MINERALOGY

Lignite Found in India

India has gained an important source of power, necessary for its technological and economic advance, with the discovery of a large lignite field in the south.

➤ EARTH-MOVING operations have begun to uncover one of the world's large fields of lignite, the soft brown substance intermediate between peat and coal.

The lignite fields at Neyveli, India, stretch over 100 square miles, in a thick layer about 180 feet below the ground level, reports T. M. S. Mani, managing director of the Neyveli Lignite Corporation (Private) Ltd. Geologists have estimated that 2,000 million tons lie buried with more easily workable deposits of 200 million tons occurring in an area of about five and one-half square miles.

(Upon this smaller area in the South Arcot district, 135 miles south of Madras, India's Prime Minister Jawaharlal Nehru on May 20, 1957, inaugurated the work as part of India's advancement "from a static economy to a dynamic, moving and self-motivated economy.")

First use of the lignite will be in a thermal plant to generate 200,000 kilowatts of power yearly for relief of the power-short areas of South India. This source of electricity will release valuable reservoir water for irrigating crops during the dry months of the year.

A proposed 380,000 tons of carbonized briquettes manufactured yearly from the lignite will substitute for coal now transported over long distances from the north. The smokeless briquettes will also be welcomed by village housewives for cooking their rice and curry, in place of valuable cow dung which could be turned back to enrich the fields.

A third important use of lignite will be in a fertilizer factory to produce urea.

The danger of floods from many high pressure artesian springs, a unique freak of nature that has prevented relatively easy conventional mining of the lignite, is a major problem of the project.

Below the 55-foot thick layer of lignite, the water exerts an upward thrust of about six to eight tons per square foot. Once the weight of the thick burden of tough sandstone and earth is removed from the top of the lignite, this pressure is lifted, and water would heave upwards, bursting through the lignite seam to flood the mine.

Thus pressure must be kept continuously under control. A careful system of mechanized open cast mining has been worked out, with elaborate systems of large-scale pumping. Forty-eight thousand gallons of water per minute will have to be pumped out from 48 wells to maintain the pressure surface of the springs at safe level below the lignite.

Only a relatively small section of lignite will be exposed and cut out at a time, a section about 6,000 feet long and 1,200 feet wide at the top. While huge earthmoving machines dig step-like terraces towards the lignite, other machines will cover up the areas already dug, thus releasing earth pressure from only a small area at a time.

Mining engineers estimate about 3.5 million tons of lignite will be removed in this way each year—the equivalent of about a million and a quarter tons of good coal. The lignite seam of the first cut is expected to be exposed in 1960, with full production reached the end of that year or in 1961.

Lignite is formed from vegetable matter in a manner similar yet midway between that forming peat and coal.

Millions of years ago plants flourished and then gradually decayed into the material known today as peat. In some places, floods and movements of the earth's crust deposited soil and other matter on top of this decaying peat and stopped the bacterial action. Thus peat was consolidated and dehydrated into what we now call lignite. In other parts of the world soil pressure was further increased, and lignite was compressed further into coal.

Production of lignite throughout the world fluctuates widely from year to year. Statistics show that Germany is the largest producer of lignite. Large quantities are also produced in Russia, Czechoslovakia and Hungary.

The Government of India has given a high priority to the Neyveli project because of the acute shortage of fuel and power in South India. With this operation, which has received American and other nations' technical and economic aid, India hopes to speed up the development of industry and agriculture in the southern areas.

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TECHNOLOGY

Two Materials Damaged Slightly by Radiation

➤ TWO MATERIALS only slightly damaged by exposure to neutron and gamma radiation have been found by scientists of the General Electric Company, Evandale, Ohio.

The materials are an alumina-silica body in felt form and an essentially pure silicon dioxide in batt form. They were tested for possible radiation damage both in reactors and cyclotrons, W. R. Morgan and W. G. Baxter reported to the American Society of Mechanical Engineers meeting in Hartford, Conn.

Their use as an insulating material for nuclear reactors is being investigated further, the scientists said, but tests to date show a satisfactorily low level of nuclear "poisoning," even at high level exposures to neutrons and gamma radiation.

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