U.S. Geological Survey Assessment of Undiscovered Conventional Oil and Gas Resources in Downdip Paleogene Formations, U.S. Gulf Coast

**Marc L. Buursink[1], Catherine B. Enomoto[1], Colin A. Doolan[1],
William H. Craddock[1], and James L. Coleman, Jr.[2]**

[1]U.S. Geological Survey, 12201 Sunrise Valley Dr., Reston, Virginia 20192

[2]U.S. Geological Survey, Retired, 130 Wesley Forest Dr., Fayetteville, Georgia 30214

ABSTRACT

In 2017, the U.S. Geological Survey (USGS) completed an updated assessment of undiscovered technically recoverable hydrocarbons in downdip Paleogene formations of the U.S. Gulf Coast region. Using a geology-based assessment methodology, the U.S. Geological Survey estimated mean undiscovered, technically recoverable conventional resources of 100 million barrels of oil and 16.5 trillion cubic feet of gas. Recent discoveries offshore and shows in wells onshore provided new evidence of a working petroleum system in this interval, albeit complex. Based on only sparse data in this interval, the USGS estimated with large uncertainty over 50 trillion cubic feet of undiscovered gas in 2007. Subsequently in this update, eight assessment units (AUs) for conventional resources and three AUs for continuous (unconventional) resources were identified in the USGS Upper Jurassic–Cretaceous–Tertiary Composite Total Petroleum System. The conventional AUs, located downdip of related expanded fault zones, were quantitatively assessed, whereas the continuous AUs were not quantitatively assessed because no known wells or fields produce hydrocarbons from Paleogene shale gas and oil reservoirs. Southern AU boundaries are coincident with State waters limits, whereas northern boundaries of the conventional AUs are typically paleo-shelf margins that defined the transition from shelf to slope depositional environment. Although expanded fault zone areas have published borehole stratigraphy and production data detailed in commercial databases, deeper downdip study areas still have a dearth of data, making these frontier exploration areas. Further complicating stratigraphic correlations were complex salt tectonics and extensive normal faulting. Depositional environment of the downdip Paleogene intervals were reinterpreted to be paleo-slope, based on interpretation of paleontologic data, geophysical well logs from wildcat exploration wells, regional two-dimensional seismic lines, and source-to-sink paleogeographic reconstruction from recent sediment provenance studies. Continuous AUs were delineated based on examina-

tion of published geochemical data, new analysis of selected core samples, and the geo-physical data.