

Reservoir Characterization, Modeling and Simulation of a Braided Channel Complex at Cambridge Cove, Nova Scotia

Peter Mulcahy*
Dalhousie University, Halifax, NS, Canada
Peter.Mulcahy@dal.ca

and

Virginia Brake, Yawooz Kettanah, Lawrence Plug, Hasley Vincent and Grant Wach
Dalhousie University, Halifax, NS, Canada

At Cambridge Cove an outcrop of a braided channel complex of the Triassic Wolfville Formation lies unconformably over the Carboniferous Horton Group in the Minas subbasin of the Fundy basin. 3-D exposures of bars in the intertidal zone have been preferentially preserved due to diagenesis caused by meteoric waters perched on the impermeable Horton shales. The section can also be viewed in 2-D along the 8-14m cliff face section. The strata comprise red to brown, coarse to fine grained sandstones, pebbly sandstones, conglomerates, minor shales and exhibits a fining upward trend.

Geological reservoir model data input include a detailed and high accuracy topographical GPS survey, outcrop descriptions, fault analysis, paleocurrent measurements, photographs, and samples for petrographic analysis. These data were supplemented with aerial photographs, digital elevation models and an airborne LiDAR survey. The GPS survey outlined the topography of almost every barform with a dataset of over 17,000 points.

The data imported into Petrel™ included survey data for the physical dimensions of the reservoir, geological data for reservoir characterization, and petrophysical data used for volume calculation and reservoir simulation. The reservoir model incorporated field data as well as analogue data from a similar braided channel complex. The braided channel complex was modeled with varying geological properties for different facies in the channels. After the creation of the reservoir model, and entry of fluid properties, a volume calculation of several factors including reservoir net volume, pore volume, and fluids in place were generated and an optimum depletion strategy was designed for the modeled reservoir.