LUNCHEON MEETING—MAY 30, 1984

MARC B. EDWARDS—Biographical Sketch

Marc B. Edwards is a consulting geologist whose present interests include the growth-faulted zones of the Gulf Coast Basin, and geological applications on the microcomputer. He received the B.S. degree in geology from The City College of New York, and the Ph.D. from Oxford University in clastic sedimentology.

Marc has worked at the Norwegian Polar Institute in Oslo, and the Norwegian Continental Shelf Institute in Trondheim, where he studied the geology of the Barents Shelf and Svalbard. At the Bureau of Economic Geology in Austin, he was involved in studies of the geopressured-geothermal energy potential of the Wilcox and Frio trends of Texas, and also investigated the uranium potential of an area of north-central Texas.

Marc is a member of HGS, AAPG, SEPM, Gulf Coast Section SEPM, and IAS. He has published widely on sedimentology and stratigraphy. In 1983 he received the Sproule Memorial Award for his paper on the "Upper Wilcox Rosita Delta System of South Texas: Growth-Faulted Shelf-Edge Deltas.

The paper to be presented at the luncheon meeting was previously presented at the AAPG-SEPM annual meeting in 1981, and appeared in SEPM Special Publication No. 33, pp. 139-157, in 1983. Charles D. Winker was the senior author of these presentations and created most of the fine graphics that accompany them.

UNSTABLE PROGRADATIONAL CLASTIC SHELF MARGINS OF THE NORTHERN GULF COAST BASIN

Rapid sedimentation (greater than subsidence) of mud-rich shelf-to-slope systems leads to rapid shelf margin progradation and early build-up of excess pore-water pressures. The muddy sediments become unstable at shallow depths, and are subject to a variety of deformational styles which result in downslope translation. Deep-seated slip surfaces evolve into listric faults which terminate upslope in extensional growth-fault systems on the shelf, and downslope in compressional fold and thrust-fault systems on the base-of-slope.

Locally, extremely high subsidence rates result from gravity sliding, while regional subsidence patterns reflect isostatic depression of the crust. The rapidly subsiding shelf margin acts as a huge sediment trap, leading to the accumulation of thousands of feet of shallow-water, primarily deltaic, sediments along a growth-faulted trend that may be many hundreds of miles long.

In contrast to shallow-shelf deltas, shelf-margin deltas show thicker and better differentiated progradational units and steeper clinoforms. Sand geometry is influenced by two competing factors. The narrow shelf allows little-attenuated waves to extensively rework coastal sediments, favoring wave dominance and strike-aligned sand continuity. On the other hand, rapid subsidence reduces lateral reworking, thus favoring river dominance and dip-aligned sand trends.

Because the shelf margin is a zone of rapid dip-wise facies changes, numerous stratigraphic and structural traps arise by the confluence of stratigraphic and structural patterns. In addition, juxtaposition of downfaulted shelf-margin deltaic sandstones against compacting slope shales favors the preservation of abnormal fluid pressures in deep fault-bounded reservoirs. Thus a comprehensive shelf margin model, incorporating depositional, paleoecological, diagenetic, structural and subsurface fluid data should be useful for reconstruction and exploration of the major downdip producing trends of the Gulf Coast Basin.