Plant for Nuclear Fuel in Trombay

THE construction of the Uranium-Thorium Plant of the Atomic Energy Commission begun this week at Trombay in Bombay Harbour marks the second stage in the processing of rare earths in India. The plant will process the cakes left over from the monazite after its rare earth and phosphate contents have been extracted in the plant at Alwaye.

Indian Rare Earths Limited, which controls the Alwaye factory, is a jointstock company the shares of which are held by the Governments of India and Travancore Cochin in the proportion 55:45 The subscribed capital of the company is Rs So lakhs. Work on the construction of this factory was started in March 1951 and the factory went into production in July 1952. A French firm, the Societic de Produits Chemiques *de* Terres Rares, are the technical consultants of the company. The factory is designed to treat 1500 tons of monazite a year and to produce some 1500 tons of rare earth chlorides and carbonates. The plant is capable of manufacturing the product either as chlorides orascarbonates,thoughitwillnormally produce approximately 1000 tons of chlorides and 450 tons of carbonates. The bye-products are from 1,500 to 1,800 tons of crystalhue tri-sodium phosphate and 900,000 gallons *of* caustic soda lye in 10 to 12 per cent solution.

The residual cake which remains after all this extraction has taken place at Alwaye, will be treated at the Trombay factory, for it still contains thorium and a small amount of uranium. It is estimated that if all the thorium is converted into nitrate, about 205 to 228 tons of thorium nitrate can be obtained annually in tin's way. In fact, however, only a portion of the thorium will be converted into nitrate. Part of this will be for the use of the indigenous gas mantle industry which will thus make India self sufficient in a raw material which has so tar been imported mainly from the USA. Limited quantities of the nitrate will be exported for strictly commercial use. The purified thorium will be retained by the Atomic Energy Commission for its own work. Thorium is regarded as the best element for use in breeder ie actors where it becomes transformed into uranium 233 a valuable nuclear fuel. The Trombay factory will thus provide the raw material for the medium-sized atomic reactor which the Commission proposes to set up in India as part of its programme of development during the next four years.

The uranium in the cake will also be extracted and processed to a state of atomic purity for use in the reactor. The plant will also process uranium bearing concentrates from Bihar and other parts of India. It will be remembered that it was the Raw Materials Division of the Atomic Energy Commission which located the deposits in Bihar and is now carrying out drilling operations and detailed prospecting in that area. This Division has also located deposits of radio-active minerals in Rajasthan, where preliminary surveys are being carried out now.

The location of the factory at Bombay has been determined by two factors. First, its central situation in relation to the various parts of the country from which the raw materials arc to be obtained, and second, the need to locate the plant near the physics and chemistry divisions of the Commission, so that all scientific personnel can participate in research and new development from the laboratory to the factory scale.