Results from the First Field Trial of a Borehole Gravity Meter for Mining Applications

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Abstract

Scintrex is in the final stages of the development of a borehole gravity meter, for mining and geotechnical applications, designed to log inside NQ drill rods to 2,000 m depth, using standard 4 conductor cable, with a sensitivity of better than 5 μgal, and operable in boreholes inclined from 30^0 to vertical. École Polytechnique of Montreal has developed forward modelling software, as part of this project.

The first field test of the prototype probe was successfully conducted in December 2008 for Vale Inco in a deep borehole located in Norman township near Sudbury, Ontario. The results of this test show a large amplitude bipolar residual gravity anomaly, with the crossover at the location where the borehole intersected sulphides. Further analysis of the data is underway. A repeat log of the hole indicates that the Gravilog system has achieved operational specifications very close to its targets.

Field tests for the other sponsors are planned during the first half of 2009, with production surveys to follow during the second half of the year.

Gravity measurements inside boreholes provide evidence of density variations both in the immediate vicinity and at a distance from the hole. Scintrex's development of a new borehole gravimeter will, for the first time, allow the application of gravity logging in typical mining and geotechnical boreholes.

Primary applications of the Gravilog system in mining include the sensing and mass-estimates of massive sulphide bodies, either intersected by or remote from the hole; and accurate bulk density measurements of formations intersected by the hole.

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Chris Nind obtained a BSc, Mathematics, from Queen's University in Canada and joined Geoterrex Ltd as a geophysicist in 1977. At Geoterrex, he worked in the ground, processing and airborne departments. From 1990 to 1994, he managed Geoterrex' airborne geophysics department in Australia. In 1994, he moved to Dighem Surveys in Toronto. From 2000 to 2004, he was the Regional Manager, Americas, for Fugro Airborne Surveys. In mid-2004, he joined LaCoste & Romberg-Scintrex as President & CEO. His background includes many gravity surveys using L&R Model G gravimeters. His interest in gravity continues at Scintrex in Toronto, Canada, which builds the CG-5 gravimeter, and at Scintrex's sister company, Micro-g LaCoste in Denver, USA, which builds absolute, airborne, marine and monitoring gravimeters.