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Simulation of 10in SB-LOCA in typical PWR using MELCOR code

Accident analysis is one of the ways to improve safety level in nuclear power plants. Due to the fact that safety is still variable which has one of the most influence for two very important elements in the nuclear industry: public response and economy, increasing knowledge in this field is crucial for future reactors.

Presented investigation have validation character for our porpoise. We want to see response of severe accident code like MELCOR on design basic accident to know better phenomena of primary circuit breaks and MELCOR itself. Less rapid scenario like SB-LOCA let us chance to observe thermo-hydraulic response of our model more carefully and check it in more delicate situation than guillotine cold leg rapture as it is in case of LB-LOCA. We decided to present one of our simulation, namely first 5000s of 10 inches break on cold led of the primary circuit. The calculation was made on created from the scratch typical PWR model based on AP1000 only on the publicly available data.

We compare our results with data from Design Control Document of AP1000 which is our reference source. Due to the fact that MELCOR is severe not system code, our results have the good agreement. General values and shape of curves are very similar with reference as well as the timing of events.

Summary

MELCOR, SB-LOCA simulation, Safety analysis

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