energy-short nation, western coal can be the "Clean Black Ace in the Hole."

SEPM Abstracts of Papers

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PETROLOGY OF MORRISON FORMATION, DINOSAUR QUARRY, UTAH

No abstract available.

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MANNVILLE (LOWER CRETACEOUS) BASIN OF SOUTHWESTERN SASKATCHEWAN

The Mannville Group is represented by the Success (new name), Cantuar, and Pense Formations. The Success Formation, Neocomian in age and lying on a low relief unconformity across the Swift Current region, is dominated by sandstones of quartz and kaolinite with accessory chert and spherosiderite. A bipartite lacustrine to fluviatile succession, the Success Formation is correlated with the upper Morrison and the Lakota sandstone of central Montana. Its provenance is deduced to have been the Precambrian shield. The tripartite Cantuar Formation lies on a high-relief unconformity that dissects the Success and all Jurassic strata in the area. At the base of the pre-Cantuar relief is the McCloud Member (new name). It is composed largely of autochthonous sandstones overlain by an estuarine to marine shale that reaches southward from east-central Alberta to the international border in Saskatchewan as ria-like fingers of the marine Ellerslie Formation. The member is Aptian in age, is correlated with the Third Cat Creek and Cut Bank sandstones of the Kootenai of Montana, and with the Success Formation, is correlated with the lower Mannville of Alberta. The Albian Dimmock Creek and Atlas Members (new name), by virtue of their chlorite and biotite content, constitute the green feldspathic facies of the Mannville and Kootenai that are distributed across southern Saskatchewan from the Rocky Mountains of southwestern Alberta. Fluviatile to deltaic-marine, these deposits were laid down on sedimentation surfaces that progressively encroached upon and largely buried the pre-Mannville topography. The Pense Formation is entirely marine and is composed of four units represented in general by (1) basal black shales, (2) dark gray and black bioturbated sandy mudstones, and (3) well-sorted, bedded and crossbedded, fine to medium calcareous sandstones. The last are thought to have formed under wave conditions as a culmination of sediment buildup on the crown of the submerged Swift Current platform prior to renewed foundering of the platform. The Pense sandstones grade into the silts and black shales at the base of the Colorado Group in central Montana.

Locally, sedimentation was controlled by episodic uplift of the Swift Current platform from the Middle Jurassic Shaunavon basin. This uplift began during the Late Jurassic and reached a climax (500-700 ft) during the earliest Cantuar, but continued into post-Cantuar-pre-Pense times. Now, the platform forms the broad structural keel of southern Saskatchewan, having down-tilted about 1,600 ft from its early Cantuar elevations. Its mass is furrowed by valley sinks and punctuated with knobs created by the episodic dissolution of salt from the Middle Devonian Prairie Evaporite.

The oil reservoirs occupy the northwestern updip edge of the Roseray and Success Formations and lie in mesas enveloped by Cantuar argillaceous valley fill. The oil reservoirs are also under the influence of a massive high-pressure potentiometric cell and its subsidiaries on the west, that are pressurized by the upwelling of waters from the Paleozoic limestones through a regional linear zone of structural weakness. The easterly to southeasterly downdip flow through the Cantuar semipermeable barriers acts to enlarge the trapping capacity of the reservoirs. Oil prospects lie in unlocated Roseray and Success mesas, and structural highs in general. Other prospects are associated with permeable sandstones of the upper Mannville beds, as well as channel sandstones of the McCloud Member. Gas prospects in addition are found in the updip edge of the Pense Formation.

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PRIMARY AND SECONDARY SEDIMENTARY STRUCTURES IN FINE-GRAINED LACUSTRINE ROCKS OF GREEN RIVER FORMATION (EOCENE), PICEANCE CREEK BASIN, COLORADO

A study of 285 polished slabs (59.0% oil shale, 23.0% carbonate, and 18.0% fine-grained clastic rock) collected from four measured sections along the southern and eastern edge of the Piceance basin reveals important sedimentologic information on the distribution of primary and secondary sedimentary structures. The slabs were studied under low-power binocular magnification, and individual stratification characteristics were noted. A total of 528 primary structures and 334 secondary structures were observed in the slabs.

Eleven descriptive classes of primary structures are important: (1) even parallel stratification; (2) discontinuous even parallel stratification; (3) wavy parallel and nonparallel stratification; (4) discontinuous wavy parallel and nonparallel stratification; (5) discontinuous curved parallel stratification; (6) curved nonparallel stratification; (7) structureless; (8) mottled; (9) brecciated; (10) algal stratification; and (11) graded stratification. Of these classes, the oil shale is dominated by classes 1, 2, 3, and 4, and the carbonate and fine-grained clastic rocks by classes 6, 7, 8, and 10. Classes 5 and 9 are rarely represented.

Apparently there is a correlation between the organic content and the stratification type of the oil shale. As oil shale increases in organic content, classes 2 and 4 become more abundant and classes 1 and 3 are less so. In the oil shale of the Parachute Creek Member of the two easternmost measured sections, class 1 decreases, whereas classes 2 and 4 increase upward through the sections. The older classes remain approximately the same. These vertical changes correlate with indications of desiccation in the depositional environment in the upper parts of the Parachute Creek Member.

Six classes of secondary sedimentary structures are common: (1) loop structure; (2) fault displacement; (3) crystal-growth displacement; (4) bioturbation; (5) contortion; and (6) total disruption. Most of these classes are restricted to oil shale, and loop, fault and crystal-growth types are most abundant. The frequency