

Developments in Coalbed Methane

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9.29.2020 - 10.1.2020 - AAPG Annual Convention and Exhibition 2020, Online/Virtual

Abstract

Coal is a continuous-type unconventional reservoir rock that is highly gas-prone and serves as both source and reservoir. Natural gas is stored in coal primarily by adsorption, and thermogenic and late-stage biogenic gases are common. Commercial reservoirs range in rank from subbituminous through anthracite. Production is achieved principally by depressurizing coal through dewatering, and exploration strategies are highly unconventional, incorporating a hydrodynamic component. The modern coalbed methane industry began in the U.S. during the 1970s, and production grew to nearly 10% of the domestic dry gas supply by 2000. Major production is concentrated in the Cretaceous bituminous coal of the Rockies, Tertiary subbituminous coal in the Powder River Basin, and Carboniferous bituminous coal in Appalachia and the Midcontinent. Multi-zone hydraulic fracturing and directional drilling have been instrumental in the growth of the industry and expansion from mining areas into areas with numerous coal seams, most of which cannot be mined using current technology. Production approached 2 Tcf in 2008 and remains at about 1 Tcf annually in the US, but production and proved reserves have declined since the expansion of the shale gas industry. Currently, coalbed methane production accounts for ~4 % of U.S. dry gas production. International activity has gained prominence in recent decades, with substantial development occurring in Canada, Australia, and China. Canadian development has focused mainly on Cretaceous bituminous coal in the Western Canada Sedimentary Basin in Alberta, where a resource on the order of 500 Tcf is thought to exist. Australian development has been particularly intensive in the bituminous Permian and Jurassic coal seams of Queensland, where production has reached 430 Bcf/yr. Chinese development, by contrast, is focusing on Carboniferous-Permian semi-anthracite and anthracite in the north-central part of the continent, and annual production has exceeded 256 Bcf. Major potential exists in Ukraine and Russia, where resources are

estimated at 2,884 Tcf, as well as in a multitude of undeveloped sedimentary basins around the world.

AAPG Datapages/Search and Discovery Article # 91200 © 2020 AAPG Annual Convention & Exhibition Online, Sept. 29- Oct. 1.