

GOVERNMENT OF INDIA  
DEPARTMENT OF ATOMIC ENERGY  
**RAJYA SABHA**  
**UNSTARRED QUESTION NO.474**  
TO BE ANSWERED ON 04.08.2011

**DEPOSITS OF THORIUM IN COUNTRY**

474 SHRI RAVI SHANKAR PRASAD  
SHRI RAM JETHMALANI

Will the PRIME MINISTER be pleased to state:

- (a) whether it is a fact that rich deposits of thorium have been found in the country;
- (b) if so, the total quantity of thorium presently available in the country and the power generation capacity that the processing of it could yield; and
- (c) whether the technology required for generating power using thorium has been developed in the country and if so, the details thereof?

**ANSWER**

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (SHRI V. NARAYANASAMY) :

---

- (a) Yes, Sir.
- (b) The Atomic Minerals Directorate for Exploration and Research (AMD), a constituent Unit of the Department of Atomic Energy has established 10.70 million tonnes of Monazite in the country, which contains 9,63,000 tonnes of Thorium Oxide (ThO<sub>2</sub>). Indian Monazite contains about 9-10% of ThO<sub>2</sub> and about 8,46,477 tonnes of Thorium Metal can be obtained from 9,63,000 tonnes of ThO<sub>2</sub> which will be used for future programmes of DAE.

India is pursuing a three stage nuclear power generation programme aimed at long term energy independence based on use of our abundant Thorium resources. The programme is to use Thorium for electricity generation in the long-term. In order to realize this goal, we are well into the first stage based on our modest domestic Uranium resources. This will be followed by second stage comprising of fast reactors which can support a large power generation capacity before getting into the third stage.

Thorium being a fertile material cannot produce fission energy unless it is converted to Uranium-233. Most effective conversion of thorium to Uranium<sup>233</sup> can be done in fast reactors several of which will be set up in the second stage of Indian nuclear programme. A comprehensive three-stage nuclear power programme is therefore being implemented sequentially.

- (c) Yes, Sir. India has been working on the development of technologies for Utilisation of Thorium for Nuclear Power Generation since the inception of the Indian Nuclear Programme. As a part of this work, thorium has been irradiated in our Research Reactors and also in Pressurised Heavy Water Reactors. Technologies for reprocessing of irradiated thorium fuel for the separation of Uranium-233 have also been developed on a pilot plant scale. Uranium-233 thus separated has been used as fuel in research reactor Purnima-II and later in the 30 kw Research Reactor Kamini now in operation at Indira Gandhi Centre for Atomic Research(IGCAR), a constituent Unit of the Department of Atomic Energy (DAE). Experimental thorium based fuel has been manufactured and used in the critical facility for Reactor Physics experiments as well. Further development of technologies for large scale commercial level manufacture and reprocessing of Uranium-233 bearing fuel is underway. The Indian AHWR is the only large scale reactor that has been designed and developed to produce a large fraction, nearly 2/3 rd of its power from the fission of Uranium-233 in the equilibrium state of this reactor core.

\*\*\*\*\*