the most readily available raw material.

The Board reported on the merits of alternative methods of increasing gas usage, especially as a fuel, to yield additional condensate to the liquid fuels system. After a year's detailed investigation on the merits of available alternative technologies, the Board recommended, and the government approved, a major gas to gasoline via methanol development, using the first commercial plant to use the Mobil process.

The Board subsequently recommended against introducing low-methanol petrol blends (M15), principally because of distributional problems.

New Zealand should be about 50% self-sufficient in liquid fuels by 1986. Currently the Board is investigating the possibilities of either increasing that level or producing liquid fuel in the post-gas era. Several options are being considered—high methol blends, potential ethanol-production from biomass, and options for major liquid fuels production from lignite, or from New Zealand's fast-grown wood.

KENNEDY, M. P., California Div. Mines & Geology, Scripps Inst. Oceanography, La Jolla, California, H. G. GREENE and S. H. CLARKE, JR., U.S. Geol. Survey, Menlo Park, California, and R. MCCARTHY, California Coastal Zone Comm., San Francisco, California

A Marine Geologic Map Series of California

A comprehensive geologic map series covering the California continental margin is currently in preparation as a collaborative effort between the State of California Division of Mines and Geology, the State of California Coastal Commission, and the United States Geological Survey. Geologic, geophysical, and seismological data are portrayed at a scale of 1:250,000 on NOS bathymetric base maps for the purpose of defining regional stratigraphy, structural patterns, tectonic history, and historic seismicity. Individual subject data sets are being compiled from existing literature as well as from current research activities. The map series consists of composite overlays depicting surficial and bedrock geology, character and recency of faulting, regional geologic structure, locations of historical earthquakes, well-defined focal mechanisms, gross regional Bouguer gravity, and regional magnetic anomalies.

The geologic information is derived in large part from subbottom seismic reflection profiles and to a lesser degree from core and dredge samples. The explanation of the geologic mapping is accompanied by interpretive line drawings constructed on actual seismic profiles. Each profile illustrates and defines, using symbols standardized for this project, specific geologic features shown on the map.

The purpose of this new marine geologic map series is to acquire and compile in a standard format all available geologic data along the California coastal zone. Although a considerable amount of geologic data exist for the California offshore, heretofore no attempt has been made to compile and present these data at a common scale using a standardized symbology. The compilation phase of this study is scheduled to continue through 1983. Contributions by individuals can be made, with credit assigned, up to mid-1983.

KIESCHNICK, W. F., Atlantic Richfield Co., U.S.A.

Resource Driven Economic Potentials of Circum-Pacific Region

(No abstract)

KITCHNER, A. L., Univ. Auckland, New Zealand

Methanol and Ethanol from Wood as a Resource

(No abstract)

KOENIG, JAMES B., Geothermex, Inc., Richmond, California

Geothermal Energy in United States: Directions and Results, 1976-1982

Development of the giant steam field at The Geysers, California, largely by private industry, has continued steadily, with over 900 Mw of generation online, and nearly 500 Mw additional under construction or design. The area of the field is at least 15 mi² (40 km²); production depth is from 0.8 to about 1.9 mi (1.3 to about 3 km). Immediately adjacent to the east, exploration of hot water resources (to 482°F, 250°C) is underway. In Imperial Valley, California, several small plants (10 to 50 Mw) are either operating or under development. These are located in a sedimentary basin, essentially nonvolcanic, but having an extremely thin crust. Brine salinities remain a major problem.

Geothermal power plants are under construction or design in Utah and Nevada. On Hawaii island, a pilot 3 Mw plant is operational. Total US geothermal generation is now about 1,000 Mw.

Research into power generation from low-temperature fluids $(302^{\circ}F, 150^{\circ}C)$ has resulted in construction of a 5 Mw binarycycle experimental station at Raft River, Idaho, using federal funds. Federal funds also are used in research into energy extraction from hot dry rocks and from high-pressure methanebearing sands at great depths along the Gulf Coast.

Low-temperature utilization to date has been limited mostly to demonstration projects using public funds in Idaho, South Dakota, Texas, Oregon, etc, heating buildings with waters of 122 to 212° F (50 to 100°C). This segment of the geothermal industry continues to need public support in order to become competitive.

Perhaps the most significant change has been the growth of interest and activity by electric utilities, especially publicly owned utilities in California. Several now are investing in exploration, singly or in joint ventures with traditional exploration companies. Tax-exempt status, lower burrowing costs, and lack of profit demands add to their competitiveness.

Current exploration interest is focused on the volcanic Cascade Range, Imperial Valley, areas in northern Nevada, the Coso Range of California, and the greater Geysers-Clear Lake region.

KONO, HIDETO, Dept. Planning and Economic Div., State of Hawaii

Hawaii's Renewable Energy Program

(No abstract)

KOSKI, RANDOLPH A., and JAMES R. HEIN,* U.S. Geol. Survey, Menlo Park, California

Volcanogenic Manganese Deposits in Western Cordillera

Our preliminary investigations suggest that numerous stratiform manganese deposits in the western United States were

formed by hydrothermal-volcanogenic processes. These deposits can be grouped into five categories on the basis of the manganese mineral assemblage, lithologic association, and tectonic setting: (1) deposits in chert-graywacke sequences (e.g., in melange of the Franciscan complex of California-lenses and beds of manganese carbonate and manganiferous opal associated with bedded chert within thick sequences of graywacke and conglomerate; (2) deposits in chert-greenstone (ophiolite) sequences (e.g., the late Paleozoic Havallah Formation, Nevada)-occurrences of Mn-jasper, Mn-oxides, and the Mn-silicates braunite, bementite, and rhodonite in lenses within bedded chert, at the interface between basalt and chert, and within basalt; (3) deposits in metachert-metavolcanic sequences (e.g., late Paleozoic to Jurassic strata of the Sierra Nevada and Klamath Mountains)-deposits that are similar in occurrence and general lithology to those in the Franciscan and Havallah sequences but that have undergone a higher grade of metamorphism, so that the manganese mineral assemblage includes rhodochrosite, rhodonite, spessartine, piemontite, and Mn-rich pyroxene and amphibole; (4) deposits in pelagiclimestone/oceanic-basalt sequences (e.g., the Eocene Crescent Formation on the Olympic Peninsula, Washington)-marine carbonate and spilitized volcanic rocks hosting a diverse manganese mineralogy dominated by silicate (e.g., bementite) and oxide (e.g., hausmannite) phases; and (5) deposits in Miocene and Pliocene sequences of conglomerate-sandstonetuff-gypsum of the Colorado River-Lake Mead area, Nevada and Arizona-high-tonnage low-grade stratiform and largely strata bound deposits consisting mainly of amorphous manganese oxide cement in clastic sedimentary rocks.

KROENKE, L. W., Hawaii Inst. Geophysics, Honolulu, and J. V. EADE, New Zealand Oceanographic Inst., Wellington, New Zealand

Geomorphology, Structure, and Geochemistry of North Fiji Basin Triple Junction

We report on the preliminary results of a marine geological/geophysical survey of the North Fiji basin triple junction, undertaken by Australia, New Zealand, the United States, and CCOP/SOPAC in April/May of 1982. This investigation, focusing on the northeastern limb of the triple junction, has helped reveal the geomorphology, and has provided an excellent opportunity for studying the geochemistry of metalliferous deposits and hydrothermal activity associated with this type of divergent margin. Station work during the 20-day cruise included coring, dredging, and bottom photography.

LEE, DAI SUNG, Yonsei Univ., Seoul Korea

Late Cretaceous Oil Shale, Southwest South Korea

(No abstract)

LEGG, MARK R., Univ. California at Santa Barbara, Santa Barbara, California, and VICTOR WONG O., Centros de Investigacion Científica y Educacion Superior de Ensenada, San Ysidro, California

Seismicity, Faulting and Tectonics of Inner Continental Borderland Offshore Northern Baja California, Mexico

Using recently collected high resolution seismic reflection

data and existing bathymetric, geomagnetic, and seismological data, we find that the inner continental borderland of northern Baja California, Mexico, is extensively deformed and tectonically active. The region is crossed by three major wrench fault zones typified by one or more relatively continuous main fault(s), numerous smaller, subparallel, en echelon and oblique conjugate faults, and transversely oriented folds. These three fault zones are the southward continuations of the Santa Clemente-San Isidro, San Pedro-San Diego Cruz-San Trough-Maximinos, and Palos Verdes Hills-Coronado Bank-Agua Blanca fault zones, mapped in the southern California continental borderland. Each of the fault zones shows evidence of Quaternary activity, such as sea-floor displacement and faulted Quaternary sediments. Earthquake epicenters roughly delineate the major fault zones, with the most significant activity occurring along the Santa Cruz-San Clemente-San Isidro fault zone. Strike-slip is suggested for the main faults by offset submarine canyons, and sea-floor scarps that reverse along strike. Large scarps and vertical separations also suggest significant dip-slip in some areas. Earthquake focal mechanisms show that present-day movements along the major fault zones is predominantly dextral strike-slip, with a significant component of dip-slip in some cases, consistent with the motion of the San Andreas fault system and Pacific-North American plate boundary tectonics. Complexity in the regional tectonics is demonstrated by earthquakes in the San Clemente Island-Fortymile Bank area, which are observed to have focal mechanisms opposite to those predicted by the rigid plate theory.

LEWIS, LLOYD F., U.S. Dept. Energy, Washington, D.C., and KENNETH R. MCDONALD, Evans-Hamilton, Inc., Rockville, Maryland

Prospects for Ocean Thermal Energy Conversion (OTEC) in the Pacific

Ocean Thermal Energy Conversion (OTEC) may be the most promising future electrical energy source for many of the Pacific nations located between 20°N and 20°S latitudes. Within this band are found the optimum physical, economic, social, and cultural conditions for OTEC development. Several of the island nation governments in this region have declared OTEC to be the preferred alternative to their existing fossil fueled power plants, the fuel for which is imported at a severe economic penalty. In addition to OTEC serving as the cornerstone of energy self-sufficiency, these nations are also attracted to the potential OTEC by-products including fresh water, mariculture, and cooling water. Their interest is also stimulated by the potential for industrial expansion and economic development based on the added electrical baseload capacity OTEC can provide. Many multi-island nations see OTEC as a modest-sized decentralized energy facility that could serve remote population centers not serviceable from large central power stations.

Many factors contribute to the prospects for OTEC development in the Pacific and there has been notable progress to date. Demonstration OTEC facilities have been built and tested in Hawaii and on Nauru. Designs, site surveys, and environmental assessments for commercial OTEC plants have been prepared for Guam, Tahiti, Okinawa, and Saipan. Planning for OTEC is underway in American Samoa, Palmyra, Yap, and the Marshall Islands. An ammonia-producing OTEC plantship has been proposed for grazing in the central Pacific. These projects illustrate the strong interest in OTEC development that is found throughout the central Pacific.