

Thrusting of Horton Group over Windsor Group rocks, Cheverie, Nova Scotia

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Strongly deformed Carboniferous rocks of the Horton and lower Windsor groups are exposed along the coastline of the Minas Basin from Cheverie Point towards Split Rock. In the past the distribution of units has been interpreted as resulting from high-angle faults to horst and graben structures. However, detailed mapping of this area shows that the Horton Bluff Formation (lower Horton Group) has been strongly deformed, when compared to the Cheverie Formation (upper Horton Group). Black shales and fine-grained grey sandstones of the Horton Bluff Formation show open to inclined tight folds with major fold axes trending northeast to southwest. Most folds are inclined to overturned to the southeast with associated northeast- to southwest-striking cleavage. Thrust and conjugate normal faults are present. Red mudstone and sandstone of the Cheverie Formation are mildly deformed at Johnson Cove. Near the top of the formation at Cheverie Point, duplex and fault-propagation fold structures are seen. Laminated limestone and calcareous sandstone of the Macumber Formation (Windsor Group) are strongly folded and faulted

throughout the entire study area. Pembroke Breccia (Windsor Group) is massively deformed with angular elongate blocks of the Macumber Formation. White gypsum and anhydrite of the Quarry Formation (Windsor Group) show anastomosing ductile (planar and linear) and brittle planar structures throughout. Interconnected diabase dykes and sills intrude only the Horton Bluff Formation; thin sections from dyke margins show that the intrusions cross-cut the tectonic fabric of the Horton Bluff host rocks. An unconformable, normally faulted contact between Triassic sandstone and the Horton Bluff Formation, which truncates a diabase sill at Johnson Cove.

A re-interpretation of the data leads to a conclusion that low-angle thrust faulting placed Horton Bluff Formation strata over the Cheverie Formation and Windsor Group. Transpressional thrust faulting exposed along the coast of the Minas Basin reveals a possible relationship with the Cobequid-Chedabucto Fault System. Mesozoic extensional normal faulting reveals unconformable contacts of Triassic sandstone on top of shale and fine-grained sandstone of the Horton Bluff Formation.