# Mesozoic rift basins – Onshore North Carolina and south-central Virginia, U.S.A.: Deep River and Dan River - Danville total petroleum systems (TPS) and assessment units (AU) for continuous gas accumulation Atlantic Margins

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## Abstract

Two continuous gas assessment units (AUs) are present in the Late Triassic (Carnian) onshore rift basins of North Carolina and south-central Virginia. The source rocks are freshwater lacustrine shales that were deposited near the paleo-equator after the onset of Pangea rifting. These two rift basins, the Deep River basin wholly contained within North Carolina's border, and the Dan River-Danville basin, present in north-central North Carolina and south-central Virginia have been assessed numerically as part of the USGS's National Petroleum Resource Assessment (Fig. 1). These two rift basins are part of a series of formerly larger continental rift basins that formed during the Permian to Early Jurassic extension in central Pangea as the supercontinent began to fragment.

These continuous gas-prone AUs are total petroleum systems (TPS). The Deep River basin continuous AU has an estimated mean gas (BCFG) content of 1,660 and an estimated mean of natural gas liquids (mmbngl) of 83. The Dan River-Danville basin continuous AU has an estimated mean gas content (BCFG) of 49 and no natural gas liquids (mmbngl) from data available in 2011 assessed by the U.S. Geological Survey (Milici and others, 2012) (Fig. 2).

Horizontal drilling and hydraulic fracturing became legal in North Carolina by Act of the N.C. General Assembly in 2012. The same Act requires rules and regulations to be established for permitting by October 2014. The North Carolina Geological Survey is the custodian of geophysical well logs, cores and samples. These are available for examination at its Raleigh, N.C. repository.