

Depositional environment of the Westphalian B Cumberland Basin coals of Springhill, Nova Scotia

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The Westphalian B coals of Springhill are part of a sequence of non-marine, largely fluvial sediments reaching a maximum thickness of 1100 m which comprises the lower fine facies of the Cumberland Group. A depositional model first proposed in 1980 has been significantly refined and expanded. Elongate coal swamps with an approximate width of 5 km flourished between a controlling trunk fluvial system and alluvial fans of the lower coarse Cumberland facies. The mature fans over which the coal measures progressively onlap contributed rogue ephemeral streams which invaded the southern margin of the coal swamps. Megascopic and microscopic coal petrography indicate a forest swamp environment. Regional three-dimensional geometry of the controlling fluvial system is known through extensive diamond-drilling while much insight into the specific fluvial subenvironment has been gained through

exposures within the Novaco open-pit mine on the Rodney seam. A modified meandering system is envisaged with extensive channeling by chutes of point bars, transitional to complete excision of bars resulting in a bradied configuration within a meandering bed.

Incorporation of this model into tentative basin fill patterns suggests early dominantly transverse flow with fluvial deposition from a semi-mature alluvial plain and the presence of a subordinate lacustrine-megaflood basin near the present axis of the Cumberland coal basin. Subsequent deposition and basin infilling gave rise to dominantly longitudinal fluvial systems paralleling mature fans bordering the Cobequid highlands. Bi-value-associated coals of the Joggins-Chignecto, Saltsprings, and Roslin coal districts may correspond to the transverse flow model.