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Deep Groundwater Monitoring in Alberta's Oil Sands: Challenges and Solutions

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Groundwater monitoring programs are an important part of the operational requirements for mining and in situ oil sands operators. These programs allow oil sands operators and regulators to monitor changes in groundwater levels and hydrochemistry to detect effects on the underlying shallow groundwater and deeper regional aquifers. Monitoring well networks supporting these operations are highly variable including well completions that range in depth from shallow water table wells to several hundreds of meters depth, variable well diameters and wellhead configurations that can encompass vented well caps to highly pressurized wellhead equipment. This variability within the well networks together with remote well locations and specific equipment required present significant challenges to consistently obtain accurate data to support the monitoring programs.

Some of these challenges include logistical planning to access well locations with all-terrain vehicles or helicopter; choosing sampling equipment that is light, portable and can be set up quickly and easily and that must work reliably under extreme temperatures; and implementing safety procedures that address the presence of gases in highly pressurized wells. Groundwater monitoring programs at oil sands operations have been in operation specialized methods and progressive tools have been developed to assist with the efficiency and reliability of data collection. This poster will provide some insight into the specific tools, sampling methods and procedures that have been developed to address the challenges in improving monitoring efficiency and ensuring quality data collection.