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Drilling in the Denver-Julesburg Basin officially began in 1862

Today, 46,000 wells operate in the D-J Basin

By David Persons
For The Tribune

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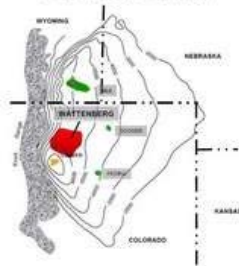
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Five oil derricks can be seen in this oil field near Boulder between 1901-1920. A horse grazes in front of some small cabins at the right. The wood frame buildings were residences for workers. Oil storage tanks and a production facility can also be seen. *Courtesy of Denver Public Library*

Denver Basin



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This map shows the general location of the Denver-Julesburg Basin and the Wattenberg Field.

Courtesy of shaleoilandgas.blogspot.com

When oil and gas officials talk about the current oil boom in northern and northeastern Colorado, they are talking about the Denver-Julesburg Basin, or D-J Basin.

This 70,000-square-mile, oval-shaped area, generally stretches northeast from Denver to Julesburg but includes portions of western Kansas, western Nebraska, and southeastern Wyoming.

The D-J Basin is widely-known for its natural gas-rich Wattenberg Field north of Denver and the rapidly-developing Niobrara shale oil field play.

Within the D-J Basin today, there are approximately 46,000 active oil and gas wells with more on the way, state oil industry officials say.

But, the D-J Basin hasn't always been so busy. In fact, it's taken some time to get developed.

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The origin of the basin began about 300 million years ago during the formation of the ancestral Rocky Mountains. As the mountains rose from the bed of an inland seaway, they pushed the rocks and other materials down into what would become the basin.

About 45 million to 65 to million years ago, the beginning of the modern Colorado Rocky Mountains began. The uplifting of the mountains along the Front Range caused the earth's crust near Denver to bend or buckle downward on the eastern side, making the basin even deeper.

The basin later filled with sediment that eroded from the mountains and organic materials that led to the creation of oil and natural gas. In the end, the Rocky Mountains rose nearly 22,000 feet from the floor of the basin under Denver.

Today, the basin is a petroleum reservoir with coal, natural gas and oil collecting in or between various shale, sandstone, and limestone formations at depths of 7,000 to 13,000 feet.

But, no one knew that until the early 1860s.

The first successful oil well in Colorado was drilled in 1862 in Florence, near Canon City. That's significant since it was just the second oil field to be drilled after the discovery of oil in Pennsylvania three years earlier.

Although it's located at the southern terminus, it is still considered to be in the D-J Basin. That early success should have started a big oil boom in the state, but it didn't.

The next successful oil field in the D-J Basin didn't occur for nearly 40 years. The McKenzie No. 1-21 struck oil in 1901 in Boulder County. It reached a peak production of 85,000 barrels in 1909. While that well is over 111 years old, it continues to produce oil today.

Geologists and oil industry officials say oil drilling and production was slow over the next 60-70 years, only speeding up when new technology became available.

The early oil rigs, for example, used a simple chipping or percussion drill technology that was man or animal-operated. Then in the late 1800s, that was replaced by a steam engine-powered, crank bit drill. That was replaced in the early 1900s with a combustible engine drill and later, in the 1920s, with a rotary drill. Different variations of the rotary drill are still being used today.

The combination of slow change in drilling technology and the off-and-on demand for oil production contributed to the herky-jerky production of oil in the D-J Basin, says a state geologist.

"The D-J Basin didn't really take off until the discovery of the Wattenberg Field (in 1970)," said Chris Eisinger, a senior oil and gas geologist for the Colorado Geological Survey.

Production of the Wattenberg Field, a 100-square-mile field of natural gas within the D-J Basin, didn't start seriously until about 1973. The field includes portions of Weld, Adams, Boulder, Broomfield and Larimer counties.

Although, production was slow initially, the field currently has over 12,000 oil and gas wells. The Wattenberg has already produced more than 4 trillion cubic feet of natural gas and ranks eighth in the U.S. in terms of gas reserves.

Eisinger said the depth of the field required newer technology and that contributed to its slow development.

"It also may have had to do with supply and demand," Eisinger said.

In recent years, the development of horizontal drilling and hydraulic fracturing has allowed oil companies to seek out oil and gas in the rich, but previously difficult to reach Niobrara play in the D-J Basin.

"The horizontal drilling and hydraulic fracturing - that was a real game-changer," Eisinger said.

Ken Carlson, an associate professor of civil and environmental engineering at Colorado State University, agrees.

"The new, recent technology has opened up a whole new area (for oil exploration)," Carlson said. "We knew (oil) was there. Now, the technology allows the hydrocarbons (oil and gas) to be gathered more efficiently."

In addition to the improvements in drilling equipment technology, Eisinger said the ability to collect data within the drill hole has also greatly increased the success rate for oil companies.

"This new data allows us to know where we are," he said, "and that's very important."

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