

Seismic Polarity Reversals in Higher Impedance Gas Sandstones

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Most interpreters view processed seismic displays with an understanding of sandstone/shale reflectivity as provided by available acoustic and density logs. Simple synthetic trace seismograms are relatively straightforward for the well-known "bright-spot" world, or zone I condition. For such a reflectivity type, impedances ascribed to a single-layer sandstone model would yield the classic "trough-over-peak" signature on zero-phase wavelet-processed data, with a composite waveform for the "thin bed."

In this study, however, we consider anomalous reflections of the higher impedance sandstones in zone II (case 2) and zone III (case 1), which do not appear as the "dim spots" we might expect if they were gas bearing. Some zone-III-type sandstone members (more consolidated and having greater acoustic impedance than their contemporary shale counterpart) frequently exhibit polarity-reversed reflections when filled with gas in commercial quantities. This effect is also often exaggerated by tuning effects on amplitude. Using case studies from gas-producing fields, seismic

amplitude/tuning thickness models, subsurface well log information, and auxiliary analyses such as amplitude versus offset and inversion, we examined this phenomenon for its interpretive significance. Also, by modeling and viewing additional analyses, we demonstrate how such hydrocarbon-associated reflectivity changes occur for certain higher impedance members of Miocene and Pliocene sections in the offshore Gulf of Mexico.

Many substantial pay zones found at depth are associated with high-magnitude (bright), trough-over-peak reflections, but they derive this exaggerated signature from tuning. Logged impedance values in such sandstones typically show good contrast on the high side with the shales for the water-wet condition and only modest impedance reductions below the shales for the gas pay. Because this high-potential province remains largely unexploited, owing to poor understanding, improved insights here may result in many new and significant discoveries.

A Current Review of Registration of Geologists and Geophysicists in California

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California was the first state to require licensing of professional geologists and geophysicists and to certify engineering geology as a geological specialty practice. License Number 1 was issued on December 12, 1969, and in the ensuing 25 yr, California's State Board of Registration for Geologists and Geophysicists (the Board) has licensed about 6,000 geologists and 1,000 geophysicists and certified more than 2,000 engineering geologists. Regulation of the practice of geology now occurs in more than 20 states, and it is predicted that all of the most populated states will adopt licensure for geologists before the turn of the century.

The Board is one of 35 boards and committees that function within the framework and jurisdiction of the California Department of Consumer Affairs. The Board's primary mission is to protect the health, safety, and welfare of the California public by (1) licensing competent professionals, (2) administering the requirements of the enabling Geologist and Geophysicist Act (the Act), (3) establishing relations with other regulating agencies, and (4) investigating complaints against licensed and unlicensed practitioners and disciplining violators of the Act.

The Board consists of eight appointed members, five of whom are "public members" (nongeologists) and three of

whom are "professional members" (licensed geologists and geophysicists). The professional and three public appointments to the Board are made by the governor. The Senate Rules Committee and the Assembly Speaker each appoint one public member. To assist the Board in its decisions are three standing committees: (1) the Professional Affairs Committee, which focuses on standards of practice issues; (2) the Examination Committee, which oversees the examination process and recommends licensing reciprocity agreements with other states; and (3) the Legislative Committee, which proposes and reviews legislation that affects professional practice.

Starting in September 1994, the Board will offer licensing examinations twice yearly on a 6-month schedule. During 1993, the Board received 1,473 new applications for licensure, which is a 360-percent growth in the past 10 yr, and in September 1993, the Board administered 1,004 examinations, which represents a 1,520-percent growth in the past 10 yr. The Board has an active Enforcement Unit and is also formulating an administrative Cite and Fine regulation to speed the disciplinary process against unlicensed practitioners and licensed professionals who run seriously afoul of the provisions of the Act.