

Stratigraphic analysis and possible tidal influence in the Stellarton Basin, Nova Scotia

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The Late Carboniferous Stellarton Basin, located in central Nova Scotia, formed as a pull-apart basin resulting from dextral movement on the Cobequid and Hollow faults. These bound the basin to the north and south, respectively. The 6 km by 8 km basin contains the approximately 2600 m of strata of the Stellarton Formation. The upper portion of the Stellarton Formation was deposited during the Westphalian C/D and is composed of the Coal Brook Member and the overlying Thorburn Member.

Two oil shale-bounded intervals from the upper Stellarton Formation were studied in order to observe a full spectrum of lithological facies in the area. An interval from the Coal Brook Member bounded by oil shales 21 and 22 exhibits a lateral thickness variation of 20 m to 10 m from east to west. The interval represents a distal facies association consisting of oil shale grading into mudstones (both laminated and massive), and a fine-grained sandstone element, which decreases in proportion with interval thickness. An interval from the Thorburn Member between oil shales 7 and 8 displays an increased proximal component to the facies association. This approximately 60-metre interval includes oil shales, mudstones, and fine-grained sandstones as well as coarser-

grained sandstones, rooted paleosol horizons, and thin coals. Both intervals show flaser and lenticular bedding associated with small-scale cross-bedding as well as localized burrowing. The spectrum of facies observed suggest river-fed deltas advancing into standing-water bodies with low-energy hydrodynamic conditions.

The Stellarton Formation has traditionally been interpreted as lacustrine in origin. However, research is ongoing into the possibility of tidal influence in the Stellarton Basin. Paired mud drapes have been discovered in laminated mudstones and sandstones of the studied intervals. Although the lack of marine fossils and the low-sulphur coals of the area argue against marine influence, paired mud drapes are considered characteristic of tidally affected environments. Further study of the abundance and distribution of the paired mud drapes within the studied intervals is underway. Marine influence has been documented in the coeval Malagash Formation north of the Cobequid and Hollow faults, and incursions could have generated periodic restricted marine conditions in the Stellarton Basin.