# Sonic Rigs Set the Pace

Drilling geothermal holes in under three hours, sonic rigs have set the pace. Drilling a test hole for a future geothermal project, a Sonic Drill Corporation rig was able to bore past 300ft and complete the hole in two hours and three minutes.

The drilling project, part of a law library extension for the University of British Columbia in Canada, was contracted to Hemmera Energy, a division of Hemmera Environmental Services Consultants in Vancouver. In this initial first step, the company was asked to conduct a feasibility study to see if it was practical to install a geothermal field in the proposed extension.

"Our role is to do the test holes to see if a larger-scale project is feasible," said Christiaan Iacoe, an environmental scientist and consultant at Hemmera Energy. "If you're going to drill 200 holes or more, it's good to know the conditions."

Located on the campus near the high sand bluffs overlooking Burrard Inlet, the plan was to drill a single 350ft hole. The initial hole was drilled using a conventional mud rotary rig but, when the drill rig passed the 320ft mark, it stopped in its tracks, so a sonic drill was brought in as a 'rescue rig'. The only problem it encountered was when installing the geothermal loop into the hole, it was too buoyant due to saltwater intrusion.

Sonic Drilling Ltd general manager Bill Fitzgerald said: "We always add rebar to compensate but, this time, we didn't have enough. By the time we got more rebar, our pipe had now become stuck. "We over-drilled the stuck pipe, removed it, moved the rig ahead, cleaned up and drilled the next hole," he said. "I don't know the time on that one. We didn't measure it but it must have been pretty close. We installed the geothermal loop and there was no problem." When it comes to test holes, Mr. Iacoe says any failed attempts are just as useful as ones that are successful. "If it shows it's not realistic to drill at that site, that's really important."

"Our job is to produce a feasibility report, so what we do is drill the test hole and install a geothermal test loop," he added. "We have a piece of equipment that runs off a pretty big generator, which applies a constant temperature to the fluid in the loop. That gives us a temperature-versus-time situation to see what the actual heat transfer is."

Mr. Iacoe says, based on the geology of the site as well as moisture conditions and other factors, they get a range of values including thermal conductivity, thermal diffusivity and deep ground temperature. If the decision is made to proceed with a larger field, this information gives mechanical engineers, in the design phase, the ability to use the actual numbers in designing the system, rather than projections. "That's way, way more accurate," says Mr. Iacoe.

"We also pinpoint challenges at each site for full-scale construction." He said of sonic technology: "Their drillholes are fully encased so there is not as much sloughing and they can grout a borehole and retract the casing, compared to a mud rotary, which just leaves an open hole."