At the type locality of the Kincaid Formation, approximately 30 ft (9 m) of massive siltstone grades upward into a very silty limestone unit. The outcrop is characterized by four resistant units of tightly cemented siltstone and limestone, which separate beds of less resistant, massive siltstone. Bedding is poorly defined throughout the section, largely the result of intensive bioturbation. The grain size of the siltstone increases upward, ranging from medium to coarse. Clay content in the siltstone decreases upward as the amount of calcareous material increases. The upper 4-6 ft (1.2-1.8 m) may actually be considered a silty limestone.

A dramatic facies change is present along the outcrop both east and south of the type section. To the east, the Kincaid Formation is composed of glauconitic and highly fossiliferous limestone. The siltstone present at the type locality thins eastward and is absent less than 20 mi (32 km) away. Eighty miles (130 km) to the south, along the Rio Grande River, approximately 45 ft (14 m) of limestone and shale comprise the Kincaid Formation. The limestone is glauconitic and highly fossiliferous and is very similar to that exposed east of the type locality.

These early Paleocene sediments are interpreted to be shallow marine in origin. The siltstone represents a shallow sublittoral shoreface environment whereas the limestones on the east and south were deposited in shallow nearshore environments beyond the reach of clastic deposition.

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Depositional and Diagenetic History of Bodcaw Sand, Cotton Valley Group (Upper Jurassic), Longwood Field, Caddo Parish, Louisiana

The Bodcaw Sand contains fine-grained sandstones and siltstones deposited within a barrier-bar sequence. Based on vertical changes in sedimentary structures, texture, and mineralogic composition, three distinct lithofacies (upper, middle, and lower shoreface) within the Bodcaw Sand and two associated lagoonal lithofacies were identified. Cross-stratification and low-angle laminations, rarely disrupted by biogenic structures, characterize the fine-grained upper shoreface sandstones. Middle shoreface sandstones have undergone extensive reworking by biotic and abiotic factors. Few primary sedimentary structures or early generation trace fossils are preserved in middle shoreface sandstones. Lower shoreface siltstones and very fine-grained sandstones contain lenticular and wavy bedding features that are disrupted in many places by bioturbation.

The Bodcaw Sand has low porosity and permeability values. Vertical and lateral variation in porosity and permeability values are related to original deposition and subsequent diagenesis of Cotton Valley sediments. The Bodcaw Sand has had a complicated diagenetic history. Compaction, cementation, replacement, and dissolution have modified primary rock properties following deposition of barrier-bar sediments. Authigenic cementation plays an important role in modification of reservoir properties. Important authigenic minerals identified in the Bodcaw include silica, carbonates, and phyllosilicates. Two major diagenetic sequences are recognized on the basis of textural relationships between allogenic grains and authigenic constituents.

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Petroleum Geology of East Dykesville Field, Smackover "C Sand," Claiborne and Webster Parishes, Louisiana

The discovery in 1980 of gas production in the Smackover "C" sand in the East Dykesville field of Claiborne and Webster Parishes, Louisiana, extended the productive limits of this reservoir 6 mi (10 km) south of the production in the Haynesville field. The development of East Dykesville field has revealed three productive fault blocks within an area 6 mi (10 km) by 3 mi (5 km).

The Smackover "C" and "B" sands of East Dykesville are present 700 ft (213 m) above the Louann Salt as a portion of a more or less continuous sand body covering an area 9 mi (15 km) from east to west. This sand body extends southward from the Arkansas-Louisiana state line for more than 10 mi (16 km), and also produces at the Haynesville field. Production has been encountered in the "C" sand at East Dykesville from 10,912 ft (3,326 m) subsea down to 11,605 ft (3,537 m) subsea, an interval of 693 ft (211 m).

The source of the sediments which constitute the Smackover "C" sand appears to be north of the sand body, as it thickens to more than 100 ft (31 m) in the Red Rock-Haynesville area and thins southward. The sand also thins both to the east toward Haynesville and to the west toward Shongaloo. The "C" sand is 60 ft (18 m) thick in the north portion of East Dykesville field and thins to 20 ft (6 m) in the most southern wells. Isopach studies suggest a submarine-fan depositional environment on a stable shelf.

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Gibsland Salt-Stock Family in Northwestern Louisiana

A semiregional isopach map of the Hosston-Sligo interval in north Louisiana suggests the existence of a salt-stock family similar to D. Sanneman's example in the Zechstein basin of northwestern Germany. The "mother salt stock" appears to be the Gibsland salt dome in Bienville Parish, which the isopach map indicates had a well-developed rim syncline during Hosston deposition. Withdrawal of salt into the Gibsland dome appears to have triggered the growth of peripheral salt pillows such as Vacherie, Minden, Athens, Sugar Creek, and Arcadia. Some of these pillows subsequently developed into salt stocks. The centrifugal or outward growth of salt structures continued with the withdrawal of salt from beneath the Minden subbasin into the Minden and Bistineau salt domes. This accentuated growth of the Sligo, Bellevue, and Cotton Valley salt pillows, which in turn triggered development of the Pine Island salt pillow in latest Early Cretaceous time.

The growth of the salt structures progressed outward from deeper to shallower portions of the North Louisiana salt basin. An older salt-stock family may be centered on the Winnfield or Cedar Creek salt domes in the deepest part of the salt basin. Centrifugal growth of these stock should be discernible in seismic profiles. A knowledge of the relative ages of these structures is important in predicting sites of Lower Cretaceous reefs and hydrocarbon migration paths.

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Internal Framework of Southwestern Florida Bank

The University of Texas Institute for Geophysics has collected 550 nmi of multichannel reflection seismic data from the western half of the southern Florida Bank. These data indicate that the structural framework underlying the area consists of several elements. Along the north, the Pinellas County arch is a basement feature oriented northeast-southwest and overlain by a relatively thin carbonate sedimentary section that thickens into the Tampa Embayment to the northwest and the South Florida basin to the southeast. The western margin of the bank is underlain by the Sheffield arch, a basement feature trending northwest-southeast and flanked by the Florida Escarpment on the west and the South Florida basin sedimentary section to the east. It is most likely a southeastward continuation of the Pinellas County arch. The southern terminus of the Sheffield arch is overlain by a structure interpreted as a buried Tertiary shelf margin, possibly a reef, within the present bank. Within the South Florida basin sedimentary section, there are two secondary basins trending approximately northeast-southwest. They probably originated in Jurassic to Early Cretaceous(?) time and were continuously reactivated into the Tertiary. In addition, an off-bank seismic facies is present between the southern end of the Sheffield arch and the Tortugas Bank. This feature is interpreted as a Jurassic(?) to Tertiary reentrant into the southern Florida Bank. Finally, the present southern shelf break is underlain by a series of prograding clinoforms estimated to be late Tertiary to Quaternary in age.

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Dolomitization by Ground-Water Flow Systems in Carbonate Platforms

Dolomite occurs throughout the subsurface of modern carbonate platforms such as the Bahamas. Groundwater flow systems must be responsible for delivery of reactants needed for dolomitization. Reflux, freshwater lens flows, and thermal convection are large-scale flow systems that may be widespread in active platforms. I have evaluated some