ated environments within an overall framework of deposition.

The Muddy Formation (Lower Cretaceous) in northeastern Wyoming is a clastic unit approximately 150 ft thick composed of sandstone, siltstone, shale, and carbonaceous deposits. Detailed core studies and selected isopach maps suggest that the unit was deposited in a manner very similar to the modern Mississippi deltaic complex. Oil productive distributary channels, crevasse splays, and marginal barrier bars are recognized by the vertical distribution of sedimentary structures observed in cores and by comparing the distribution in space of the interpreted elements to a Mississippi model.

In considering the Mississippi model, one must realize that different processes are taking place side by side at different elevations relative to sea level, hence the unidirectional current-flow processes of a distributary may occur 100 ft or more below sea level at the same time that the wave processes of a beach occur at and near sea level. The Muddy Formation must be understood as a total depositional system; detailed vertical subdivision will only obscure genetic relations.

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UTILIZATION OF WELL LOGS IN EXPLORING FOR STRATIGRAPHIC TRAPS

Well logs are used qualitatively to make stratigraphic correlations and environmental interpretations. Formational fluid properties, porosity, and compositional attributes are computed quantitatively from many well logs for use in preparation of exploration maps. Dipmeter data are treated statistically and incorporated with other log data for use in making stratigraphic interpretations and predictions in the subsurface. Computers may be used effectively to process digitized well logs and associated data; plotters are used to display exploration maps automatically.

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DELTAIC ORIGIN OF DIFUNTA GROUP (LATE CRETACEOUS TO PALEOCENE), PARRAS BASIN, COAHUILA AND NUEVO LEÓN, MEXICO

The Difunta Group is predominantly gray calcareous mudstone, siltstone, and sandstone with 3 wedge-shaped redbed units. The redbeds provide a basis for subdividing the group into 7 formations with a composite thickness of 12,000 ft. Simple structure, continuous exposures, and lithologic variability provide an excellent opportunity for paleoenvironmental interpretations.

The Difunta Group is largely the product of deltaic sedimentation in the Parras basin, a shallow embayment off the ancestral Gulf of Mexico. Major delta progradation was from southwest to northeast as shown by facies changes, thickness trends, and paleocurrent data. The redbed units are interpreted as delta-plain deposits that accumulated as lake and bay muds and silts and fluvial and distributary-channel sands.

Redbeds are bounded by resistant gray blanket sandstones 20–60 ft thick that have sharp bases, scour-and-fill bedding, *Ophiomorpha,* and local mudstone, wood, and oyster clasts. These sandstones are interpreted as delta-front and delta-destructional deposits formed during progradation and retrogradation of the deltaic complex.

Prodelta facies are gray sequences of either (1) burrowed mudstone or muddy sandstone, many beds of which have ball-and-pillow structure and a sparse molluscan fauna, or (2) interbedded graded sandstone and burrowed mudstone. The graded sandstone beds of the later facies were deposited by turbidity currents that were generated at the delta front probably by hyperpycnal flow.

Patchlike carbonate banks up to 1,000 ft thick developed in the north during episodes of low terrigenous influx in this area. Bank deposits are chiefly micritic bioclastic rocks; boundstone is rare.

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RESERVOIR ANALYSIS, PENNSYLVANIAN TENSLEEP FORMATION, LITTLE BUFFALO BASIN, WYOMING

The Little Buffalo Basin field, in northwestern Wyoming on the southwest side of the Big Horn basin, is a north-south asymmetric anticline 3½ mi long, 1½ mi wide, with about 1,000 ft of structural closure. Oil was discovered in 1943 in the Pennsylvanian Tensleep. Cumulative production has been over 30 million bbl of oil from the 1,500 acres. Reservoir energy is from an active water drive from the north-northwest. A core study of the Tensleep revealed that extensive crossbedding, permeability variation, and fracture orientation influence oil recovery from this reservoir.

The Tensleep sandstone and dolomite gradationally overlie the Amsden Formation carbonates and shales, and average 275 ft in thickness. There is a general increase in average grain size of the Tensleep sandstone progressing upward in the section and also an increasing amount of crossbedding and poor sorting. Deposition occurred in relatively high-energy transporting currents in a shallow water, nearshore, and/or deltaic marine environment. Nonmarine channeling and sand-dunes also occur in the upper part of the section. Pore-filling cements of carbonate, silica, anhydrite, and clay particles are generally due to 2 factors: (1) primary deposition of carbonate and clay with dissolution of these and other minerals during fluvial channeling and erosion in Late Pennsylvanian-Early Permian, and (2) redeposition of these minerals in open pore spaces and fractures by downward-percolating groundwater.

As a direct result of this reservoir study, well spacing has been reduced from 40 to 20 acres by drilling 30 new wells in certain areas of the field that would not otherwise have been efficiently depleted. These additional wells have accelerated production from 3,000 b/d to a new peak rate of 9,400 b/d and have increased ultimate oil recovery.

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OIL OCCURRENCES RELATED TO BREAKUP OF GONDWANALAND

The fragmentation of the Gondwana supercontinent during the Mesozoic Era produced tectonic features and depositional environments favorable for the genesis and entrapment of petroleum. Large-scale rifting is directly responsible for the pericratonic basins which may occur as taphrogenes or sphenochasms depending on rift phase and geometry. Deltaic environments de-