

Sequence Framework of Mississippian Carbonates, Kentucky, West Virginia, and Virginia, U.S.A., Thomas C. Wynn, Department of Geology and Physics, Lock Haven University, Lock Haven, PA 17745, twynn@lhup.edu; Aus Al-Tawil, Saudi Aramco, Dhahran, Saudi Arabia, aus.tawil@aramco.com.sa; and J. Fred Read, Department of Geosciences, Virginia Tech, Blacksburg, VA 24061, jread@vt.edu

The sequence framework of the Mississippian Greenbrier-Newman carbonates (Meramecian-Chesterian) was documented using outcrops, well cuttings, and wireline logs in conjunction with limited core data in Kentucky, West Virginia, and Virginia. The major sequences are fourth-order sequences, a few meters to over a hundred meters thick. They consist of updip red beds and eolianites, lagoonal muddy carbonates, ooid and skeletal grainstone-packstone shoal complexes, open-ramp skeletal wackestone and slope-basinal laminated silty lime mudstone. The sequence boundaries are overlain downdip by lowstand sandstones and calcareous siltstones, and locally on the ramp by basal transgressive shales, eolianites, and redbeds; few sequence boundaries are calichified downdip, compared with updip sections in Kentucky. Transgressive systems tracts on the ramp are siliciclastic prone. Maximum flooding surfaces on the ramp slope occur beneath slope or basinal facies that overlie lowstand to transgressive complexes; on the ramp, maximum flooding surfaces occur beneath widespread grainstones that overlie nearshore shale or lime mudstone. The highstand systems tracts contain significant grainstone units and are relatively free of siliciclastics. Fourth-order sequences are arranged into weak third-order composite sequences. Correlation of the sequences with third-order global sea-level curves, and high-frequency sequences in the Illinois Basin (Smith 1999, 2001) indicates that the eustatic signal driven by moderate ice sheets on Gondwana generated the sequences, whose thicknesses were controlled by foreland basin tectonics.