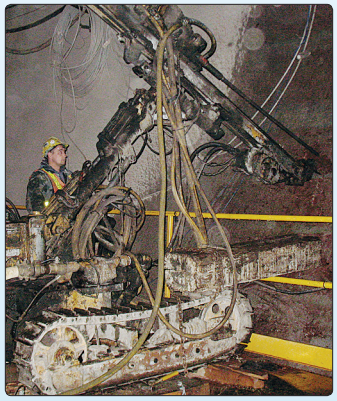
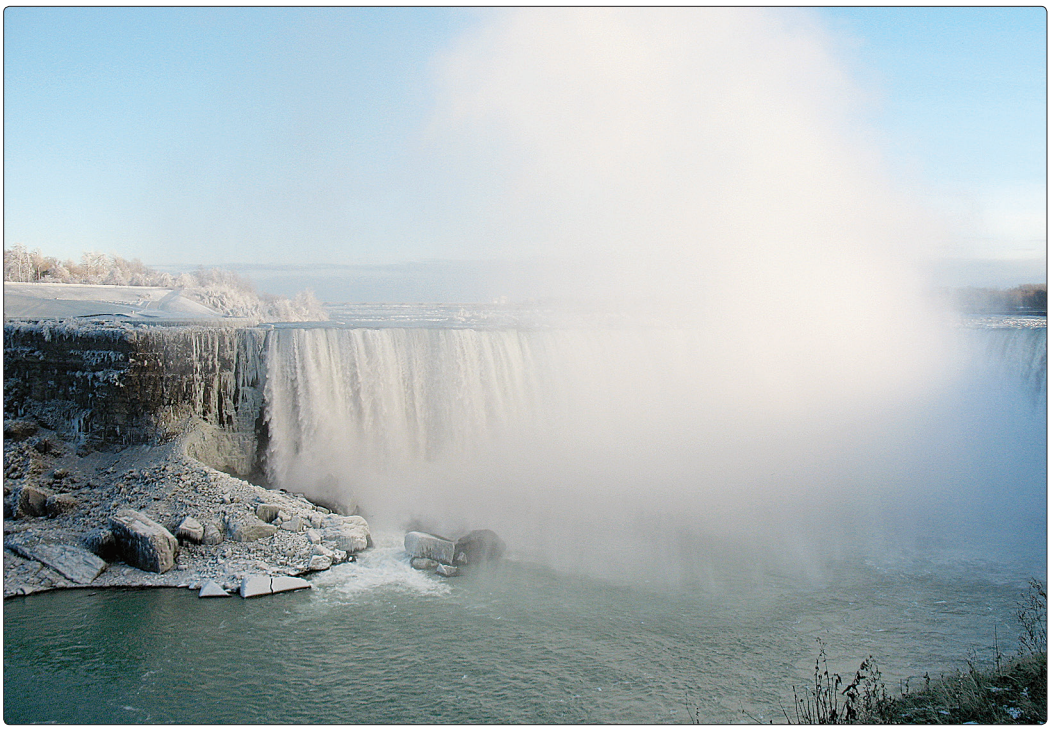
Niagara Falls Tunnel, Ontario

Tunnel entrance



Borehole drilling for extensometer and piezometer installation

Extensometer installation



Niagara falls

In the summer of 2005, Ontario Power Generation (OPG) contracted the Strabag AG Company to build one of the largest tunnels in North America, using a 14.4 meter diameter open shield Robbins TMB.

The tunnel runs under the City of Niagara Falls from the upper Niagara River to the Sir Adam Beck Power Station at Queenston, which is 10.4 kilometers away.

In the fall of 2007, GKM Consultants undertook the instrumentation of the deepest sections (140 m depth). The instrumentation was deployed to confirm the designers' (Hatch Energy) hypotheses regarding the behavior of the geological conditions and to monitor the rate of change, stabilization and structural integrity during, and after, construction.

The project consisted of installing arrays of 8 Multi-position borehole extensometers, each with 6 anchors, and 6 vibrating wire piezometers. All cables are routed to the surface through a dewatering shaft and connected to a Micro-800 datalogger for automatic data acquisition.

The piezometers were installed in the annulus between the precast lining and bedrock, where 20 bar of concreting pressure is expected. As a precaution, protective sleeves were used to house the sensor cables to help protect them during and after installation.

The monitoring period of the instrumentation was for 5 years. Construction of the tunnel was completed on time.