

DOUBLE PRESENTATION—OCTOBER 20, 1986

MARLAN W. DOWNEY—Biographical Sketch



Marlan W. Downey is President of Pecten International, a subsidiary company of Shell Oil. He earned both his M.S. and his B.S. from the University of Nebraska. After receiving his Masters degree in 1957, he joined Shell Oil Company. He worked in the domestic exploration department of Shell Oil and was involved in the search for oil and gas in all parts of the U.S.A. He spent four years in Shell's research center in charge of

research on carbonates and organic geochemistry. He was Chief Geologist of Shell's Western Region for a number of years, and then was Manager of Exploration in Alaska from 1975-1977.

Beginning in 1977, he supervised Shell Oil's international exploration efforts as General Manager International Exploration. He was elected to the position of Vice President in charge of International Exploration and Production in March of 1980.

In 1982 he became President of Pecten International, the newly formed subsidiary of Shell Oil devoted to international exploration and production. Pecten, which currently produces hydrocarbons from Canada, Cameroon, Malaysia, New Zealand, and Syria, is reviewing development plans in China and Brazil, and holds over 100 million acres for exploration worldwide.

In 1980, with T. T. Schowalter, Mr. Downey convened the AAPG Research Conference on Seals for Hydrocarbons.

EVALUATING SEALS FOR HYDROCARBON ACCUMULATIONS

Seals are an important and often overlooked component in the evaluation of a potential hydrocarbon accumulation. Effective seals for hydrocarbon accumulations are typically thick, laterally continuous, ductile rocks with high capillary entry pressures. Seals need to be evaluated at two differing scales: a "micro" scale and a "mega" or prospect scale. Quantitative "micro" data measured on seal rock hand specimens are difficult to extrapolate a billion-fold to the scale of the sealing surface for a hydrocarbon accumulation. Fortunately, each class of exploration prospects has recognizable seal problems. Technical review should focus on the characteristic seal problems that result from the structural form and the stratigraphy of classes of prospects. Anticlines have relatively little seal risk, since any horizon serving as a top seal will also be a lateral seal. Stratigraphic traps have substantial seal risks. Faulted prospects need to be very carefully analyzed, as they have inherently large seal risks. Hydrocarbons are not distributed randomly or arbitrarily on complexly faulted structures. Hydrocarbon entrapment follows very simple physical principles, and preferential hydrocarbon distribution can be predicted, given adequate data. An improved assessment of seal risk for an exploration prospect directly affects the accuracy of estimation of exploration success.