

A Snapshot - Additional Natural Gas Potential in the Scotian Basin

*HARVEY, Paul J.**, Nova Scotia Petroleum Directorate, Halifax, N.S.; *MACDONALD, D. Jack*, Nova Scotia Petroleum Directorate, Halifax, N.S.; *MUKHOPADHYAY, (Muki)*, P.K., Global Geoenergy Research Ltd., Halifax, N.S.

The Nova Scotia offshore area covers 400 000 km² and comprises the Atlantic continental margin from Georges Bank to the Laurentian Channel including most of the highly prospective Scotian Basin. Since the first exploration in the 1950's, the petroleum industry has acquired over 300,000 km of seismic data and has drilled 153 wells resulting in the discovery of $182 \times 10^9 \text{ m}^3$ (6.4 TCF) of gas and $34.5 \times 10^6 \text{ m}^3$ (217 million barrels) of oil and condensate in 22 significant discoveries. It is estimated by the Geological Survey of Canada (1989) that these discoveries represent only 35% of the total gas resources and 20% of the oil and condensate resources predicted to exist in this area.

With all the regulatory approvals in place for the Sable Offshore Energy Project (SOEP) in early January 1998, this project in conjunction with the Maritimes and Northeast Pipeline Project is scheduled to deliver gas to markets in Maritime Canada and the northeastern United States in November, 1999. Other than the six fields comprising SOEP, many other exploration opportunities exist offshore Nova Scotia which will help ensure the longevity of natural gas supply from this region. While the well control is dense in the Sable and Abenaki Subbasins, there remain many untested prospects as well as theories. The remaining Scotian Basin has sparse well control and contains plays untested and entire virgin subbasins which all bode well to fuel future exploration activity.

Some 200 identified structures based on seismic interpretation remain to be drilled offshore Nova Scotia and just over one-half are associated with fault-bounded rollover anticlines which by far has been the most successful play drilled to date resulting in 17 of the 22 significant discoveries. This paper will provide you with a glimpse of the calibre and quality of untested prospects that remain undrilled in the Sable Subbasin in close proximity to the SOEP facilities which can either be exploited by the proponents or by third parties who can access the SOEP facilities. From the geochemical analysis of samples from key successful wells, the suggestion is that source rock potential in this area lies in the majority of the organic-rich horizons from the Logan Canyon, Mississauga, Mic Mac formations and their distal equivalents are kerogen Type IIB and III condensate- and gas-prone source rocks. In the Sable Subbasin, the onset of maturation ($\sim 0.5\%R_o$) in various wells is between 2200 and 3000 m, the main oil generation zone ($0.6 - 1.0\%R_o$) is between 3800 and 4800 m and the start of over maturity ($>1.3R_o$) is between 5000 to 5500 m. The geochemical characteristics of the condensates and light oils showed distinct variation in source and maturity.

It is also possible that the potential exists below the portion of the Sable Basin that extends seaward from Sable Island deeper than the presently productive normally pressured sands in fields such as Alma, Glenelg, Chebucto and North Triumph. The last well drilled in the Thebaud field encountered deep potential in sands not penetrated by earlier wells drilled in the area. Special geophysical effort will be required to define these deep seated closures and to predict the presence of reservoir facies.

Another prospective area this paper will highlight is the slope diapiric province that lies seaward of the 2000 m water depth contour. This area contains hundreds of piercement features that may either be salt or shale cored. They vary in size and have penetrated considerable vertical section. No wells have been drilled to date to evaluate this play. Even though this play lies in deep water, major technological advances have been made in seismic acquisition and processing techniques and deep water drilling and development methods that will allow future exploitation in these areas.

The Sable Offshore Energy Project will undoubtedly act as a catalyst to spur on exploration to find new natural gas fields. The Nova Scotia offshore is still at a relatively immature stage of exploration and with extensive seismic coverage and existing well control, combined with a progressive policy of data curation and release, will provide any interested explorer an excellent information database with which to commence their assessment of exploration opportunities.

**EAST COAST: THE SCOTIAN &
JEANNE D'ARC BASINS**