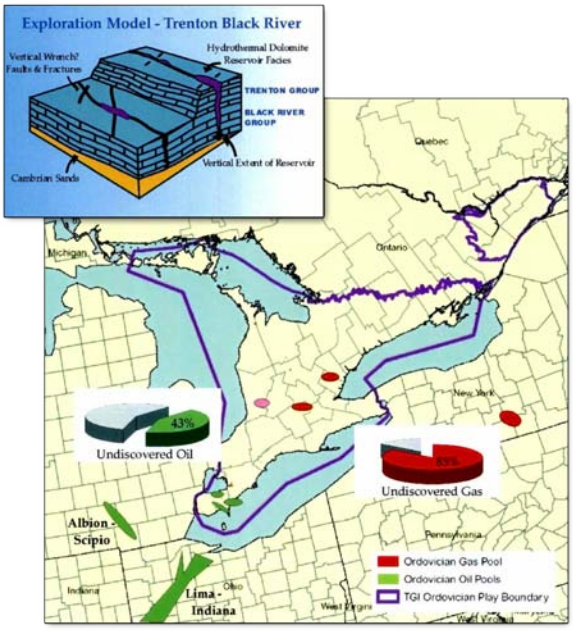
HILLMAN FIELD

The Hillman Field includes 6 pools, Hillman, Mersea 4-240-STR, Mersea 1-16-I, Mersea 4-14-I, Mersea 5-20-A and Mersea 2-12-I. All pools are located in Mersea Township of Essex County.

Hillman Pool

The Consumers' Gas Company Ltd. with partners Pembina Resources Ltd. and Ontario Energy Corporation drilled the Consumers et al 33683 Mersea 1-15-B exploratory well to discover the

SOUTHERN ONTARIO HYDROCARBON RESOURCES EVALUATION



DOWNLOAD FULL REPORT:

http://q.ogsrlibrary.com/ord2015