The geology of the Hoadley gas field is a classic example of a modern barrier-bar complex. Principal facies recognized in the studied area include marine shale, bay, barrier sand bar, eolian sand ridge, tidal channel, levee, inter-bar lagoon, and back-bar washed sands. A deltaic complex, found immediately to the southeast of the barrier bar, includes deltaic distributary channel and abandoned channel sand facies. Each of these facies can be recognized from diagnostic electric-log characteristics.

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Nonlinear Creep Behavior of Oil Shale

Oil shale resources in the United States are important as an energy source. Knowledge of the mechanical properties, including the creep behavior, is essential to any form of development. The creep behavior of oil shale samples taken from the Parachute Creek Member of the Green River Formation has been studied. A pneumatic-driven testing machine with long-term displacement monitors was used. The set of duplicate test specimens required for creep testing were cut from the same horizon of oil shale using a diamond-impregnated-wire saw to avoid surface damage. Duplicate samples were tested at various stress levels of the ultimate compressive strength. Samples with different organic contents were taken at different depths of the core. A nonlinear rheological model was developed and a multiparametric statistical analysis was performed. It was concluded that the organic content and the stress levels were important parameters. The creep phenomenon can be represented by a nonlinear strain-time equation upon which a nonlinear pseudo 3-D creep model can be built, relating the strains to the stresses.

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Application of On-Site Prime Power Packaged Cogeneration Systems in Pacific Basin

The term cogeneration was coined to define the concept of simultaneous production of two forms of useful energy from one fuel source. The energy produced is typically electrical or mechanical power and thermal power. There are two types of systems, distinguished according to whether the electrical power from the generator is first produced by direct combustion of a fuel or results from the utilization of a thermal energy supply. A new modular design concept allows virtually any commercial or industrial project to incorporate a compact, packaged pre-engineered cogeneration system into their plant or office facilities. In the United States, there are approximately 8,000 Mw (megawatts) of cogeneration and this level is expected to double by 1990. The incentives for installing cogeneration systems arise from tax credits and anticipated availability of natural gas at cost.

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Molten Rock Drilling

The Sandia Magma Energy Project has resulted in the conclusion that it is scientifically feasible to extract energy from magma resources buried within the top 6.2 mi (10 km) of the earth's crust. Supporting that conclusion were the ten holes that have been drilled successfully into the melt zone of Kilauea Iki Lava Lake. One recent hole was drilled and cored through the entire 98 ft (30 m) thick molten zone.

Two novel drilling systems were developed. The first used an insulated drill stem with an uncooled superalloy drag bit. This system was tested successfully in the laboratory at magma temperatures but never used in the field. The second system used standard drill pipe, a modified core barrel, and a water jet-augmented face discharge diamond coring bit. A high rate of water flow was used to cool the drill stem and solidify the molten rock as the bit advanced. This system was laboratory tested and successfully used to drill 5 holes (345 ft, 105 m) in the molten rock zone of Kilauea Iki, where the temperatures were above 1,020°C. Core recovery was 100%.

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Southeast Quadrant Mapping: Circum-Pacific Map Project

The Southeast Quadrant maps on display are the coordinated results of panel members from seven South American countries and from the United States plus the special and active participation of a number of geoscientists and institutions from many parts of the world.

Geographic and Plate-Tectonic maps have already been published. The compilation of the Geologic Map has been completed and it is being processed for publication. Unlike traditional small-scale geologic maps, it emphasizes major tectono-stratigraphic units and their facies. These have proved to be the most useful mapping units and they provide the most significant background for the other maps of the Circum-Pacific Map Project series. The completed series will facilitate comprehension and correlation of the stratigraphic development between continents in terms of the sequence and chronology of major tectonic events.

The surface sediment distribution is shown on this map as a 13-category classification, prepared by Floyd McCoy of the Lamont-Doherty Geological Observatory. Land geology was compiled from the latest published maps, as well as unpublished information, and from maps compiled specifically for the Project by scientists from Venezuela (C. Martin, H. Bellizzia, C. A. Galavis, N. Pimentel), Colombia (H. Duque-Caro, J. Cruz), Bolivia (C. Salinas), and Peru (J. Lizarraga).

Preliminary drafts of the Mineral Resources Map and the Tectonic Map are also complete. The former, compiled under the technical direction of Philip Gould of the U.S. Geological Survey, includes special contributions from various South American countries. It shows the geographic distribution of mineral deposits according to type, class, and size, on a simplified geologic-tectonic background. The relevant information for each deposits has been recorded and will be computerized. Suggestions from interested geoscientists are welcomed.

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Geologic Map of Antarctica

With the Antarctic sheet of the Plate-Tectonic Map of the Circum-Pacific Map Project (CPMP) now completed and published, the CPMP Antarctic panel is at work preparing a new 1:10,000,000 Geologic Map of Antarctica. It will build upon earlier geologic maps of that continent at 1:5,000,000 (1972 and 1976) and at 1:10,000,000 (1979). It is intended that all new Antarctic work, published through 1981, be incorporated into the new CPMP geologic map.