Tilted Jurassic fault blocks form the primary hydrocarbon trap at Statfjord as throughout the East Shetland basin. Statfjord field is a structural/stratigraphic trap formed by westward tilting and erosion of a major fault block. Brent deltaic sandstones and underlying Statfjord fluvial to continental sandstones are truncated by mid-late Kimmerian unconformities on the crest and east flank of the structure, which is marked by a major fault system. Overlying and onlapping Jurassic and Cretaceous shales seal the trap. Organically rich Upper Jurassic shales provide an excellent oil source. Reservoirs have separate oil/water contacts. Normal faulting separates Statfjord field from the Brent field on the southwest.

Joint Norwegian and United Kingdom development utilizes "condeep" type gravity platforms and initial offshore loading. Development drilling from Statfjord "A" platform, towed to the location in May 1977, began in late 1978. First production is expected late in 1979.

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Calcification and Significance of Soil Filamentous Microorganisms in Quaternary Calcretes, Eastern Spain

Petrographic studies reveal the presence of various soil-dwelling organisms preserved as calcified filaments in Pleistocene to Holocene calcretes from coastal regions of eastern Spain.

On the basis of gross morphology, occurrence, abundance, and chemistry of relic organic tissues, four organomineral associations may be recognized. The mineral phase is low-magnesian calcite; its fabric occurs as micron-sized needles and rhombs. The organic phase includes four taxonomic groups: filamentous soil fungi (dominant); filamentous soil algae (rare); actinomycetes (common); and root hairs of vascular land plants (common). Filamentous soil fungi are generally 1 to 10μ in diameter, branch dichotomously and are nonseptate. Filamentous soil algae are 2 to 10μ in diameter, unbranched or show false ramifications, and are septate. Actinomycetes are less than 1μ in diameter, branch irregularly and are nonseptate. Root hairs of vascular land plants are 5 to 15μ in diameter, unbranched and nonseptate. All four groups are dominantly chasmolithic.

Morphology of calcified filaments depends on whether calcification is determined by physicochemical or biochemical processes, or both. The calcified product may be a hollow tube or a solid rod, depending on the condition of the organic substrate before, during, and after its calcification. Biochemical control of calcification produces filaments whose morphologies are related closely to those of the organic substrate; physicochemical control of calcification produces filaments whose morphologies may or may not be related to those of the organic substrate.

Calcretes containing calcified filaments indicate that they functioned, at some stage in their evolution, as biologic soils. Such calcretes are paleosols; they record the presence of a former land surface, colonization by terrestrial organisms, and subaerial vadose conditions in ancient successions.

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Slumping in Intercanyon Areas, Middle Atlantic Continental Slope

Analyses of high-resolution seismic reflection profiles show that slump deposits are ubiquitous within the intercanyon areas of the continental slope of the Middle Atlantic Bight. Of 15 widely spaced 3.5-kHz profiles obtained between Hudson Canyon and Chesapeake Bay, 12 define slump deposits that vary from thin, homogeneous or parallel-bedded lenses of sediments, to masses of intermediate thickness containing contorted bedding, to relatively thick slump blocks with discontinuous bedding. These deposits constitute the upper 10 to 90 m of sediments, extend downslope for 2 to 7 km, and are present at water depths ranging from 545 to 1,500 m. Minisparker profiles obtained during a detailed survey of a 9 by 28 km area of the slope between Hudson and Wilmington Canyons define 19 slump deposits in water depths of 398 to 2,190 m that comprise 12% of the survey area. Individual masses are as much as 50 m thick, cover as much as 5.3 sq km, and contain a maximum of 0.11 cu km of sediments. Although some of the slump deposits on the Middle Atlantic slope undoubtedly are relict, stemming from sediment instability produced by rapid deposition during Pleistocene sea-level regressions, the acoustic characteristics of others suggest recent formation. Data from this study indicate that slumping in the intercanyon areas may be quantitatively important in transporting sediments to the deep sea and suggest that recent mass movements may constitute a geologic hazard to future economic development of this part of the continental slope.

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Simple Pyrolysis Technique Using Well Cuttings to Map Source Rocks, Gas-Condensate Maturity, and Abnormal Fluid Pressures Associated with Fracture Reservoirs: Example from Anadarko Basin

P. Trask showed that when small samples of kerogen-rich rock are pyrolyzed in a test tube, oil-like material may be generated and condensed as a brown residue around the walls of the tube. This technique is adaptable to the use of well cuttings and may be utilized to identify source rocks capable of generating oil. For any given source rock, the amount of pyrolysis yield decreases with increased thermal maturity as verified by vitrinite reflectance analysis. Samples from stages of maturity corresponding to the gas-condensate and dry-gas generation "windows" yield no pyrolysis residue because of their inability to generate dark oily liquids.

We have used the test-tube-pyrolysis technique to map quickly and accurately (1) source rocks capable of generating oil, and (2) the maturity threshold of gas-condensate generation in part of the Pennsylvanian section of the Anadarko basin.

The area of gas-condensate generation within the Atoka Formation, as mapped by the pyrolysis technique, is coincident with the presence of (1) abnormally