GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
RAJYA SABHA
UNSTARRED QUESTION NO. 483
TO BE ANSWERED ON 02.12.2021

USE OF WASTES GENERATED FROM ATOMIC ENERGY PLANTS

483. # Shri Naresh Bansal:

Will the PRIME MINISTER be pleased to state:

(a) the status of atomic energy plants in the country and the details of various steps taken to use the wastes generated from it and the details of various other new initiatives planned;

(b) whether these initiatives are being implemented properly so that its harmful impact on living beings can be prevented; and

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

ANSWER

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

(a) There are presently 22 reactors with a total capacity of 6780 MW in operation and one more reactor, KAPP-3 (700 MW) has been connected to the grid on January 10, 2021. Ten (10) nuclear power reactors with 8000 MW capacity (including 500 MW PFBR being implemented by Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI) are under construction). Additionally, the Government has accorded administrative approval and financial sanction of ten (10) indigenous Pressurized Heavy Water Reactors (PHWRs) of 700 MW each to be set up in fleet mode. On progressive completion of the projects under construction and accorded sanction, the nuclear power capacity is expected to reach 22480 MW by the year 2031. More nuclear power plants are also planned in future. India has adopted "closed fuel cycle", where spent nuclear fuel is regarded as a material of resource. Closed fuel cycle aims at reprocessing of spent fuel for recovery of fissile material and recycling them back to reactor as fuel. This finally leads to a very small percentage of residual material present in spent nuclear fuel requiring waste management as High Level Liquid Waste (HLLW).

A three-stage strategy for management of HLLW is adopted in India in line with international practices.

- Immobilization of HLLW into a stable and inert matrix by vitrification process.
- Interim storage of the conditioned waste to facilitate decay of radionuclides.
- Disposal in Geological Disposal Facility.

India is among very few countries in the world to master the technology of HLLW vitrification and its interim storage. Vitrification and Interim storage facilities for management of HLLW have been operating safely and successfully for more than three decades.

HLLW contains various useful radioisotopes and with the advent of new technologies based on partitioning of waste, emphasis is, now-a-days, towards separation and recovery of these useful radio-isotopes for their deployment in various societal application. Such partitioning technology also aims to separate long - lived constituents of radioactive waste prior to immobilizing them in vitreous matrices and the long-lived radio isotopes is planned to be burnt in fast reactors or Accelerator Driven Sub Critical systems to get it converted into short-lived species. As a result, the need of geological disposal facility will be nearly obviated in near future.

(b)&(c) Department of Atomic Energy has been safely and successfully handling the waste from atomic energy plants, additionally advancements with respect to partitioning of the radioactive residue (waste), enabling recovery of useful radio-isotopes like Caesium-137, Strontium-90, Ruthenium-106 etc, were implemented and recovered radio-isotopes are deployed for societal applications.

Ceasium-137, a prominent fission product, has been recovered in large quantity from radioactive waste, converted into non-dispersive glass form and then deployed in blood irradiator devices in more than fifteen hospitals.

Strontium-90 has been extracted from waste using indigenously developed novel extractants and deployed for generation of Yttrium-90, which has been routinely supplied to Radiation Medicine Centre and Tata Memorial Hospital, Mumbai for therapeutic application.

Ruthenium-106 has also been extracted employing a series of highly selective separation techniques, ascertaining the desired product purity. Ru-106 containing silver plaques, have been successfully fabricated for eye-cancer treatment as low cost import substitute. Plaques were supplied to various hospitals including Dr Rajendra Prasad Centre, AIIMS, New Delhi, Centre for Sight Hospital, Hyderabad and Sankara Eye Hospital, Bengaluru.

******