age and Oligocene marlstones. The source rock is considered to be the Rhaetic black shale, which was deposited in an euxinic environment.

Drilling activities have to overcome unusual difficulties owing to high pressure gradient. New methods to forecast and study overpressured zones have been developed. The hydrocarbons in the reservoir are in a gas phase. Reservoir pressure is 15,000 psi (103,425 kPa), temperature is 300°F (149°C), a minimum amount of carbon dioxide is present, and serious problems of corrosion have to be faced in the completion operations. Estimated original reserves are 50×10^9 cu m of gas and 40×10^6 tons of crude oil.

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Determination of Depth to Hydrocarbon Maturation Temperature from Magnetic Data, Bligh Water, Fiji

The depth to the temperature at which rocks lose their magnetization (Curie point depth) can be calculated by estimating the average depth to the bottom of the magnetized bodies which make up the crust. Using the method of spectral analysis on magnetic data, as suggested by Bhattacharyya and Leu, we have calculated the depth to the Curie point temperature in Bligh Water, Fiji.

Measurements of the magnetic susceptibility of rocks versus temperature at field strengths approaching that of the earth's main field suggest that the effective Curie point temperature of the magnetic crust is about 500°C. Using this temperature with the calculated Curie point depth and reasonable ocean-bottom temperatures, we have prepared a crustal-thermal-gradient map of the Bligh Water basin. The thermal gradients thus calculated are in reasonable agreement with gradients determined from conventional oceanographic heat-flow measurements in surrounding deep-water regions. The results for Bligh Water, Fiji, suggest that hydrocarbon maturation temperatures are probably reached in the relatively shallow lower to middle Miocene reefs.

We are presently analyzing marine magnetic data over the Fiji Plateau west of Fiji, where an active back-arc spreading center is postulated. The results of this investigation will provide a direct comparison between thermal gradients calculated from Curie point data and marine heat-flow measurements, as well as provide insight into the regional geophysics of the area.

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Petrology and Diagenesis of Arc-Derived Lithic Sandstones—Wagwater Trough, East-Central Jamaica

The Wagwater trough is a fault-bounded block of lower Tertiary sedimentary and volcanic rocks that cuts across east-central Jamaica in a southeast direction. Detrital sandstone and conglomeratic sequences within this block include the early Eocene and Paleocene(?) Wagwater and Richmond Formations. The Wagwater Formation is a red-bed sequence of breccias, conglomerates, sandstones, and mudstones with minor amounts of limestone and gypsum deposited as a subaerial fan-delta complex. Sedimentary rocks of the Wagwater Formation are laterally equivalent to sandstones, conglomerates, shales, and limestones of the Richmond Formation, which were deposited in submarine-slope and fan environments.

Lithic arenites are the dominant sandstone type within the trough. Principal framework constituents include volcanic and carbonate lithic fragments, plagioclase, quartz, and fossil fragments with minor amounts of plutonic lithic fragments and opaque heavy minerals. Authigenic minerals are abundant in some sandstones and include phyllosilicates (chlorite and clay minerals), calcite, and iron oxide.

The progressive sequence of diagenetic features from earliest to latest in marine sandstones of the Richmond Formation is: (1) development of clay coats around framework grains, (2) precipitation of calcite pore-fill cement, (3) development of a second clay coat on calcite cement in incompletely filled pores, (4) crystallization of radiating pore-fill chlorite after development of clay coats in either stage 1 or stage 3, and (5) late-stage calcite replacement.

Despite minor differences in diagenetic features, the Richmond sandstones are similar to other arc-derived sandstones from five other basins. These separate occurrences suggest that sands deposited in arc basins have the same compositional range, and that postdeposition processes produce a common diagenetic sequence.

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Active Faults in Houston, Texas, Area as Observed on LANDSAT Imagery

Digitally processed LANDSAT imagery offers geologists a new perspective for detecting and assessing active faults in the Texas Gulf coastal plain. Many known active faults in and around Houston, such as those that periodically break the Katy Freeway and the runway at Ellington Air Force Base, appear on LANDSAT imagery as discrete linear features. Many other linear features correlate with surface projection of down-to-basin growth faults mapped in the subsurface. Several linear features observed do not appear to correlate with any known or mapped features. Investigation of these features using surface and subsurface data may reveal incipient or potentially active faults that may constitute geologic hazards as urban growth and development continue.

Many lineaments are marked by geomorphic features. Some lineaments seem to be marked by small-scale disruption of terrain and cultural patterns, especially in the urban area. Still others appear as changes in tone across sharp linear boundaries that may reflect differences in soil moisture on either side of a fracture system.

Each linear feature detected on space or aircraft imagery must be carefully investigated before it is designated a fault because its recognition can both guide future development and adversely affect current property values.