The Paradox Basin Akah Formation: Implications for Solving North America's Rapidly Depleting Helium Resource

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Abstract

The middle-Pennsylvanian evaporitic Akah Formation plays a pivotal role for helium explorers in the in the Paradox Basin. Reaching thicknesses of greater than 6000', this ~12,500 square mile NW/SE trending elliptical-shaped body has multiple operators (domestic and international) seeking to utilize the sealing capacity of the interbedded salts and anhydrites of the Akah, to test the dolomitized Mississippian Leadville Formation (equivalent to the Madison Fm at ExxonMobil's LaBarge helium/CO_2/methane field). Conventional traps develop in a multitude of structural styles and sizes under the Akah, while inherent velocity issues and heterogenic priorities challenge explorationists. Proterozoic faulting that witnessed Laramide-influenced re-activation became significant conduits for both crustal and mantle derived helium, while high helium concentrations are also associated with the perimeters of the Paradox Basin sub-basins. Hot magnesium-rich brines traveling upwards through Proterozoic-aged faulting can create world class permeabilities and porosities, as witnessed in the northern San Juan County, Utah, Lisbon Field (55 MMBO and 250 BCF @ ~1% helium). With flow rates of 4-8,000 MCFD, and helium percentages ranging from 0.75 to 1.4%, the economics are favorable for Akah subsalt payers, even if helium prices soften in the future. Considering the United States Federal Helium Reserve is ~90% depleted and is in the process of being sold to Germany based Messer LLC, it's critical for the United States to locate a stable and plentiful source for helium, and not become dependent on helium from foreign sources. At current estimates, upwards to 30-40 BCF of helium could be currently contained underneath the low permeability Akah Formation.