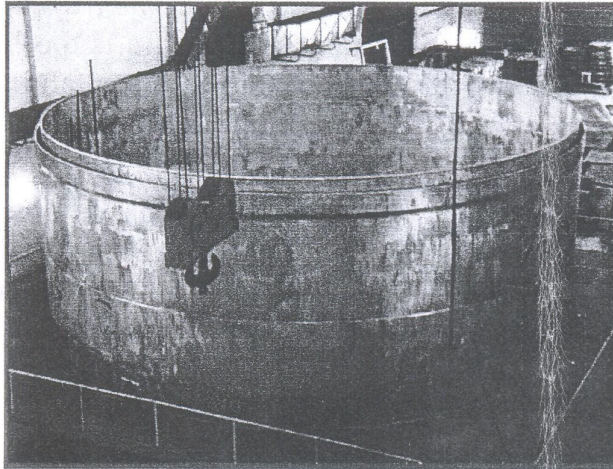


THERMAL BAFFLE ERECTION IN PROTOTYPE FAST BREEDER REACTOR BEING CONSTRUCTED BY BHARATIYA NABHIKIYA VIDYUT NIGAM LIMITED (BHAVINI), KALPAKKAM

13th May 2010



Prototype Fast Breeder Reactor (PFBR) in Kalpakkam is 500 MWe Sodium cooled pool type reactor. All the internals of the reactor including core and primary sodium circuit is contained in a single vessel called Main Vessel. Thermal Baffle is integrated by in-situ welding to the Main Vessel through a support shell and an annular support plate. Thermal Baffle has two large concentric cylindrical shells of about 5 mtr height made up of SS 316LN

material. The diameter of the inner shell is 12.44 mtr and the outer shell is 12.67 mtr. The weight of the thermal baffle is 70 tonne. The load to be handled for thermal baffle erection is 170 tonne. This includes weight of evener beams and the platform that is integrated together.

The main purpose of Thermal Baffle is to provide annular passage for the cold sodium, which is circulated to cool the Main Vessel. The Main Vessel is cooled by cold sodium, to keep the maximum temperature during normal operation of the reactor to less than 450°C. This is to minimize the effect of creep, thermal fatigue and embrittlement of the structure.

About 5 % of the primary sodium flow is used for cooling the Main Vessel during reactor operations. The baffle structures are adequately stiffened to avoid flow induced vibrations during the entire range of operation of the reactor.

It is nearly impossible to repair any defects in the Thermal Baffle after its installation and integration with the reactor assembly. Hence, Thermal Baffle is manufactured with utmost care to a very high degree of precision and quality control and its welding with Main Vessel requires tremendous caution and careful execution.

The handling of two concentric shells of large diameter with thin walled shells requires careful planning and procedure development. The radial buckling force during handling has to be zero. This required manufacture of special lifting frames and sling arrangement which enables only axial loading on the Thermal Baffle during lifting and lowering into the Main Vessel.

The Quality control of the thermal baffle is vital to enable good fit up with the matching weld edge in the Main Vessel flange. The thermal baffle is too large in dimension to be transported by rail or the road and hence this has been fabricated at site itself by Bharat Heavy Electrical Limited.

The entire Thermal Baffle assembly has been fabricated on to a base frame at site and later transported to the reach of crawler crane on the base frame itself. This enables maintenance of the tolerance and guarantees no dimensional changes/deviations during transportation.

Thermal Baffle erection is a step towards energy security for the future.