

Old Harry: A Supergiant Structure in an Emerging Basin

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The largest fields in a basin are usually found during the early exploration phases. The Upper Carboniferous Old Harry structure is a potential supergiant field with 27,000 hectares (65,000 acres) of four-way simple closure. It lies in the northeastern corner of the Maritimes Basin in the Gulf of St. Lawrence. The Maritimes Basin contains thick oil-prone shale source rocks in addition to the world-class gas-prone coals of the Carboniferous Coal Measures.

New understanding of the basin reservoir provenance reveals quartz arenites reservoirs with porosities as high as 18% and permeabilities as high as 116 md that are derived from Canadian Shield rocks to the north. These sandstones were intersected in the only two wells drilled in the northern part of the basin and contrast greatly with the low-permeability Appalachian-derived sandstones of the southern Maritimes Basin. Early loading of the underlying salt structure in the Old Harry area appears to have captured a thick (sand-rich) stratal package.

The overlying shale and coal-rich Green Gables Formation provides reservoir seal. Hydrocarbons have been trapped in similar or more complex structures throughout the southern Maritimes Basin, indicating good seal capacity and favorable timing of the charge. Surface slicks, amplitude anomalies, and flat spots strongly support a hydrocarbon trap.

What has changed from the 1970s (last exploration phase)? 1. Ability to drill in 400 m of water, 2. Maritimes and Northeast Pipeline to Boston, 3. Modern seismic acquisition and processing, 4. New major discovery in the same basin (McCully), and 5. Northern reservoir provenance model.