

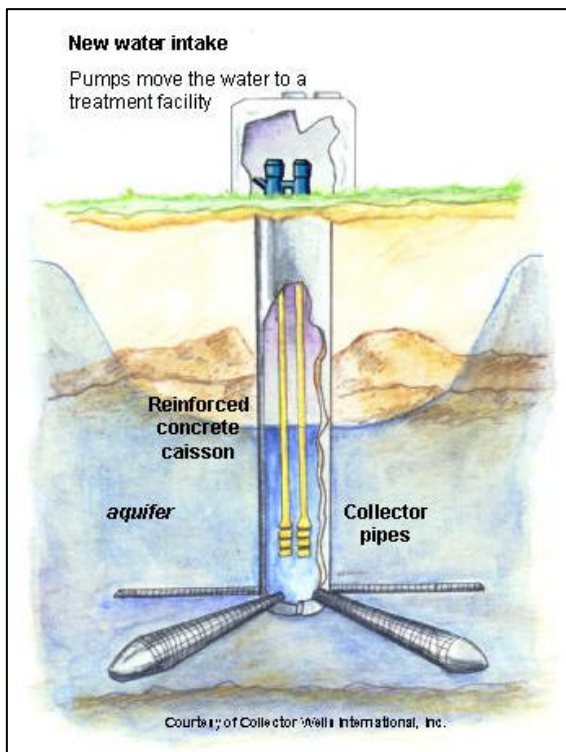
# City Testing the Waters

*If plan works, Bismarck's water-intake system could be world's largest*

By **TONY SPILDE**  
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A pile of busted metal shafts laid discarded in the weeds, each caked with dried mud that looked like day-old oatmeal.

The drilling machine to which the shafts were once attached rattled and hummed nearby Thursday, on the east bank of the Missouri River. It drove a new set of shafts – attached to a toothy bit as big as a pumpkin – incessantly downward through the sand and gravel. Mud and black lignite flowed up out of the hole as the bit dug deeper.



If you've traveled between Bismarck and Mandan recently, you've probably seen the big green contraption. A well-drilling company from the southeast part of the state has its rig set up between the Memorial and Expressway bridges, on the Bismarck side.

The city is literally testing the waters to see if a new type of water-intake device could be built there. If so, it could be the largest of its type in the world and the first in North Dakota.

The device is called a horizontal collector well, which could eventually supply the city with greater quantities of water at less of an operating cost. Over the next 20 years, the city wants to go from its current output of 30 million gallons of water per day to 50 mgd to keep up with the demands of a growing population. Horizontal collector wells provide a more efficient way to do that.

The idea is to pull water from an aquifer below the Missouri instead of taking it directly from the river.

Since the construction of Garrison Dam 50 years ago, the stretch of the Big Mo between Bismarck and Mandan has become an area where the river dumps considerable sediment. **Brett Jochim, an engineer at Advanced Engineering in Bismarck**, said the city's current water-intake plant acts as a vacuum for those sediments.

"That's a problem up and down the river," Jochim said. "With conventional intake systems, it's almost inevitable that you bring a lot of sand in with the water. Sand really wears on equipment all the way through the plant."

The sand and other sediments that come in, along with bacteria, mean more people are working longer, with more chemicals, to treat the water. The city thinks a horizontal collector well would cut down on the operational costs and chemicals used.

By taking water from an aquifer below the river, the city would be tapping a cleaner source, Jochim said. Much of the sediment and bacteria gets filtered as the water leeches through the material below the riverbed.

“The theory is to let Mother Nature do a lot of the filtering for us,” said **engineer Deon Stockert, also with Advanced Engineering**. “The water will be cleaner from a horizontal collector well.”

To access the aquifer, a concrete caisson is sunk into the ground, down to about 150 feet. Screened collector pipes radiate from the bottom to collect water and filter gravel. Water travels from the collector pipes to the main pipes in the caisson, which pump the water from the aquifer to the treatment plant.

Stockert helped design the world’s largest horizontal collector well in Kansas City, which grabs about 40 mgd. He said the city is very happy with its well and is planning to drill a few more.

“This is a big, big deal,” Jochim said. “This technology would be the first one in the state. We’ve spent a lot of time since 1998 optimizing the (current) plant, taking what’s there and making it as good as it can get. We’re at the point now where we’ve done just about everything we can do that way. The City of Bismarck isn’t going anywhere, and they’re going to need more water.”

The need for more water isn’t immediate. Keith Demke, director of Bismarck’s utility operations, said the city isn’t strapped for water but is planning for the future. It has the luxury of time to test the horizontal collector well idea to see if it’s feasible. A smaller-scale test well – the one described above – is being dug now. It will pull water from the aquifer for 72 consecutive hours. Advanced Engineering will use four observation wells to check the effect on the aquifer, to see if the river recharges it at a rate to keep up with the draw.

If the test is successful, Demke said, the well could soon be put on the city’s capital projects list and be operational in a couple of years. Odds are it would take longer than that, though, as other projects would take priority.

If the test proves unsuccessful, the city would look at a bigger intake system that pulls in surface water.

“The nice thing is we’re not frantically trying to get enough water,” Demke said. “It’s not something we have to have in the next few years. We’re planning for the future. It’s very likely the kind of project that might be built in phases.”

Since it hasn’t been determined whether such a well can work here, and a horizontal collector well specific to Bismarck’s needs hasn’t been designed, Demke doesn’t know how much the project would cost. He ballparked it at \$6 million-plus.

Mandan is closely watching the goings-on of its neighbor. Jerry Zander, superintendent at the Mandan Water Treatment Plant, said that city is in the same water situation as Bismarck. It’s planning to have a siltation study performed and may consider a horizontal collector well if one works in Bismarck.

“We can’t have sandbars clogging up our intake, wearing on our pumping equipment,” Zander said. “But it’s too early to determine what the city is going to do. We would need to do a study.”