

## Design, manufacturing and transportation of high capacity High Level Liquid Waste Storage tanks

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High level liquid Waste (HLLW) storage tanks with large storage capacity weighing a few tens of MT are proposed to be used in Fast Reactor Fuel Reprocessing Plant (FRP) of Fast Reactor Fuel Cycle Facility (FRFCF), Kalpakkam to store the HLLW. Six years storage capacity is envisaged for allowing Ru106 to decay sufficiently before sending the HLLW for vitrification. These tanks have lot of internals such as cooling coil (2 Km piping with about 600 welded Joints) arrangement with ballast tanks positioned inside the vessel to remove decay heat. Presence of highly radioactive fields coupled with highly concentrated nitric acid and remote chance of maintenance after commissioning demands well proven design, material selection, fabrication, meticulous QA practices and transportation methodology to be employed. This presentation dwells upon the design, manufacturing aspects and transportation methodology used for the fabrication of such critical high capacity tanks.

HLW tank, weighing around 67 MT, is a Horizontal cylindrical tank with capacity of 212 m<sup>3</sup> fabricated using torispherical formed heads with 4.7m OD and an overall length of 13 m. Material of construction for all the components of the tank is AISI 304L with tailor made chemical composition and other supplementary requirements. The welding process used was manual & semi-automatic GTAW with ER308L filler wire. Prior to fabrication, a detailed study was made to decide the simultaneous fabrication of individual components & the assembling sequence from the point of fabricability & inspectability in tandem meeting project delivery schedule. Based on the above a manufacturing sequence cum quality assurance plan. Accordingly, the individual shell courses, Baffle plates, ballast tanks, saddle supports, cooling coils & air spargers, dished ends with outlet piping, machining of nozzles, manholes, deep feed piping of all tanks were fabricated simultaneously. Production test coupon has been put in place in qualifying all special processes such as Post forming heat treatment. Assembly of individual components including assembly of closure dished end to shell were carried out as sub-assemblies in sequence and the final assembly was completed & tested. Because these were over dimensional consignments, these tanks were transported & unloaded after a detailed road survey, as per approved methodology.

A well designed, thought provoking and proven design, manufacturing sequence & QAP and its effective implementation resulted in the successful fabrication of such critical and complex tanks.

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