

N66. MITSUBISHI's NEW PASSIVE PWR

Horizontal steam generators are among the innovative features of Mitsubishi's new simplified PWR design, which was unveiled at the recent ENC 90 trade show in Lyon.

Mitsubishi's new model, still at the early design stage, comes in two sizes -- 300 MWe (the MS 300) and the 600 MWe (the MS 600) -- both twin-loop plants. The aim is to achieve an optimal combination of active and passive safety systems. Active systems (charging/safety injection pumps, auxiliary feedwater pumps, and an emergency diesel generator) are used to provide flexible operation and early termination of accident sequences. Passive safety features (quench pool, automatic de-pressurization systems and accumulators) give long-term cooling after a LOCA and make operator intervention unnecessary for three days. In the initial stage following a LOCA, primary and secondary automatic de-pressurization systems are actuated, and when reactor cooling system (RCS) pressure falls to 50 kg/cm², there is water injection from accumulators (by pressurized nitrogen). In the intermediate stage, when RCS pressure falls to that inside the containment, cooling is provided by gravitational flow from the quench pool. In the long-term cooling mode, the inside of the containment is flooded, the secondary side of the steam generators is depressurized, and natural circulation removes decay heat. The passive annulus system is designed to reduce post-accident radiation releases. The diagram shows the safety systems of the MS-300/600.

The designers envisage an annual occupational exposure of 0.2 man-Sv/y and a construction period of 3 years (start of basemate concrete to commercial operation).

For more, see Nuclear Engineering International, November 1990, p. 8