(b) The project at an estimated cost of ₹ 1583.05 crore includes construction of an underground lab and associated surface facilities at Pottipuram in Bodi West hills of Theni District, in Tamil Nadu, construction of a 50 kilo ton magnetised iron - calorimeter detector to study a fundamental particle called neutrino, and setting up Inter-Institutional Centre for High Energy Physics at Madurai. The environmental impact of the project has been taken into account before sanction of the project. Detailed studies on the environmental impact of the project were carried out by Salim Ali Centre for Ornithology and Natural History, Coimbatore an autonomous institute under the Ministry of Environment & Forests, and geotechnical studies were carried out by the Geological Survey of India (GSI).

(c) and(d) The Project is located in Tamilnadu and the application for environmental clearance was submitted to the Department of Environment & Forests, Government of Tamil Nadu. The Government of Tamil Nadu recommended and forwarded the application to the Ministry of Environment and Forests, Government of India for concurrence. The Ministry of Environment and Forests, Government of India has cleared the project.

Thorium based nuclear power plants

1603. SHRI AJAY SANCHETI : Will the PRIME MINISTER be pleased to state:

(a) the policy of Government so far as Thorium based nuclear power plants are concerned;

(b) whether such plants are functioning in India;

(c) the estimated availability of Monazite mineral reserves from which Thorium is derived, in the country; and

(d) whether the country is extracting Thorium from Monazite mineral at present; and

(e) if so, details thereof and if not, reasons therefor?

THE MINISTER OF STATE IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH) : (a) Research and Development on Thorium utilisation has been a high priority for the Department of Atomic Energy (DAE) right since its inception. On account of physics characteristics of Thorium, it is not possible to build a nuclear reactor using Thorium alone. It has to be converted into Uranium-233 in a reactor before it can be used as fuel. With this in view, a three-stage nuclear power programme, based on a closed nuclear fuel cycle has been chalked out. The three stage nuclear power programme aims to multiply the domestically available fissile resource through the use of natural Uranium in Pressurised Heavy Water Reactors (PHWRs), followed by use of Plutonium obtained from the spent fuel of Pressurised Heavy Water Reactors in Fast Breeder Reactors. Large scale use of Thorium will subsequently follow making use of Uranium- 233 that will be bred in Fast Breeder Reactors, when adequate nuclear installed capacity in the country has been built. Accordingly, the utilisation of Thorium as a practically inexhaustible energy source has been contemplated during the third stage of the Indian nuclear programme, which can be reached after a few decades.

(b) Thorium based reactors have not yet been set up in the country for generation of power. A 30 kW (thermal) research reactor KAMINI, the only operating reactor in the world using Uranium-233 fuel (which is produced by irradiation of Thorium) has been setup at Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam (Tamil Nadu).

A 300 MWe Advanced Heavy Water Reactor (AHWR) using Thorium based fuel has been designed and developed. This reactor will serve as a technology demonstrator for the Thorium fuel cycle technologies. A project for initiation of activities towards start of construction of AHWR has been included in the Twelfth Plan.

(c) Atomic Minerals Directorate for Exploration & Research (AMD), a constituent unit of Department of Atomic Energy (DAE), has established 11.93 million tonnes of *in situ* resources of Monazite as on December 2014 in the country, which contains about 1.07 million tons of Thorium Oxide (ThO_2).

(d) and (e) Yes, Sir. Indian Rare Earths Limited (IREL), a 100% owned Government of India Undertaking under the administrative control of the Department of Atomic Energy (DAE), is engaged in the mining and separation of beach sand minerals. IREL has supplied Thorium for various experimental programmes carried out in DAE.

Monazite Processing Plant in Rare Earth Division of IREL in Kerala was in operation during the period 1952 to 2004. Monazite was processed in the plant and Thorium values generated have been stockpiled in silos and RCC trenches for future use in the third stage of nuclear power programme in the country.

IREL has set up a Monazite processing plant at its unit in Orissa Sand Complex (OSCOM), Odisha which will be producing about 2000 tons per annum (tpa) of Thorium Oxalate. The commissioning of the plant is awaiting clearance from Atomic Energy Regulatory Board (AERB) for regular plant operation.