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Dynamic Pressure Assessment for the Steam Explosion in a PWR Cavity using TEXAS

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Abstract

One-dimensional three-phase code TEXAS is used for the assessment of dynamic pressure load induced by steam explosion phenomena which might occur in a PWR cavity structure during severe accident scenario. To overcome the limitation imposed by the one-dimensionality of TEXAS code, premixing phase of the steam explosion is simulated by IFCI code which has a two-dimensional capability. The code-simulated results show that the pressure behavior generally conforms to the typical experimental observation and also reveal the importance of trigger time. The sensitivity study shows that the magnitude of the pulse is lowered by about 35 % when the cross sectional area is doubled from 0.2 m2 to 0.4 m2. The increased premixing void fraction for the delayed triggering time from 1 second to 2 second suggests minimal pressure generation because of water voiding effect.