

REGIONAL GEOLOGY OF THE FT. NORMAN, NWT AREA

The Ft. Norman area is located in the Mackenzie Plain, which is a physiographic depression lying between the Laramide-aged Mackenzie Mountains to the southwest, and the Franklin Mountains (McConnell, St. Charles and Norman Ranges) to the northeast. The geology of this area is a northern continuation of the Western Canada Basin.

Deposition in this area began with the infilling of the Mackenzie Trough with Proterozoic (up to 10 km thick) and Paleozoic Cambrian (up to 1 km) sediments, primarily shales and salts. The Cambrian Saline River Salt is of importance because it is an excellent seismic marker, and it makes an excellent detachment horizon for some of the Laramide structures. The rest of the Paleozoic consists of shelf carbonates, three periods of reef growth (Nahanni, Kee Scarp and Jean Marie), and basinal shales. The southern part of the study area remained as a trough (Root Basin) throughout the Paleozoic and has thickening of most stratigraphic units. Many of the carbonates (such as Kee Scarp reefs, Nahanni Dolomite, Arnica Fm. and the Ronning Group) are known to be very good reservoirs. The Nahanni is also an excellent seismic marker. The Canol and Bluefish Fms. were deposited as condensed sections in front of prograding clastic clinoforms (Imperial and Hare Indian Fms., respectively), and are known to be excellent source rocks. The Canol Formation supplied oil to the Kee Scarp reef at Norman Wells.

There was likely continued deposition throughout the later Paleozoic and Triassic that was subsequently eroded by the sub-Cretaceous Unconformity. The majority of the uplift of the Keele Arch occurred during this unconformity, resulting in the pre-Cretaceous exposure of Devonian and Ronning carbonates and Cambrian shales at this surface.

During the Cretaceous, the Ft. Norman area developed into part of a foreland trough as a result of the Cordilleran Orogeny to the southwest. The area has nearly 2 km of Upper Cretaceous to Eocene sandstone and shales preserved within the Brackett Basin. Originally, the clastic sediment covered the entire Mackenzie Corridor, but because of subsequent uplift and erosion of surrounding areas, the Brackett Basin is one of the few places remaining where Upper Cretaceous to Eocene section is preserved. The Keele Arch was emergent during the Cretaceous, but relatively passive, and there was progressive onlap of marine shales of the Arctic Red and Slater River Formations on to it. The Keele Arch became completely buried during the deposition of shallow marine to non-marine sandstones/shales of the Little Bear Formation. A subsequent transgression resulted in the deposition of the marine shales of the East Fork Formation.

As the Laramide tectonics migrated towards the northeast, non-marine sandstones, conglomerates and volcanics of the Tertiary Summit Creek Formation were deposited. The Laramide continued folding, thrusting and uplifting to create the Mackenzie and Franklin Mountains.

STRATIGRAPHY OF THE FT. NORMAN AREA

