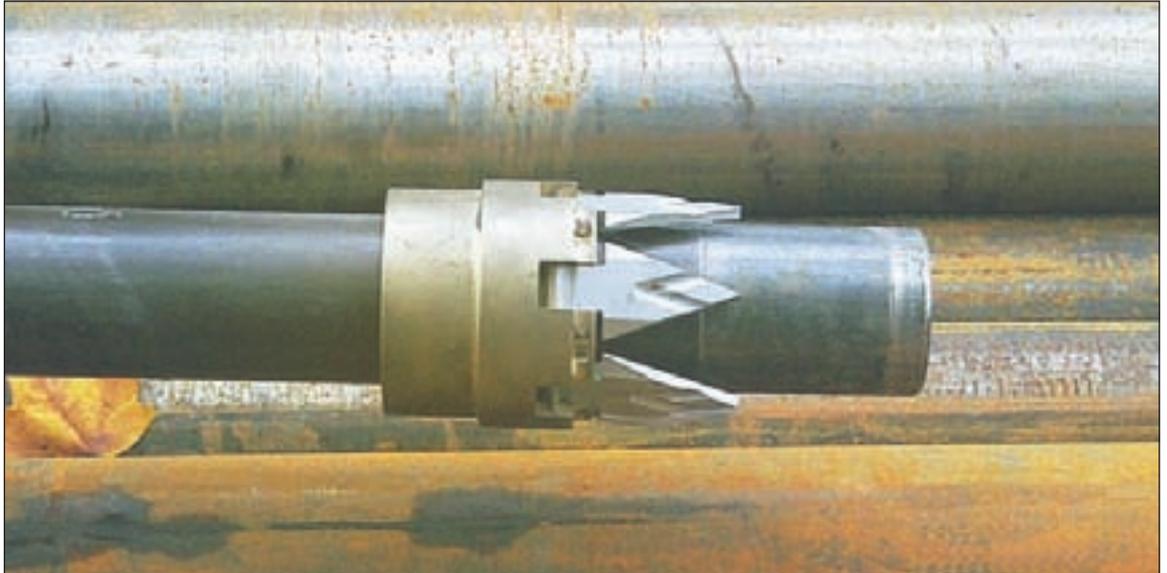


The inner tube passing through the open AquaGuard valve



“First Drilling Group was tasked with drilling underground core holes in a zone of known high-pressure, high-flow and high-temperature groundwater”

Keeping drillers out of hot water

Canadian diamond-drilling tool manufacturer Fordia’s new solution helps underground drillers cross zones with high-flow groundwater, while maintaining good core recovery

The underground drilling environment presents a myriad of challenges.

Often groundwater is unexpectedly encountered in the drill hole, and extremely high flow rates and pressures are not uncommon.

High-pressure and high-flow groundwater can have disastrous results for a drilling operation. Drillers may have to abandon operations or deal with hazardous working conditions. Beyond

the obvious safety issues associated with groundwater, time and efficiency is lost as drillers try to deal with the sudden high-pressure water gushing out of the drill hole.

Fordia, a Canadian manufacturer of diamond tools, equipment and accessories for mineral exploration and geotechnical companies, recently launched AquaGuard – a solution that is designed to allow drillers to safely cross zones with high water inflow.

The new product can be used for underground as well as surface drilling, and was originally developed as a solution to the challenging conditions facing one of Fordia’s customers.

DIFFICULT CONDITIONS

In Nevada, First Drilling Group, a provider of exploration and production drilling services, was tasked with drilling underground

core holes in a zone of known high-pressure, high-flow and high-temperature groundwater. The rock formation here consisted of broken, fractured volcanic dyke, and clay and sand.

To accomplish the job without compromising core size, the drillers were faced with water spouting from the hole at a rate of 200psi (13.8bar) and 800gal per minute (3,028L/min), as well as temperatures in excess of 125°F (51.67°C). The hole completion rate was only 50% and working conditions were dangerous.

While recovering core samples, there was an increased risk that the inner tube would exit the drill hole at high speed due to excess water pressure. What is more, drill crews had to deal with unrestricted, high water flows that were pouring into the drill station every time they had to add a rod or change a tube.

In some parts of the mine, conditions had become so difficult that the drill crews were faced with losing a hole or drilling with zero core recovery. Time was lost and productivity dropped up to 50%.

GUARDING THE FLOW

By using AquaGuard, First Drilling Group was able to reduce the water inflow from up

An AquaGuard adaptor



to 800gal per minute to only 20gal per minue.

The system has a valve that partially limits the water from flowing into the drill string when positive pumping pressure is off. The valve closes on itself, similar to a check valve, when the inner tube is recovered using wireline coring methods.

When the inner tube is pumped back into the hole, the AquaGuard valve will reopen to allow the tube to gain its locked position.

To create space for the AquaGuard valve in the rods, the system's core bit has a wider kerf (or cutting area), reducing the core to one size smaller than the actual hole. The customer's drillers were using an HWL outside diameter with a NWL core size. The inner tube was the same diameter as the core (NWL) and required an AquaGuard



adaptor to connect to the HWL head assembly.

Once the drill hole advanced beyond the water inflow zone, drillers were able to trip all the rods and resume drilling with the original size without the need to reduce the hole.

"Having to deal with high inflows for 12 hours consecutively is hazardous, strenuous and extremely time-consuming.

Using this system is much safer. With the limited water flow, adding rods and changing the inner tube was much more efficient. Our operating time was reduced significantly," says First Drilling Group's operations manager.

The AquaGuard valve reduced inflows, and thus prevented core from being washed away. In addition, the crew appreciated the fact that the drilling station was not flooded with excess water, flowing into the primary travel ways and eroding the roads.

"The AquaGuard solution allows drilling crews to safely and effectively drill in geological conditions that are extremely challenging," says Hélène Coulombe, director of sales at Fordia. "These customers can now recover high levels of quality core." ♥

The AquaGuard positioned inside the reaming shell

"Having to deal with high inflows for 12 hours consecutively is hazardous, strenuous and extremely time-consuming"

This article was written by Dani Knezevic

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