Preliminary Experimental Results Using the Thermal-Hydraulic Integral Test Facility (VISTA)for the Pilot Plant of the System Integrated Modular Advanced Reactor, SMART-P

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Abstract

Preliminary experimental tests were carried out using the thermal-hydraulic integral test facility, VISTA (Experimental Verification by Integral Simulation of Transients and Accidents), which has been constructed to simulate the SMART-P. The VISTA facility is an integral test facility including the primary and secondary systems as well as safety-related passive Residual heat removal (PRHR) systems. Its scaled ratio with respect to the SMART-P is 1/1 in height and 1/96 in volume and heater power. So far, several steady states and transient tests have been carried out to verify the overall thermal hydraulic primary and secondary characteristics in a range of 10% to 100% power operation. As results of preliminary results, the steady state conditions were found to coincide with the expected design values of the SMART-P. But the major thermal hydraulic parameters are greatly affected by the initial water level and the nitrogen pressure in the reactor upper annular cavity. In the PRHR transient tests, the steam inlet temperature of the PRHR system is found to drop suddenly from a superheated condition to a saturated condition at the end period of PRHR operation