NOON MEETING—FEBRUARY 22, 1978

W. H. (BILL) ROBERTS III—Biographical Sketch

Bill Roberts began life in Moorestown, New Jersey. He attended Amherst College, Wyoming University, and finally Colorado School of Mines for a geological engineer's degree under F. M. Van Tuyl, with extra work in geophysics under Carl Heiland. During World War II he controlled air traffic for the FAA and served as an engineer in the Maritime Service. For the next 12 years Bill worked up and down the Rocky Mountains from Albuquerque to Edmonton for Union of California, National Petroleum Corp. Ltd., and Gulf Oil. He has 26 years with Gulf, including 8 years at the research center in Pittsburgh. He has been in Houston 12 years with the Houston Technical Services Center of Gulf Research and Development Company.

Bill's interest in basinal hydrology and the fluid mechanics of oil and gas deposits has been sharpened by field observations in many parts of the world. He believes that it is most important to understand how traps work—that there are vital common denominators of entrapment which are easily observed but commonly overlooked. He looks for the resurrection of seepology, creekology, and surface geology.

THE DESIGN AND FUNCTION OF OIL AND GAS TRAPS (Abstract)

It is in *traps* that oil and gas are found, and thus traps should yield the most positive information. If we can understand well what is going on in the traps, that should enable us to look back along the migration trail with special insight as to what has been happening. That insight could even extend all the way back to the "source."

This study concludes that traps are the most logical places for hydrocarbon (HC) mixtures to be put together as distinct oil and gas fluids. It follows that traps are not just passive receivers or containers of HC mixtures put together elsewhere. Effective oil and gas traps of different well-known styles have a very important feature in common: structurally and stratigraphically, they are designed to discharge waters from depth. Thus they function as active focal mechanisms to gather and process feedstock waters carrying HCs and other organics. It is a forced-draft system. The concept adds an exciting new dimension to the anticlinal theory. It honors all factual observations around oil and gas deposits.

Very simply, the most important function of a trap is to leak water while retaining HCs. The water can leak because the enclosing membranes and cover are water-soaked, like a wick. The HCs and other organics are separated from the waters as they pass through the trap. The separation is caused by abrupt changes in pressure, temperature, and possibly salinity; these are related to the basic change in direction of feedstock (water) movement from lateral to upward. Coalescence of HCs makes bubbies or globules which cannot move easily like water. The ultimate composition of a trapped HC mixture depends on the residence times of the various components, which in turn depend on (1) what the water carries, (2) what the trap retains, and (3) the pore-volume exchange rate.