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Drilling in Canada's Pristine Arctic

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Decades ago, huge natural gas deposits were discovered in the Mackenzie Delta area, northwest of Inuvik, in Canada's beautiful frozen western arctic. As luck would have it, proving out the reserves underneath Parson's Lake was no easy feat of logistics and endurance as temperatures dipped to -40 C and winds howled across the lake's frozen surface.

Ironically, although the arctic presents an often-inhospitable environment, it was the abundant aquatic life of Parson's Lake that needed as much protection from the men working on it as the men needed protection from the unforgiving climate around them. To accomplish that, ConocoPhillips, the company tasked with the difficult job of proving the reserve, chose a sonic drill. In Canada, proving out a gas reserve usually comes with a blast – created by using explosives, lowered down a drill hole, and geophones, used to listen and record the percussion wave created by the blast as it travels through the rock below. But, in pristine arctic environments, an explosion could be devastating, especially in sensitive marine environments.

With concerns over creating turbidity during the drilling process as well as delivering a blast deep enough to prevent a possible fish kill, the only option available was a sonic drill. Positioned on ice two metres thick and huddled inside a protective rig cover, the crews of Sonic Drilling Ltd. worked 24 hours a day, carefully drilling through ice, water, lake bottom and then on through a mixture of sand, wet clay, silt and gravel to depths of 50-80 metres.

By using the sonic drill, ConocoPhillips was able to bore fast through the wet clay, without using drilling mud and with no disruption to the surrounding sensitive lake environment. With the sonic drill's ability to drill and case in one-step, explosive charges could then be easily inserted, with each charge's depth and location verified. The results were explosively successful – gathering important data, core samples and proof of the gas reserves below. Just as importantly, all environmental regulations were met and the unique arctic aquatic world around the drillers was spared from any human-caused damage.

Drilling in Tough Urban Conditions



In the province of Ontario, GeoEnergy Solutions Inc., of Bolton, has been able to position itself as a leader in the expanding sector of geothermal drilling by using a sonic drill rig. "The sonic drill is extremely efficient," says Jeremy Beatty, president of GeoEnergy Solutions Inc. "We purchased our Sonic SDC 550 from the outset since we had heard many positive things about the outstanding performance provided by these rigs. In the three years-plus that we have been using this equipment, we have been more than happy with the results in our various drilling projects," says Beatty

Beatty describes the company's biggest project of the summer of 2008, for Idomo Furniture in North York, as having been particularly challenging given its scope as well as the on-site ground conditions. "We had to drill through 200 feet of overburden and case the material as we progressed downward, then, switch to a different technique as we reached the bedrock. The versatility of the drill allowed us to do this quickly and we were able to bore 66 holes to a depth of 550 feet in two and a half months," says Beatty. The challenging working environment meant having to bore some of the holes at a distance of only ten feet away from the building, which meant that they had to drill at night for three weeks to avoid disrupting Idomo's business.

Another noteworthy project for the company was one that involved drilling a geothermal installation before the actual building was built by Toronto Community Housing. GeoEnergy took on the task of drilling 50 bore holes to a depth of 430 feet, taking into consideration an extra 30 feet of drilling for the two-level underground parking facility.

"The unusual part of this operation was that we had to cut away the pipe casing 30 feet below ground level to allow for the subsequent construction of the underground parking. We then had to remain on site while they were doing the excavating to make sure they did not damage our pipe installation."

It's All a Matter of Geology



After more than 27 years of development and testing, the sonic drilling method has found its niche market in geothermal installations, environmental investigations and mineral exploration but, every year, companies find new applications for it.

"For us, the geo-construction market has really opened up over the past few years as people learn what a sonic can do," says Shane Hughes, sales director for Miller Drilling Co. Inc. Based out of Lawrenceburg, Tennessee, a southern state that Hughes refers to as "rock country," Miller Drilling's sonic rigs are typically deployed where the ground conditions warrant their use – conditions where there is substantial overburden or water in the formation.

Miller Drilling has been using sonic drill heads, manufactured by the Sonic Drill Corporation, since the late 1990's and, today, the company is in high demand for the advantages this drilling technique brings. "Our sonic rigs are scattered all over the country," says Hughes. "What impresses most people is the ability of the sonic rig to drill dry – because it is so much less intrusive, particularly when you are talking about dam remediation. Everyone is concerned about hydro-fracturing or getting high-pressure air into the formation."

Miller Drilling has worked on two of the largest dam remediation sites in the United States using sonic rigs. With four sonic drill rigs constantly on the go, Hughes says "it all comes down to geology." "Basically, a sonic rig is capable of getting through things that would take several other conventional methods to get through." A few years ago, Miller Drilling was asked to demonstrate the sonic drilling method against the ODEX method so that the US Army Corps of Engineers could decide on their preferred choice for a dam remediation project. The sonic drill won and Miller Drilling was, once again, sending their sonic rigs to a high-profile project.