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First commercial reactor completes fabrication of safety vessel
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MUMBAI: India's first 500 MW commercial Prototype fast Breeder Reactor (PFBR), which is under construction, has reached an important milestone by completing the fabrication of its crucial and first of its kind Safety Vessel.

The Safety Vessel will be placed in its position in the reactor in a month's time, top scientist and Project Director Prabhakar Kumar said on Sunday.

The construction of the Rs 3,492 crore PFBR, to be commissioned in 2010, started in October 2004 and is the first commercial plant of the country's second stage nuclear programme using Plutonium-Uranium Oxide as its fuel and liquid metal sodium as a coolant.

The PFBR is under the new company Bharatiya Nabhikiya Vidyut Nigam (BHAVINI) of the Department of Atomic Energy at Kalpakkam and has achieved several milestones in the last three years and "now the Safety Vessel assembly has been completed and we have also completed civil structure including Reactor Vault," Kumar said.

Safety vessel has a thin wall of 316 LN (Low carbon Nitrogen stainless steel alloy). It is 13 metre in diameter and 13 metre tall with a dish ending, Kumar said adding this vessel will be hanging from top of the reactor vault.

"The most difficult Safety vessel erection will be undertaken soon after the crane which is being assembled for this purpose is tested. The safety vessel along with its 'elevator beam' will weigh 165 tonnes and will have to be lowered from distance of 57 metre," Kumar said.

Because of this crucial requirement of weight, distance and lowering of the vessel through a narrow gap within Reactor Vault - extensive preparations are done by the PFBR team, Kumar said. "We are also carrying out mock up exercises before the actual procedure is undertaken".

"We have applied for the Atomic Energy Regulatory Board clearance and we expect to install the safety vessel in place in around a month's time," he said.

Talking about the Reactor Vault, Kumar said "Reactor Vault is a marvel of engineering technology with several engineered features built within the concrete structure."

Explaining how the components of the PFBR are much bigger than the earlier version of fast reactor Fast Breeder Test Reactor (FBTR) and other thermal reactors, Kumar said the components like Safety Vessel, main vessel and Inner vessel cannot be transported in a single piece from manufacturer's shop and therefore, all are fabricated at the site

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Elaborating about records created by PFBR project, Kumar said "in May 2005, we have created a record of carrying out the largest continuous concreting of the raft in the country at 5,800 cubic metre."

"The Project, as of today, has placed order of purchases of various components and equipment around Rs 2,000 crore," Kumar added.

Earlier, the Fast Breeder Reactor expert of Department of Atomic Energy S B Bhoje had said indigenous manufacture of PFBR components is a challenging task.

Once the techno-economic demonstration of PFBR is done, four more Fast breeder Reactors (FBRs) of 500 MW each are expected to be commissioned by 2020, according to Chairman, Atomic Energy Commission Anil Kakodkar.

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