

## **Cambrian Early Rift-Fill Sediments in the Southern Oklahoma Aulacogen, A “Granite Wash” Analog in the Subsurface of the Arbuckle Mountains Area**

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Surface exposures of volcanic rocks from the early rift stage of the Southern Oklahoma Aulacogen are limited to rhyolite outcrops in the Arbuckle and Wichita Mountains of south-central and southwestern Oklahoma. Early rift-fill sediments interbedded with volcanic units are integral to failed-arm/aulacogen rifting models. Although these sequences have been imaged on deep-seismic experiments in southwestern Oklahoma, there are no known outcrops of early rift-fill sedimentary rocks in the region. The Washita Valley Fault in the western Arbuckle Mountains thrusts rift-related volcanic rocks of the aulacogen over younger oil-bearing sediments. Drilling along a 25-mile section of the overthrust has resulted in numerous penetrations of the igneous section up to a maximum drilled thickness of 16,000 feet, encountering two or more intervals of early rift-fill sedimentary rocks contained within the volcanic sequence. These intervals are interpreted to be a complex of fluviially generated fan deltas emerging from the craton into the rapidly subsiding aulacogen. The maximum drilled thickness of a complete sequence is 1,417 feet. Lithologies present include sandstone, arkose, limestone, dolomite, dolomitic conglomerate, volcanoclastics, and water-lain chloritized tuffs. Interbedded extrusive and intrusive rhyolites, as well as overlying rhyolites and basalts, constrain the intervals as syn-volcanic. The complex depositional sequence indicates multiple source areas within the volcanic terrain and the granitic craton. Lithologies indicate facies representative of volcanoclastic and eolian deposition, as well as thick fluvial and marine arkosic deposits.