MEETINGS

HGS DINNER MEETING— NOVEMBER 11, 1991

HENRY W. POSAMENTIER—Biographical Sketch

Henry W. Posamentier received his Ph.D. from Syracuse University in 1975. He taught for five years at Rider College in New Jersey before joining Exxon Production Research in 1979, and most recently accepted a position with Arco in 1991. Henry played a key role in the development of the sequence stratigraphic concepts, focusing on deep-sea as well as shallow-marine deposition utilizing seismic, well-log, and core data. He has published and lectured widely, in particular serving as co-editor and author of several key papers in the landmark SEPM Special Publication #42.

VARIATIONS OF THE SEQUENCE STRATIGRAPHIC MODEL: PAST CONCEPTS, PRESENT UNDERSTANDING, AND FUTURE DIRECTIONS

Sequence stratigraphic concepts, originally developed on the basis of observations from seismic data largely from passive margins, have recently had more widespread application in a variety of other data bases including outcrop, well log, and core, in a variety of different physiographic settings. With these applications to higher resolution data bases have come modifications and refinements of the sequence concepts. A hierarchy of sequences within sequences is observed as closer inspection reveals greater complexity. *The common thread linking the hierarchy is the occurrence of sequences bounded by unconformities and composed of systems tracts.*

The working hypothesis upon which the sequence concepts are based is that *relative* sea level change (i.e., a function of eustatic, tectonic, and compactional effects) results in changes in the capacity of a basin to accommodate sediment, which, in turn, results in a succession of sequences. The interplay between eustasy, tectonics, sediment flux, and physiography yields a predictable geologic response in carbonate, clastic, as well as mixed carbonate/clastic settings. Sequence-bounding unconformities subdivide the rock record into genetically related packages characterized by a continuum of deposition (albeit at varying rates). The criteria for recognition of sequence boundaries can be varied within a given basin as well as between basins. They include but are not restricted to (1) a basinward shift of facies across a sharp bedding contact, (2) onlapping stratal geometry, and (3) truncation of strata. The key to the correct utilization of these concepts is to recognize sequence stratigraphy as an *approach or a tool* rather than a *rigid template*.

Observations from the upper Albian, Cretaceous, Viking Formation of the western Canadian sedimentary basin are presented to illustrate the stratigraphic expression of clastic depositional sequences on a ramp margin. In this setting, *forced regressions* and lowstand shorelines commonly occur, incised valleys sometimes occur, and submarine fans rarely occur, in response to fluctuations of relative sea level.

The base of the Viking Formation sometimes is characterized by relatively coarse-grained sediments sharply overlying fine-grained offshore muds and is interpreted as a third-order sequence boundary. Pebbles occasionally are observed at this contact. Subsequently, a number of higher-order sequences within the lower to middle Viking are observed and are characterized by the occurrence of *forced regressions* and lowstand shorelines without associated incised valleys. Within the upper Viking Formation, significant incised valleys occur. The fill with associated lowstand shorelines is complex and suggests a multistaged fill history during an overall transgression. The upper boundary of the Viking is a significant transgressive surface interpreted to be a ravinement surface and is characterized by relatively coarse-grained sediments sharply overlain by fine-grained offshore muds. This surface is commonly veneered by a pebble-rich, thin transgressive lag (<1 m).