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Texas A&M RELAP5/MAAP4 Comparison Project

Presented by:

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MAAP4 Information Exchange Meeting

Rockville, MD

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Overview

- MAAP Users Group funding independent assessment by Texas A&M using RELAP5
- Dr. Yassin Hassan main contributor
- Initial RELAP5 plant model provided by NMC for Palisades PTS project
- MUG providing sequence definitions and MAAP4 analysis

Project Description

- Obtain RELAP5 parameter files from industry participants
- Identify candidate sequences for RELAP5/MAAP4 comparison to address critical T/H issues
- MUG will perform MAAP4 analyses
- Texas A&M to execute RELAP5 calculation

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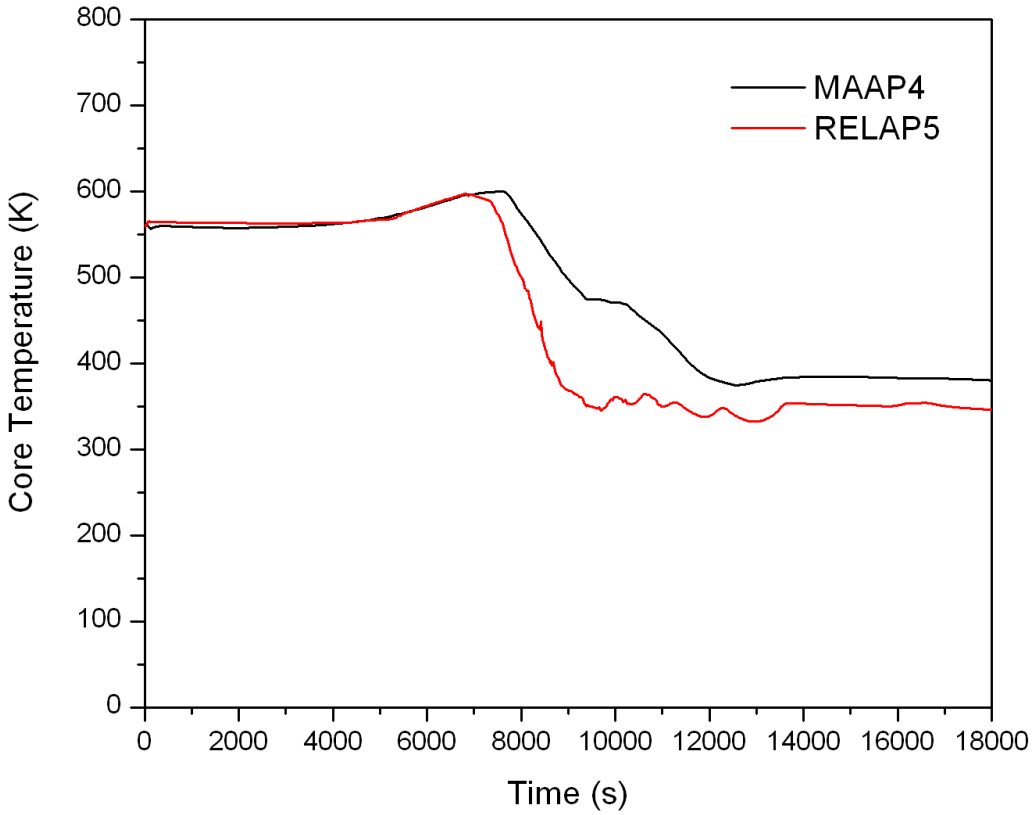
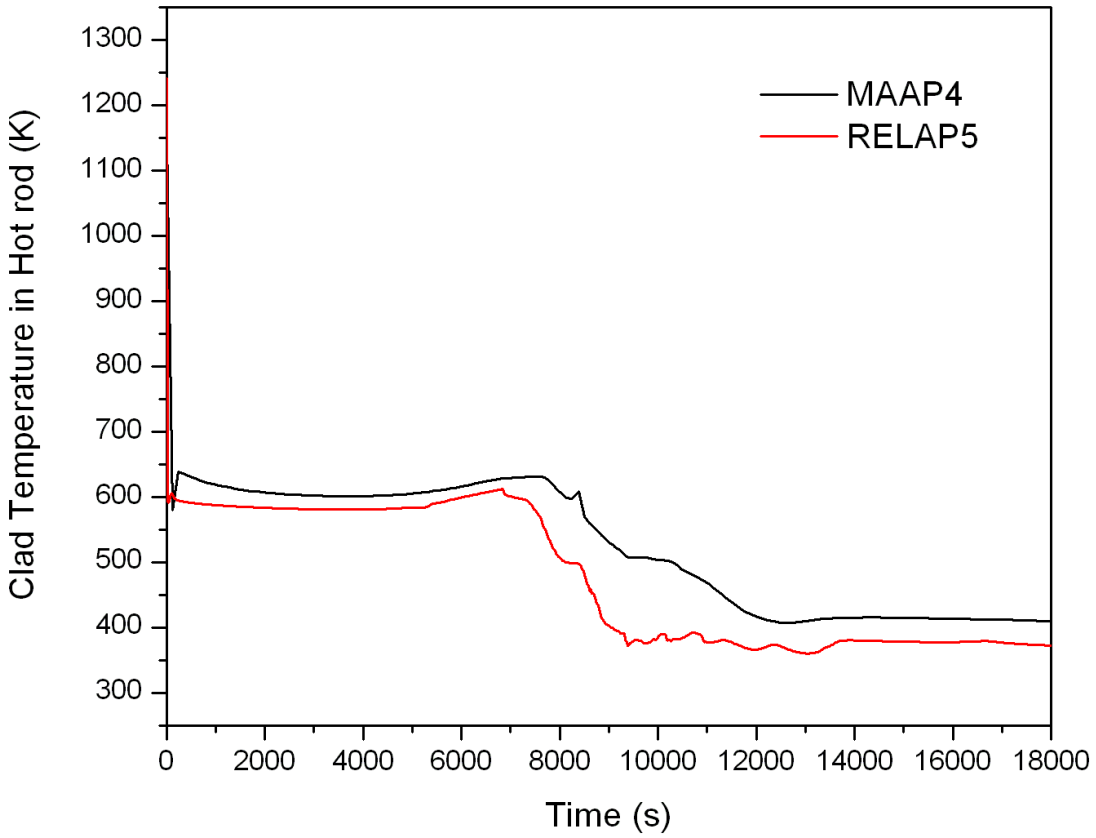
Initial Comparison Task

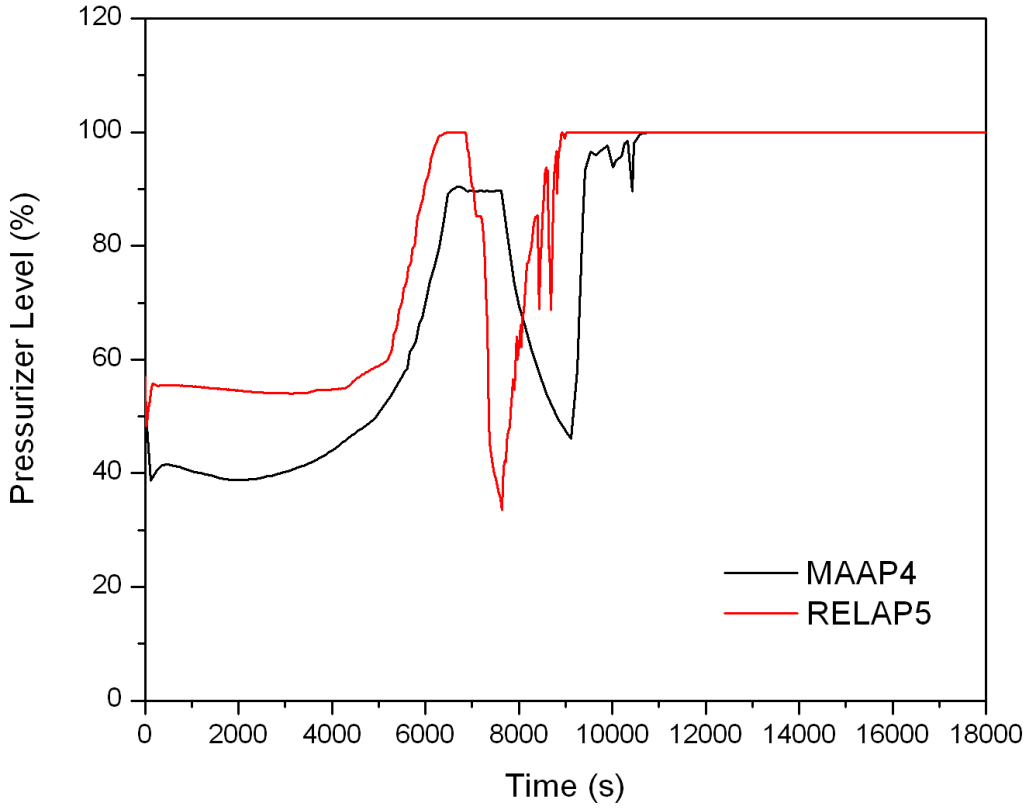
- Based on Palisades examination of the 3/25/2003 loss of shutdown cooling event
- Event occurred during the 2003 refueling outage and resulted from a digging incident that created an electrical fault separating both safety and non-safety related ac power buses from the grid
- This loss of local power resulted in a loss of shutdown cooling.

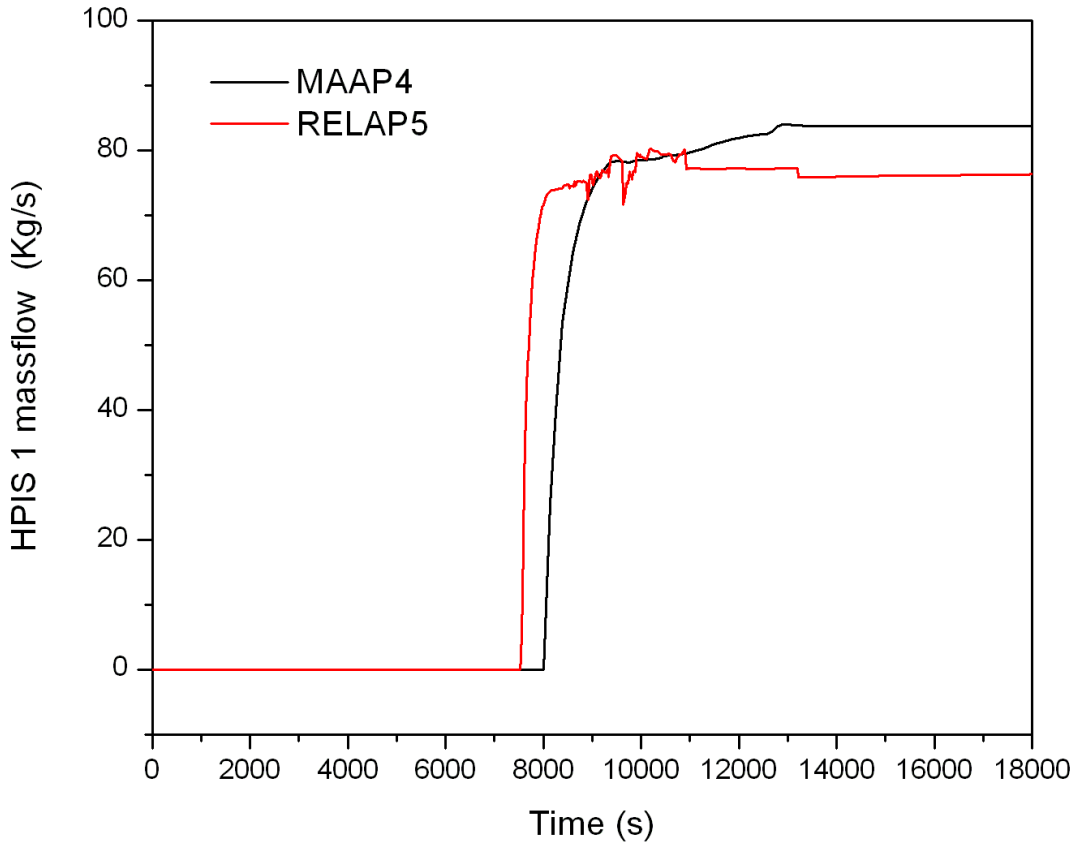
Sequence Description

Time	Event description
0	Scram, MSIV closure, Loss of AFW
6512 sec	Start 1 HPSI pump (P-66A)
6794 sec	Start 2 CHPs (P-55A/B)
6845 sec	Open 1 PORV
7584 sec	Start 2nd HPSI pump (P-66B)
7669 sec	Start 3rd CHP (P-55C)
7727 sec	Open 2nd PORV


MAAP4
RELAP5
Core Temperature (K)
Time (s)
0
100
200
300
400
500
600
700
800
0
2000
4000
6000
8000
10000
12000
14000
16000
18000


Clad Temperature in Hot rod (K)
1300
1200
1100
1000
900
800
700
600
500
400
300
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Time (s)
MAAP4
RELAP5


Pressurizer Level (%)
120
100
80
60
40
20
0
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
Time (s)
MAAP4
RELAP5


MAAP4
RELAP5
HPIS 1 massflow (Kg/s)
Time (s)
0
20
40
60
80
100
0
2000
4000
6000
8000
10000
12000
14000
16000
18000

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Discussion of Results

- Shift in time due to modeling of hot channel in MAAP4 and average channel in RELAP5
- Higher peak core temperature results in slightly higher pressure at onset of HPI injection
- Results in slower depressurization for M4 and delayed injection.

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Summary

- Initial results show good agreement for PWR feed/bleed scenario
- Specific scenario does not result in core damage