

- 1:30 D. R. HORN, B. M. HORN, M. N. DELACH: Nickel- and copper-rich nodules of equatorial north Pacific
- 2:00 G. P. GLASBY: Exploitation of manganese nodules in South Pacific
- 2:30 W. M. LONIE, J. L. MCINTOSH: Occurrence and development of sedimentary manganese ore, Groote Eylandt, northern Australia
- 3:00 A. W. KARNS: Submarine phosphorite deposits of Chatham Rise near New Zealand

## COAL, Room I

*Presiding:* B. K. KIM

- 1:00 E. N. MILLIGAN: Status of coal exploration and mine development in Australia
- 1:30 T. SHIMOYAMA, A. IJIMA: Influence of temperature on coalification of Tertiary coal in Japan
- 2:00 B. K. KIM: Paleozoic and Mesozoic coal in Korea
- 2:30 A. A. WANEK: Coal in Alaska
- 3:00 B. A. LATOUR: Coal resources of Canadian cordillera
- 3:30 M. SIMANJUNTAK, (no initials) WURJANDI, S. U. WIJAYA: Coal resources of Indonesia
- 4:00 P. WU: Coal resources of Taiwan
- 4:30 CCOP Meeting

## Abstracts of Papers

ACHALABHUTI, C., Dept. of Mineral Resources, Ministry of Industry, Thailand

## PETROLEUM GEOLOGY OF GULF OF THAILAND

Significant oil and gas shows and discoveries in the Gulf of Thailand in mid-1973 have encouraged the six petroleum concessionaires to drill 15 additional wildcat wells in 1973-1974. Detailed geophysical surveys and results of seven wildcat wells have revealed that the Gulf of Thailand is underlain by Quaternary and Tertiary formations about 2,000-12,000 ft thick. Paleontology dating indicates that the basal Tertiary formation is as old as Oligocene, but from place to place the acoustic basements vary from granitic basement to metasedimentary rocks of Mesozoic and/or late Paleozoic age.

ALCARAZ, A., Philippine Commission on Volcanology, Philippines

## GEOHERMAL EXPLORATION AND DEVELOPMENT IN PHILIPPINES

The Philippines, like many developing countries, is energy-deficient and needs to import much of her raw energy in the form of oil. The government, therefore, as early as 10 years ago gave encouragement and support to studies of the islands' indigenous energy resources, not only with the view of reducing dependence upon external sources, but to meet her steeply increasing power requirements. One such indigenous energy resource is geothermal energy in which the Philippines apparently abounds.

Geothermal exploration and development undertaken in the Philippines during the past decade are reviewed and discussed. Results obtained, especially

in the Tiwi geothermal field of southeastern Luzon which was the first to be studied, are evaluated and potentials are estimated. The sequential investigations undertaken in the study of a particular geothermal field and the interplay of geologic, geophysical, and geochemical approaches are outlined.

An overview of the future role of geothermal energy in the power development of the country is presented. Research being undertaken on other uses of geothermal energy in industry and agriculture is discussed.

ALMOGELA, D. H., Bureau of Mines, Manila, Philippines

## GEOLOGIC ENVIRONMENT AND ECONOMIC POSSIBILITIES OF PORPHYRY COPPER DEPOSITS IN PHILIPPINES

In the Philippines, the bulk of copper production comes from the porphyry copper type. The original concept of porphyry copper is a uniform low-grade sulfide deposit wherein the sulfide minerals are disseminated discrete grains and veinlets throughout a large volume of rock, commonly a porphyry. In contrast, and reflective of what is termed as such in the Philippines, porphyry copper means a hypogene copper sulfide deposit in which the ore minerals are in disseminated grains or networks of veinlets within siliceous to intermediate intrusive bodies and their intruded rocks. This definition emphasizes the occurrence and genetic significance without consideration of the economic aspect and avoids the use of descriptive relative terms, such as low-grade, large, and big.

At least seven of these deposits in the Philippines are being mined and 16 are in the development or prospect stage. All are close to the axes of Tertiary geanticlines made up of Cretaceous to Tertiary meta-volcanic and metasedimentary rocks. Most of the deposits are near prominent fault zones, especially where they branch or are intersected by other faults. The deposits are irregular in form, steeply dipping to flat, and localized near contacts of plutons and their intruded rocks. Ore minerals are chiefly chalcopyrite and to a less degree bornite. Magnetite, pyrite, molybdenite, gold, and silver, in some prospects, are recoverable as by-products.

Considering the present expansion programs of producing mines and the development of new mines which are in various stages of intensive exploration for this type of deposit, in the not too distant future mining of porphyry copper will constitute the biggest foreign-exchange earner among our major industries.

ALONSO E., H., Comm. National Territorial Studies, Mexico

## GEOHERMIC POTENTIAL OF REPUBLIC OF MEXICO

After almost 15 years of study in different parts of the country and after 10 years in the geothermal zone of Cerro Prieto, Baja California, the first plant in this zone, with a capacity of 75,000 kw, was inaugurated in April 1973. Electricity is generated on a commercial scale using the natural steam from underground.

The possibilities for Mexico in this field are rather large, as there are 130 known zones where it is feasible