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## *Production of Low-resistivity, Low-contrast Reservoirs, Offshore Gulf of Mexico Basin*

By Harold L. Darling, Schlumberger, and Robert M. Sneider, Robert Sneider Exploration

Low-resistivity, low-contrast (LRLC) pay sands are now being found and produced. In the past, these intervals were often overlooked, being considered wet or tight. These LRLC intervals, which can contain significant reserves, can be recognized today through proper identification and evaluation techniques using well logs, samples, and cores.

Although LRLC pay sands have been recognized for many years, their economic importance has only recently been demonstrated. With the recognition of LRLC zones in clastic basins throughout the world, (e.g., Gulf of Mexico, North Sea, Indonesia, West Africa, Alaska) evaluation

and production of these zones has taken on new significance. These not-so-obvious pay zones have proven to be of large areal extent and contain many thousands of barrels of hydrocarbons. Thus, proper evaluation and understanding of these zones has become essential.

The principal geological causes of LRLC are: 1) laminated intervals, 2) dispersed clay, 3) structural clay, 4) altered framework grains, 5) grain size, 6) other. The major depositional systems containing LRLC reservoirs are: 1) channel fills, 2) delta front and toe deposits, 3) shingled turbidites, 4) deep-water fans, including levee-channel complexes. This knowledge, along with

knowledge of wireline tools and responses, can be used to build petrophysical models that can evaluate these LRLC reservoirs.

### **Biographical Sketches**

**Harold Darling** received his professional degree in Engineering Physics from the Colorado School of Mines in 1965. He joined Schlumberger in 1968 and worked as a field engineer, specialist engineer, and district manager in the Rocky Mountain Division, Texas Coast Division, and Offshore Unit. From 1984 to 1991 he worked for the Gulf Coast Unit, focusing on offshore applications of wireline interpretation. From 1991 to 1993 he was assigned to the Interpretation Development group at Schlumberger's headquarters location. He was assigned to the Applied Interpretation group, working with sonic and nuclear tool responses and rock mechanics, from 1993 to 1995. As of January 1995, he has been assigned to the Schlumberger Product Center in the Electrical-Nuclear Department as the Marketing Coordinator.

**Dr. Robert M. Sneider** is President of Robert M. Sneider Exploration, Inc. in Houston, and has a Ph.D. in geology and mining engineering from University of Wisconsin. His company, Sneider and Meckel Associates, was co-discoverer of the giant Elsworth deep basin gas area in Canada. He worked 18 years with the Shell companies on exploration and development of sandstone and carbonate reservoirs, application of well logs in geology, and training. He has worked 21 years as a consultant in exploration, production, research, training, and management. He has been dedicated to professional continuing education for many years and teaches exploration and development courses worldwide. He is an Honorary Member of the AAPG. He was a Distinguished Lecturer for AAPG and SPE, and received AAPG's 1994 Distinguished Service Award.