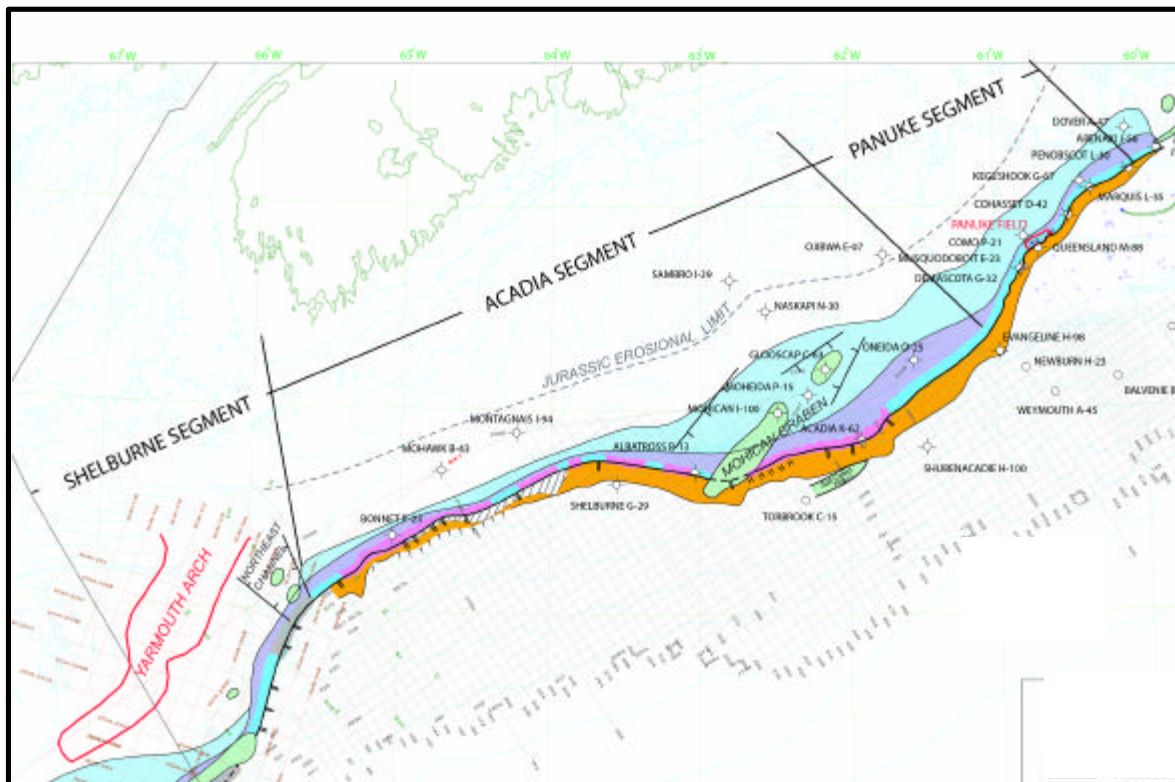




CANADA-NOVA SCOTIA
OFFSHORE PETROLEUM BOARD

The Upper Jurassic Abenaki Formation Offshore Nova Scotia: A Seismic and Geologic Perspective



Arthur G. Kidston^{1,2}, David E. Brown¹, Brenton M. Smith¹ and Brian Altheim¹
(¹ Canada-Nova Scotia Offshore Petroleum Board, ² Table Rock Resources Ltd.)

June 2005 – Version 1.0
HALIFAX, NOVA SCOTIA, CANADA

CONFIDENTIALITY

This Report was originally created by the Canada-Nova Scotia Offshore Petroleum Board for its exclusive internal use. This version has been edited for public release, as the original work contained portions of well, seismic, and other information currently held under confidentiality agreements between the respective owners of the data and the CNSOPB. Most of the figures that were included in the original Report are included herein, and where appropriate, with the express permission of the data owners.

ACKNOWLEDGEMENTS

The authors hereby acknowledge the ongoing support of the Canada-Nova Scotia Offshore Petroleum Board, especially Steve Bigelow, Manager-Resources & Rights, for providing the resources required for this study, and guidance and integration of human resources with day-to-day operational responsibilities. His vision of accomplishing a study of this magnitude, to further enhance the knowledge base for the Nova Scotia Margin, is admirable. We also warmly thank our CNSOPB colleagues Carl Makrides, Andrew McBoyle, Christine Bonnell-Eisnor and Troy MacDonald for their continuous input, support and encouragement. We greatly appreciate the generous support of John Hogg, John Weissenberger, Rick Wierzbicki and Nancy Harland (EnCana), Kim Abdallah (TGS-NOPEC), Ian Davison (Earthmoves) and Gabor Taru (Vanco), and thank them and their firms for permission to use selected seismic profiles and figures. We recognize Sonya Dehler, Lubomir Jansa, John Wade and Don McAlpine (Geological Survey of Canada-Atlantic), Haddou Jabour (ONAREP/ONHYM), and Paul J. Post (U.S. Minerals Management Service) for their insights and advice. Finally, we sincerely thank Jim Dickey, CEO of the CNSOPB for his endorsement and support of the study.

EXECUTIVE SUMMARY

This study documents the geology of the Upper Jurassic Abenaki Formation carbonate platform located along the edge of the continental margin, offshore Nova Scotia. The study area extends for 650 kilometres from Sable Island southwest to the U.S. border.

During Upper Jurassic time, the circum-North Atlantic was fringed by carbonate platforms and related facies. Within the Abenaki offshore Nova Scotia, three main depositional facies are recognized; an inner low energy shelf, an outer high energy shelf including the bank edge, and a deeper water foreslope. Analogues to the Abenaki are similar aged strata along the U.S. Atlantic margin, on the conjugate margin offshore Morocco, and both U.S. and Mexican Gulf of Mexico.

Based on geological characteristics, the Nova Scotian Abenaki carbonate platform and margin succession is subdivided into three segments along the trend: Panuke, Acadia and Shelburne.

The Panuke Segment is 120 km long and lies adjacent to the Sable Sub-Basin and includes EnCana's Deep Panuke gas discovery made on the bank edge in 1999. This area has 14 of the 21 exploration wells, seven on the bank edge, six in the back-reef and one on the foreslope. The latest 3D seismic surveys were used for detailed mapping in time and depth. The Cohasset/Panuke oil production (44MMB) was from Cretaceous sands draped over the bank edge.

The Acadia Segment extends 400 km from the edge of the Sable area to the Northeast Channel adjacent to George's Bank. The modern 2D regional seismic survey by TGS-NOPEC was used. Unlike the Panuke area this segment is faulted, eroded and intruded by salt but the presence of reefal facies bodes well for likely reservoir development. There are seven wells in this area, three on the bank edge and four in the back-reef with no discoveries but with reservoir and mud-gas shows.

The Shelburne Segment is about 120 km long and includes the George's Bank Moratorium area and extends to the U.S. border. This area is the least understood because of dated 1970 and 1980 seismic and a lack of wells.

From 1970 to the present (2004), there have been 28 wells drilled on the Abenaki Platform in the study area: ten bank edge wildcats, seven delineation wells at the Deep Panuke field and 11 other wells either landward or basinward. Only two wells were drilled in the Abenaki along the U.S. margin in the late 1970s and early 1980's but without success. On the conjugate Moroccan margins several wells encountered oil shows but none of commercial value. To date, the prolific Mexican "Golden Lane" trend in the western Gulf of Mexico is the only region with production from carbonate bank margins in the circum-Atlantic realm.
