

NEW YORK'S OIL AND NATURAL GAS HISTORY – A LONG STORY, BUT NOT THE FINAL CHAPTER

Vision, ingenuity and persistence have been applied to the development of New York's oil and natural gas since the early years, and continue to be applied today. This resourcefulness and hard work has sustained the New York natural gas and oil industry for many decades. New York's future hydro-carbon potential remains bright, despite the State being one of the most mature oil and gas producing areas in the world. Building upon the long history of natural gas and oil production in New York, this report describes the recent resurgence of natural gas and oil exploration and development activity, and the benefits resulting from a reinvigorated industry. It describes how government policy and programs have facilitated this renewed activity, while ensuring that all stakeholder interests and the natural environment are appropriately protected. Most important, this report describes the diverse natural gas and oil resource potential that still remains in New York and the continued actions needed to fully develop the State's hydrocarbon resource potential. Following is an overview of some highlights of New York's rich oil and gas history.¹ To learn more about this history, additional sources are provided in the End Notes.²



"Shooting" an oil well with nitroglycerine to stimulate production.

NATURAL GAS HAS FUELED LOCAL ECONOMIC DEVELOPMENT IN NEW YORK FOR 186 YEARS

Natural gas seeps in Ontario County, New York were first reported in 1669 by the French explorer, M. de La Salle, and a French missionary, M. de Galinee, who were shown the springs by local Native Americans. William Hart, a local gunsmith, drilled the first commercial natural gas well in the United States in 1821 in Fredonia, Chautauqua County. The Hart well was first dug to a depth of 27 feet in the shale that outcropped in the area. A 1.5 inch diameter borehole was then drilled to a depth of 70 feet. Hart built a simple gas meter and piped the natural gas to an innkeeper on the stagecoach route from Buffalo to Cleveland.



Plaque commemorating the discovery well for Richburg Oil Field.

Shallow natural gas wells were soon drilled throughout the Chautauqua County shale belt. This natural gas was transported to businesses and street lights in Fredonia at the cost of \$1.50 a year for each light, approximately \$22.00 today. Street lights fueled by this natural gas frequently attracted travelers, often causing them to make a significant detour to see this new "wonder." The first Lake Erie lighthouse illuminated by natural gas was built in 1828 at Barcelona.

BIRTH OF NEW YORK'S COMMERCIAL NATURAL GAS INDUSTRY

The original Hart gas well produced until 1858 and supplied enough natural gas for a grist mill and for lighting in four shops. By the 1880s, natural gas was being piped to towns for lighting and heat, and to supply energy for the drilling of oil wells. Natural gas production from sandstone reservoirs in the Medina Formation was discovered in 1883 in Erie County. Medina production was discovered in Chautauqua County in 1886. By the early years of the twentieth century, Medina production was established in Cattaraugus, Genesee and Ontario Counties. Gas in commercial quantities was first produced from the Trenton limestone in Oswego County in 1889 and in Onondaga County in 1896. By the close of the nineteenth century, natural gas companies were developing longer intrastate pipelines and municipal natural gas distribution systems. The first gas storage facility in the United States was developed in 1916 in the depleted Zoar gas field south of Buffalo.

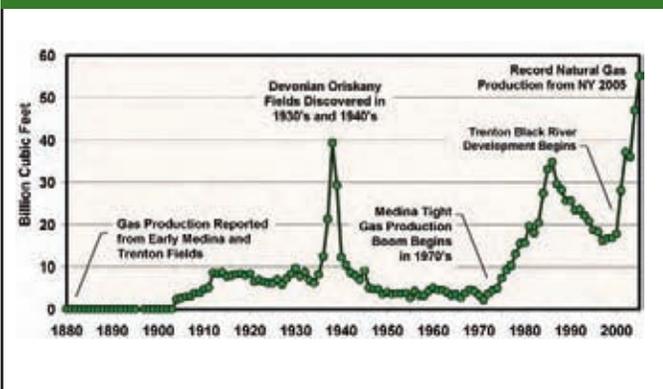
DESPITE NEW GAS DISCOVERIES, DEMAND OUTPACED SUPPLY

By the late 1920s, declining production in New York's shallow gas wells prompted gas companies to drill for deeper gas reservoirs in Allegany, Schuyler, and Steuben Counties. The first commercial gas production from the Oriskany sandstone was established in 1930 in Schuyler County. By the 1940s, deeper gas discoveries could no longer keep pace with the decline in shallow gas supplies. Rapid depletion and over-drilling of deep gas pools prompted gas companies in western New York to sign long-term contracts to import gas from out of state.

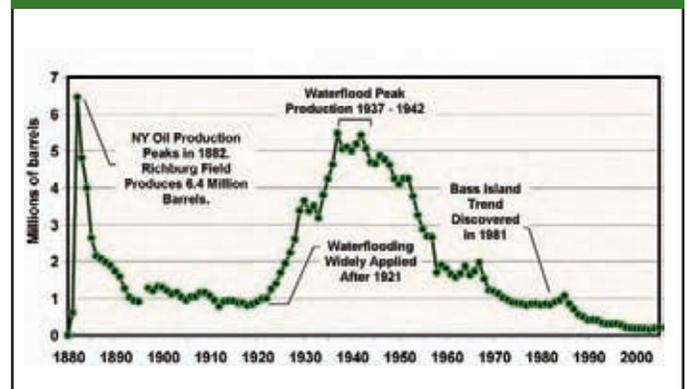
ADVANCES IN EXPLORATION AND PRODUCTION TECHNOLOGIES OPENED NEW GAS PLAYS

Onondaga reef fields were discovered by seismic prospecting in the late 1960s. Seven reef fields have been discovered to date in southern New York. Today, the Onondaga reef fields and many Oriskany fields are largely depleted and are being converted to gas storage fields. Hydraulic fracturing was widely applied in the 1970s and 1980s to develop low permeability reservoirs ("tight" gas sands) in the Medina Group. The rapid development of New York's current Trenton-Black River gas play is made possible by technological advances in three-dimensional (3-D) seismic imaging, horizontal drilling, and well completion.⁴

New York Natural Gas Production (1880 - 2005)



New York Crude Oil Production (1880 - 2005)





FIRST COMMERCIAL OIL DEVELOPMENT IN NEW YORK

Oil “springs” and natural gas seeps in western New York were long known to the local Native Americans who used the oil for a variety of purposes. In 1627, a French missionary Fr. de la Roche d’Allion, provided the earliest description of oil obtained from a spring now believed to be Seneca Oil Spring in Cuba Township, Allegany County. Col. Bradford H. Alden obtained the first lease for oil exploration in the state of New York from the Seneca Nation on December 15, 1859. Oil exploration in New York commenced a mere three months after the completion of William Drake’s oil discovery well at Titusville, Pennsylvania, the world’s first commercial oil well. Col. Alden drilled three dry holes by 1861; eventually, oil was produced in non-commercial quantities.

The first commercial oil well is credited to Job Moses and his Hall Farm Petroleum Company. The discovery well was located in Carrollton Township, Cattaraugus County. The Moses No. 1 well was completed in November 1865 to a depth of 1,165 feet and a cost of more than \$7,000, a huge expense for the time. Initial production was seven barrels per day. The first three Moses wells were marginal producers at best, but were later proved to be on the edge of what became the Bradford oil field and New York’s “oil belt.”



Job Moses #1 Well, Cattaraugus Co., 1865

CRUDE OIL REFINING IN NEW YORK STATE

New York’s earliest crude oil refineries were established in Olean in 1861 to produce lamp oil. Initially, the crude oil was purchased in Venango County, Pennsylvania and shipped by rail to Olean. The first crude oil pipeline in New York was completed in 1875, to deliver oil from New York oil fields to the Pennsylvania Railroad terminal in Olean. By 1877, oil refining had become a major industry in New York State. Buffalo had six refineries, New York City had forty-three, and Brooklyn had seven. Olean remained an important refining center, hosting the world’s largest refinery at one point. By 1948, the total number of refineries in New York State had dwindled to six, located in Brooklyn, Buffalo, Olean, Staten Island, Tonawanda and Wellsville, with total refining capacity of 90,000 barrels of crude oil per day. Today, no petroleum refineries remain in New York State. All of New York’s crude oil is trucked to refineries in Pennsylvania and West Virginia, with most going to the American Refining Group refinery in Bradford, Pennsylvania. New York crude oil is used in the manufacture of a range of products including motor vehicle fuel, home heating oil, lubricating oil, and other specialty lubricants.

ENHANCED RECOVERY, NEW DISCOVERIES, RISING PRICES

New York’s annual oil production peaked at approximately 7.3 million barrels in 1882. By 1914, 60 million barrels of oil had been produced in New York, but oil production from most oil wells had declined to under a barrel per day per well. The first water flood in New York was demonstrated in Allegany Field in 1911, but intentional waterfloods of oil fields were not widely applied until the 1920s. As waterflood techniques improved, New York’s annual oil production increased to a second peak in 1942 of more than 5.4 million barrels.

New York’s oil production entered a prolonged period of decline after 1942, as oil and gas exploration companies became more interested in other prospective areas. Following the discovery in 1981 of the Bass Island Trend in Chautauqua County, seismic techniques were used to explore for narrow, fault-controlled reservoirs in the Akron Dolomite. Rising crude oil prices since 2002 have spurred the first increases in drilling and production in the State in 20 years. This increased activity halted the long-term production decline. New York’s oil industry remains small and local, generally relying on low cost production methods. In 2005, the annual oil production of the average New York oil well was 76 barrels.

New York's "stranded oil" resources -- the oil remaining in a reservoir after traditional primary and secondary recovery operations -- are thought to be substantial. Throughout the United States, stranded oil generally represents about two-thirds of the original oil resource in place. For New York's old oil fields, stranded oil may be much as 80 percent of the more than the estimated one billion barrels of original oil in place. Approximately 255 million barrels of New York's stranded oil resources are estimated to be the maximum amount recoverable by future primary and enhanced recovery techniques.⁵ The future of New York's oil industry lies in finding ways to economically recover a portion of the State's stranded oil resources through innovative approaches to enhanced recovery tailored to New York's geology and operational history.



Barcelona Lighthouse, Lake Erie - first lighthouse to be illuminated by natural gas.



Richburg Oil Field Circa, 1890's



Modern New York Oil Field