

## Analysis the PORV accident for the Kori #2 using SPACE code

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### 1. Introduction

Fail Low signal is generated by the malfunction of control pressure channel at Kori #2 in 1995. Consequently, the reactor is stopped by over-temperature error signal follow a rapid decompression. Safety injection system is down as the pressurizer water level reach to 92%, the reactor coolant pumps of the flow path "B" is down. And then, RCS cooling started using the RHRS, but RCP of the flow path "A" was also stopped. By the site inspection, it confirmed in a driver of the pressurizer spray valve PCV-655B and a valve connection bar are breaking. In this study analyze the accident using the SPACE code.

### 2. Methods and Results

Fig. 1 is shown the pressurizer nodalization as the SPACE PRZR component. The pressurizer heater is not modeled because the effect is not large as a result the RETRAN analysis. Also, modeled the Backup heater of pressurizer, the heatloss to pressurizer tank wall is ignored.

The spray system is modeled as a flow boundary condition, the pressurizer Relief tank is pressure boundary condition, PORV is modeled by time valve. The flow of high temperature and thermodynamic conditions are modeled as a flow and pressure boundary condition, the loss factor of the tube is used values applied at the input of RETRAN.

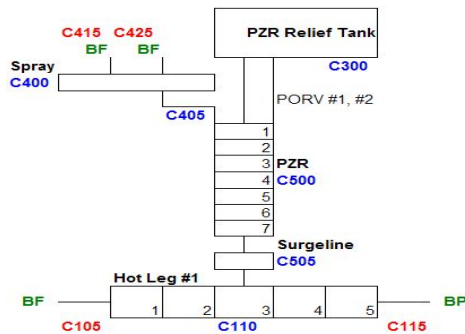


Fig. 1. Space nodalization.

#### 2.1 Boundary Conditions

Boundary conditions are following four cases.

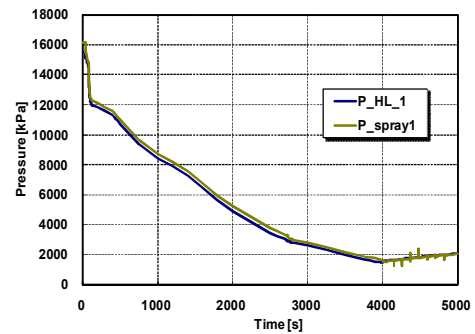


Fig. 2. Boundary face pressure

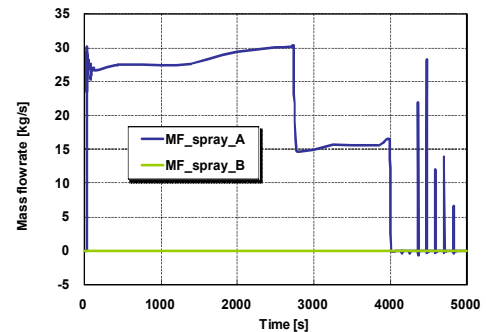


Fig. 3. Spray mass flow rate

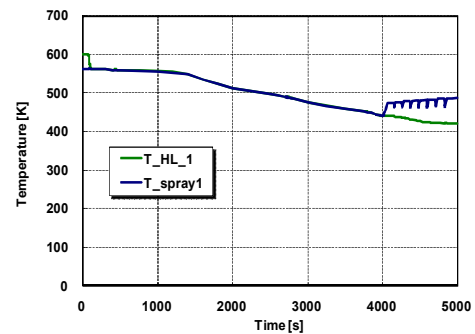


Fig. 4. Boundary face temperature

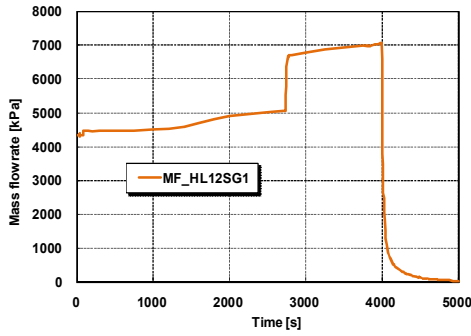


Fig. 5. Hot leg mass flow rate

Analyze the four cases, it compared with results of RETRAN.

### 2.2 Results

In case of the pressure of the top of pressurizer, all analysis results are consistent with the results of RETRAN cause of the pressure of the hot leg outlet is boundary condition. In case of the pressurizer collapsed water level(Fig. 6), the overall trend cannot be successfully replicated the decompression and condenser as an initial spray operation similar to RETRAN analysis results, out surge phenomenon. And, SPACE result predicted less the water level peak, figure 7 is under-predict the pressurizer water level by forecast excessively runoff flow after 100seconds. Pressurizer pressure(Fig. 8) predict well.

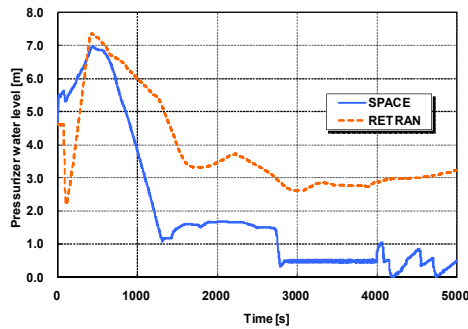


Fig. 6. Pressurizer collapsed water level.

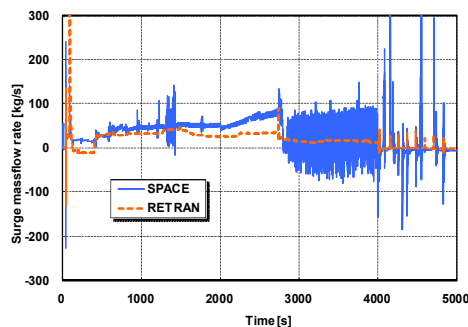


Fig. 7. Surge mass flow rate.

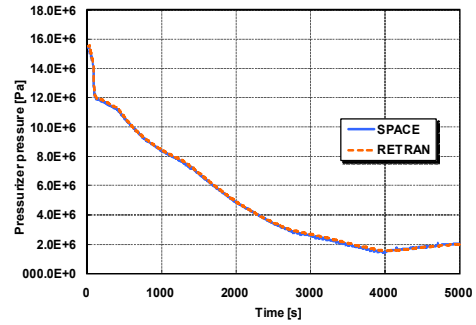


Fig. 8. Pressurizer Pressure.

### 3. Conclusions

As shown Figure 8. pressruizer pressure, SPACE calculated value and RETRAN calculated value, is almost same. However, pressurizer collapsed water level(Fig. 6.) and surge mass flow rate(Fig. 7.) are shown a similar trend, but some error occur. Currently, related functions are going on steady complement. So, expect to get a positive result like a pressurizer pressure in future.

### REFERENCES

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