

# Partnership approach to borehole cleaning delivers clear results

*When a large water utility company identified iron bacteria problems with three of its boreholes, it asked two borehole specialists to remediate the issue.*

Working together, borehole maintenance specialist Drilcorp and treatment experts Geoquip Water Solutions, came up with a two-pronged approach involving physical and chemical treatment to deliver exactly what was required to solve the problems.

A combination of a mechanical clean by jetting and airlifting to clear initial loose sediment and sludge, was followed up with acidisation to remove any long-lasting bacteria and help prevent future regrowth.

Mike Bushby, Contracts Manager within Drilcorp's Borehole Engineering Services division, explains: "These boreholes were part of a key water supply for two large areas of population and understandably the water company was reluctant to take them out of action for any length of time.

"Two recently drilled boreholes were supporting the water demand for the local area while the works were undertaken, however it was important to complete the works before any increase in supply was needed."

Work began at the site in October 2019, with the first step being to remove the 8" riser pipe with flanged connections out of each borehole, a lengthy process involving a mechanical overhead gantry crane and grinding old rusted bolts. A camera inspection identified the condition of the three wells and at what depths required the most intense jetting from the Borestorer.



**Photo shows typical iron bacteria residues on a pipe prior to treatment. © Drilcorp**

A partial collapse of part of one borehole wall meant large pieces of iron, broken stones and pebbles had also been deposited, and the team was faced with a significant build-up of sediment and sludge. The third borehole had high suspended solids and turbidity requiring intensive airlifting.

The Drilcorp team first performed an airlift operation in each borehole and followed this up by bringing in its new Borestorer jetting machine.

Mike explains: "The Borestorer uses high pressure jetting technology inside the borehole, injecting water on a spinning wheel to quickly and efficiently remove any material encrusted onto the casing. This technology not only cleans the casing, but penetrates the formation opening fractures and pores previously blocked to improve well efficiency.

"The jetting was carried out over an eight-hour period per borehole, after which we performed another airlift to remove remaining debris, gathering it into tanks ready for disposal and safely pumping the wastewater into a nearby stream."

With physical cleaning completed, the next stage was an application of Geoquip's BoreSaver Ultra C Pro, a proven biodegradable well rehabilitation treatment solution which is well-known in the industry for tackling iron contamination

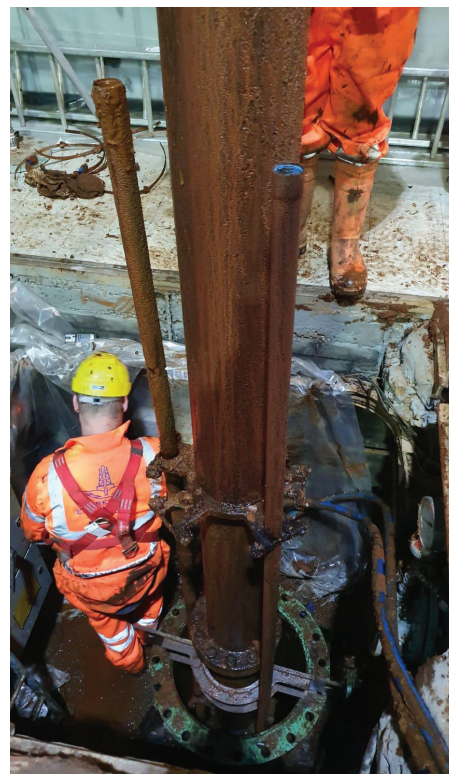
Mike Deed, from Geoquip, said: "We had been involved in discussions with the water company, consultants and contractors over a period of time, during which BoreSaver was specified as the best treatment solution.

"A professional mechanical cleaning practice, as performed here by Drilcorp, to remove much of the loose debris and sediment from the borehole as possible, is an essential part of a good, cost-effective treatment.

"This can, of course, impact on the amount of chemical required – getting the right dosage and using the correct methodology is very important in being able to achieve the best lasting results."

Additional maintenance and repair work, which was carried out by Drilcorp's engineers, before EGS, geophysical company, moved in to identify the well cavity properties, such as the cement bond and formation configuration.

Following cleaning, Drilcorp undertook a series of tests on each well. These tests consisted of clearance pumping with surging; to remove residual sediment and lower turbidity, step



**During the pump removal process. © Drilcorp**

rate testing; to identify the well efficiency and result of the cleaning, and finally a constant rate test; to observe the reaction of the aquifer to pumping. For this testing Geoquip supplied an energy-efficient 150kW Franklin Electric E-Tech borehole pump which ran with an inverter with abstraction rates up to 80l/s.

The data from the testing was sent to the client's hydrogeologist, and the new hydraulic and water quality potential was calculated by the client.

The client's Hydrogeologist then informed Drilcorp that the cleaning had improved the performance of all three boreholes.

A stainless steel ZSM rising main supplied by Drilcorp replacing the old flanged rising main in the three boreholes. Each of the headplates was refurbished by the sub-contractor George Green, the final element of the works was to install the above equipment into each borehole.

The project was an overall success with Mike Bushby commenting: "By using both the Borerestorer and BoreSaver cleaning processes, we were able to provide a good all-round clean and the combination of these processes, together with the partnership between our two companies, worked really well."

Mike Deed concluded: "We were pleased that we were able to work in partnership with Drilcorp to overcome the contamination problems and ensure these boreholes were once again ready to supply both the quality and quantity of water required by the utility company to serve its customers."

For more information, visit [www.drilcorp.com](http://www.drilcorp.com) and [www.geoquipwatersolutions.com](http://www.geoquipwatersolutions.com)