

southeastern Wyoming and north-central Colorado

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ABSTRACTS

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QUARTZ EXTINCTION IN SILTSTONE

The distribution of extinction types in siltstone from the Red Peak Formation (Early Triassic) of Wyoming and the Spearfish Formation (Permian-Triassic) of South Dakota has been studied. Results indicate that the amount of nonundulatory extinction, monocrystallinity, and inclusion-free grains in quartz of these rocks is extremely variable. Variability of these characteristics decreases, and the minimum observed values increase, however, with decreasing grain size. Thus, in most thin sections or in grouped results from either formation, populations of successively finer grains (very fine sand to fine silt) contain more nonundulatory, monocrystalline, and inclusion-free grains. Angularity of the quartz grains increases slightly as the size of the grains decreases, but roundness in quartz silt is not related to its internal structure. Sphericity is not related to internal structure or to the size of grains.

Selective abrasion of structurally weak grains may reduce the amounts of undulatory quartz, polycrystalline grains, and quartz with abundant vacuoles and microclots in successive sedimentary cycles. Another possible mechanism is that original size reduction of quartz grains yields increasing amounts of nonundulatory quartz, monocrystalline grains, and inclusion-free grains in finer sizes. We suggest that the second process is probably dominant. There is some evidence to suggest that selective replacement of quartz grains by carbonate cement may reduce the amount of undulatory quartz in successive sedimentary cycles.

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CARBONATE PETROLOGY AND PALEONTOLOGY OF PERMIAN BIOHERMS, SOUTHEAST IDAHO
(No abstract submitted)

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UPPER JURASSIC AND BASAL CRETACEOUS SANDSTONES OF SOUTHERN SASKATCHEWAN AND VICINITY

The Roseray Formation ranges in age from Callovian in the west to Oxfordian(?) in the east and is correlative with the upper part of the Rierdon Shale.

Well-sorted quartzose sandstone beds (clino-beds) sloping eastward and southward constitute the formation. Grade size of the clino-beds and kaolin (up to 10% as matrix and laminae) decrease downslope in inverse relation to illitic clay and accessory glauconite. Thickness ranges between 45 and 160 ft for the formation and up to 70 ft for a particular clino-bed. The clino-beds are imbricated west to east and resemble marine spits linked to an eroded easterly migrating northern delta.

The Cantuar Formation (Aptian to Albian) comprises (a) white to light-gray quartz-kaolin (feldspathic) arenites; (b) olive-green to dark-gray speckled biotite-chlorite, and argillaceous (feldspathic) quartz-arenites; and (c) dark-gray and gray-black carbonaceous-lignitic mudstone and argillaceous quartz-arenites. Both (a) and (b) grade into (c). Generally bimodal, the arenites range from fine to coarse grained with abundant grit and intraformational conglomerate, but are dominantly coarsely fine and medium. They are mudstone indurated, earthy, and characterized by heterogeneity of crossbedding types, grain size induration and unit thickness, all attributable to fluvial channel deposition. The carbonaceous facies reflects overbank and floodplain swamp-lacustrine sedimentation. The quartz-kaolin facies apparently blankets a broad low-relief topography on the Upper Jurassic beds, whereas the biotite-chlorite facies belongs to a later valley system entrenched on the former.

The Roseray oil reservoirs are in the updip mesas, buttes, and escarpments cut into the Roseray Formation and isolated by impervious Cantuar lithologies. Oil is also produced from permeable Cantuar quartz-kaolin sandstones overlying these features.

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OPKISHAESA: COAL ON CROW RESERVATION, BIG HORN COUNTY, MONTANA

Geologic information has been gathered from 93 holes drilled and cored during the summers of 1968 and 1970 on coal lands in T6, 7S, R37, 38E, Big Horn County, Montana. Results of drilling indicate that at least 16 correlatable coal seams are present and range in thickness from 2 to 55 ft. Several billion tons of strippable reserves (200 ft high wall) were found in the Canyon, Anderson, Smith, Realbird, Schaak, and Roland seams. Realbird and Schaak are new seam names. Other correlations were established and are found in agreement with the work of the Montana Bureau of Mines and Geology.

Stratigraphic changes in the upper part of the geologic column (surface to 1,000 ft) should be of interest and importance to both the oil explorationist and those involved with the mode of environment and origin of the Northern Powder River basin coal deposits.

The entire project data are being digitized. More than 700,000 points controlling the surface contours are used in conjunction with coal-seam structure maps to arrive at overburden estimates, outcrop patterns, volumetric rock accounting, and mine model studies. Log suites were digitized as were chemical coal analysis results in order to develop both quantitative and qualitative control of the stratified sequence as well as the coal seams.

It is believed that this and other discoveries in the area are nationally significant and are suitably large enough to be able to support petroleum liquid or gasification conversion plants, de-ashing refineries, as well as mine-mouth and char power facilities. Development of those industries will be dependent on many factors