Burial Histories of Mississippian Potential Source and Shale- Gas Reservoir Rocks, Central and Western Utah

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The Mississippian Manning Canyon and Chainman Shales and their equivalents in central and western Utah are potential hydrocarbon source rocks and shale-gas reservoirs. The Utah Geological Survey has constructed burial histories of these strata as an aid to both modeling their thermal maturation histories and understanding their reservoir properties. The Mississippian strata reached maximum burial depths of 18,000-40,000 ft in much of the area, but, as would be expected from the geological diversity of Utah, burial histories vary significantly with location.

In the Basin and Range Province of central Utah, Pennsylvanian-Permian subsidence of the Oquirrh basin dominated the burial histories. Farther west, Pennsylvanian subsidence was less pronounced, possibly due to tectonism identified in eastern Nevada or to development of the West Central Utah high. Maximum depths were probably reached in the Jurassic, but erosion of most of the early Mesozoic section in the Basin and Range hinders reconstruction of this part of the record. Compression during the Sevier orogeny further buried some parts of the Mississippian section beneath foreland basin sediments and thrust sheets, whereas other sections were exhumed on the hanging walls of reverse faults. Locally thick sediments and volcanics contributed to additional burial in Cenozoic extensional basins.

In contrast, the Mississippian of the thrust belt east of the Basin and Range experienced relatively steady and less pronounced subsidence during the late Paleozoic and early Mesozoic. Burial histories of these sections show moderate subsidence in the Late Jurassic, probably related to development of the back-bulge basin of the Nevadan orogeny. Maximum burial depths were reached during pronounced Late Cretaceous and early Cenozoic subsidence of the Sevier foreland basin. As in the Basin and Range, post-orogenic continental deposits locally added to burial depths.