

Installation and Commissioning of 80K Liquid Nitrogen Booster System

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The static heat loads on the 80 K thermal shields of SST-1 will be removed using single phase liquid nitrogen cooling at 0.7 MPa. The single phase liquid nitrogen is obtained using 80 K liquid nitrogen booster system. Booster system is in form of three storey building as pump cryostat at bottom, sub-cooler vessel cryostat at middle and pressurized vessel cryostat at upper. Boosting system utilized three centrifugal cold pumps at liquid nitrogen services among them two remain in operation and one remain in cold standby mode as redundant. Pre-assembly leak tightness test at individual components level were carried out before final integrated installation of booster system. Functional validation of booster system as per defined PFD was carried out after installation at IPR site. Booster system's different modes of operation like purge, LN2 filling, first phase cool-down, second phase cool-down, steady state and warm up were successfully tested along with their process alarms, safety interlocks and failure events. The booster system performance test was conducted using system inbuilt dummy load of 20 kW @ 80 K, which is similar to actual heat load on SST-1 thermal shields from ambient. 80 K booster system installation and commissioning detail is presented in this paper.

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