
NORTH AMERICAN EXPLORATIONISTS

**HGS NORTH AMERICAN
EXPLORATIONISTS GROUP DINNER
MEETING—MAY 18, 1993**
Social Period, 5:30 p.m.,
Dinner and Meeting, 6:30 p.m.
Post Oak Doubletree Inn

ROBERT R. BERG—Biographical Sketch



Dr. Berg is Professor of Geology and holds the Michel T. Halbouty Chair at Texas A&M University. His academic experience of 26 years was preceded by industrial experience of 16 years as an exploration geologist and geophysicist. His research has concentrated on the geological properties of reservoir sandstones, the role of hydrostatic and hydrodynamic pressures in oil accumulation, and the origins of abnormal reservoir pressures. His publications include 70 papers and one book, and he has supervised the research of 106 graduate students.

He has served as President of the Rocky Mountain Association of Geologists (1966) and President of the American Institute of Professional Geologists (1971) and holds Honorary Membership in the American Association of Petroleum Geologists, the American Institute of Professional Geologists (1971) and holds Honorary Membership in the American Association of Petroleum Geologists, the American Institute of Professional Geologists, and the Gulf Coast Association of Geological Societies. In 1981 he was awarded the AIPG's Ben H. Parker Medal for "Outstanding Service to the Profession" and in 1988 was elected to membership in the National Academy of Engineering. In 1993 he received the Sidney Powers Memorial Award of the American Association of Petroleum Geologists for outstanding contributions to petroleum geology.

HYDRODYNAMIC EFFECTS ON MISSION CANYON (MISSISSIPPIAN) OIL ACCUMULATIONS IN THE BILLINGS NOSE AREA, WILLISTON BASIN, NORTH DAKOTA

Robert R. Berg*, William D. DeMis, Alan R. Mitsdarffer

Hydrodynamic effects on oil accumulations generally can be recognized at an early stage of exploration but

*Speaker

become of critical importance with increased drilling and discoveries. At the mature stage, hydrodynamic concepts can be readily applied in exploration and development to reduce risk and to increase success ratios. The south flank of the Williston Basin is an example of a mature area with significant hydrodynamic effects on oil accumulations. Early exploration was aimed at stratigraphic traps in the Mission Canyon Formation, but the development of major fields showed that all are strongly influenced by hydrodynamic flow and some oil accumulations may be largely independent of porosity pinchouts.

Examples of hydrodynamic effects are illustrated by the Billings Nose fields, and the Elkhorn Ranch and Knutson fields. All of these accumulations have hydraulic gradients on the order of 10 ft./mi. (2 m/km) or more; tilted oil-water contacts with gradients of about 25 ft./mi. (5 m/km); displacement of oil downdip to the northeast; and variable formation-water salinities that range from nearly fresh to highly saline. Some producing zones have been described as purely hydrodynamic traps, lacking both structural and stratigraphic closure. Future success will depend on applying hydrodynamic concepts in exploration and development drilling, and prediction methods are illustrated by possible extensions to existing one-well fields. Simple graphic techniques can estimate the limits of production before drilling, but a knowledge of local structure is most important to the interpretation.