

Unconventional Gas Accumulations: The New Era of Exploration

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ABSTRACT

The new era of unconventional gas exploration (basin-centered, coalbed, and shale) offers the most promising opportunity for the future discovery of giant, onshore gas fields in North America. In the United States these gas accumulations account for 26-28 % of annual production. However, in order for this “new era” to fully meet expectations, there is a need for explorationists to modify and expand their understanding of the elements and processes that constitute commercial, gas accumulations.

Most explorationists during their formal education and professional lives were thoroughly ingrained with the idea that the key to discovery is dependant on the anticlinal theory and a few basic “conventional” principles that include 1) organic-rich source-rocks, 2) porous and permeable reservoirs, 3) fluid buoyancy, 4) structural and stratigraphic traps, and 5) lithologic seals. Exploration for conventional gas accumulations commonly requires complex and lengthy studies. In contrast, “unconventional” principles are simple and intuitive. They include truths such as 1) source rocks may also be reservoir rocks, 2) reservoir rocks may have very low porosity and permeability, 3) absence of downdip water contacts, 4) regionally pervasive gas accumulations with little or no structural and stratigraphic influence, 5) capillary pressure seals, 6) sorbed gas, 7) thermal cracking of oil to gas, and 8) biogenic gas. In most cases the application of these “unconventional” principles is easier and can be accomplished with a higher degree of confidence than the application of “conventional” principles. Acceptance of these and other “unconventional” guiding principles opens up new geographic and stratigraphic exploration frontiers.