The Utah Core Research Center Collection: A Valuable Resource for Paradox Basin Exploration and Production

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The Utah Geological Survey's (UGS) Utah Core Research Center (UCRC) offers access to the most comprehensive collection of core and cuttings samples from the Paradox Basin of southeastern Utah. The UCRC is fortunate to have researchquality core collections ideally suited for petroleum-industry and university research, workshops, and cooperative industry/UGS projects. Highlights of the UCRC's Paradox Basin collection include over 26,000 ft of core (representing 274 field and exploratory wells) from shallow-shelf carbonate reservoirs in the Pennsylvanian Paradox Formation and the Mississippian Leadville Limestone. These cores have been the focus of past UGS/industry reservoir characterization and modeling studies that evaluated regional facies, horizontal drilling targets, and both CO_2 flood-enhanced oil recovery programs and sequestration potential of these rocks. The collection also includes cores of Paradox Formation shale which serve as hydrocarbon seals and sources, as well as potential shale gas reservoirs.

Examination of UCRC cores from the Paradox Formation and Leadville Limestone often reveals complex reservoirs consisting of limestone (oolitic, peloidal, and skeletal grainstone and packstone, and algal boundstone/bafflestone) and finely crystalline dolomite. These lithotypes represent a variety of depositional environments (open-marine shelf, shallow-marine beach and oolitic shoals, algal mound, low-energy restricted shelf) that produce reservoir heterogeneity beyond what is determined from well logs.

Examples of early diagenetic events such as marine cementation, finely crystyalline dolomitization, and dissolution, and late diagenetic events such as coarse dolomitzation, anhydrite replacement, and bitumen plugging are typically observed in many of these carbonate cores. Fractures in cores are relatively common and there are many examples of hydrothermal (saddle) dolomite and various types of brecciation (karst related and hydrofracing).

Cyclic shale units in the Paradox Formation consist of thinly interbedded black, organic-rich marine shale; dolomitic siltstone; dolomite; and anhydrite. These units have TOC contents as high as 15% having type III and mixed type II-III kerogen, are naturally fractured (usually on the crests of anticlinal closures), and are typically overpressured. These shale beds within the Paradox Formation are widespread, 25 to 55 ft thick, and buried deeply enough to generate dry gas; they may contain significant recoverable gas reserves.