

**GOVERNMENT OF INDIA
ATOMIC ENERGY
LOK SABHA**

UNSTARRED QUESTION NO:3162
ANSWERED ON:12.12.2012
FAST BREEDER REACTORS
Jaiswal Dr. Sanjay

Will the Minister of ATOMIC ENERGY be pleased to state:

- (a) whether the development of Fast Breeder Reactors (FBRs) is essential for full utilisation of indigenous nuclear fuel reserves and if so, the details thereof;
- (b) whether FBRs pose certain challenges in terms of nuclear safety and cost of electricity generation;
- (c) if so, the details thereof and the steps envisaged for overcoming the above challenges;
- (d) whether the Government has fully integrated and operationalised these aspects in the FBRs designs in the country; and
- (e) if so, the details thereof?

Answer

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

(a) The Fast Breeder Reactor (FBR) programme represents the second stage of the three stage nuclear power programme of the Department of Atomic Energy and is intended to enhance the utilization of the existing uranium resources in our country. The FBRs have an electricity potential of 42,000 GWe year. FBRs provide an efficient method of producing Plutonium from U-238. In an appropriately designed Pu/U-238 fuelled FBR, it is possible to produce more fresh plutonium from U-238 than the plutonium consumed. The excess plutonium can be used to set up additional FBRs and thus, the full energy potential of Uranium is realized by FBRs. Also the nuclear power capacity can be expanded according to our needs. Thus, the FBR programme is essential to provide energy security to our country in the long run.

(b)&(c) The FBRs are designed with three levels of safety levels (viz.)

(a) Design and construction of an inherently safe, stable system with negative feedback coefficients of reactivity

(b) Incorporation of diverse and redundant protection systems to act in the event of off-normal events as initiated by coolant temperature and flow monitors, failed fuel monitors etc. and (c) design and construction of reactor vessel and containment vessel such that even if the first and second level safety measures fail, the public is safe from any hazard. Efforts have been made to reduce the cost considerably without compromising on the safety, by decreasing the number of components, adapting a compact plant layout and increase in fuel burn-up. By constructing more reactors at a given project site, where the infrastructure facilities already exist, the cost can be further reduced.

(d)&(e) Yes, Sir. Safety and economics have been given highest attention in the design of Indian FBRs. Safety has been well demonstrated through analytical and numerical analysis as well as through extensive experimental investigations under environments such as sodium and high temperatures prevailing in the reactor. These were executed through in-house expertise / facilities and collaborations. The design and safety aspects are reviewed thoroughly at all stages starting from design to component erection stage by well qualified experts in the country under Atomic Energy Regular Board (AERB). The safe operation of the FBTR at Kalpakkam for over 25 years has also provided confidence about the safety aspects of Fast Breeder Reactors.