Lithofacies 2

Lithofacies 2 varies from a greenish-grey, argillaceous siltstone to brownish grey, very fine-grained sandstone. Sandstone accumulations are areally restricted on localized highs. Rip-up clasts were observed along the southeastern flank of the anticline. The sandstone gradually changes to a medium brown siltstone with brachiopods and burrows with localized dolomite cement. As the contact portion of the facies is approached the siltstone becomes a medium-dark grey shaly siltstone. The facies is characterized by clay draping and Helminthopsis burrows. These are concentrated in the lower portion of the section. Extensive burrowing has homogenized the upper section. Porosity is also enhanced by burrowing. Fossils are commonly replaced by pyrite. Pyrite nodules are occasionally present.

Lithofacies 2 reaches a maximum thickness of 40 ft, averaging 14 ft. The facies gradually thins towards the margin. Abrupt thickness variations occur in areas of uplift or salt collapse. The facies has the greatest areal extent and is easily recognized throughout the Williston basin by its distinctive burrows and clay drapes. The interval is mappable on wireline logs. The upper section deflects the gamma-ray curve to the right (increasingly shaly) with the lower section having a noticeably cleaner gamma-ray curve representing the highly burrowed portion of the facies. Log porosities for this interval commonly range from 6 to 12% and appear to indicate dolomitization. This section is the stratigraphic equivalent to the producing zone in the Elm Coulee Field, Montana. Mapping with wireline logs should reference the available core control whenever possible.

The sediments of Lithofacies 2 represent upper to lower shoreface. Although Helminthopsis is thought to represent deep water facies, in this case it is indicative of a facies not an environment. Sediment source is from the northeast with transport restricted to the eastern side of the Nesson anticline. It is readily apparent that the marine channel has become broader with the transgression of the Bakken seas. It is also apparent that uplift on the Nesson is confined to the northern and southern portion of the structure.