PERMIAN BASIN/MID-CONTINENT EXPLORATIONISTS

Permian Basin and Mid-Continent Exploration Meeting
Tuesday, October 22, 1991
6:00 p.m. - Post Oak Doubletree Inn

The secret of finding big reserves, in our "lean and mean" environment, is having the right geophysical - geologic model.

The October dinner meeting of the Houston Geological Society, Permian Basin and Mid-Continent group, will feature Kenneth W. Grove, Columbia Gas Development Corporation, who will present a paper on geology and seismic modeling of an Aneth-type Desert Creek Mound Trend. This work was jointly authored by Mr. Grove and Duncan L. Edwards, Consulting Geologist, and was first presented at Denver Geotech Conference and subsequently presented at 1987 AAPG Rocky Mountain Section Meeting.

Reservations must be made by Friday, October 18, 1991, by calling Margaret at Houston Geological Society (785-6402) before 4:00 p.m. Dinner is $20 for HGS members and $22 for non-members; no-shows will be billed.

GEOLOGY AND SEISMIC MODELING OF AN ANETH-TYPE DESERT CREEK MOUND TREND, PARADOX BASIN, SOUTHWEST COLORADO

In the Paradox Basin of southwest Colorado, a major facies change from thick, porous algal dolomite to thin, tight anhydrite occurs within the Desert Creek zone of the Pannsylvanian Paradox Formation. This northwest-trending algal mound belt is subparallel to and separated from the ancestral Uncompaghre mountain front by lagoonal anhydrite and nearshore arkosic fanglomerates. Carbonate rocks attain a maximum gross thickness of 200 ft., which can include 100 ft. of reservoir quality dolomite. These rocks have an updip and abrupt eastward facies change to thin evaporites which form a regional master trap for potentially significant hydrocarbon accumulations. Reservoir parameters and trapping mechanisms are similar to Utah's Aneth Field, where oil production exceeds 340 million barrels.

The subsurface stratigraphic changes have been seismically modeled with a microcomputer to define the extent of each facies. The modeling is based on sonic logs from two wells that exhibit the end-member facies of thick, porous dolomite versus thin, tight evaporite. An interpolation routine creates intermediate logs between these end-members, thereby defining the geometry of the model. The depth model is convolved with a zero-phase wavelet of 10/20=40/60 hz, and the result is an extra seismic cycle where reservoir thickness exceeds 40 ft. Updip loss of the cycle defines the transition from reservoir dolomite to trap anhydrite.

The modeling demonstrates that this major facies change can be detected at frequencies reasonably attainable by modern seismic methods. Regional subsurface stratigraphic analysis and modern seismic data provide an integrated approach to hydrocarbon prospecting in the Pennsylvanian Desert Creek zone.