

Geochemical Trends in Gas Quality in Kansas

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ABSTRACT

Analysis of Kansas gas-chemistry data defines several regions that may have reserves of low-BTU gas (i.e., heating value <950 BTU/scf). About one-third of the 4600 compiled chemical analyses are less than 950 BTU/scf. With higher gas prices and new upgrading technologies, utilization of this low-BTU gas may be increasingly possible.

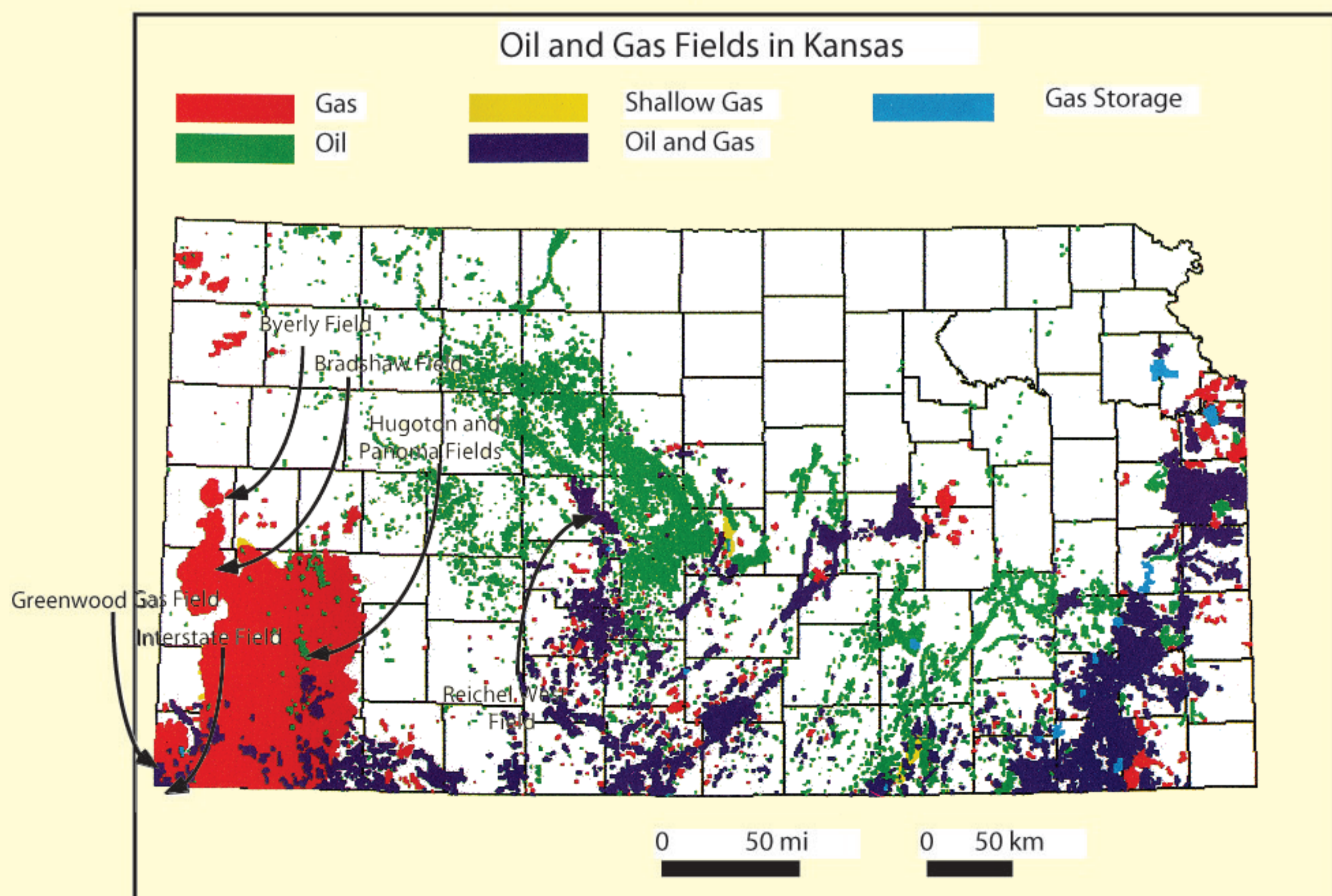
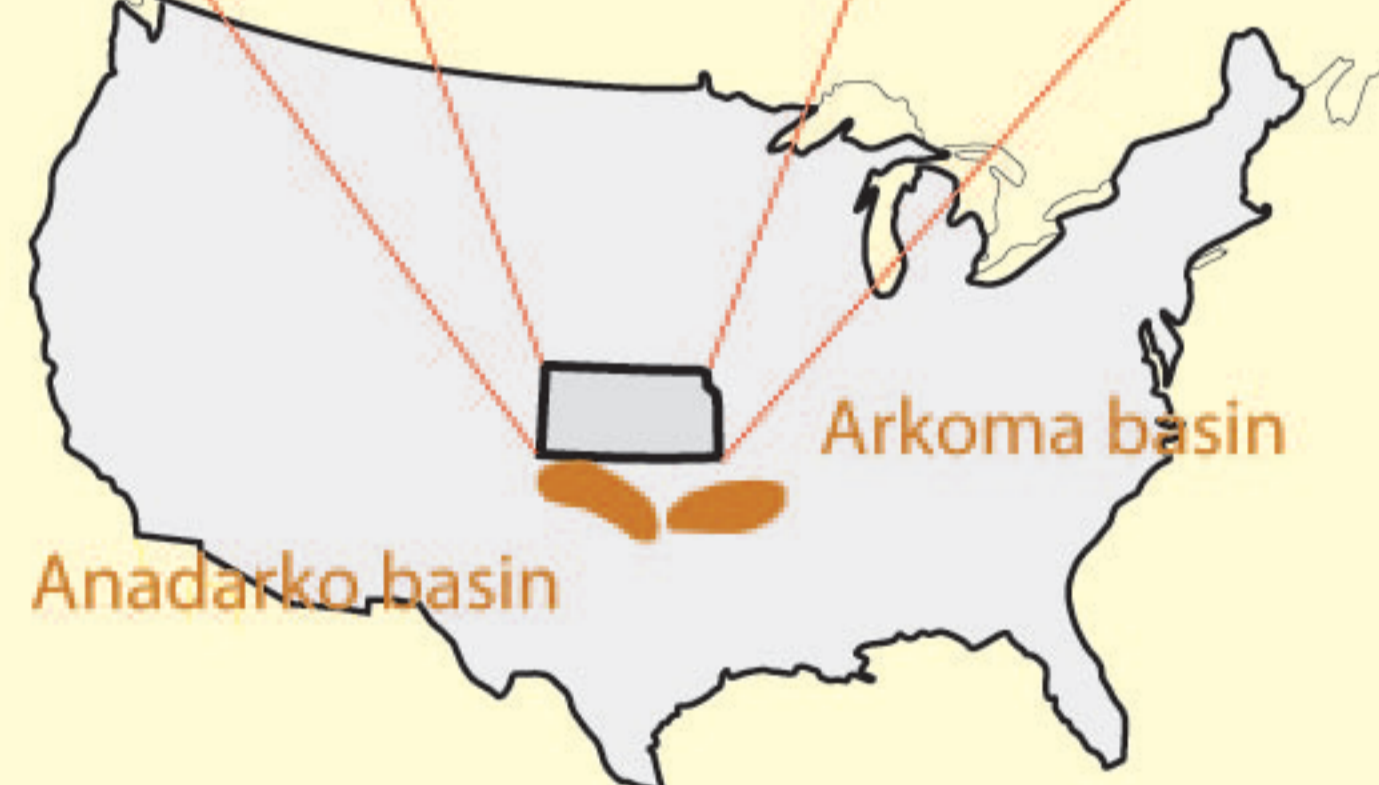
Low-BTU gas in this part of the Mid-Continent is primarily caused by high percentages of nitrogen and subsidiary helium. Argon and carbon dioxide can also be present, but they commonly compose less than 0.5% of the total gas.

Stratigraphic and spatial trends are evident. Percentages of noncombustible component gases and nitrogen-to-helium ratios increase with decreasing age of the producing formation. With several pay zones, low-BTU gas is more common on the Central Kansas uplift than in deeper geological provinces farther south. A rim of low-BTU gas is also present around the giant Hugoton Gas Field in southwestern Kansas.

Some possible low-BTU-gas plays include: Permian Chase Group west of the Central Kansas uplift and on the eastern side of the Hugoton Gas Field; Pennsylvanian Topeka Limestone and Permian Red Cave Sandstone in the vicinity of the Greenwood Gas Field; Cambrian-Ordovician Arbuckle, Pennsylvanian Lansing-Kansas City, Shawnee and Douglas Groups on the perimeter of the Central Kansas uplift and in sporadic localities in the southern Cherokee and Sedgwick basins; and Mississippian chert on the western flank of the Pratt anticline.

LOCATION

Kansas is in the southern Mid-Continent, on the craton north of the Anadarko basin. Gas production is mostly from the southern half of the state. All of the basins and uplifts in Kansas except the Salina basin have producing gas fields. The largest gas field is the giant Hugoton Field in southwestern Kansas.



PETROLEUM GEOLOGY

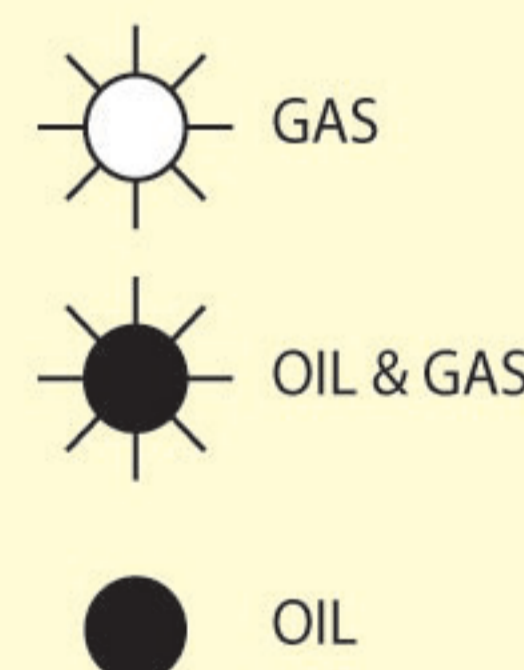
GAS PRODUCTION

Currently, Kansas annually produces 33.6 million barrels of oil and 380 bcf of gas. The giant Hugoton Gas Field in southwestern Kansas accounts for 53% of the current gas production.

PRODUCING STRATA

Most oil and gas production in Kansas is from Mesozoic and Paleozoic strata. The most prolific reservoirs are several carbonate beds in the Permian Chase Group, which comprise the main pay zones in the Hugoton Gas Field. Significant gas production is also associated with strata immediately overlying, and subcropping beneath, the basal Pennsylvanian angular unconformity.

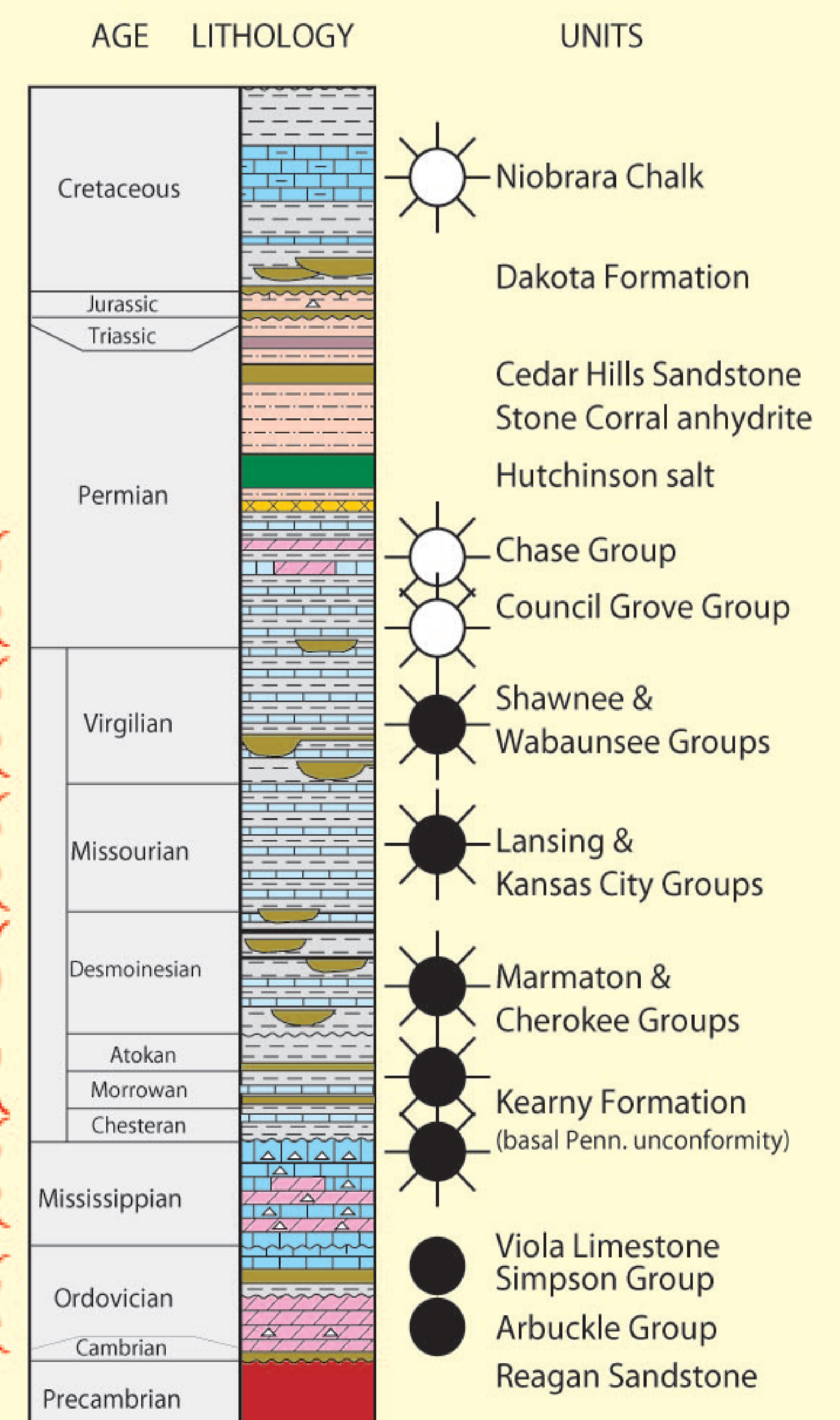
MAJOR TYPE OF PRODUCTION



STRATIGRAPHIC GROUPINGS for GAS ANALYSES

- Permian (Sumner, Chase, Council Grove Gps.)
- Pennsylvanian (Virgilian) (Admire, Wabaunsee, Shawnee, Douglas Gps.)
- Pennsylvanian (Missourian) (Lansing-Kansas City, Pleasanton Gps.)
- Pennsylvanian (Desmoinesian) (Marmaton, Cherokee Gps.; Morrowan-, Atokan-Stage strata)
- Mississippian; basal Pennsylvanian angular unconformity (units subcropping unconformity; siliciclastics overlying unconformity)
- Sub-Mississippian (units significantly below, and not in communication with reservoirs at basal Pennsylvanian angular unconformity)

General Stratigraphy



500 m approx scale