Revised Nordegg Member Subsurface to Surface Correlations Based on Detailed Core Descriptions, Regional Cross-Sections and New Ammonite Data

M. Asgar-Deen*, R. Hall and C. Riediger
Department of Geology and Geophysics, University of Calgary, Calgary, Alberta
pelletier@geo.ucalgary.ca

The Lower Jurassic Nordegg Member is the richest hydrocarbon source rock of the Western Canada Sedimentary Basin with total organic carbon values commonly in excess of 10 weight percent. It is also an important subsurface stratigraphic marker by virtue of its regional extent and generally high gamma-ray geophysical log response.

The Nordegg Member has no type locality and its age has been called into question. It displays marked changes in thickness and lithology across the Western Canada Sedimentary Basin. In the subsurface of west-central Alberta, it is commonly a dark grey to black, organic-rich phosphatic lime mudstone. Despite the Nordegg Member's distinctive log response, subsurface facies changes and the presence of two carbonate "ramps" are poorly documented. In surface exposures, the Nordegg Member is commonly a cherty carbonate. Correlations between surface and subsurface stratigraphy are tenuous, hindered by the aforementioned lithological differences and a lack of biostratigraphic data.

Newly discovered ammonites within Nordegg Member drill-core range in age from Hettangian to Middle Toarcian. Lithological changes, exposure surfaces and revised geophysical log cross-sections have been used to divide the subsurface Nordegg Member into informal units. Based on their lithology and age, the subsurface Nordegg Member units are equivalent to surface exposures of unnamed Lower Jurassic shales, Nordegg Member cherty carbonates, the Red Deer Member and the Poker Chip Shale.