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Reservoir Pressures Suggest Communication Between Hugoton and Panoma Fields and Provide Insights on the Nature of the Connections.

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Analysis of Hugoton and Panoma pressure through time and pressure versus cumulative production at well to field scales suggests the vertically stacked Hugoton and Panoma Fields are in communication and are one giant reservoir system. Insights on the nature of the communication are gained by comparing temporal and spatial relationships of reservoir pressure with spatial geologic variables. However, pressures by zone data support the concept that the Hugoton and Panoma are layered reservoirs with relatively low cross flow between differentially depleted zones, thus presenting a quandary.

Hugoton and Panoma Fields in Kansas have undergone three phases of development: pre-1950 Hugoton "parent" wells, Panoma wells in the 1960's and Hugoton "infill" wells in the late 1980's. Hugoton and Panoma biannual 72-hour wellhead shutin pressure (WHSIP) through time are nearly equal and paralleling and the correlation of change in slope of pressure versus cumulative production with development phases, all suggesting communication. Dynamic visualization of the WHSIP data volume through time and space provides a novel, multi-dimensional view of subtle anomalies in reservoir pressure. Linear to sub-linear anomalous pressure regions in 3D space coincide with lineaments in the first derivative of reservoir structure that are likely related to basement fractures and faults. Mile to tens of miles scale pressure anomalies may be a result of vertical communication enhancement by swarms of small-scale vertical fractures associated with these lineaments. Though avenues for large-scale communication between Hugoton and Panoma Fields the lineament spacing may be too distant to provide complete pressure equalization between zones.