NORTH AMERICAN EXPLORATIONISTS

HGS NORTH AMERICAN EXPLORATIONISTS GROUP DINNER MEETING—DECEMBER 15, 1992

Social Period, 5:30 p.m.,
Dinner and Meeting, 6:30 p.m.
Post Oak Doubletree Inn

ROBERT LOUCKS—Biographical Sketch

Robert Loucks received his B.A. degree from the University of New York at Binghamton in 1967 and his Ph.D. degree from the University of Texas at Austin in 1976. Before joining ARCO Exploration Research in 1983, he had already gained 15 years of research and exploration experience with Texaco, Texas Bureau of Economic Geology, Mobil, and Cities Service. He is presently a Research Advisor in ARCO's Exploration and Production Technology group in Plano, Texas. His research interest includes carbonate sequence stratigraphy, carbonate depositional systems, and carbonate and clastic diagenesis. He has conducted research on ancient and modern cave systems for over a 15-year period and he has published on Lower Ordovican, Siluro-Devonian, and modern cave systems.

ROBERT HANDFORD—Biographical Sketch

Robert Handford is currently a Principal Geologist with ARCO Exploration and Production Technology in Plano, Texas where he conducts research and technical service work in carbonate sequence stratigraphy. Handford received a Ph.D. in geology from Louisiana State University in 1976, and he holds a B.S. from Northeast Louisiana University and an M.S. from the University of Arkansas. Prior to joining ARCO in 1988, Robert was assistant professor of geology at the University of Arkansas. He has held research positions with Amoco Research in Tulsa, the Louisiana Geological Survey, and the Texas Bureau of Economic Geology. His interest in paleokarst stems from 30 years of experience as a caver and a member of the National Speleological Society.

PALEOCAVE-RESERVOIR NETWORKS: THEIR ORIGIN AND RECOGNITION

Many pore networks and permeability barriers in carbonate reservoirs are the result of cave-forming processes. The origin and recognition of fractures, breccias, and sediment fills associated with paleocaves were determined through the study of modern and paleocave systems. Cave formation and destruction are the products of near-surface and burial processes. Near-surface processes include solutional excavation, clastic and chemical sedimentation, and collapse of cave walls and ceilings. Initial fracture, breccia, and vug porosity develops during this stage. Cave sediment may either be derived from inside and/or outside the system. Depositional mechanisms include suspension, tractional, mass-flow, and rock-fall. Collapse of ceilings and walls form *chaotic breakdown breccia*. These piles can be tens of meters thick and contain large voids and variable amounts of matrix. Breakdown clasts may fracture upon impact forming *crackled breakdown breccia*. Subterranean fluvial and mass-flow processes can rework breakdown to form *transported breakdown breccia* deposits. *Cave-roof crackle breccia* forms from stress- and tension-related fractures in cave-roof strata.

As the cave-bearing strata subside into the subsurface, mechanical compaction increases and restructures the existing breccias and remaining cavities. Fracture porosity increases and breccia and vug porosity decrease. Large cavities collapse forming *burial chaotic breakdown breccia*. Differentially compacted strata over the collapsed chamber fracture and form *burial cave-roof crackle breccia*. Continued burial leads to more extensive mechanical compaction of the previously formed breakdown, thus causing clasts to fracture and pack closer together. The resulting product is a *rebrecciated chaotic breakdown breccia* composed predominantly of small clasts. Rebrecciated blocks are often overprinted by crackling. Subsurface paleocave systems commonly have a complex history with several episodes of fracturing and brecciation.