Cretaceous and Jurassic strata within the bombing range are more than 150 m higher than in the leased area to the east. Nine dry holes have been drilled in the vicinity, seven of them concentrated on a structural high in Upper Cretaceous strata on the eastern flank of the dome.

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Exploration History, North U.S. Atlantic Margin

The Baltimore Canyon Trough is the site of 26 exploration wells and two stratigraphic tests. As of November 1981, six dry holes had been drilled on the Great Stone Dome. This structure appeared to be the largest and most promising in the basin. Seventeen wells have been drilled along the edge of the continental shelf with significant hydrocarbon shows reported from five wells. Combined daily flow rate is 90 mmcf. This flow is approximately one-half the amount required to warrant construction of a production platform and pipeline.

Georges Bank basin is characterized by an older thick carbonate and evaporite sequence (0 to 8 km) of Late Triassic-Early Jurassic age; a middle sequence of interbedded limestone, sandstone, mudstone, and red shale of Middle Jurassic to Early Cretaceous age (0 to 2.5 km); and a thin sequence (middle Cretaceous and younger) of transgressive shelf limestone and regressive claystone and siltstone (0.5 to 2 km). Elevated patch reefs beneath the shelf and a massive reeflike carbonate buildup under the slope form potential hydrocarbon traps. The patch reefs, which are elongate to circular and as much as several kilometers across, have caused a broad arching of younger strata. They may be built on salt swells or elevated basement blocks. A two-dimensional, finite-difference simulation of the main basin's thermal history of crustal stretching and subsidence suggests that some of the oldest sedimentary sections over the seaward part of rift-stage crust and extending out to oceanic crust are thermally mature for oil generation.

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Stability of Natural Gas at High Temperatures, Deep Subsurface

The components of natural gas are reactive in the deep subsurface and may not survive under all conditions. The stability of natural gas in reservoirs of various lithologies is studied using a combined theoretical and experimental approach.

A computer program uses real gas data to calculate equilibrium in multicomponent (up to 50), multiphase (up to 30) systems simulating subsurface conditions to 12 km (40,000 ft). This program predicts the stability of hydrocarbons in sandstone reservoirs by first considering clean sands and then sequentially adding feldspars and clays, carbonate cements, and iron oxides. In all examples, equilibrium compositions have been computed for low, average, and high geothermal gradients; hydrostatic and lithostatic pressures; and with and without graphite. Graphite is present when deep gases are generated by the cracking of oil but is absent in reservoirs originally filled with dry gas. Similar calculations have also been made for limestone and dolomite reservoirs with various combinations of clays, iron minerals, anhydrite, and sulfur, again with and without graphite. Natural gas shows considerable stability in sandstone reservoirs under most conditions, but its concentration in deep carbonates is more variable and tends to a hydrogen sulfide-carbon dioxide (H_2S-CO_2) mixture except when an appreciable concentration of iron is present. Hydrogen is present at the 1 to 2% level for most lithologies.

A multicolumn gas chromatograph is used to analyze inorganic and organic gases released by crushing rock samples in a Teflon ball-mill. Gas samples from deep wells in the Anadarko basin and southern Louisiana have been analyzed and the compositions compared with those predicted from the computer program.

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Problems Facing Geophysical Industry Today with Suggested Solutions to These Challenges

No abstract.

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Phayles Sandstone (Upper Cretaceous) Deltaic and Shelf-Bar Complex, Central Wyoming

Outcrop and subsurface studies of Phayles Sandstone (basal Mesaverde Group), southeastern Wind River basin, indicate rapid deltaic progradation and subsequent formation of a shelf-bar complex. Net sand distribution determined from 175 well logs indicates a major deltaic lobe with maximum thickness of 45 m prograded at least 20 km basinward from exposures of deltaic and shoreface deposits. The West Poison Spider field is located approximately 8 km southeast and downdrift from this deltaic lobe. Study of 33 logs and 13 cores from this field indicates the reservoir is associated with elongate shelf sandbars. The bar complex is at least 10 km long, 8 km wide, and 15 m thick; bar-axes are oriented N40°W. Study of shoreface sandstones in outcrop suggests the paleoshoreline trended N50°W. Several distinct sandstone bodies are stacked within the complex. Three component facies are recognized: (1) cross-stratified medium-grained sandstone; (2) parallel-bedded (hummocky cross-bedded?) fine-grained sandstone; and (3) bioturbated fine-grained sandstone. These sandstones occur in repetitive successions with facies 1 capping the sequence and facies 3 forming the basal member. Log-response compares favorably with core descriptions permitting detailed facies correlations. Within the field, individual bars range from 3 to 8 m in thickness and pinch out both seaward and landward interfingering with bioturbated and rippled shelf siltstones. Sedimentary structures, stratigraphic relations, and petrography suggest the bar complex was derived from sands reworked from the deltaic lobe. The shelf bars migrated shoreward and stacked during a major transgression resulting in the deposition of the Wallace Creek Tongue of the Cody Shale. This shale overlies and forms an updip seal for the reservoir facies.

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Carapebus Member (Eocene), Campos Basin, Brazilian Offshore: An Example of Deep-Sea Fan Turbidites Winnowed by Bottom Currents

The Carapebus Member (Eocene), Campos basin, offshore