

GROUND GEOPHYSICAL SURVEYS NEAR ATIKOKAN, ONTARIO - 1984

by

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ABSTRACT

The geophysical surveys carried out during 1984 on the West grid at Atomic Energy of Canada Ltd.'s Atikokan Research Area have measured the VLF-EM and magnetic fields on a 100-m line separation. These surveys were done to determine the near-surface characteristics of the bedrock and to locate a region of relatively unfractured rock prior to drilling borehole ATK-6. Eight refraction seismic profiles were done to determine overburden depths in areas of interest.

All three techniques, VLF-EM, magnetic, and refraction seismic, encountered uncertainties in describing the overburden that precluded a definitive description of the bedrock condition beneath: it was possible however, to model the field data and present some possible configurations. The overburden has a range of physical properties similar to or even greater than the range of physical properties within a fracture zone in the bedrock. Since overburden always infills depressions in the bedrock, the geophysical response from a strong subsurface fracture zone must compete with the normally even stronger signals from the overburden. In many cases, the irregular contact of overburden with bedrock and the rather large electrical and acoustic contrast creates a very difficult practical problem in interpreting the results.

Drilling is recommended in a few areas to confirm the predictions presented in this report. Integration of information provided by surface and borehole geophysics is recommended in all future surveys of this type of terrain.

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