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**Fracture Toughness and Geomechanical Analysis of the Uteland Butte and Cane Creek Tight Oil Plays  
in Utah**

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While evolving drilling, completion, and stimulation technology has led to the successful development of a large number of unconventional plays around the country, successful production in many other plays has still eluded operators – or is developing more slowly. Two such plays in Utah include the Uteland Butte member of the Green River Formation in the Uinta Basin and the Cane Creek shale of the Paradox Formation in the Paradox Basin. Operators in the Uteland Butte have struggled to produce outside of a core overpressured zone while operators in the Cane Creek have struggled with declining production after hydraulic fracturing (outside the Big Flat area) - possibly due to salt flowback. While hydraulic fracture geometry control is of vital importance for any well to achieve maximum production, it is of particular importance for these two plays. The goal of this investigation is to use available drilling and completion records, core, log, and laboratory measurements from wells in the Uteland Butte and Cane Creek plays to create a dimensionless brittleness index. This would enable accurate comparisons with the relative brittleness of rocks and can be used to predict these parameters from log traces. The brittleness is being verified with a semicircular three-point bending fracture toughness test. These tests are carried out with samples on relevant core. A subsidiary interest is to assess any treatment fluid-rock sensitivity. The fracture toughness samples would be exposed to four different fluids; air, water, 3% KCl, and HCl. The results from these tests in different fluids are then used in conjunction with the predicted mineralogy to modify the brittleness and fracture toughness to represent the fluid exposure history of the well so that hydraulic fracture geometry can be better controlled for improved production. The initial fracture toughness measurements for wells in these two formations will be discussed.