# SEQUENCE STRATIGRAPHY

1988 SEG Research Committee Workshop

**Organizers:** James W. Hugg, Independent Consultant
H. Roice Nelson, Jr., Landmark Graphics Corporation

**Discussion Topics and Leaders:**

1. Depositional Sequences, Systems Tracts, and Eustasy
   John Sangree - Richardson, Sangree and Snyder, Houston
2. Seismic Attributes and Lithofacies
   Milo Backus - University of Texas, Austin
   Turhan Taner - Seismic Research Corporation, Houston
3. Relating Seismic to Logs, Outcrops, and Biostratigrahy
   Sandy Phillips and Peter Thompson - Arco Research, Plano
   John Armentrout - Mobil, Dallas
4. Depositional Environments and Stratal Geometries
   Brad Macurda - The Energists, Houston
   Bob Mitchum - Exxon Production Research, Houston
5. Carbonate Depositional Sequences
   Christian Ravenne - IFP, Paris
   Peter Vail - Rice University, Houston
6. Depositional Sequence Modeling
   Tim Cross - Colorado School of Mines, Golden
   Scott Bowman - Rice University, Houston

**Contents:** We believe this workshop set a new precedent for SEG research workshops, by showing that we can return to a hands-on environment and by encouraging active debate on research aspects of Sequence Stratigraphy. The workshop provided a forum for discussing regional scale seismic stratigraphy, production-scale log-derived stratigraphy, outcrop stratigraphy, integrated stratigraphy, as well as the various possible geologic and depositional controls on stratigraphy (global eustasy, local tectonics, climate, sediment supply rates, etc.). One of the discussion leaders brought a Macintosh computer and demonstrated depositional modeling. Within this broad framework a generalized Vail/Sangree definition of Sequence Stratigraphy was used to establish a common thread for the workshop.

**Workshop Format:** The format of the workshop was a modification of the 1987 Austin Summer Research Workshop on Seismic Interpretation. Everyone started out at the front of the hall and listened to John Sangree's introductory speech, with comments about the Society of Economic Geophysicists and just using these ideas to make a buck, before going into the topic and explaining how these concepts help predict capillary characteristics of reservoir, seal and source sediments in the subsurface, providing the basic tools to integrate geology and geophysics with reservoir engineering. Then the audience was allowed to select from six areas the topic they were interested in for a hands-on workshop. The back of the room was organized with six large discussion tables. The first row of chairs was for active participants, and then there were additional chairs for passive observers. Each team of discussion leaders prepared a brief hands-on exercise with written instructions for all participants. The exercises were designed to focus attention on some of the salient research problems in the subtopic area and to help stimulate subsequent discussion. Notes were taken during the discussion and then the discussion leaders were responsible to share these with the entire audience as a summary to the workshop. The two days following the workshop was an SEG Continuing Education Course on Sequence Stratigraphy for those that wanted to go into more detail.

**Lessons we learned:** An unanticipated cost of about $350, for copying the workshop materials and for the colored pencils, was accrued by the SEG. Because of delays in obtaining company permission for some of the speakers there was some mixups on who was participating as discussion group leaders in the printed program. There were also two different starting times printed. In addition, the SEG was so well organized that they notified speakers of their presentation before they had final approval and had given their commitment to participate. In two cases they did not obtain approval. The SEG workshop "tie-down' meeting was held during the session in which both organizers were speaking. This was a problem because there was considerable confusion due to the different format. We were going to have participants sign-up for the topic area of interest and then provide name tags, but the logistics were too much. We just let people go to the areas they were interested in, and it worked out fine as far as the numbers in each group. However, there was a significant noise problem. We strongly recommend that any future workshops to follow this format arrange for separate rooms for the different discussion groups. All in all it was a successful experiment.

Sequence Stratigraphy is the integrated interpretation of stratal patterns from seismic, well, and outcrop data, together with the associated depositional environments and lithofacies. The sequence stratigraphy interpretation process develops a chronostratigraphic framework of cyclic, genetically-related strata, bounded by surfaces of stratal discontinuity created by erosion or by non-deposition or by their correlative conformities. Within this chronostratigraphic framework the interpretation process develops the distribution of depositional environments and their associated lithofacies, that may be confined to synchronous intervals that are bounded by stratal surfaces, or to diachronous intervals that step across stratal surfaces