Petroleum System Evolution in Southern Piceance Basin

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The Piceance Basin is now under active development for gas production. Abundant data from various sources for the Piceance Basin are integrated using a 2D basin modeling approach. The purpose of this study is to understand the development of petroleum systems in this basin for further exploration.

The composite section passes the Grand Valley, Parachute, and Rulison fields. The section for basin model simulation was built based on regional stratigraphy, well logs, core information, source rock data and estimated Tertiary erosion. Subsurface temperature, vitrinite reflectance data, measured rock physical properties and pore pressure were used to constrain and calibrate the model.

The modeling process is focused on the following four aspects: (1) hydrocarbon generation history in the source rock, (2) reservoir hydrocarbon charging history, (3) subsurface pressure evolution and (4) seal capability variation through time. The impact of several erosion scenarios on the four aspects of petroleum system development was investigated in detail. Finally, subsurface pressure distribution, seal capability of the mudstone (William Fork Formation), and fluid flow at present day are compared with those at maximum burial.