

## AN UPSTATE SUCCESS STORY— NATURAL GAS AND OIL IN NEW YORK

*Oil and natural gas production currently makes a significant contribution to New York's economy, especially in western New York and the Southern Tier — generating royalties, jobs, tax revenues, and benefits to landowners and local communities, businesses, consumers, and state and local government. In the last decade, this contribution has grown significantly, made possible by new technology, improved understanding of New York's petroleum geology, and rising prices. For more than 140 years, New York's oil and gas industry has been driven by foresight, creative thinking, leaps in technology development, perseverance and improved understanding of the State's hydrocarbon resource potential. This continues to be true today.*

New York State government has played an active role in ensuring that natural gas and oil development proceed with high regard for the environment and the public interest. The dramatic growth in natural gas and oil exploration and development activity in New York has been facilitated, to a large extent, by proactive state agencies ensuring environmentally responsible development and protecting landowner rights. New York State policies, and the programs responsible for implementing them, continue to evolve for the benefit of all citizens:

- to ensure proper environmental stewardship
- to provide appropriate access to natural gas and oil resources on public and private land
- to enhance access to high-quality information on resource potential
- to enable investment and demonstration of new technology for meeting the unique challenges of New York's hydrocarbon resources.

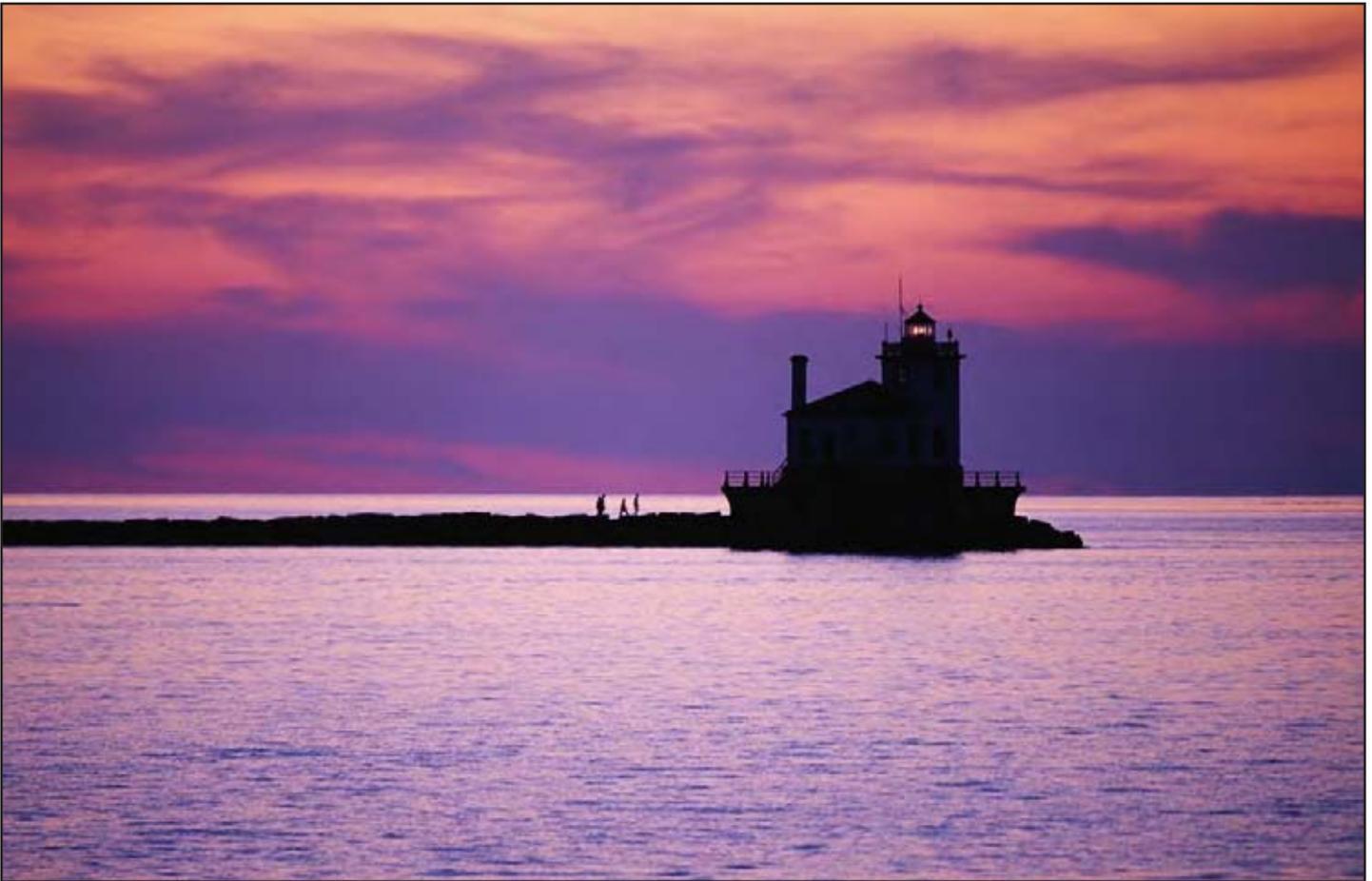


*Horses graze near drilling operations for the Gublo #1 well in Chemung County, which was drilled as a Trenton-Black River field extension well.*

Many believe that the current reinvigoration of natural gas and oil production in New York can continue, yielding substantial returns to the state economy and New York citizens, especially in upstate rural and agricultural areas. Significant additional natural gas and oil resource potential exists within the State. This potential, coupled with its proximity to existing pipeline and storage infrastructure and major population centers, positions New York to reap benefits from its hydrocarbon resource endowment for many years to come.



*Drilling a Trenton Black River well at the edge of a suburban community.*



*Oswego Light, Lake Ontario*

## ENDNOTES AND SOURCES

<sup>1</sup>Main source for information on the history of the natural gas and oil industries in New York is Herrick, John, 1949, *Empire Oil, the Story of Oil in New York State*, Dodd, Mead & Company (out-of-print), New York, 474 pp.

<sup>2</sup>The Pioneer Oil Museum of New York  
P.O. Box 332, Bolivar, NY, 14715

Curator: Ray Payne

The museum is dedicated to preserving the oil heritage of southwestern New York and northwestern Pennsylvania. Items on display include antique engines, a model rig, a “dynamite” wagon, and similar items related to the local oilfields. Also on display are plaques, photographs, news articles, and video footage. The museum maintains a Web site with current and historical articles and photographs documenting New York’s oil industry. <http://www.usgennet.org/usa/ny/county/allegany/OIL-COUNTY/OIL-OIL-MORE%20OIL.htm>

The American Oil and Gas Historical Society (AOGHS)

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Executive Director: Bruce Wells

AOGHS is dedicated to preserving the history of United States oil and natural gas exploration and production. The Society provides advocacy and service for organizations that work to preserve that history. AOGHS publishes a newsletter. The Web site is a good source of articles, photos, and links to oil and natural gas history museums throughout the United States. [www.aoghs.org](http://www.aoghs.org).

Drake Well Museum

202 Museum Lane, Titusville, PA 16354. Phone: (814) 827-2797.

Director: Barbara Zolli; administered by the PA Historical and Museum Commission.

The Drake Well Museum collects, preserves, and interprets the founding of the oil industry in Pennsylvania for residents and visitors by educating audiences about the persons, places, and events important to the development of the petroleum industry and its growth into a global enterprise. [www.drakewell.org/museum](http://www.drakewell.org/museum)

<sup>3</sup> Historical natural gas production data compiled by Rich Nyahay, January 2007, New York State Museum, Reservoir Characterization Group.

<sup>4</sup> The discovery well for the current Trenton-Black River hydrothermal dolomite play was drilled in 1986 by Columbia Natural Resources. Several years following the discovery were devoted to studying the play and developing an exploration and development strategy. Drilling of development wells and additional exploration wells began in 1996. The success of the Trenton-Black River play in New York is due in part to the successful application of 3-D seismic imaging to the placement of development wells.

<sup>5</sup> Arthur Van Tyne, New York oil and gas industry consultant, Wellsville, NY personal communication to Advanced Resources International and John Martin, NYSERDA personal communication to Advanced Resources International. An extensive geological study of the State’s resource base done in the 1980s, estimated original oil-in-place to be 1.118 billion barrels. Cumulative production through 2005 totaled approximately 245 million barrels, representing an estimated recovery rate of approximately 22%. Primary production can usually recover a maximum of 30% with another 15% possible from enhanced oil recovery methods. Assuming a 45% maximum recovery factor, total New York production from primary and enhanced methods may total 503 million barrels with approximately 245 million barrels already produced and 255 million barrels yet to be recovered.

<sup>6</sup> Historical crude oil production data compiled by Rich Nyahay, January 2007, New York State Museum, Reservoir Characterization Group.

<sup>7</sup> Current data on New York natural gas and oil drilling and production provided by the NY Department of Environmental Conservation Division of Mineral Resources.

<sup>8</sup> Table shows estimated oil and gas industry employment for New York State. The U.S. Census Bureau is the source for these data. Alternative estimate can be made using the United States Department of Commerce Bureau of Economic Analysis RIMS II multipliers for output, earnings and employment by state. The Final-Demand Employment Multiplier for the Oil and Gas Extraction Industry in New York is 4.3 jobs per \$1 million change in final demand for oil and gas extraction in the State. The Direct-Effect Employment Multiplier is 4.38 jobs per direct job: (direct job+ indirect job + induced job)/(direct job). This means that each direct job is estimated to sustain 3.38 indirect plus induced jobs.

<sup>9</sup> <http://www.naturalgas.org/naturalgas/exploration.asp>

<sup>10</sup> <http://www.dec.state.ny.us/website/DMR/brochure.pdf>

<sup>11</sup> <http://www.naturalgas.org/naturalgas/extraction.asp>

<sup>12</sup> <http://www.naturalgas.org/naturalgas/production.asp>

Sector	Employment
Exploration and Production	784
Refining	1,951
Transportation	1,753
Wholesale	47,230
<b>TOTAL</b>	<b>51,718</b>

<sup>13</sup> Personal communication from Bradley Field, NYSDEC Division of Mineral Resources to Advanced Resources conveying selected results from unpublished economic impact study of Fortuna Energy operations in New York conducted by Pennsylvania State University.

<sup>14</sup> Single well example of the direct economic benefit to the State of a single prolific Trenton-Black River well from Bradley Field, NYSDEC Division of Mineral Resources.

<sup>15</sup> New York State Department of Environmental Conservation Division of Mineral Resources, Oil and Gas Leasing Report, 2005 and preliminary results of 2006 lease sales from Division of Mineral Resources.

<sup>16</sup> U.S. Energy Information Administration, Advance Summary: U.S. Crude Oil, Natural Gas and Natural Gas Liquids Reserves Report, 2005.

<sup>17</sup> Milici, R.C. and others, 2002, United States Geological Survey Assessment of Undiscovered Oil and Gas Resources of the Appalachian Basin.

<sup>18</sup> USGS resource assessments are fully-risked estimates ranging from a 95 percent chance of occurrence through a 5 percent chance of occurrence. Values shown here are the mean estimates. T-BR Consortium used USGS methodology and new T-BR data. Mean estimate shown. USGS allocates a percentage of the estimated Appalachian Basin undiscovered resources to individual states. Table reflects the percentage of estimated resources that are allocated to New York by individual assessment unit (geologic play).

<i>Sources: USGS 2002 Assessment and Trenton-Black River Consortium 2006 Assessment</i>	<b>Assessment Units (Geologic Age)</b>	<b>New York Undiscovered Natural Gas Resources, Bcf</b>
<b>Conventional Resources</b>	Oriskany Sandstone (Devonian)	74.7
	Black River Trenton Hydrothermal Dolomite - USGS 2002 (Ordovician)	633.8
	<b>Black River Trenton Hydrothermal Dolomite (Trenton Black River Consortium, 2006)</b>	<b>1524.0</b>
	Theresa Sandstone and Beekmantown (Cambrian/Ordovician)	42.2
	All Other Conventional Reservoirs (Silurian, Ordovician, Cambrian)	22.5
	<b>Total New York Conventional (total includes 2006 T-Br Assessment)</b>	<b>1673.4</b>
<b>Unconventional Resources</b>	Upper Devonian Tight Sandstones, Siltstones & Shale	1072.0
	Marcellus Shale (Middle Devonian)	96.3
	All Other Devonian Siltstone & Shale	194.0
	All Clinton-Medina Group (Silurian)	4041.6
	<b>Total New York Unconventional</b>	<b>5403.9</b>

<sup>19</sup> National Energy Technology Laboratory, 2006, Geologic Play Book of Trenton-Black River Exploration in the United States. This study applies the USGS assessment methodology for undiscovered oil and gas resources to the most current and complete Trenton-Black River play data available. The USGS allocates 34.5 percent of the total undiscovered resources in the Appalachian Basin hydrothermal dolomite play to New York.

<sup>20</sup> Soderblom #1 in the town of Big Flats, Chemung County produced 6.3 Bcf in 2005.

<sup>21</sup> Lovell #1 in Steuben County has cumulative production of 15.2 Bcf; producing rate is 9.7 MMcf/d

<sup>22</sup> Milici, Robert, 2005, Assessment of Undiscovered Natural Gas Resources in Devonian Black Shales, Appalachian Basin, Eastern U.S.A, U.S. Geological Survey Open File Report 2005 – 1268.

- <sup>23</sup> TICORA Geosciences and NYSERDA, 2002, Fractured Gas Shale Potential in New York. NYSERDA report available for download from Empire State Oil and Gas Information System (ESOGIS).
- <sup>24</sup> Milici, Robert, 2005, Assessment of Undiscovered Natural Gas Resources in Devonian Black Shales, Appalachian Basin, Eastern U.S.A, U.S. Geological Survey Open File Report 2005 – 1268.
- <sup>25</sup> TICORA Geosciences and NYSERDA, 2002, Fractured Gas Shale Potential in New York. NYSERDA report available for download from Empire State Oil and Gas Information System (ESOGIS).
- <sup>26</sup> Hill, D.G., 2002, 181 Years Later – Why Isn't Shale A Major Source of Natural Gas Production in New York? TICORA Geosciences, Inc. Presentation to the Ontario – New York Oil and Natural Gas Conference, November 4 – 6, 2002.
- <sup>27</sup> Stripper Well Consortium, Keeping the Home Wells Flowing. Helping Small Independent Oil and Gas Producers Develop New Technology Solutions, Summer 2005.
- <sup>28</sup> Hydraulic fracturing is the practice of pumping liquids into the formation at high pressure to induce a crack into rock so that natural gas can flow more easily to the well bore.
- <sup>29</sup> New York State Department of Environmental Conservation, Minerals Division, 2005 production data.
- <sup>30</sup> New York State Department of Environmental Conservation, Minerals Division, 2005 production data.
- <sup>31</sup> New York State Museum, ESOGIS, Empire State Oil and Gas Information System. Totals do not include confidential wells. Operators may hold wells confidential for up to two years. Deep Trenton-Black River wells drilled during 2005 and 2006 may not be represented in these totals.
- <sup>32</sup> Copley, D. L. and L. Robert Heim, 2006, Preliminary Subsurface Correlations of the Theresa (Galway) Sandstone Formation in New York State: Implications for Exploration, presentation at the AAPG Eastern Section Meeting, October 8 – 10, 2006, Buffalo, NY.
- <sup>33</sup> Copley, D. L., Ardent Resource, 2004, The Theresa Sandstone in New York State; the Next Big Play? presentation at the AAPG Eastern Section Meeting, October 3 – 15, 2004, Columbus, OH.
- <sup>34</sup> Interstate Oil and Gas Compact Commission, 2006, Marginal Wells, Fuel for Economic Growth. Available from IOGCC website. [www.iogcc.state.ok.us](http://www.iogcc.state.ok.us).
- <sup>35</sup> New York State Department of Environmental Conservation, Division of Mineral Resources, 2005 New York State Oil, Gas and Mineral Resources Annual Report.
- <sup>36</sup> Jacobi, R.D. and G.J. Smith, 2006, Depositional and Tectonic Models for Upper Devonian Sandstones in Western New York State, Guidebook and Field Trip, October 7, 2006, American Association of Petroleum Geologists, Eastern Section Meeting, Buffalo, NY.
- <sup>37</sup> The New York State Department of Environmental Conservation is charged with implementing this law.
- <sup>38</sup> <http://www.nysm.nysed.gov/esogis/>
- <sup>39</sup> U.S. Departments of Interior, Agriculture and Energy, 2006, Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and the Extent and Nature of Restrictions or Impediments to Their Development, Phase II Cumulative Inventory, published November 2006, available from the U.S. Bureau of Land Management.





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