GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
RAJYA SABHA
UNSTARRED QUESTION NO-2247
ANSWERED ON 12/03/2026

RADIOACTIVE WASTE MANAGEMENT

2247. SMT. SUDHA MURTY

Will the PRIME MINISTER be pleased to state:-

(a) whether, in view of the Government's commitment to a closed nuclear fuel cycle and the proposed use of Slightly Enriched Uranium (SEU) for Small Modular Reactors (SMRs), any assessment has been undertaken of the long-term waste profile arising from SEU-based reactors ;

(b) whether existing reprocessing and vitrification facilities have adequate capacity to manage the additional spent fuel expected from upcoming reactors and whether any roadmap has been prepared for strengthening long-term waste management infrastructure; and

(c) whether Government is considering the establishment of a deep geological repository for the final disposal of high-level radioactive waste?

ANSWER

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH)

(a) Slightly enriched uranium (SEU) is considered as potential fuel for proposed Small Modular Reactors (SMRs). In case of domestic fuel, reprocessing of spent fuel is envisaged to recover valuable nuclear materials. Broad philosophy of nuclear waste management will remain the same to reduce the overall nuclear waste burden i.e., recovery of useful radioisotopes, volume reduction followed by vitrification of waste in stable glass matrix and storage in engineered facilities kept under surveillance at par with internationally accepted practices.

(b) The Department operates spent fuel reprocessing plants and associated waste management facilities at Tarapur and Kalpakkam to process existing spent fuel of

Pressurized Heavy Water Reactor (PHWR) from domestic sources. To cater to the increasing requirements, Integrated Recycle Plant comprising of spent fuel reprocessing, waste management and fuel fabrication facilities are under construction- one each at Tarapur and Kalpakkam for recycling & waste management of domestic spent fuel of PHWRs and Fast Breeder Reactors (FBRs) respectively. These facilities are specifically designed to enhance the indigenous capacity with respect to fuel reprocessing and waste management.

(c) Department of Atomic Energy (DAE) is pursuing nearly closed fuel cycle where spent fuel from domestic source is considered as a material of resource. Most of the useful components of spent fuel are recycled as fuel for future reactors. High level radioactive waste generated during the recycling process is converted into vitrified glass through a process called vitrification. With advent of partitioning technologies, segregation of long-lived radioactive constituents including actinides and extraction of useful radioisotopes from high level radioactive waste for societal application can result in significant reduction of waste-volume prior to vitrification eliminating the need of deep geological repository in near future.

Further, research and development activities are being done to incinerate long-lived actinides to inactive or short-lived radioactive wastes using fast reactors.

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