Benchmark Model Temperatures Incorporated into DICE

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Outline

- Benchmark model temperatures extracted from evaluations and available in DICE
- A few words about available experiments not at room temperature
- Using PST-038 & PST-039 to look for a temperature bias

Temperatures available in DICE

- Benchmark model temperature (Section 3.4) for each case extracted
  - Somewhat arbitrary decision that “room temperature” is 293K
- Temperatures in Section 1 are not included in DICE to avoid confusion
- Available as a searchable parameter and a displayable parameter at the case level
- First version with temperature data is DICE build 2.9 (September 2017 edition)
  - Available on-line at https://www.oecd-nea.org/science/wpncs/icsbep/dice.html

Experiments above room temperature

- Listing in paper of experiments at or above 301K and 310K
  - Temperature ≥ 301K for 143 cases in 21 evaluations
  - Temperature ≥ 310K for 43 cases in 11 evaluations
- LCT-046 has several cases at elevated temperature, but there are problems with the evaluation
  - Only square pitch LEU rod lattice benchmark with elevated temperatures
- The 100 cases between 300K and 310K may not be elevated enough to see a temperature bias

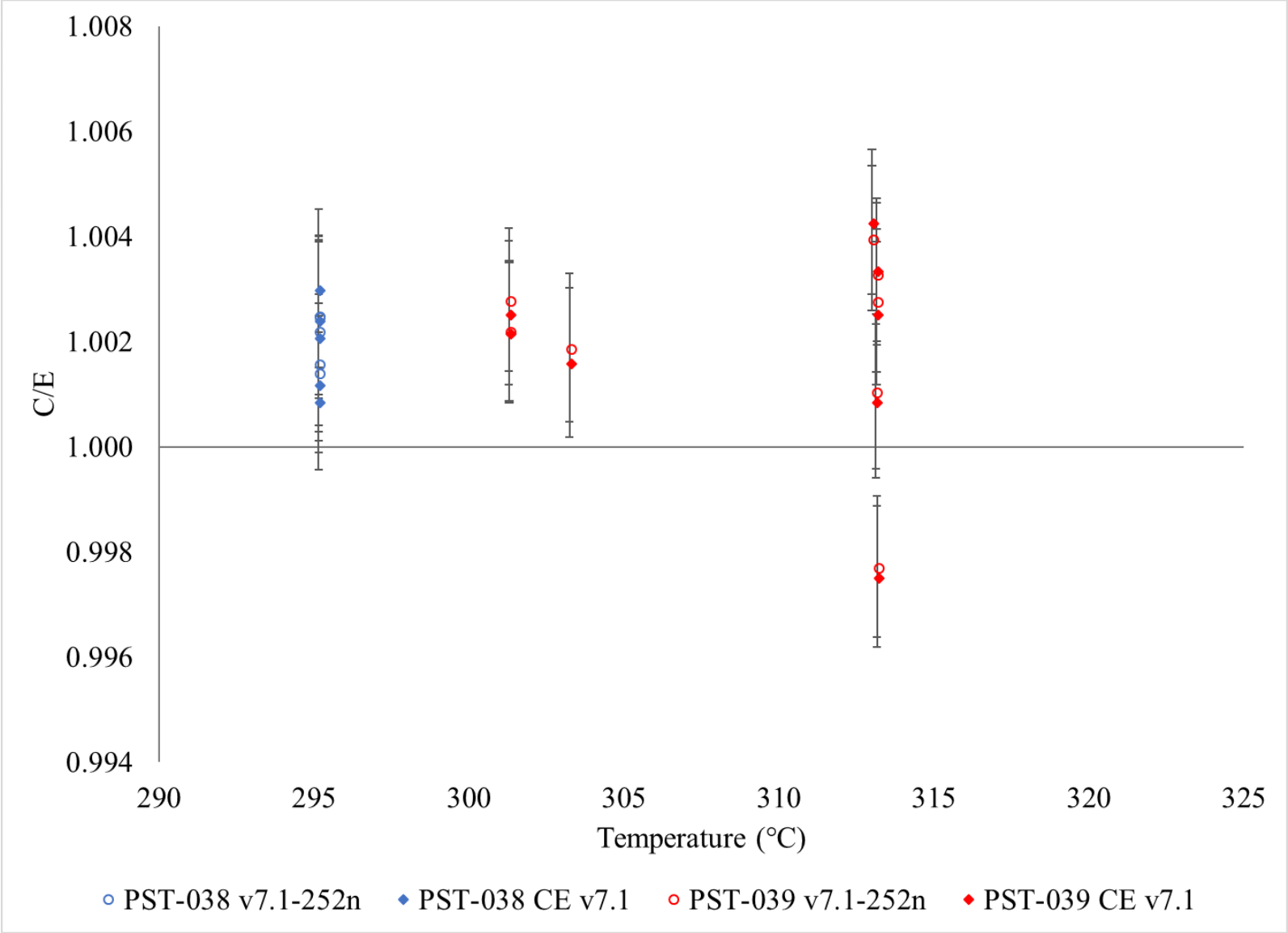
Experiments below room temperature

- 0 cases below 285K (54 °F)

PST-038 & PST-039

- Water reflected experiments to identify whether or not a “positive temperature effect” exists for dilute Pu solutions
- PST-038 all at room temperature
- PST-039 at 301K, 303K, or 313K
- Results shown on next slide, no clear trend in temperature for KENO in either MG or CE mode

Results for PST-038 and PST-039



Conclusions

- Benchmark model temperatures are available in DICE starting with the September 2017 version (build 2.9)
  - Can search and/or display temperatures
- Only a limited number of cases are available away from room temperature
  - Nothing significantly below room temperature
- Initially scoping shows no clear temperature-dependent bias in KENO for plutonium solutions

That’s it – any questions?