Lithofacies and spectral gamma-ray analysis of a potential outcrop analogue for a secondary reservoir in the McCully Gas Field, Sussex, NB

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The McCully Gas Field, near Sussex, New Brunswick, comprises a succession of gas-filled sandstone units interbedded with organic shale that are collectively included within the Hiram Brook Member of the Albert Formation (Horton Group, Tournaisian). The sandstone has been interpreted as the deposits of lacustrine deltas, shorelines and fluvial systems, based on limited core extracted from the reservoir interval in the gas field, and on broad interpretations of Hiram Brook Member outcrop in the region. The purpose of our ongoing research is to provide a more detailed lithofacies and sequence stratigraphic interpretation of outcrops and to better correlate these outcrops with producing horizons in the subsurface.

The main producing horizon in the McCully field is the 'A-sand', which from total-gamma-ray wireline logs is interpreted to be a sharply based, fining-upward sandstone. An equivalent outcrop analogue has yet to be identified. In contrast, overlying secondary targets include overall sandstone packages that appear to coarsen upward over a scale of several tens of metres. Outcrop of a coarsening-upward succession within a roadcut of Highway #1, between Sussex and Norton, has been identified as potentially correlative. Detailed sedimentological logging and spectral gamma ray data has been collected over an approximately 40 m thick (vertical) interval of the outcrop succession.

Preliminary interpretations indicate sedimentation in a periodically and progressively shallowing (likely prograding) wave-dominated lake shoreface. A possible root horizon near the top of the succession could indicate a temporary lowering of

lake-level and development of a shallow lagoon or back-swamp whereas an overlying limestone conglomerate is identified as a storm-beach deposit. There is no conclusive evidence of fluvial deposition within the succession. Accompanying spectral gamma-ray data initially appears to indicate that radioactive Uranium and Thorium (from organic detritus in the rock), and Potassium (from K-feldspar and micas in the siliciclastic fraction) all decrease upsection in tandem with an overall increase in grain size from silt to fine sand.