

Reservoir Characterization - Recent Advances

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This book is the result of the Fourth International Reservoir Characterization Technical Conference (1997) which was sponsored by the U.S. Department of Energy (DOE). As the title of this book suggests, it is focused on the application of the reservoir characterization of sedimentary rocks that accumulated in a variety of different depositional settings. It places an emphasis on the petrophysics of these rocks, and their tie to layered flow models. Potential purchasers of the text are probably specialists who work with reservoir characterization including reservoir geologists, petrophysicists and/or engineers.

The book is divided into seven sections. The first section provides an overview incorporating the philosophy of the DOE when considering reservoir characterization. Their approach emphasizes maximum economic return and is described for the DOE “type” reservoirs which are currently studied and include the East Randolph Field of Ohio, the Citronelle Field of Alabama and the Bainville North Field of Montana. This paper is written very much from a manager’s perspective of this process, focusing on generalities rather than the specifics of the management process; these come later in the other sections of the text.

The second section contains four papers that consider depositional settings that range from the deeper water slope deposits of the Upper Miocene of California; incised valley sandstone fill of the middle Pennsylvanian of Oklahoma; the tidal channel, tidal delta and foreshore facies of an Upper Cretaceous transgressive systems tract from the Green River Basin; and fluvial deltaic reservoirs from the Cretaceous of Utah, and the Oligocene Frio Formation of the Texas Gulf Coast. The section ends with a paper on petrofacies analysis, demonstrating how the analysis of well logs, pore characterization and production performance coupled to an understanding of the genesis of these rocks can be used to build reservoir models.

The third section has two papers on enhanced and improved oil recovery. The first of these papers is focused on Brushy Canyon of the Nash Draw Pool in Eddy County, New Mexico. It uses well logs from six producing wells that are tied to 3-D seismic to make better depositional and production models for this field. The second of these papers integrates geologic and engineering models for the North Robertson (Clear Fork) Unit of Gaines County Texas.

The fourth section is on method and techniques and contains seven papers that cover a range of topics on including: well imaging; geostatistical description using pressure data; transient productivity index; a method for determining positive and negative capillary pressure curves; flow units from integrated WFT and NMR data; how to extract maximum petrophysical and geological information from a limited reservoir database; and a paper on the use of tracers to enhance production from injection.

The fifth section consists of two papers on fracture analysis. The sixth section contains four papers on up scaling and simulation with the papers focused on engineering simulations. The seventh and final section is focused on modeling and the incorporation

of geologic and engineering data to produce more accurate 3 dimensional layered models of different reservoirs.

This text works through the methodology of building models for reservoir characterization starting from depositional models, and emphasizing the importance of the interdisciplinary integration. Many of the authors favor a team approach to improve the prediction of reservoir character and so maximizing recovery and profit. The papers are packed with information on how geologists infer the continuity of sedimentary facies and how engineers link this to reservoir databases and production models to make accurate production predictions. The papers are full of really great illustrations that include maps, diagrams, well cross-sections, and seismic. Many of these illustrations are in color and most of are of high quality. The text is extremely current and the authors, editors and AAPG are to be congratulated on a first rate text.

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