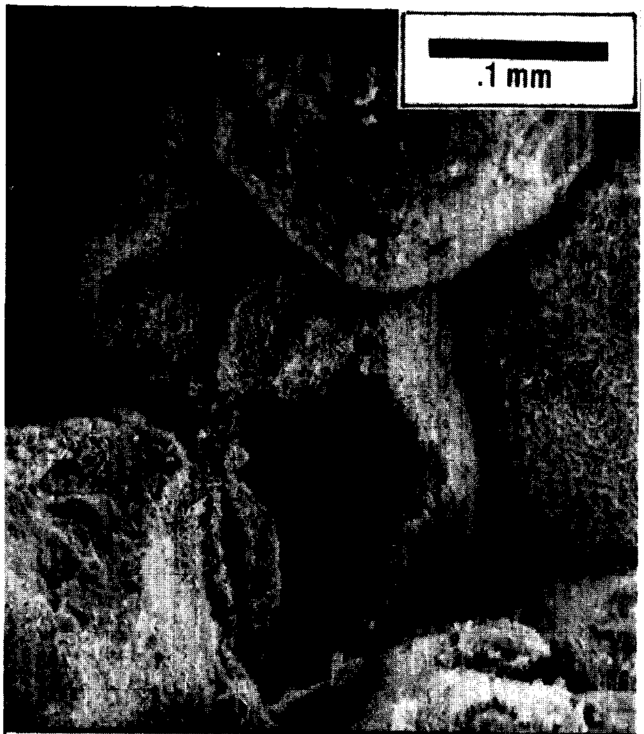

RELIC RIM OF CHLORITE CEMENT
Chevron #1 Crochet
Pointe Coupee Ph., La.
19929 ft. (6075m)
Porosity 29% Permeability 680md

production from these deeply buried Tuscaloosa sandstones is dependent upon secondary enhancement of a reduced primary pore system and its subsequent maintenance by geopressure.

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Mineral Deposits at Shelf-Slope Break

Sedimentologic, geochemical, and tectonic processes, both past and present, in the vicinity of the shelf-slope boundary have created favorable conditions for the formation and accumulation of a range of mineral deposits. Phosphorites and authigenic sulphides are probably the most important but other deposits, including heavy mineral placers and aggregates, are of interest. The nature and formation of these deposits are reviewed with particular reference to the relevant processes which characterize the outer shelf and upper continental slope. These processes include the reworking of consolidated deposits which crop out on the outer shelf; authigenic sulphide formation in intra-slope basins or where the oxygen-minimum layer intersects the outer shelf or upper slope; the accumulation of heavy mineral placers along ancient strandlines and the subsequent reworking during the passage of the transgressing shoreline; authigenic mineral formation in relict sediments; and the bypassing of the outer shelf by recent, terrigenous sediment which might otherwise dilute the valuable minerals present.

An attempt is made to realistically appraise the economic potential of the mineral deposits found close to the shelf-slope boundary. Although at present they are nothing more than a gleam in the marine prospector's eye, strategic considerations, the availability of local markets for the commodities produced, and the depletion in the available land-based resources could make such deposits economically viable in the not-too-distant future.

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Petroleum Potential of Shelikof Strait Based on Outcrops in Katmai National Monument, Alaska

During the summers of 1979 and 1980, the U.S. Geological Survey conducted field work in Katmai National Monument to assess the reservoir and source rock potential of stratigraphic units which project into the Shelikof Strait outer continental shelf. Six stratigraphic sections and two traverses of Jurassic, Cretaceous, and Tertiary rocks were measured and sampled. Samples were analyzed for porosity, permeability, geochemistry, and fossil age dates.

Rocks with the highest organic contents are from the Upper Jurassic Naknek Formation (late Kimmeridgian) and from the Upper Cretaceous Kaguyak Formation (Maestrichtian). Organic-rich rocks of these ages found along Hallo Bay also have a strong petroliferous odor. These rocks are part of a large, complex anticline which plunges northeast into Shelikof Strait. The anticline is flanked by the Tertiary West Foreland Formation, with Middle Jurassic Shelikof Formation near the axis. Lower Cretaceous rocks were found between the Naknek and Kaguyak Formations, including discovery of Valanginian and Albian rocks on this part of the Alaska Peninsula. Several unconformities were observed in the area, the most notable of which is between the Upper Jurassic Naknek Formation and the Upper Cretaceous Kaguyak Formation.

Upper Cretaceous sandstones of good reservoir quality were penetrated by the ARCO Lower Cook Inlet COST No. 1 well. Onshore, source rocks were found in both the Naknet Formation (upper part) and the Kaguyak Formation. Mapping of these units should reveal promising exploration targets in the Shelikof Strait OCS.

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Subaerial Exposure Criteria in Modern Playa Mud Cracks

The playa mud flats of five closed basins in Nevada and California were examined to establish the characteristics of their ubiquitous mud cracks. The mud-crack patterns seen in plan view reflect local conditions of deposition, ground-water level, and exposure time. The purpose of this study was to determine how they appear in vertical cross section (as seen in rock outcrops or drill cores). Trenches and polished slabs of plastic impregnated surface samples reveal a variety of mud-crack cross sections, including: (1) sinuous, V-shaped fillings with lobate margins; (2) marked changes in width of a single filling; (3) branching fillings; (4) horizontal and obliquely dipping cracks; (5) breccia patterns created by mud-filled vertical and horizontal cracks; and (6) multiple crack fillings. These features are similar to characteristics used for identifying subaqueous shrinkage cracks in the rock record. Although subaqueous shrinkage is possible for the playa mud cracks, more important mechanisms for their formation are: (1) superimposed mud-crack patterns in areas of low sedimentation; (2) soil-like processes (internal drying, eluviation, clay expansion, and shrinkage); (3) partial erosion and mechanical slumping of mud-crack margins; and (4) plastic sediment flowage during