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PS A Tale of Two Breccia Types in the Mississippian Leadville Limestone, Lisbon and Other Fields, Paradox Basin, Southeastern Utah*

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Abstract

Breccia associated with sediment-filled cavities is relatively common throughout the upper third of the Mississippian Leadville Limestone in Lisbon and other fields, Paradox Basin, southeastern Utah. These cavities or cracks are related to karstification of the Leadville during exposure in Late Mississippian time. Infilling of the cavities by detrital carbonate and siliciclastic sediments occurred before deposition of the Pennsylvanian Molas Formation. The transported material consists of poorly sorted detrital quartz grains, chert fragments, and clasts of carbonate and clay. The carbonate muds infilling the karst cavities are very finely crystalline and non-porous dolomites.

Post-burial brecciation is also quite common within the Leadville reservoir at Lisbon field. This brecciation is most generally caused by natural hydrofracturing, creating an explosive-looking, pulverized rock. The result yields an “autobreccia” as opposed to a collapse breccia. Clasts within these autobreccias have remained in place or moved very little. Dolomite clasts are commonly surrounded by solution-enlarged fractures that are partially filled with coarse rhombic and saddle dolomites. Areas between clasts may exhibit very

good intercrystalline porosity or microporosity, or are filled by dolomite cements. Intense pyrobitumen plugging was concurrent with, or took place shortly after, this brecciation. Rimmed microstructures are present, reflecting shear and the explosive fluid expulsion from the buildup of pore pressure. The post-burial breccias are associated with the best reservoir development at Lisbon and are probably related to Laramide compression through Oligocene intrusive activity.

Outcrop analogs for both breccia types are present in the stratigraphically equivalent Mississippian Madison Limestone along the south flank of the Uinta Mountains (However, caves seen today in outcrop are likely Quaternary in age). Examples from cores of both types of breccias are also available.

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