Any interruption of our foreign energy supplies would have a dramatic effect on our economy and security and would show the dangerous results of the lack of a coherent and positive energy policy.

There are very few discovered but undeveloped oil reserves in the U.S. except on the North Slope, and those probably cannot be made available before 1976. Though the recent NPC-AAPG study indicates almost 200 billion bbl of undiscovered but expectable recoverable U.S. reserves, any large increase in exploratory effort to find them cannot have any great effect on our crude deficit before 1978 because of the necessary lead times. It is obvious, however, that certain steps can and should be taken immediately to encourage or to cause such an increase so that the period of danger to our economy and security will be as brief as possible.

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Consolidation Studies of Deltaic Sediments

The Texas Colorado River delta, which built across Matagorda Bay between 1929 and 1941, was selected for consolidation research. The objectives were to observe structural changes which occur when deltaic sediments undergo primary consolidation, and to correlate these consolidated sedimentary structures with those reported from ancient deltaic environments.

Double cores were collected along a traverse parallel with the main river channel in the southeast lobe of the delta. One core was split lengthwise, described, and radiographed. An analogous undisturbed section of the second core was then selected for consolidation.

Consolidation, through vertically compressing the sediments, partly creates new structures or makes poorly visible structures more discernible. It was noted in some cases that convolute laminations and recumbent folding formed after sections containing parallel laminations were consolidated. It was also observed that apparent homogeneous sections, after compaction, changed structurally to reveal parallel laminations.

Consequently, it should be realized that consolidation will affect unconsolidated sediments and that these changes should be considered when comparing recent and ancient environments.

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Drilling Funds and the Energy Crisis

(No abstract submitted)

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Significance of Reservoir Diagenetic Alteration for Petroleum Exploration, Gulf of Alaska Tertiary Basin

The Tertiary clastic section of the Gulf of Alaska sedimentary basin is considered an important potential future petroleum province. Considerable work in the onshore area has been carried out by industry preparatory to a projected sale of federal leases on the continental shelf. Examination of numerous samples collected from measured sections in Oligocene to Pleistocene strata has shown that the sandstones are mineralogically immature and unstable. Diagenetic alteration of these potential reservoir sands at shallow to intermediate depths of burial has resulted in the ubiquitous formation of authigenic clay rims and coats around detrital grains and of pore-filling zeolite cements. These diagenetic alterations adversely affect both porosity and permeability and will provide a major limitation on the thickness of the sedimentary section than can be considered prospective. A compaction versus depth gradient, which is related to the sandstone porosity gradient, can be determined in offshore areas by combination of seismically derived interval, velocity depth profiles, with a velocity-density calibration based on well data from the Hecate Strait (a geologically similar Pacific Margin basin lying off British Columbia). The resultant density configuration can be cross checked by gravity modeling along the same seismic line. Work on a line off Cape Yakataga shows that the prospective section is characterized by a high velocity and density gradient, indicating rapid loss of reservoir porosity with increasing depth of burial, as predicted by the onshore diagenetic model. Semiquantitative evaluation of the compaction profile using the onshore reservoir data suggests that even in the youngest sections porosity decreases to less than 20% at depths of 5,000 to 8,000 ft.

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Depositional Systems and Oil-Gas Reservoirs in Queen City Formation (Eocene), Texas

Regional surface and subsurface studies indicate that thick deltaic (Queen City Formation) and thin shelf (Reklaw and Weches Formations) sequences compose the stratigraphic interval between the top of the Wilcox Group and the base of the Sparta Formation. In East Texas, the Queen City Formation accumulated as part of a high-constructive, lobate delta system; and in South Texas, as part of a high-destructive, wave-dominated delta system. In South Texas, principal facies are meander-belt sand, lagoonal mud, stacked coastal barriers, and prodelta-shelf mud facies; in East Texas, delta plain, delta front, and prodelta facies are dominant; and in Central Texas, the principal facies are strandplain sands originated by southwestward longshore drift of sediments from the high-constructive delta system.

Facies distribution, composition, and size of the deltas in East Texas are similar to lobes of the Holocene high-constructive Mississippi delta system and to ancient deltas in the lower part of the Wilcox and in the Jackson Groups of the Gulf Coast basin. Fluvial-deltaic sediments of South Texas are comparable to Pleistocene high-destructive wave-dominated facies on the Surinam coast, to the Holocene Rhone delta system, and to ancient deltas in the upper part of the Wilcox Group.

Queen City deltas prograded gulfward over shelf muds and glauconites of the Reklaw Formation; they are overlain by comparable shelf facies of the Weches Formation. In East Texas, deltaic facies wedge out eastward; terrigenous clastics of the high-destructive deltas extend southward into Mexico.

Hydrocarbons are produced from thin strike-oriented sands downdip from the belt of maximum sand thickness of the high-destructive deltas in South Texas; only a minor amount of oil and gas has been obtained from delta front and distributary channel sands of the high-constructive deltas in East Texas.

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Petroleum Exploration and Environmental Conservation

U. S. faces energy crisis.—U. S. energy demands will nearly double by 1985. All our principal sources of fuel will be needed to meet the demand; if domestic supplies cannot keep pace, we face increasing reliance on foreign oil.

Energy and public lands.—Much of U. S. energy potential, including offshore oil and gas reserves, is on publicly owned lands. Potentially productive acreage in the federal and state domain should be made available to industry in a manner designed to maximize timely development.

Environmental delays.—A principal factor in delaying exploration of frontier areas is environmental concern. Many environmental objections are founded on the argument that oil and gas development is incompatible with other uses of the same land or water area.

Compatible use.—If exploration is to proceed at a pace consistent with national needs in the future, the concept of compatible multiple use of lands must be established as national policy. Industry must demonstrate from available examples that this concept is sound and results in maximum benefits to public and private interests.

Geologists must contribute.—Petroleum geologists should bring their knowledge to bear on public environmental issues and work for reasoned solutions based on scientific fact. Much exploration today awaits public consent; geologists must aid in showing public that energy-environmental problems can be