LUNCHEON MEETING—
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ROBERT M. SNEIDER—Biographical Sketch

Mr. Robert M. Sneider is a partner in the firm Richardson, Sangree and Sneider and an AAPG Distinguished Lecturer for 1989. He graduated from Rutgers University in 1951 with a BS in Geology. He received his PhD in Geology and Mining Engineering from the University of Wisconsin at Madison in 1957. Mr. Sneider joined Shell Oil Co. in 1957 and worked as a Senior Staff Geological Engineer, a Research Supervisor and Area Production Geologist. In 1974, he became President and Partner in Sneider and Meckel Associates. In 1981, he formed Robert M. Sneider Exploration Inc. and has been a partner in Richardson, Sangree and Sneider since 1986.

RESERVOIR DESCRIPTION FOR EXPLORATION AND DEVELOPMENT: WHAT IS NEEDED AND WHEN

The biggest challenge for geologists, geophysicists, and petroleum engineers now and in the decades ahead is to significantly improve hydrocarbon recovery from all new and previously discovered reservoirs. Keystone of the methodology required to improve oil and gas production, as well as to evaluate and delineate new reserves, is a detailed reservoir description. This is a characterization of the reservoir and nonreservoir rock fluid system that is appropriate in content and detail for the particular stage of exploration and production. The type and amount of data required for a proper reservoir description are diverse, from several disciplines, and depend upon where the reservoir is in its E & P cycle. The E & P cycle is viewed as a continuous series of overlapping stages from discovery, through appraisal, planning, development, and reservoir management. The concepts and data needed to define and exploit reservoirs become more complex and quantitative as production becomes more mature. Concepts, data, and models developed during the production phases, when reapplied to exploration, provide important guides to the explorationists for evaluating trapping elements, seals, reservoir quality, and risks in basin and wildcat evaluation.

When one looks at the question "When is a reservoir description needed?" the answer is simple. The need starts once a discovery is made and the discovery is being appraised as to the best estimates of hydrocarbon in place, recoverable reserves, and rates of production. As a field or reservoir goes through its typical "life cycle" of discovery, appraisal, planning, development, and reservoir management, a more complete discription is both necessary and possible. Key concepts and methodology for reservoir description appropriate to the history and stage of field/reservoir depletion are illustrated by case studies from several basins around the world. Check lists that outline reservoir description needs and timing are discussed in the context of the stage of field/reservoir exploitation.

A critical first step in the reservoir description process is the recognition of any correlative reservoir subzones or layers and any intervening dense, impermeable, or low-permeability strata. Knowledge of the depositional/diagenetic processes controlling reservoir and nonreservoir rock is essential to determine ones ability and degree of confidence in correlating these units. Seismic sequence, lithologic, and fluid analyses and well-documented outcrop studies can add significantly in establishing interwell correlations. Recognizing and mapping all vertical or horizontal fluid-flow barriers, as well as "thief" zones or zone of unusual permeability contrast and faults, are critically important to all recovery processes. Flow-test data dovetailed with knowledge of the reservoir and nonreservoir framework based on geology/geophysics provides the best reservoir description of continuity/discontinuity.

Structural and stratigraphic maps, cross sections, and fence and block diagrams are the illustrations used to convey the three-dimensional geometry, distribution, and continuity of the reservoir, nonreservoir, and aquifer. A variety of computer programs aid in preparing these illustrations. Isopach maps without the accompaning detail correlation sections have been the "pitfall" of many projects. Net pay isopach maps drawn to provide the basis for determining hydrocarbons-in-place have "tricked" many petroleum engineers into believing a reservoir is more continuous, more homogeneous, and less stratified than it actually is. The importance of discontinuous shale barriers of limited areal extent on coning and the drainage of oil from a gas-invaded area are illustrated.

The recognition, selection, and description of reservoir units or layers and then the communication of this "picture" to the petroleum engineers are fundamental contributions and the responsibility of the geologists/geophysicists team members. A coordinated data-acquisition program can greatly improve the probabilities of correct assessments in discovery, appraisal, planning, development, and reservoir management.

In exploration ventures, detailed reservoir description studies made during the production stages provide the critical data needed by the explorationist to estimate reservoir and seal quality from seismic, well logs, and samples.