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## **Developing A Regional 3D Model of Deformation in The Valley And Ridge Province, East Tennessee**

The Tennessee salient is a foreland-convex map-scale curve in the southern Appalachians extending from southwest Virginia to northwest Georgia. Regional hydrocarbon exploration has focused on the fold-thrust belt portion of the salient since discovery of the Swan Creek oil and gas field in a subthrust structure in northeast Tennessee. The present understanding of regional stratigraphy/basin development as well as the kinematics of the salient result in part from construction and palinspastic restoration of serial, balanced 2D cross sections. Factors vital to understanding the development of structures such as the Swan Creek Field, but not always included in these 2D sections include the potential regional effects of basement faults, facies boundaries, and out-of-sequence thrusts. In addition, 2D cross sections cannot account for strike-parallel movement required by a regional radial thrusting model, which is suggested by both the orientation of map-scale folds and faults, and kinematic indicators such as small-scale fold geometry, cleavage, and calcite twin strain analyses. A 3D model of the salient can incorporate these complexities and address questions about the kinematic development of structural traps. New cross sections constructed with the aid of recently available industry 2D seismic reflection lines are combined to develop a 3D volume-balanced regional model for deformation. This model is then used to evaluate different kinematic models, proposed out-of-sequence thrusting, the possible timing and location of hydrocarbon generation and migration, and predict possible locations of complex structural plays in the fold-thrust belt.