
Production of Natural Gas from Unconventional Low-Permeability Sandstone and Shale reservoirs- Analogs from the U.S

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Production of natural gas from low-permeability sandstone and fractured-shale reservoirs accounts for about 24 percent of total annual gas production in the U.S. The past few decades have seen a dramatic increase in the number of wells producing gas from these reservoirs in several basins in the U.S., including the Uinta-Piceance Basin, Greater Green River Basin, Appalachian Basin, Michigan Basin, Gulf Coast, and Ft. Worth Basin. The availability of production data from several thousand wells in low-permeability sandstone and fractured-shale reservoirs has allowed us to construct production-decline curves and Estimated Ultimate Recovery (EUR) distributions. Median EURs of wells from many low-permeability sandstones reservoirs range from 100 to 700 million cubic feet (3 to 20 million cubic meters) of gas, and maximum EURs range from 5 to 15 billion cubic feet (0.14 to 0.42 billion cubic meters) of gas. Although there is less production data for fractured shales, median EURs of wells from fractured-shale reservoirs range from 300 to 600 million cubic feet (9 to 17 million cubic meters) of gas, and maximum EURs range from 1 to 7 billion cubic feet (0.03 to 0.2 billion cubic meters) of gas. Geologic "sweet spots" within both of these types of reservoirs can have higher median and maximum EURs. The EUR distributions served as a quantitative guide to the assessment of potential resources in the unexplored parts of various U.S. basins, but the EUR distributions might also be valuable as analog production curves for the assessment of potential Silurian and other sandstone and fractured-shale reservoirs in the Middle East.
