tion at Cato San Andres field (New Mexico) and Mission Canyon pay at Haas field (North Dakota) reveal no diachronous buildup. As expected these fields demonstrate only a lateral change in velocity within the formation.

Application of stratigraphic-seismic techniques to low-energy carbonate facies can fall into two depositionally controlled divisions. When sediment accretes vertically, traps are mapped solely by lateral changes in velocity. Sedimentary buildup in transgressive or regressive sequences provides angularity, which combined with velocity contrast facilitates seismic detection of the trap.

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Strategy of Exploration for High Temperature Hydrothermal Systems in Basin and Range Province

A 15-phase strategy of exploration for high temperature convective hydrothermal resources in the Basin and Range province features a balanced mix of geologic, geochemical, geophysical, hydrologic, and drilling activities. The strategy is based on a study of data submitted under the Department of Energy's Industry Coupled Case Study Program. Justification for inclusion in or exclusion from the strategy of all pertinent geoscientific methods is given. With continuing research on methods of exploration for and modeling of convective hydrothermal systems, this strategy is expected to change and become more cost-effective with time. Variations on the basic strategy are to be expected where the geology or hydrology requires it. Personal preferences, budgetary constraints, time and land position constraints, and varied experience may cause industrial geothermal exploration managers to differ with our strategy. For those just entering geothermal exploration, the strategy is expected to be particularly useful.

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Middle-Late Permian Paleogeography of Idaho, Nevada, Montana, Utah, and Wyoming

Conodont and brachiopod biostratigraphic zones are used to divide the Phosphoria Formation and related rocks into 7 discrete time intervals of the middle and Late Permian to examine the general sedimentation patterns of the Phosphoria basin. Three depocenters existed in the middle Permian: one in southwestern Montana, one in northeastern Nevada, and one in central-eastern Nevada and adjacent Utah. The sedimentation occurred in two transgressive phases followed by sea level stillstands. A major regression occured in late Guadalupian time. The conodont and brachiopod faunas indicate that cooler water existed in the area of maximum phosphorite deposition, generally in eastern Idaho and southwestern Montana.

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Permian Conodont Biostratigraphy and Paleoecology

Permian conodont faunas are not diverse but yield a wealth of information on biostratigraphy and paleoecology. Pennsylvanian faunas carried over into the Early Permian and became extinct in the late Wolfcampian. At this time the rapidly evolving neostreptognathodid and common neogondolellid stocks arose. Predominately, these two stocks are used to subdivide the Permian.

Through most of the Permian, three ecologic faunas can be recognized: (1) a shallow, nearshore fauna dominated by *Hindeodus,* (2) an intermediate fauna dominated by *Neostreptognathodus* or *Merrillina,* and (3) a far-from-shore fauna dominated by *Neogondolella.* Some species of *Neogondolella* varied according to nearness to shore; populations containing higher percentages of individuals with serrated or bumpy margins were nearer to shore, often occurring with *Hindeodus.*

Early Permian *Neogondolella* faunas were cosmopolitan. In the middle Permian three provinces of *Neogondolella* faunas can be recognized: a very endemic west Texas province, a partly endemic Canadian province, and a cosmopolitan Eurasian province. All three provinces consist of stocks that seem to be derived from a common widespread ancestor, *Neogondolella idahoensis.* Only the Eurasian province faunas persisted into the Triassic. It appears that the basins containing the west Texas and Canadian faunal provinces dried up and their respective faunas died out in the Late Permian.

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Multiphase Fluid Movements in Glass Micromodels of Pore Systems

The efficiency with which oil or gas can be displaced by water in the pores of a reservoir rock is affected by the properties of the fluids and the properties of the pore spaces which contain those fluids.

Pore casts provide the most effective way of viewing pore structures and are prepared by impregnating pore systems with resins and subsequently removing the host rock by solution in acid.

Unsteady state relative permeability tests, countercurrent imbibition tests, and drainage-imbibition capillary pressure tests can be used to estimate the displacement efficiency for particular fluid conditions in selected cores of reservoir rocks. The results of these tests can be compared with visual observations of pore structure made from pore casts and, in this way, it is possible to suggest which attributes of pore systems in reservoir rocks are critically important in influencing displacement efficiency. These variables include: pore to throat size ratio, the average number of throats connecting with pores, the types, abundance, and arrangement of non-random heterogeneities, and the roughness of surfaces.

However, pore systems in any rock are a complex of variables and, to further understand and define the interaction of fluid and pore variables in trapping oil or gas during displacement, it is necessary to create physical models of pore systems which incorporate the characteristics of real systems but in simplified and controlled forms. The fluid and pore geometric attributes can be varied singly and displacement tests can be viewed under the microscope in transparent micromo-