of the Middle Devonian Elk Point Group. The Deadwood clastics are quartzose sandstone, sand, subordinate shale, and conglomerate. Locally, in the northernmost part of the area, they have been removed by pre-Devonian erosion. The carbonate sequence of the Elk Point Group is divided into lower and upper subgroups. The Lower Elk Point subgroup contains the Meadow Lake Formation (new) which is subdivided into lower and upper members. The basal formation of the Upper Elk Point subgroup, the Winnipegosis is present in the area. The younger formations of these southwest-dipping Devonian strata are absent owing to erosion or nondeposition. The Devonian carbonate rocks are overlain unconformably by clastic sediments of the Lower Cretaceous Mannville Group.

The common occurrence of fractured and brecciated carbonate rocks within the Meadow Lake Formation indicates salt solution and can be correlated with the extensive rock salt deposits of the Lower Elk Point subgroup in central Alberta. The depositional edge of one of these salt deposits, the Cold Lake Salt, can be traced.

Accessory copper, lead, and zinc minerals are present locally in clastic rocks of the Deadwood Formation and also in the Devonian carbonate rocks. Gas shows have been reported from the upper member of the Meadow Lake Formation. Meadow Lake limestone of economic significance was recently discovered near Pinehouse Lake.

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Post-Depositional Control of Gas-Reservoir Quality in Eagle Sandstone of Bearpaw Mountains, North-Central Montana

The Eagle Sandstone of Late Cretaceous age is an important conventional reservoir for biogenic gas (isotopically light methane) near the Bearpaw Mountains. A petrologic examination of cores from producing wells was undertaken to establish the petrologic features which significantly affect reservoir quality in a conventional shallow gas reservoir, and to provide a framework for the investigation of lower quality reservoirs on the east.

Petrologic studies indicate that the quality of most Eagle Sandstone reservoirs in the Bearpaw Mountains area is controlled by a consistent sequence of postdepositional events. Most sandstones were tightly sealed early in their burial history by authigenic calcite, which filled intergranular pores and partially replaced some framework grains. In some sandstones, minor quartz cement partly preceded the precipitation of calcite. Subsequent to calcite precipitation, siderite or ankerite formed as numerous patches which were localized by altering biotite. This iron-rich carbonate may occupy as much as 3 or 4% of the rock volume. Later, most calcite was removed through dissolution that resulted in abundant intergranular and intragranular porosity. The newly developed porosity further facilitated the movement of interstitial waters, which produced extreme dissolution effects in susceptible framework grains such as andesine. Later in the burial history of the Eagle Sandstone, clay minerals were formed in intergranular pores and to a lesser extent in intragranular pores. Although kaolin is the dominant clay, iron-rich chlorite and mixed-layer mica-smectite are locally important.

The following conclusions can be made. (1) The highly porous and permeable nature of the Eagle Sandstone in conventional reservoirs is due predominantly to the dissolution of authigenic and detrital components. (2) The formation of dissolution porosity occurred at relatively shallow depths in thermally immature rocks and was not directly related to burial diagenesis of clays in associated shale sequences. (3) The common occurrence of acid-soluble iron-rich phases should be considered when using acid treatments. (4) In some conventional Eagle reservoirs, migration and/or expansion of clay-size components may cause formation damage if clays are not stabilized.

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Environments for Sedimentary Uranium in Triassic-Jurassic Basins, Eastern North America

The association of feldspar-rich alluvial-fan deposits with lake sediments formed in anoxic conditions is one of the most intriguing and least understood settings for sedimentary uranium accumulation. The Triassic-Jurassic basins formed during early rifting of North America's eastern margin all contain extensive accumulations of alluvial deposits which intertongue with basin-center black shales and, in places, coals. These basins lie adjacent to, or just beneath, the prograded seaward-thickening sedimentary coastal plain wedge which blankets the trailing continent margin. Many analogies in basinal development, sedimentary fill, climatic controls, and presence of evaporites can be drawn between these basins and the spreading centers of the Red Sea and Gulf of California-Salton Trough.

In addition to extensive interfingering between oxidized and reduced sedimentary deposits, the Triassic-Jurassic basins contain the first major rock groups in the Phanerozoic of the Appalachian region having ubiquitous feldspar and feldspar-weathering products. These basins apparently received significant input from exposed Acadian and younger Paleozoic batholiths and granitic intrusions developed during the terminal evolution of the Appalachian geosyncline. Wide variations in source-rock types are directly reflected in both the sediment fills and uranium potentials within and among these Triassic-Jurassic basins.

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Coal Development in Powder River Basin of Wyoming

Thick Tertiary age coals make the Powder River basin of northeastern Wyoming the most prolific coal-bearing area in the United States, with an estimated remaining coal resource of more than 609 billion tons. The reserve base from the remaining resources is conservatively estimated at 45.6 billion tons. Whereas 23 billion tons of this reserve base is believed strippable, another 22.6 billion tons is probably recoverable by un-