

## **Geothermal Resource Characterization of the Slave Point Formation in Clarke Lake Field, Fort Nelson, B.C., Canada**

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Middle Devonian hydrothermal dolomites of the Slave Point Formation have been host to significant gas reserves since the discovery of Clarke Lake Field in 1957. The geothermal potential of the field was demonstrated by a 2005 to 2009 experiment in which Petro-Canada Oil and Gas attempted liberating trapped gas by pumping formation water out at rates of 2800m<sup>3</sup>/day to reduce water cut; instead pressure only dropped marginally due to a strong water drive. High temperature water, a strong water drive and porous carbonate rock allow for a viable geothermal resource.

Depositional and diagenetic facies are defined and related to porosity and permeability data in order to develop a static reservoir model for the formation that will be the basis for flow simulations. In the late Givetian, a relative sea level rise drowned the Keg River carbonate platform, which allowed small, laterally discontinuous patch reefs of the Slave Point Formation to develop on the flanks of the Horn River Basin. More porous and permeable zones are related to development of dolomite, enlarged vugs, and mouldic pores; unaltered limestone facies are considered non-reservoir. Mapping and modeling the spatial variability of dolomitization is a key objective concerning optimization of geothermal well targets.

Development of this geologically based geothermal reservoir model is feasible because of the availability of a large-scale oil and gas well data set. The data include direct permeability/porosity core measurements, well-logs, DSTs and eighteen core descriptions taken at the BC Oil & Gas Commission core research facility. This work is being funded by the Future Energy Systems research group at the University of Alberta and is part of a collaborative effort for transitioning into a low net-carbon energy economy.