lower sequence of hemipelagic shales and submarine-fan deposits succeeded by slope-deposited silty shales and culminating in shelf and fluviodeltaic sandstones, shale, and coal. Basinal facies are expressed seismically as convergent bottomset reflectors of moderate to high amplitude and continuity, grading updip into mounded and channelized events of poor continuity and variable amplitude that onlap the base of the slope. This hummocky facies represents a combination of overlapping submarine fan lobes and gravity-failure deposits. The overlying slope sequences are expressed as complex sigmoid-oblique clinoform bundles of low amplitude bracketed by discrete continuous events of high amplitude. Clinoform bundles downlap over mounded facies onto bottomset events except where removed by deeply incised submarine canyons. Mounded submarine fans generally onlap the base of toplapped foresets, documenting their development during periods of low stand and shelf bypass. They were blanketed by high-amplitude foresets during transgressive periods of relative sea level rise. Shelf and nonmarine facies are seismically expressed as prograding and aggrading topset reflectors that respond to fluctuating sea level and sediment supply. Amplitude and continuity are high in the eastern wave-dominated shelf setting, low in the western river-dominated setting, and uniformly variable in the alluvial-plain setting owing to discontinuous channels and coal measures. Maximum reservoir development parallels the wave-dominated shelf setting.

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Stratigraphy and Depositional Environment of Middle Member of Minnelusa Formation, Central Powder River Basin, Wyoming

Regional correlations of the middle member of the Minnelusa Formation (middle Upper Pennsylvanian) shed new light on the stratigraphic relationships of Pennsylvanian rocks in the central Powder River basin and serve as the basis for a regional depositional model.

The middle Minnelusa (Leo section) stratigraphy is best known in the southeastern part of the study area. To the north, the upper boundary (Red Marker shale) correlates with the base of the "B" dolomite interval, an upper Minnelusa marker. The underlying "C" sandstone of the upper Minnelusa is therefore Pennsylvanian in age. To the west the Red Marker becomes silty and disappears into the sand of the Tensleep Formation along the eastern Bighorn Mountains. There the middle Minnelusa is equivalent to the lower three-fourths of the Tensleep.

The two main factors influencing the depositional environments of the middle Minnelusa were paleogeography and sea level change. In the southeastern and south-central parts of the area, the proximity of the Lusk embayment and fluctuations in sea level caused frequent flooding of a broad, flat sabkha surface over which isolated dune complexes were migrating. The sediments deposited were subtidal carbonates and black shales interbedded with supratidal dolomites, evaporites, and eolian sandstones. Farther north, closer to the sand source, the dune complexes were larger, more continuous, and were affected only by major transgressive events. Laterally extensive eolian sands were also deposited to the west. The lack of black shales and presence of sandy dolomites with *Skolithus* burrows, however, suggests more normal marine conditions and deposition on a sand-dominated tidal flat.

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Sedimentologic and Tectonic Control of Uranium Mineralization, Upper Triassic Chinle Formation, Southeastern Utah

Uranium deposits in the Upper Triassic Chinle Formation of the White Canyon, Capitol Reef, and Circle Cliffs areas occur in a succession of lithofacies that formed from sediments deposited under anoxic conditions. Anoxic conditions in the depositional environments of these lithofacies are indicated by the preservation of abundant organic matter and the drab (reduced) colors of the rocks. The coincidence of facies changes and the vertical sequence of rocks associated with isopach "thicks" suggests that certain depositional environments were localized by tectonic subsidence. Lake, marsh, and bog environments adjacent to anastomosing fluvial channel systems occur in synclinal areas that were actively subsiding during deposition. Deposition in these wetland environments, which had high organic productivity, high water tables, and minimal clastic input, resulted in organic-rich rocks. The vertical sequence of lithofacies indicates that initially the rate of tectonic subsidence was greater than the rate of clastic sediment influx. Subsequently, as the rate of clastic influx exceeded the rate of subsidence, sedimentation on prograding deltas buried the wetland deposits with clastic sediments that also contained abundant detrital plant debris. The subaqueous decomposition of this organic matter produced anoxic conditions in the overlying deltaic sediments that protected underlying marsh and bog deposits from oxidizing meteoric waters. Preservation of the organic material incorporated in the bog and marsh deposits established the reducing chemical environment necessary to precipitate uranium. Maintenance of this reducing environment also protected uranium deposits from later oxidation.

Subsidence, concomitant with sedimentation, produced the hydrologic conditions conducive to plant production, accumulation, and preservation and established the reducing chemical conditions necessary to precipitate and preserve uranium. Identification of wetland environment sediments that accumulated in structurally controlled areas of subsidence is a useful guide for uranium exploration in the Chinle Formation.

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Oil Generation and Entrapment in Railroad Valley, Nye County, Nevada

Railroad Valley is a graben block in the Basin and Range structural province. Topographically, it is basically flat with recent playa deposits on the surface. Two structural deeps exist in the valley. Five oil fields are associated with the northern deep. All oil fields are related to faulting.

Oil has been generated from Tertiary Sheep Pass and Mississippian shales. This generation is probably due to recent local heating of the valley by intrusive rocks. Temperature gradients are as low as 0.9°F/100 ft (16°C/km) to as high as 7.3°F/100 ft (133°C/km).

Eight million barrels of oil, with no significant quantity of gas, have been produced from the fields. The seals on the fields are imperfect and any gas generated, and much oil, has probably leaked into the overlying valley fill. Trap Spring and Eagle Springs fields are hydrostatically pressured whereas Bacon Flat, Currant, and Grant Canyon fields are overpressured.

The concept of immature source rocks occurring near a valley with high heat flow may improve exploration success.

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Teton Pass—A Window on Structure of a Thrust Belt–Foreland Overlap Area

Detailed geologic mapping along Teton Pass, southwest of Jackson, Wyoming, has led to a reinterpretation of the spatial and sequential relations between the Paleocene-Eocene detached Jackson thrust and foreland Cache Creek thrust in that area. Structural evidence from both thrust sheets shows that where the two faults overlap, the Jackson thrust sheet was overridden by foreland rocks during southwestward movement along the Cache Creek thrust. Movement of the Cache Creek thrust sheet caused several anticlines along the leading edge of the Jackson thrust sheet to overturn to the southwest. Anomalous southwestward overturned folds elsewhere in the northern Snake River range may also be a result of this deformation. Continued movement of the Cache Creek thrust sheet sharply overturned the anticline on the leading edge of the Cache Creek thrust to the southwest and broke it along two major reverse faults that die out westward into an overturned anticline.

Cretaceous rocks form a common footwall of the Jackson and Cache Creek thrusts. On Teton Pass these rocks, squeezed up between the two faults, are nearly vertical and very broken. Seismic studies oriented at right angles to the apparent movement of the thrusts are necessary to determine the subsurface structure of the footwall, thrust belt, and foreland rocks in this overlap area from west of Teton basin, Idaho, to Hoback basin, Wyoming. Although the rocks on Teton Pass appear to be too deformed to produce oil and gas, suitable prospects may exist where the interaction of thrust belt and foreland deformation was less intense.