

Geology of the Upper Devonian Grosmont Formation in North Eastern Alberta

Beate E. Buschkuehle
EUB-Alberta Geological Survey, Edmonton, AB, T6B 2X3

The Upper Devonian Grosmont Formation is a giant bitumen-bearing carbonate trend in northeastern Alberta (Townships 60 to 108/Ranges 1W4 to 15W5), which covers ~75000 km² and has a thickness of 100 to 200 meters. The trend contains approximately 50.5 billion m³ of heavy bitumen. The Grosmont Formation forms an extremely heterogeneous reservoir, due to its varying lithology, exposure and karstification. A better understanding of the location of major karst features, internal architecture, fluid flow and migration paths is essential for developing a successful recovery scheme in the Grosmont Formation.

The Grosmont boundary has been newly defined using well log data and regional cross sections. Towards the east the Grosmont subcrops beneath the western portions of the Cretaceous Athabasca-Wabasca oil sands deposit. A depositional change from platform carbonates (mainly dolomites) into basinal shales and marls defines the complex in the west and south. The Grosmont is usually overlain by a thin Ireton shale layer or directly by the Winterburn Group carbonates. The evaporites of the Hondo Member are diachronous within the Grosmont in the southwestern/central part and gradually change into limestones towards the eastern subcrop edge.

The regional cross sections reveal several locations, where the Grosmont is in direct contact with the Leduc reef chain, indicating a contiguous aquifer within the Woodbend Group. The Grosmont also crops out at the Peace River, where it is equivalent to the porous carbonates of the Mikkwa Formation, again indicating one contiguous aquifer.