AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

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Sequence Stratigraphy and Sedimentology of the Late Carboniferous Sydney Mines Formation at Morien Bay, Sydney Basin, Nova Scotia

Extensive coastal outcrops of the Sydney Mines Formation (Westphalian D) at Morien Bay record stacked high-frequency sequences, 10-30m thick, of fluvial, restricted marine, and possible lacustrine strata, with economic coals. Multiple outcrop sections at Schooner Pond, Long Beach and Port Morien measured 70-150m in thickness and included the Emery to Harbour seam interval. The dominant facies association comprises grey sandstones and shales and associated hydromorphic paleosols. Associated coals range from 0.5 - 2m in thickness. Dark limestones and shales containing bivalves and ostracods are found either above or in close proximity to a coal seam. The coals are sulphur-rich, indicating a marine influence during their development. The second major facies association includes calcareous paleosols as well as vertic red and grey paleosols.

Repetition of wetland and dryland facies, representing regressive and transgressive cycles, is observed in all sections. Marine flooding surfaces are represented by thick coals and faunal concentrate limestone/shale. Sequence boundaries can be identified by the presence of calcretes and red mudstones. The grey, wetland facies are well represented within the Transgressive and Highstand Systems Tracts. Red and grey dryland facies are represented in the topmost Highstand to Lowstand Systems Tracts. The Falling Stage Systems Tract may also be represented here in some valley fills within highstand deposits. Forested horizons of calamitacean and lepidodendrid trees standing in their growth position are observed at many levels within the Transgressive and Highstand Systems Tracts along with abundant compression flora. Rarer litter is identified in red beds of the Highstand through Lowstand Systems Tracts.