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Volcanic Stratigraphy, Timing, and Petroleum Exploration in Southeastern Absaroka Range, Big Horn Basin, Wyoming

The southeastern Absaroka volcanic sequence consists mainly of middle Eocene (50 to 43 m.y.B.P.) epiclastic rocks with minor pyroclastic rocks and lava flows near vent areas. The Wood River - Greybull River volcanic center is a major source of reworked material. From oldest to youngest, moderately colorful tan, brown, green, and maroon volcanic claystones, siltstone, and sandstones predominate in the Aycross Formation (1,000 ft, 305 m, thick); olive-drab volcanic sandstones and breccias predominate in the Tepee Trail Formation (2,500 ft, 760 m, thick); and light gray volcanic conglomerates and tuffaceous sandstones are most common in the Wiggins Formation (2,000 ft, 600 m, thick). The Aycross Formation contains abundant bentonitic material, forms a perched water table, and is probably an effective caprock. The Blue Point marker, a distinctive sequence of white bentonite beds, separates the Aycross and Tepee Trail Formations and is the best horizon for structural contouring within the volcanic rocks.

Broad gentle folds and horst blocks within Aycross, Tepee Trail, and lower Wiggins strata indicate movement on "Laramie structures" until approximately 45 m.y.B.P. However, several episodes of large-scale Eocene detachment faulting and mass movements locally obscure this relationship. Domal features beneath the volcanics and stratigraphic traps at the volcanic-nonvolcanic contact are the primary exploration targets, but significant traps related to the volcanic activity may be present locally.

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