

BOREHOLE GEOPHYSICAL CALIBRATION FACILITIES OF THE GEOLOGICAL SURVEY OF CANADA, IN OTTAWA, CANADA: AN UPDATE

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Calibration sites provide important opportunities for the standardization of downhole instrument response. Using quantitative physical properties from borehole cores, calibration adds value to projects by allowing for data consistency from hole-to-hole, system-to-system, and importantly, over time. The Geological Survey of Canada (GSC) maintains the Bells Corners Calibration Facilities near Ottawa, Canada, which is open to all members of the logging community. An effort is underway to update petrophysical core measurements, maintain standardization for traditional instruments, and conduct logging with newly developed downhole instruments so that sites remain relevant to members of the groundwater, geotechnical, and mineral exploration sectors.

Work will be presented from two Ottawa-area GSC borehole calibration sites, drilled in distinctly different geological settings. In the late 1970's and early 1980's, the GSC developed quantitative borehole calibration facilities, consisting of model calibration boreholes for gamma-ray spectral logging probes with known concentrations of potassium (K), uranium (U), and thorium (Th), and six deep test boreholes drilled in Palaeozoic sedimentary (sandstone, dolomite, shale) and Precambrian (granitic) bedrock. The boreholes were continuously cored, range in depth from 120 – 300 m, and were sited within a 10 to 100 m triangular configuration for cross-hole capabilities.

In 2014, the GSC sampled and cased a 75-m borehole in a thick sequence of fine-grained, post-glacial sediment in a region prone to sensitive clay landslides. The wide range of geophysical and geotechnical properties measured during core testing and geophysical logging has led us to consider the borehole as a valuable calibration site, supporting ongoing geotechnical and hydrogeological studies at the site.