

THE MACKSBURG OIL FIELD

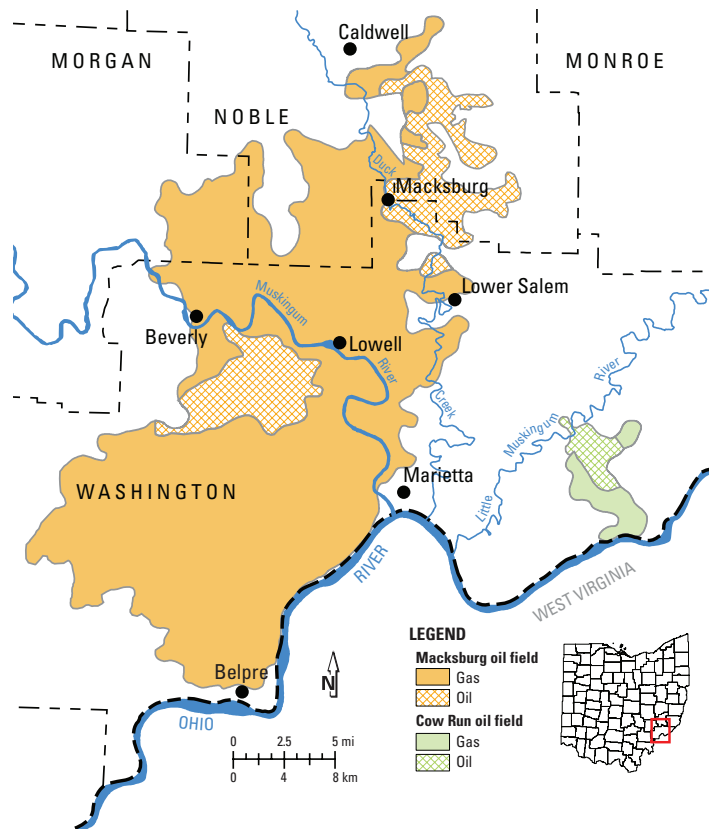
Ohio is credited with a long and rich history of oil production. Located near the town of Caldwell in Noble County lies one of the nation's first oil-producing wells. Drilled in 1814, the Thorla-McKee well is named after the two men responsible for its development, Silas Thorla and Robert McKee. Thorla and McKee intended to extract salt, not oil, from this well. The oil was unprofitable to pioneers at the time as there was no means of refining the oil for use. However, Thorla and McKee soon realized there was a market for the black crude. Once the brine and oil would separate in a barrel, a blanket was used to soak up the oil. When the oil was collected, it was then wringed out into bottles and sold as "Seneca Oil" to be used for medicinal joint and nerve ailments. Further south of Caldwell in Washington County, in the Duck Creek valley, is the town of Macksburg, which would soon be the site of one of Ohio's first producing oil fields.

DRILLING HISTORY OF THE AREA

Considered one of the earliest producing oil fields in Ohio, the Macksburg is located in Washington County surrounding the town of Macksburg and extending southwest through Washington County to the Ohio River. Drilling began in 1860 on a piece of land owned by William Rayley. In a joint endeavor, Rayley allowed James Dutton, Alden T. Warren, and John Smithson to drill on his land fronting Duck Creek. The location was chosen for drilling due to the oil seepage that was clearly visible on the surface of the creek. Early accounts recall swimmers emerging from Duck Creek with a film of oil on their skin. These areas were known at the time to be indicative of oil-producing locations.

The method employed to drill the first well into the Macksburg oil field was that of the earliest techniques used to drill or "kick" down a well. The method was comprised of a small tree (or "spring pole") supported in a forked upright and tied down or secured with a counterbalance at the larger end. A solid wooden rod was then attached to the smaller end of the spring pole by a rope or chain, with a cutting instrument connected to the lower end of the wooden rod. Two to three men would then perform the arduous task of quickly bringing the pole down using their own weight, causing the instrument to strike the bottom of the hole. Then the pole would raise itself or spring back up to be brought down again quickly. Attached to a derrick made up of three 20- to 30-foot-long timbers was a pulley system used to remove and reinsert the tools when necessary. This method was very strenuous and required a considerable amount of time. Thankfully for Dutton, Warren, and Smithson, oil was discovered at only 59 feet below the surface. However, the oil was too heavy and Dutton had difficulty disposing of it. Eventually he discovered the oil had value as a lubricant, which sold for as much as \$28.00 per barrel.

A year later, the exploration of oil had spread to southeastern Washington County as the Cow Run oil field also began to show potential. The success of the Dutton well sparked an oil boom in the vicinity of Macksburg. Oil derricks became a common sight in a short amount of time, and the small farming community of Macksburg became an epicenter for the emerging oil-production market. The initial oil boom brought oil men from surrounding states into the small town. Soon the town was crawling with oil-seeking men from other surrounding states. In response to



Map showing locations of the Macksburg and Cow Run oil fields in Ohio.

this growth in population, a number of hotels, saloons, gambling dens, brothels, and boarding houses sprang up, despite the local inhabitants' distaste for such establishments. The major influx of oil men on the small community also created a shortage of food and shelter. This period of rapid exploration was met with great discomfort for the local residents of Macksburg.

The main field of oil production was thought to be only in the vicinity of Macksburg in the Duck Creek valley. Macksburg wells were relatively shallow and produced an excessive amount of water, which caused extra cost to the operator due to the increased amount of casing. In 1861, oil had been discovered in an adjacent oil field located in southeastern Washington County known as Cow Run. The Cow Run discovery attracted drillers for a brief amount of time. Nevertheless, many of the wells were abandoned due to outbreak of the Civil War, declining oil prices from inflation, relatively short production, and the cost to transport the oil. In 1872, a land survey was conducted by a private producer. During this survey a well was found that had been drilled in 1865 and was pumping approximately five barrels per day. This well was soon rejuvenated and began pumping fifty barrels per day. Increased production and the completion of the Cleveland & Marietta Railroad had once again sparked the attention of operators.

It wasn't until 1874 when a Macksburg well, drilled to a depth of 140 feet, produced 150 barrels per day. For the next three years, an estimated 33 additional wells were placed in the

Macksburg oil field. In 1883, a well was drilled further outside the initial field of production. This well produced in excess of 100 barrels per day and was the first of the large Berea Sandstone producers. This large producer opened the possibility of extending the field into the nearby hills and valleys. By 1885, over 5,000 acres proved to be productive territory. In March 1885, production had reached 21,600 barrels and in July 1885, 79,700 barrels. The largest yearly production occurred in 1886 with a total of 703,945 barrels. From that point forward production slowly decreased and many of the operators moved outside the Macksburg field to expand operations in several other areas of southeastern Ohio. By 1900, the town of Macksburg was again a small farming community with nothing but the remnants of a once booming mecca of oil production.

GEOLOGY

Production of oil and natural gas in Washington County is owing to the geology of the area and a region known as the Appalachian Basin. The principal source beds that account for hydrocarbons associated in the Macksburg oil field are Devonian-age rocks: the Marcellus Shale, the Rhinestreet Member of the West Falls Formation, the Huron Member of the Ohio Shale, and the Cleveland Member of the Ohio Shale (see column of lithostratigraphic units). These source beds were deposited as muddy sediments in a nutrient-rich inland sea bottom. A low-oxygen environment facilitated the preservation of these organic-rich sediments before burial. Over time, these sediments were buried by various sequences of sand, silt, and clay; the heat and pressure from within Earth began to cook the organic sediments to create hydrocarbons. Migration of hydrocarbons is dependent on rock and fluid properties, including porosity, permeability, pressure, and temperature. Hydrocarbons migrate through porous and permeable rock units until they either reach the surface as seepage or become trapped under confining (impermeable, non-porous) rock layers. These hydrocarbons accumulate in porous layers as hydrocarbon reservoirs, which could be explored and produced by drilling.

Structural features and or irregularities account for many of the oil and gas accumulations. These structural features and irregularities consist of domes, ravines, noses, and terraces. The accumulation of oil and gas also depends largely on local structure, permeability, and porosity of reservoir rocks. The target rock units for oil production in the Macksburg field are Pennsylvanian- to Devonian-age sandstones. During the Pennsylvanian, eastern Ohio was dominated by vast low-lying coastal plains, deltas, and coastal swamps. The sequence of rock units associated with this period leave a record of multiple occurrences when the shoreline rose and fell. The sandstones capturing these hydrocarbons in the Macksburg are Upper Pennsylvanian to Upper Devonian in age and include the Cow Run, Buffalo, Mahoning, Upper Freeport, Homewood, Massillon, and Berea.

The development of the Macksburg led the way in Ohio's oil and gas production. Although the oil field had many setbacks, it is credited with expanding oil and gas exploration in Ohio. Many other oil fields were discovered in surrounding areas. The future may yet hold a place for further production in the Macksburg oil field, as unconventional drilling methods give access to the organic-rich shale source beds.

FURTHER READING

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SYSTEM/ PERIOD	SERIES	GROUP	LITHOSTRATIGRAPHIC UNITS	
PENNSYLVANIAN	UPPER	CONEMAUGH	Glenshaw Fm	Cow Run ss Buffalo ss Mahoning ss
	MIDDLE	ALLEGHENY		Upper Freeport ss
	LOWER	POTTSVILLE		Homewood ss Massillon ss
MISSISSIPPIAN			Logan Fm Cuyahoga Fm	Sunbury Sh
DEVONIAN	UPPER			Berea Ss
			Ohio Sh	Cleveland Mbr Huron Mbr
	MIDDLE	HAMILTON	Olentangy Sh Westfalls Fm	Rhinestreet Mbr Marcellus Sh

Fm = Formation Mbr = Member Sh = Shale Ss = Sandstone Ls = Limestone
 ~~~~~ Unconformity

*Simplified lithostratigraphic units of the Macksburg oil field and vicinity, showing hydrocarbon producing units (in blue) and source rocks (in red).*



STATE OF OHIO  
 DEPARTMENT OF NATURAL RESOURCES  
 DIVISION OF GEOLOGICAL SURVEY

