

Recent Hydrocarbon Studies in the Baffin Bay, Northwest Greenland

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ABSTRACT

Recent studies co-financed by GEUS (Geological Survey of Denmark and Greenland) and MMR (The Ministry of Mineral Resources Greenland) cover the east Baffin Bay region from 70°N to 77°N based on the latest available data. Recent compilations including this new data have resulted in better correlations and enhanced interpretation models. The updated mapping and information from cores drilled in north-east Baffin Bay show the presence of large structures and deep basins containing Proterozoic, Mesozoic and Cenozoic sedimentary rocks, as well as areas affected by volcanism and oceanic crust formation. One of the prime uncertainties of the east Baffin Bay region relates to the occurrence and age of petroliferous rock strata in the basins and ridge structures. Before 2010, no wells had been drilled in the greater Baffin Bay region in Greenland and only limited seabed sampling had been carried out. In 2010 and 2011, Cairn Energy drilled five wells offshore the Nuussuaq Basin. This was followed by shallow coring at 11 sites in 2012, conducted by a Shell-led consortium. By drilling along a transect where dipping strata subcrop close to the seabed, a nearly complete stratigraphy could be obtained. The wells and shallow cores obtained from 2010–2012 provided significant new information and allowed a revision of the seismic stratigraphic interpretation and regional basin development. A significant outcome of the new results was that the mega-units contain late Mesozoic rocks similar to outcrops onshore West Greenland and East Canada. The region may have hydrocarbon potential and could be prospective, but a number of factors still remain to be clarified, including proof of oils in the north-east Baffin Bay area. Large Cretaceous and Cenozoic structures have been mapped, some of which show large structural closures at depths of 0.5 to 3 km. A preliminary assessment of some of the key geological risks includes: 1) Critical thickness of potential reservoir sections of less than 50 m; 2) Critical thickness of potential overburden (including possible seal) of less than 600 m; 3) Uncertainty of closures relying on the regional 2D seismic grid. Other risk factors could be added and reviewed in a more detailed prospect evaluation. The main conclusion based on the new data compilation is that several of the identified structures have an attractive combination of size, short distance to a mature source kitchen and sufficient seal to make them attractive for further investigations.