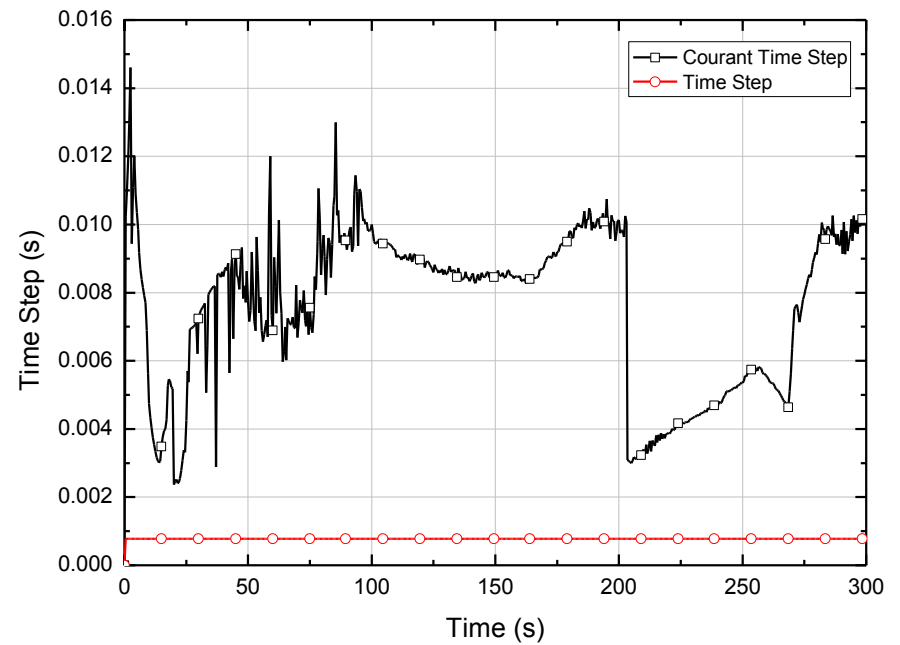
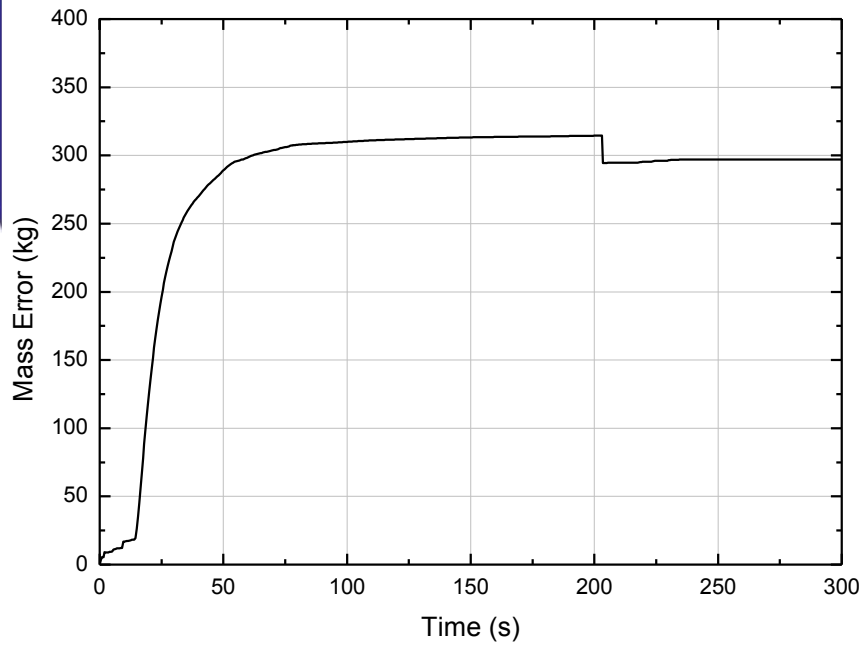


Response to Open Issues

-
1. Mass Error vs. Time
 2. Number of Mesh Point of the Heat Structures for Lower Head and Vessel Wall
 3. Vessel Wall Temperature
 4. Heat Structure Mesh Size
 5. Junction Control Flag in Break Valve

1. Mass Error vs. Time



2. Number of Mesh Point of the Heat Structures for Lower Head and Vessel Wall

TS

3. Vessel Wall Temperature – node 240

TS

3. Vessel Wall Temperature – node 260

TS

3. Vessel Wall Temperature – node 280-01

TS

3. Vessel Wall Temperature – node 280-02

TS

3. Vessel Wall Temperature – 280-03

TS

3. Vessel Wall Temperature – node 280-04

TS

3. Vessel Wall Temperature – node 280-05

TS

4. Heat Structure Mesh Size

- Heat structure mesh size of APR1400 vessel wall following β definition is

$$\checkmark \quad \beta = \frac{0.5 * x}{L} = \left(\right)^{TS}$$

$0.5 * x$: one half of the first mesh interval
 L : wall thickness

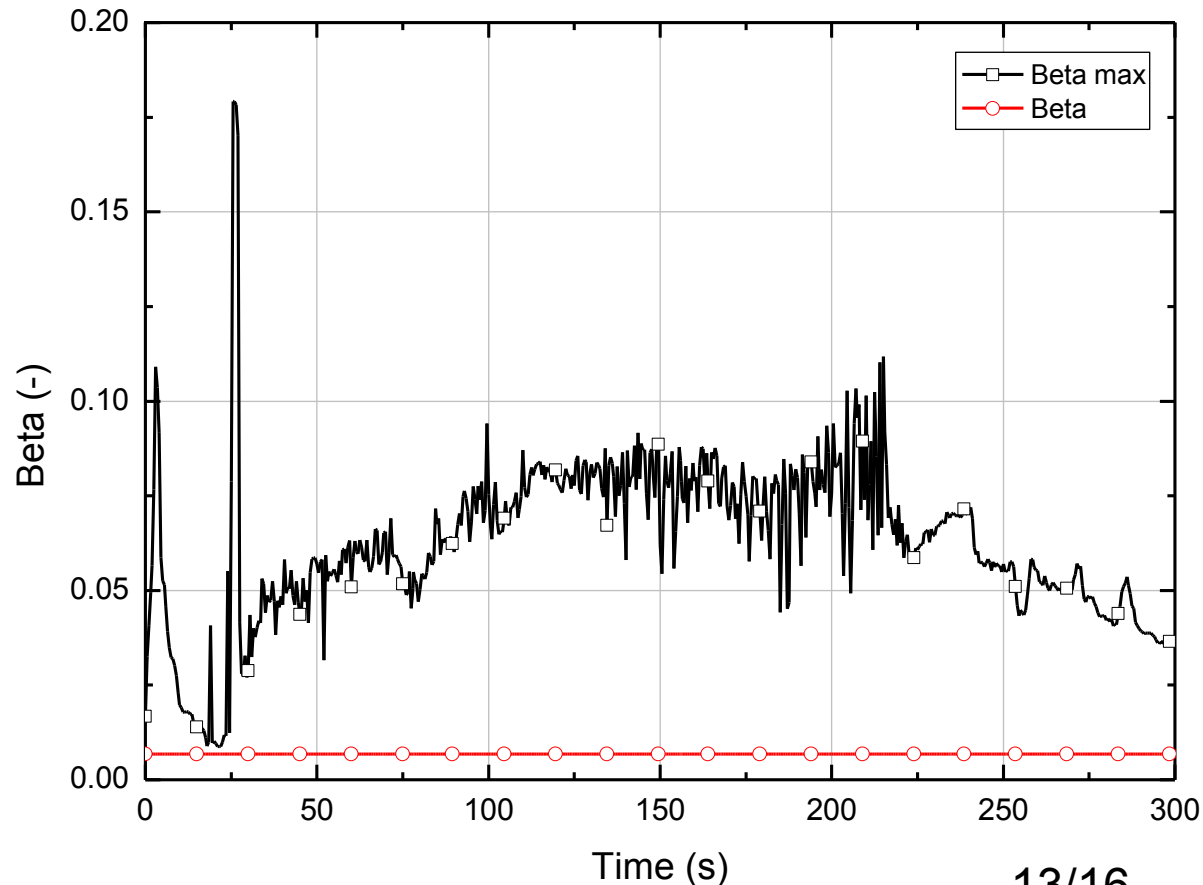
- RELAP5-3D heat structure mesh guide line states,

$$\checkmark \quad \beta \text{ should be smaller than } \beta_{max}$$

$$\rightarrow \frac{1}{\beta_{max}} = 0.338Bi + 5.2, \text{ where } Bi = \frac{hL}{k}$$

4. Heat Structure Mesh Size

- As shown in the figure below, β is always lower than β_{max} during the transient. Therefore, current mesh interval size is allowable.



4. Heat Structure Mesh Size

✓ Nodalization Strategies

- In reference [1]*, in order to examine the effect of the different nodalization strategies, three separate nodalization are used. Based on this study, the use of variable noding is recommended.
- The noding for heat structure of downcomer in APR1400 plant calculation is as below.

TS

* [1] D. L. Aumiller, " The Effect of Nodalization on the Accuracy of the Finite Difference Solution of the Transient Conduction Equation," 2000 RELAP5 International Users Seminar, September 12-14, 2000.

4. Heat Structure Mesh Size

- ✓ Nodalization Strategies

TS

[Total Volume Heat Source from the Downcomer Wall to the Fluid]

5. Junction Control Flag in Break Valve

✓ Valve Junction Geometry Input

TS

e : modified PV term	= 0 : not applied
f : CCFL option	= 0 : not applied
v : entrainment/pull through option	= 0 : not applied
c : choking options	= 0 : applied
a : area change options	= 0 : smooth area change
h : non-/homogeneous option	= 0 : nonhomogeneous option
s : normal or crossflow junction	= 0 : normal junction