

Low-BTU Gas in the Permian Chase Group in the Ryersee Field in Western Kansas: A Case History Where Technology Creates a Marketable Commodity

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Porous dolomites at the top of the Permian Chase Group host low-BTU gas (520 BTU/scf) at the Ryersee Field in T.18S.-R.21W., Ness County, KS. The gas is structurally trapped at 2250 feet depth in the Bazine anticline, a SSW-plunging fold on the northeastern flank of the Hugoton embayment. Low-BTU gas (defined as <950 BTU/scf) in the Chase Group is also present along the margin of the supergiant Hugoton Field (65 miles southwest of Ryersee Field) and in the large Bradshaw and Byerly fields northwest of the Hugoton Field. The Chase-Group gas at Ryersee Field, however, is chemically separate from these other fields in that it is dryer (i.e., less higher molecular weight hydrocarbons), has a lower N:He ratio, and contains a greater amount of nonhydrocarbon gases. These characteristics make it more akin to widely separated Chase Group fields on the Central Kansas uplift, Pratt anticline, and Sedgwick basin. The major nonhydrocarbon gases accounting for low-BTU production at Ryersee Field are nitrogen (48.6%) and helium (1.4%). Production and subsequent processing of this gas is now being attempted by American Warrior, Inc. in a cryogenic N₂-rejection plant designed by River City Engineering, Inc. With a design capacity of 5 MMSCFD of feed gas, it is one of the smallest facilities of its type. The produced helium is cryogenically enriched to crude helium quality (50-60%), then upgraded via conventional membrane technology to a level of 90+% for shipping purposes. The hydrocarbon gas, now at 960 BTU/scf, is ready for pipeline sale.