Uranium Occurrences in the Horton Group of the Windsor Area, Nova Scotia, and the Environmental Implications for the Maritimes Basin[1]

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Uranium enrichment occurs at numerous localities in the basin fill units of the Maritimes Basin, and in the adjacent basement rocks in Atlantic Canada. The exploration model applied on the sandstone-hosted occurrences was that of a uranium roll-front, similar to the deposits of Texas and the western United States. The recognition of deeply weathered granitoids below the unconformity of the Horton Group on the South Mountain Batholith, however, suggests an additional genetic link to regolith-related unconformity deposits, such as the Athabasca Basin of Saskatchewan. There is no doubt that roll-front type uranium mineralization occurs in the Horton Group sandstones; however, the source of the uranium within the system may be related to weathered horizons in the basement rocks beneath the Horton Group and not exclusively the result of diagenetic change within the sandstones. There are numerous uranium occurrences in the type area of the Horton Group near Windsor, Nova Scotia. The most notable occurs at Three Mile Plains where Saarberg Interplan Canada Ltd. drilled over 40 diamond-drill holes from 1978 to 1981. Significant uranium mineralization is stratigraphically restricted to the top of the Horton Bluff Formation and base of the Cheverie Formation near the Horton Bluff-Cheverie unconformity. The uranium mineralization can be divided into two types: (1) carbon and pyrite-related quartz sandstone type and (2) hematite arkosic sandstone type. Although this paper deals primarily with uranium and associated elements from occurrences in the Windsor area, the regional nature of the pre-Carboniferous weathering episode and the areal extent of Horton Group strata throughout eastern Canada suggests that uranium enrichment is likely more widespread than is documented in the Maritimes Basin. Particular note should be taken in areas that have uranium occurrences within granitoid basement rocks adjacent to the Carboniferous basin fill. Preliminary leaching experiments of the mineralized rocks indicate that uranium and radon are easily leached from the samples and enter the present day environment.

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