

Larger wells for Muncie

Municipal wells in rock call
for Dilden Bros. T2W and
QL 120 hammer

To make sure the casing was still seated in the limestone, Findlay set the hammer's bit on timbers over the casing and gave it some love taps.



When contractors of large commercial and municipal projects need a helping hand to drill quickly through rock, Dilden Bros. Well Drilling often gets the call. The company's Atlas Copco Secoroc QL 120 down-the-hole hammer gives Dilden Bros. access to a niche market in the multi-state geography within reach of their Lafayette, Ind., headquarters.

Brothers Wayne and Don Findlay have co-owned Dilden Bros. Well Drilling since they bought the company from Jude Dilden back in 1985.

Wayne Findlay said when he first started using pneumatic technique on the occasional rock he encountered, he never dreamed he'd eventually be hammering 15-inch diameter bores with his Atlas Copco T2W water well rig. But after acquiring an auxiliary compressor to help their T2W rig run its first 8-inch (203 mm) hammer, Findlay said, "We were doing so well that we knew we had more than enough air to go bigger." That's how Dilden Bros. worked its way up to the 12-inch QL 120.

Bigger holes faster

On this particular job Bastin-Logan Water Services of Franklin, Ind., subcontracted Dilden Bros. to help with two replacement wells for Indiana-American Water Co., the company providing water services for Muncie, Ind.

Delford Dunn, the Bastin-Logan project manager on the site, said: "We do have our own rigs for large diameter sand and gravel drilling. But on jobs like this it just makes sense to call Dilden because they can get through rock so much faster with their hammer."

Delford said in comparison it might take Bastin-Logan three to four weeks to complete a well without bringing in Dilden's QL 120. In spite of the soggy conditions, Dilden spent just three and a half days on this hole, start to finish.

Findlay explained that drilling large well bores with air is really a sideline. It works for his company because they made the investment in tooling, and they have a rig with sufficient torque and pullback for tools this size.

In Dilden's case, he said, a new T2W Series III water well rig was working fine. Torque was no problem for them, either for 24-inch rotary or 15-inch percussion. The three-speed rotary head has 12,000 foot-pounds of torque at 80 rpm, 8,000 foot-

pounds at 120 rpm, and 3,500 foot-pounds at 275 rpm.

With the rig's 410 hp (372 kW) engine, 30,000-pound (13,607 kg) pullback capability and 15,000-pound (6.9 metric ton) hoist, Dilden comfortably bores to 24 inches as part of their normal well services repertoire.

Dilden driller-helper John Baker guided the QL 120 as it was hoisted into position. Smiling broadly, he said the company has had the QL 120 for six years now without any trouble and without having to rebuild or repair it.

Muncie's primary source of drinking water is actually the White River. Whereas these water wells will produce hundreds of thousands of gallons of water a day, the river can supply millions. The groundwater is blended with water from the river prior to Indiana-American's treatment process. Treatment of this blended source water results in improved water quality at lower cost for customers.

The aging 8-inch wells needed a size upgrade to keep up with demand. Dilden's assignment was to drill two 320-foot well profiles that began at 24-inches in diameter. These were to be cased with 18-inch steel through sand, clay and gravel layers and sealed 3 feet into limestone. Once into limestone, the profile would narrow to 15 inches and continue down to shale lying just past 300 feet (90 m).

Drilling in a flood plain

It had rained a couple of days prior, and the forecast was calling for more. The site was just a few feet above river level and only a few dozen yards from the bank. Any more moisture could threaten completion, as the spongy, saturated ground constantly wanted to swallow them. Findlay had stopped once already to add more ground support under the rig.

(right) Project manager in the field Delford Dunn gives a tour of the completed first well Dilden Bros. did earlier. The raised deck gives an indication of what water levels along the White River were during its "150-year flood." Groundwater from both wells will be pumped to the nearby treatment facility where it will mix with water from the river. Indiana-American Water Co. blends the water before treatment, having found they can improve quality with lower cost to the customer.





Once a 15-inch socket is created in the limestone, Wayne Findlay switches from mud to air to put the QL 120 to work. With a 15-inch concave bit, rate of penetration was anywhere from 10 to 15 inches per minute in fractured limestone.



(below) Helper Mike McCaw prepares the QL 120 with 15-inch bit for hoisting. The crew will use both the main and auxiliary lines to guide the big hammer into place. Then two collars totaling 7,000 pounds will stand between the hammer and 6 5/8 inch pipe.



» Findlay cleaned the cased top portion of the well and sent down a stepped tri-cone starter bit into the limestone. This was an 18-inch diameter reamer of bit thirds with a 15-inch tri-cone extending ahead of it. The pilot bit created a perfectly centered rock socket to start the QL 120 with a 15-inch bit.

When chip samples from the discharge convinced him the pilot hole was cleanly cut into the limestone, Findlay withdrew the piloting bit and switched the T2W over to air.

Once in the hole, the hammer was followed by two collars, one 12 inches and the other 8, to give it about 7,000 pounds of weight. Then a sub adaptor connected the lower part of the string to 20-foot lengths of 6 5/8-inch pipe.

A veteran driller, Findlay tuned weight-on-bit by ear and string vibration. "We're holding back some, but I couldn't give you a set number," he said. "I just listen and see how it's acting. It's drilling really well."

The 1070 cfm (505 L/s) auxiliary compressor boosting the rig's 500 cfm (236 L/s) compressor was set to about 225 psi (15.5 bar). Findlay added water at 4 gpm. No adjustments were necessary during the completion of 15-inch hole to 320 feet (97.5 m). Twenty-foot pipe lengths descended out of sight at rates of 20 to 25 minutes each, with drilling progressing at 10 to 12 inches a minute (255 to 305 mm/min.) from start to finish.

"I'm very pleased with the rate of penetration," Findlay said.

The drill's progress also impressed Dunn: "That hammer is just amazing."

Also on Findlay's crew that day was new-hire Patrick Taylor. This was Taylor's first time seeing a hammer run. He had been working a Kelly rig for the past 20 years. "Dilden Bros. is introducing me to top head operations," Taylor said. "And I'm impressed. It's so smooth."

As for the hammer, Taylor said, "I just can't believe how fast it is. I mean, look at that, that large a hole, and in rock. I've never seen anything like that."

The first well drilled by Dilden on this job already had its head on and its decking set up. Forty feet of 18-inch casing was set 5 feet into limestone, and then it was bored by hammer to 324 feet total depth. Dilden completed all but 40 feet on this second hole by dark and returned to finish it the following morning.

Initial estimates judged the wells to be producing at about 800 gpm each prior to testing. Formal testing was scheduled later. ☉

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Patrick Taylor
Driller, Dilden Bros. Well Drilling

With 20 years' experience on table drive rigs, but new to top head rigs and percussive drilling, new-hire Patrick Taylor said, "I just can't believe how fast it is ... that wide a hole, and in rock. I've never seen anything like that."

