From New Delhi by Susan Maitra

Another nuclear power milestone

Test-burning of U-233 fuel, made indigenously from India's large thorium deposits, will begin soon.

India's nuclear scientists have announced a new milestone in the country's nuclear power program. At a press conference held here on May 7, Dr. P. K. Iyengar, director of the Bhabha Atomic Research Center (BARC), revealed that the nuclear scientists have built a tiny experimental reactor, Kamini, which will use man-made fuel processed from the thorium-rich sands of the Kerala Coast.

Dr. Iyengar said that the reactor, which will use 500 grams of U-233, will be commissioned in the next three months at the Kalpakkam Research Center near Madras. Kamini is the precursor of future Indian power reactors which will use the thorium-based U-233 as fuel instead of U-235 (natural or enriched uranium) or plutonium. The fuel will come from research reactors in Trombay, where U-233 has been produced by irradiating thorium over the last several years.

There is no commercial reactor in the world based on U-233 at this time, but since India has the largest deposits of thorium in the world, its nuclear power program for the next century has been designed to rely almost entirely on U-233 and thorium.

The press conference was also called by the Department of Atomic Energy (DAE) to announce the formation of the Nuclear Power Board. Addressing the conference, Dr. Raja Ramanna, chairman of the Atomic Energy Commission, said that the board has been established to supervise all nuclear projects, to increase nuclear power capacity to 10 GW by the end of the century.

Before the press conference, one leading news daily had serialized a five-part "investigative report" attacking the Atomic Energy Commission for its "failure to manufacture heavy water successfully."

The articles were deliberately slanted to portray the AEC as an incompetent body investing huge amounts in projects doomed to fail. A year ago, the same author had accused the AEC of "inept" operation of the Tarapur Atomic Power Station and exposing the workers to a "dangerous level of radiation." This accusation was firmly refuted by the then-AEC chairman, Dr. Homi Sethna.

Answering newsmen's questions, Dr. Ramanna pointed out that difficulties in the area of heavy-water manufacture could be traced to a lack of power, uncertain supply of synthetic gas from the coal-based fertilizer plants with which the heavy-water plants are coupled, the plant's own engineering problems, and in one case, even the disappearance of distillation towers from the high seas while en route from the West.

Nonetheless, Dr. Ramanna insisted, "our confidence in the technology has been vindicated and we are in a position to adopt it totally for future plants."

The Indian nuclear program depends on efficient heavy-water production, since the nuclear reactors India uses require heavy water for neutron moderation. India is now in the process of mastering this technology.

The first heavy-water plant with an annual capacity of 14.11 tons was commissioned in 1962 at Nangal. The plant, whose technology is based on distillation of hydrogen obtained from the electrolysis of water, is now under full production. Since then, four more heavy-water plants have been installed, based on several different production processes.

The plant at Kota, with a capacity of 100 tons per year, is based on a hydrogen-sulfide/water exchange process. By contrast the heavy water plant at Talcher is based on a hydrogen-ammonia bi-thermal exchange process. The two plants at Tuticorin and Baroda are both based on an ammonia-hydrogen mono-thermal exchange process.

Dr. N. Srynivasan, director of the DAE's Heavy Water Division, said that the Tuticorin heavy water plant is a success story, now running at a high 80% of capacity. In fact, the technology at the Tuticorin facility has been determined to be the best, and future heavy-water plants will be designed using the Tuticorin facility as the model, he said.

Dr. M. R. Srynivasan, DAE Director of Power Projects, pointed out that in order to install 10 GW of nuclear power by the year 2000, India will build first 12 units of the 235 MWe size and then another 10 units of 500 MWe each.

The units will be built in clusters of four, or added to existing nuclear power sites so that the time and cost to build the infrastructure associated with the power plants can be reduced.

BARC director Dr. P. K. Iyengar also reported that deep shafts of the Kolar Gold Fields in Karnataka are now being explored as a possible site for permanent disposal of radioactive wastes produced by the nuclear facilities. He said a technology had been developed to store the wastes, but only for 25 years.