

Water and Steam Interaction Facility (WASIF)

Water and Steam Interaction Facility (WASIF) is being set up in two phases to study the Direct Contact Condensation (DCC) of steam with cold water occurs during the functioning of various safety systems in water-cooled nuclear power reactors. In phase-I, studies pertaining to Condensation Induced Water Hammer (CIWH) phenomenon (a form of DCC) that occurs in horizontally oriented pipes which can happen during actuation of Emergency Core Cooling System (ECCS) following a Loss of Coolant Accident (LOCA).

The facility consists of utility service systems such as steam generator system, compressed air system and feed water system along with temperature and flow control arrangement for experimental needs. To study CIWH phenomenon in pipes, experiments are conducted in a horizontal Test Pipes section which is instrumented with pressure transducers [both fast (10000Hz) and normal (100Hz)] to capture the pressure pulses, temperature, flow rate, strain in pipes, acceleration sensors. Experiments are carried out for two different diameter test pipe section for different operating parametric conditions like steam & feed water pressure, temperature, water flow rate, water injection location etc. The collected data such as pressure, temperature & flow transients were used for validating in-house codes such as CIWH-REGIME and CIWH-TRAN.

In Phase-II, a setup for investigating suppression pool hydrodynamics and efficacy of containment sprays will be constructed. The main component of the facility is test vessel for investigating both suppression pool hydrodynamics and efficacy of containment spray system. Test vessel can be fitted with different types of vent system to carry out suppression pool related studies and to carry out spray studies, the vessel can be fitted with spray nozzle. Since the utility service systems (steam, air & water) are common to both the phases, the effect of non-condensable (air) on direct contact condensation related experiments are also planned in suppression pool studies. The vessel will be extensively instrumented to measure a wide range of parameters (depending on the experiments), such as pressure, temperature, flow rates of steam, water and air at various locations, suppression pool level, hydrodynamic loads, and flow visualization etc.