Approaches to Stratigraphic Cross-Section Construction

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Stratigraphic cross sections are fundamental tools for portraying reservoir, trap, seal and source-rock relationships. Yet 59% of 538 stratigraphic cross sections surveyed in nine volumes of the AAPG Bulletin from 1940 to 1995 consistently show deficiencies of layout, well projection, scale, and vertical exaggeration, regardless of the year of publication. Such mechanical aspects of stratigraphic cross-section construction are not simply academic issues. Adherence to simple mechanical construction rules focuses our efforts on the real issues of correlation and eliminates the perceived “art” in cross-section construction. Without these rules, accurate geometric portrayal of sedimentary rock bodies is impossible, and, as a result, we are reduced to schematic representations that are often model-driven.

Consideration of the mechanical aspects of stratigraphic cross-section construction leads to an even more important issue: stratigraphic datum selection. A stratigraphic datum is a synchronous surface or horizon with a flat depositional topography at the time of formation. So, which stratigraphic surfaces and/or marker beds constitute good stratigraphic datums? Are flooding surfaces really flat? Does a cross section require a unique datum? Beginning with the “love of our first datum” (sea level), we examine various types of marker beds and stratigraphic surfaces commonly used as stratigraphic datums in the survey and discuss how they may or may not lead to miscorrelation, given adherence to accurate construction mechanics. We illustrate these issues with as variety of surface and subsurface data sets from both Rockies and Permian Basins.