
Comparing geophysical logging tools and how they can assist in hydrogeological model building: A case study in the Mabou Group near Sussex, New Brunswick

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Investigating the hydrogeology of a geological unit can be challenging. In the case of a potash and salt mine, characterizing the hydrogeology of the overlying geological unit is very important. A relatively new logging tool, Hydrophysical Logging (HPL), originally developed for shallow environmental applications, has been used at PCS Potash New Brunswick Division for formational fluid evaluation. The Mabou Group, which overlies the economic evaporite deposits in the Sussex area (New Brunswick), is predominantly made up of siltstone with interbedded sandstones and conglomerates. In earlier exploration for evaluating a potential new mine, the Picadilly Project, drill stem tests were used to measure porosity and permeability. Further hydrogeological work was required as the project was given a green light to proceed to mine development. Deep monitor wells drilled for piezometer installations over the planned new mine provided an opportunity to collect more geophysical and hydrophysical data. Six monitor wells were drilled to the base of the Mabou Group, approximately 650 meters average depth. A series of conventional geophysical tools were run in each well and also logged using the HPL tool. It is anticipated that this suite of data will assist in creating a possible hydrogeological model for the Picadilly Project area. However, the downhole data must first be interrogated. This paper discusses the comparison between various types of borehole geophysical data collected with the HPL tool and examines the interpreted porosity and permeability information to be integrated in the hydrogeological model.