

Geological Report for the Gulf of Alaska Planning Area

by De Risley, Gary C. Martin, Maurice B. Lynch, Tabe O. Flett, John A. Larison, Warren L. Horowitz edited by Ronald F. Turner, OCS report MMS 92-0065 published in Anchorage, Alaska in 1992 by the US Department of Interior, Mineral Management Service, Alaska, OCS region, (302 pages with appendices A through I, and eight Plates).

Review by Christopher G. Kendall

This book is a thick tome that focuses on the geology of the Gulf of Alaska. The area covered includes the continental margin 800 miles of offshore SE Alaska and stretches from the Amatuli trough, to southwest of Montegue Island to Dixon Entrance on the east, at the US/Canadian border. Here, in the east, the continental shelf is some 50 miles wide adjacent to Baranof Island, reaching a width greater than 60 miles off Middleton Island. Seaward of the shelf is the bathyal Pacific basin.

This book focuses on three tectonic areas, namely an area of convergence, west of Kayak Island where the Pacific plate is subducting beneath the continental North American crustal plate at the Aleutian megathrust; the translation along southeast of Alaska where the Pacific plate is being transported northward with the respect to the North American plate; and the transitional margin of the Kayak Island to Cross Sound which is intermediate between the zones of convergence and transform. The papers presented in this volume are interpretations based on offshore seismic reflection lines, onshore and offshore wells, dredge samples, and geological investigations of outcrops onshore. A major interest of the book is focused on 13 wells drilled offshore between 1975 and 1983. The book's interest is to provide information for the industrial exploitation of the Gulf of Alaska, particularly with respect to petroleum exploration and the background needed for potential bids at lease sale 158 scheduled for 1995.

The book is broken down into four parts. The first part deals with the regional geology of the area, namely the geological framework, the geologic history, seismic stratigraphy, structural geology, stratigraphy and biostratigraphy of the area. The second part focuses on the petroleum geology of the area, namely the regional petroleum exploration history, the reservoir rocks of the area, temperature gradients, organic geochemistry and source rock of potential and play concepts. Part three focuses on the shallow geology, geo-hazards and environmental conditions. Finally there are nine appendices to the volume dealing with Alaskan foraminifera, core descriptions of the offshore area, descriptions of vitranite reflectance for some onshore wells, mud additive petrography, crude oil and biomicro-analysis of the Katalla 63 well, including crude oil analysis, chromatographs, and interpretation of a crude oil in biomicro-analysis.

Though the book is bulky, it is short and to the point. Essentially its contents explain the tectonics of the area and the response to plate collision and subduction with explanations of the development of local earthquakes, volcanism, faulting and rapid uplift. The area described is one of severe weather, experiencing the effects of glaciation, vaste ice fields and calving icebergs. The rates of sedimentation for the area are some of the highest on the globe. Extensive logging, mining, fishing and drilling have taken place in the last century, despite the difficulties associated with the weather of this area.

The papers of this book highlight the potential for petroleum generation in this area of the middle Miocene to late Eocene Poul Creek Formation and the late early Eocene Kulthieth

Formation. The text suggests that the Miocene part of Poul Creek Formation is prospective, while offshore the immature to marginal immature Poul Creek has not proved to be as prospective as had been expected. The book explains that because the potential source rock is immature, the most prospective reservoir rocks offshore include the widespread Miocene and Paleocene, Yakatag Formation, particularly the nonglacial marine sequences. The Eocene Kultieth Formation has some reservoir potential.

The book outlines five major tectonic plays presently in the Gulf of Alaska, namely the Middleton fold and thrustbelt play, the Yakataga fold and thrustbelt play, the Yakutat shelf play, the subducting terrane play, and the Southeastern Alaskan subbasin play. The book reports on the presence of the best structures offshore and the numerous oil and gas shows onshore.

The book is professionally put together. Illustrations and texts are very much to the point. The writing style is clear and the maps are comprehensive. There are numerous interpreted seismic sections scattered through the text and the eight foldout plates. The information in this book is well organized and a person involved in evaluating the exploration potential of this area will find they have a good start on understanding the regional geology. Numerous interpreted seismic lines are illustrated for the area, mostly for the offshore. The wells are well described. The biostratigraphic descriptions are extensive. The geochemistry is well illustrated and play concepts are clearly laid out. This is a book that doesn't test the intelligence of the reader as a cryptographer, is well written and informative. There is an extensive bibliography and scattered through the volume are nice examples of old newspaper headlines and articles reporting on the oil industry, the geology and local happenings as the area has been developed. It is an interesting book and I recommend highly to you, particularly if you need to know more about the geology of the Gulf of Alaska or if your company is planning to bid to the upcoming lease sale in 1995.