GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
RAJYA SABHA
UNSTARRED QUESTION NO - 3681
ANSWERED ON 03/04/2025

OPERATIONAL NUCLEAR POWER PLANTS

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Will the PRIME MINISTER be pleased to state:-

(a) the number of nuclear power plants constructed and run by Department of Atomic Energy (DAE), details of units that are operational as on date;

(b) whether there is any progress made in associated fuel cycle activities; and

(c) if so, the details thereof?

ANSWER

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

(a) Presently, there are 25 operational nuclear power plants in the country with a total capacity of 8880 MW. The details of operational nuclear power plants in the country are given in Annexure.

(b) & (c) India is pursuing a three-stage nuclear power programme, for optimum utilisation of its limited uranium resources and exploit vast thorium resources for long term energy security, by following nearly closed nuclear fuel cycle wherein the spent fuel from reactors is treated as resource material and not waste. India has developed expertise in backend fuel cycle of pressurised heavy water reactors (PHWRs).

The Programme of Atomic Minerals Directorate for Exploration and Research (AMD&ER) is linked to the front end of nuclear fuel cycle, wherein exploration is carried out to identify, evaluate and augment atomic mineral resources to cater the need of Nuclear Power Programme of India. As on date, AMD&ER has established 4,28,300 tonnes in-situ U-oxide resource in 47 uranium deposits located in Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Maharashtra. The state-wise details of uranium resources are given in Table 1.

Besides, Directorate has estimated 13.15 million tonne (Mt) in-situ monazite (a mineral containing thorium, uranium and Rare Earth Elements) resource occurring in the coastal beach and teri/red sands in parts of Kerala, Tamil Nadu, Odisha, Andhra Pradesh, Maharashtra and Gujarat and in the inland alluvium in parts of Jharkhand, West Bengal and Tamil Nadu. Monazite in beach placer

sands contain about 9-10% thorium oxide. The estimated in-situ monazite resource (13.15Mt) contains approximately 1.04Mt thorium metal (Th) or approximately 1.18Mt thorium oxide (ThO2). The state-wise details of these resources are given in Table 2.

Uranium fuel requirement for the reactors which are under domestic safeguards is adequately met by Uranium Corporation of India Limited (UCIL), a Public Sector Enterprise under the Department of Atomic Energy (DAE). Time to time, projects which include capacity expansion of some of existing units as well as for establishing new projects in various parts of the country, are planned for maintaining sustained supply from UCIL.

Nuclear Fuel Complex (NFC) with its initial establishment in Hyderabad has further augmented its own production facilities for fuel and structural fabrication at Hyderabad and further established new facilities through Greenfield Projects at "Zirconium Complex", Pazhayakayal for Zirconium sponge production and "NFC-Kota" for Fuel Production. The project at Zirconium Complex, Pazhayakayal is completed in 2009 and is under operation since then.

NFC-Kota project is scheduled for completion by March 2026 and has currently achieved more than 90% physical progress with commissioning of major equipment in advanced stage.

Currently, the spent fuel from PHWRs is reprocessed to extract fissile material for use as fuel for next stage nuclear power plants. However, a small volume of radioactive liquid wastes containing minor actinides and fission products is generated during reprocessing. The high level radioactive liquid waste, generated from reprocessing of spent fuel, is subjected to a process called vitrification, wherein it is converted to glass. This vitrified solid product is subjected to natural cooling in solid storage surveillance facility. This policy is at par with international practices following the guidelines of International Atomic Energy Agency.

For efficient management of high-level radioactive waste, BARC has developed and demonstrated partition technology for separation of long-lived actinides to facilitate increase in specific loading of waste in the vitrified solid and thereby facilitating substantial volume reduction of vitrified waste. Moreover, this partition technology also helps in recovery of useful radio-isotopes such as Caesium-137, Strontium-90, Ruthenium-106 from the liquid wastes for various societal applications.

Capacity enhancement for PHWR fuel reprocessing and waste management is under progress by construction of large capacity Integrated Nuclear Recycling Plant (INRP) for deploying the partition technology.

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Annexure

Sr. No.	Unit & Location	Capacity (MW)
1.	TAPS-1, Tarapur, Maharashtra[@]	160
2.	TAPS-2, Tarapur, Maharashtra[@]	160
3.	TAPS-3, Tarapur, Maharashtra	540
4.	TAPS-4, Tarapur, Maharashtra	540
5.	RAPS-1, Rawatbhata, Rajasthan	100[#]
6.	RAPS-2, Rawatbhata, Rajasthan	200
7.	RAPS-3, Rawatbhata, Rajasthan	220
8.	RAPS-4, Rawatbhata, Rajasthan	220
9.	RAPS-5, Rawatbhata, Rajasthan	220
10.	RAPS-6, Rawatbhata, Rajasthan	220
11.	RAPS-7, Rawatbhata, Rajasthan	700*
12.	MAPS-1, Kalpakkam, Tamil Nadu[@]	220
13.	MAPS-2, Kalpakkam, Tamil Nadu	220
14.	NAPS-1, Narora, Uttar Pradesh	220
15.	NAPS-2, Narora, Uttar Pradesh	220
16.	KAPS-1, Kakrapar, Gujarat	220
17.	KAPS-2, Kakrapar, Gujarat	220
18.	KAPS-3, Kakrapar, Gujarat	700
19.	KAPS-4, Kakrapar, Gujarat	700
20.	KAIGA-1, Kaiga, Karnataka	220
21.	KAIGA-2, Kaiga, Karnataka	220
22.	KAIGA-3, Kaiga, Karnataka	220
23.	KAIGA-4, Kaiga, Karnataka	220
24.	KKNPP-1, Kudankulam, Tamil Nadu	1000
25.	KKNPP-2, Kudankulam, Tamil Nadu	1000

'[#]' RAPS-1 is under extended shutdown

[@] In project mode for refurbishment

'*' RAPP-7 is connected to the grid for the first time on 17-03-2025 and presently generating infirm power.

Table 1. State-wise Details of the Uranium Resources

State	District	Name of the deposit	U_3O_8 Resource (tonne)	Status
Andhra Pradesh	YSR	Tummalapalle Group	2,51,259	Existing mine (Under investigation)
	Guntur	Koppunuru	2,761	Under investigation
	Sub-total		**2,54,020**	
Telangana	Nalgonda	Lambapur	1,450	Planned mining centre
		Peddagattu	7,585	Planned mining centre
		Chitrial	9,515	Planned mining centre
	Sub-total		**18,550**	
Jharkhand	East Singhbhum	Jaduguda	8,038	Existing mine
		Jaduguda North - Baglasai - Mechua	23,337	Planned mining centre
		Bhatin	1,700	Existing mine
		Narwapahar (NWP) + NWP Extn.	11,780	Existing mine
		Narwapahar Deeper	10,723	Extension of existing mine
		Singridungri-Banadungri	9,856	Extension of existing mine
		Turamdih Group	11,510	Existing mine
		Banduhurang	6,489	Existing mine
		Bagjata	1,860	Existing mine
		Mohuldih	3,330	Existing mine
		Garadih	1,270	Small deposit
		Kanyaluka	3,170	Small deposit
		Nimdih	815	Small deposit
		Rajgaon	1,200	Small deposit
		Rajdah	1,019	Under investigation
		Kudada	3,565	Under investigation
	Saraikela-Kharswan	Bangurdih	1,785	Small deposit
	Sub-total		**1,01,447**	
Meghalaya	South West Khasi Hills	KPM (Domiasiat)	9,500	Planned mining centre
		Wahkyn - Wahkut	9,764	Exploratory mining planned
		Gomaghat-Phlangdiloin	1,000	Small deposit
		Tyrnai	600	Small deposit
		Lostoin	869	Small deposit
		Umthongkut	1,535	Small deposit
	Sub-total		**23,268**	

State	District	Name of the deposit	U_3O_8 Resource (tonne)	Status
Rajasthan	Sikar	Rohil	8,813	Exploratory mining centre (Under investigation)
		Rohil (West)	1,086	Under investigations
		Geratiyon Ki Dhani	2,402	Under investigations
	Jhunjhunu	Jahaz	3,868	Under investigation
	Udaipur	Umra	1,160	Small deposit
	Sub-total		**17,329**	
Karnataka	Yadgiri	Gogi	4,267	Exploratory mining centre
		Kanchankayi	2,194	Under investigation
		Hulkal	800	Under investigation
	South Canara	Walkunji-Yellakki	415	Small deposit
	Sub-total		**7,676**	
Chhattisgarh	Rajnandgaon	Bodal	1,530	Small deposit
		Bhandaritola	518	Small deposit
	Surguja	Jajawal	1,438	Small deposit
		Dumath - Dhabi	500	Small deposit
	Sub-total		**3,986**	
Uttar Pradesh	Sonbhadra	Naktu	785	Under investigation
	Sub-total		**785**	
Uttarakhand	Rudraprayag	Pokhri-Tunji	100	Small deposit
	Sub-total		**100**	
Himachal Pradesh	Una	Rajpura	364	Under investigation
	Shimla	Kasha-Kaladi	200	Small deposit
	Mandi	Tileli	220	Small deposit
	Sub-total		**784**	
Maharashtra	Gondia	Mogarra	355	Small deposit
	Sub-total		**355**	
Grand total			**4,28,300**	

Table 2. State-wise Total Heavy Mineral (THM) Resource (million tonnes)

State	Deposits	Monazite	THM
Odisha	13	3.22	**351.36**
Andhra Pradesh	25	4.05	**359.79**
Tamil Nadu	54	2.55	**330.64**
Kerala	35	1.84	**242.88**
Maharashtra	5	0.004	**5.64**
Gujarat	2	0.07	**12.53**
West Bengal	1	1.20	**5.45**
Jharkhand	1	0.21	**1.12**
Total	**136**	**13.15**	**1,309.42**

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