

A Testing Trifecta: Data, Codes, and Evaluations

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U.S. DEPARTMENT OF
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Outline

- Purposes of code and data testing
- Example of data testing
- Example of code testing
- Example of evaluation testing

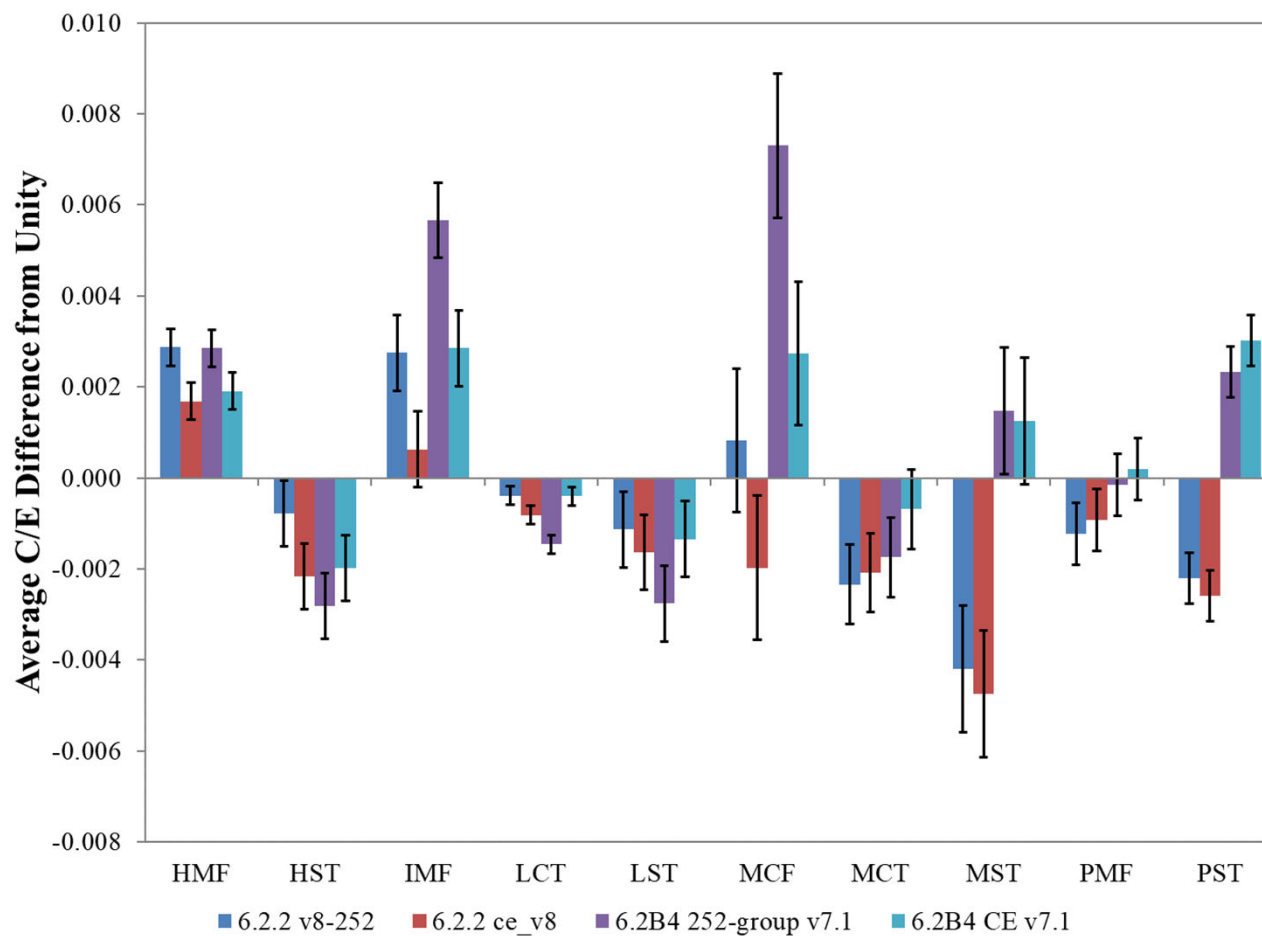
Purposes of code and data testing

- Three areas are examined in code and data testing with critical benchmark experiments
 1. Nuclear data testing
 2. Code testing
 3. Evaluation testing – least obvious
- We will look at a brief example of each from work performed recently for the DOE Nuclear Criticality Program (NCSP)

Nuclear data testing

- One of the two obvious purposes: testing the data
- Running a suite of critical experiments with a new data set allows examination of differences caused by new evaluations
 - Experiments do not have to be great benchmarks since the *difference* is the key result
- Several ENDF/B-VIII beta releases were tested in FY17
 - Andrew Holcomb presented Beta 4 testing at NCSD in Carlsbad and has run all of VALID on the released version as well
 - ENDF/B-VIII data will be available in SCALE 6.3

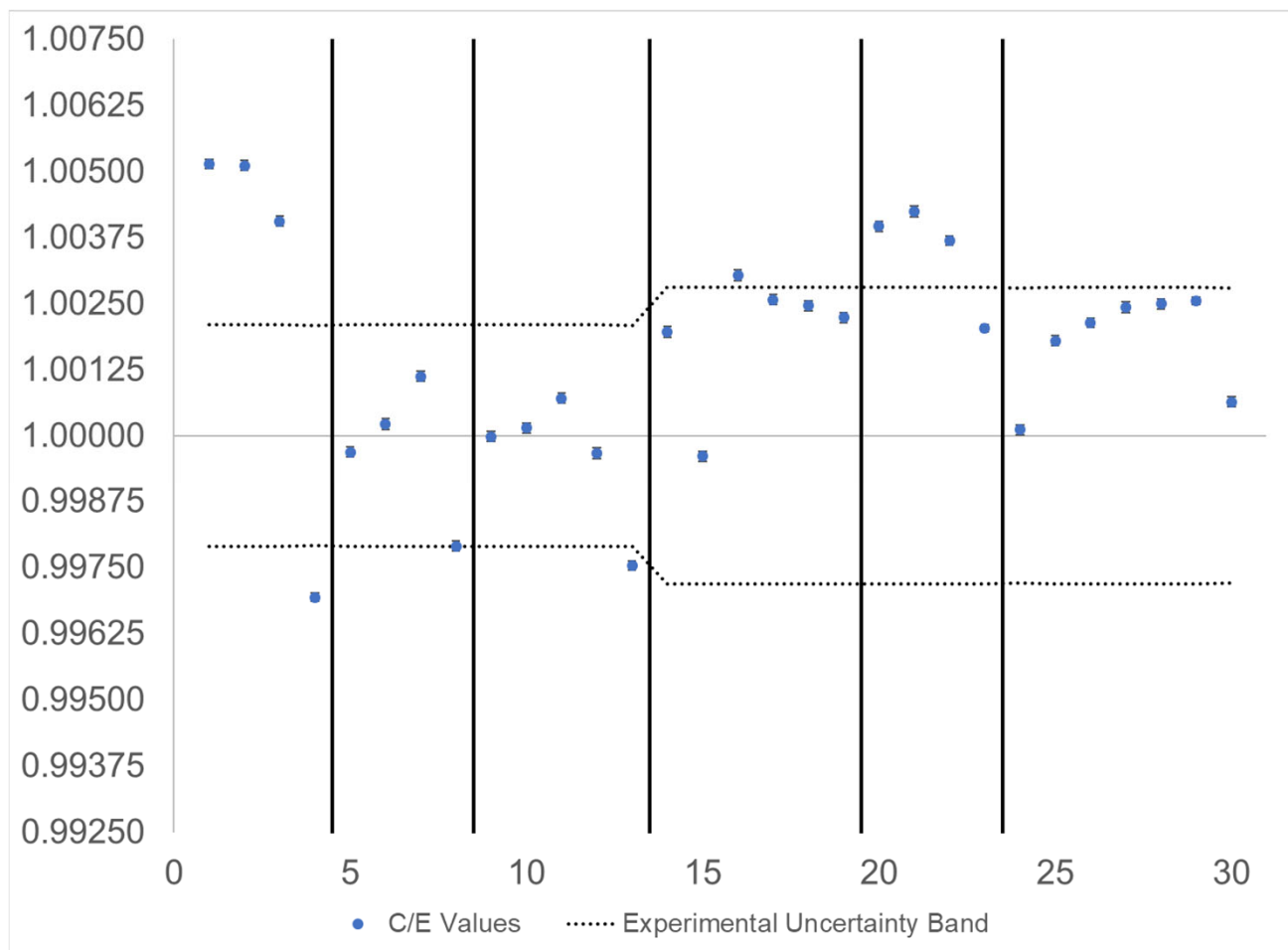
ENDF/B-VII.1 vs ENDF/B-VIII



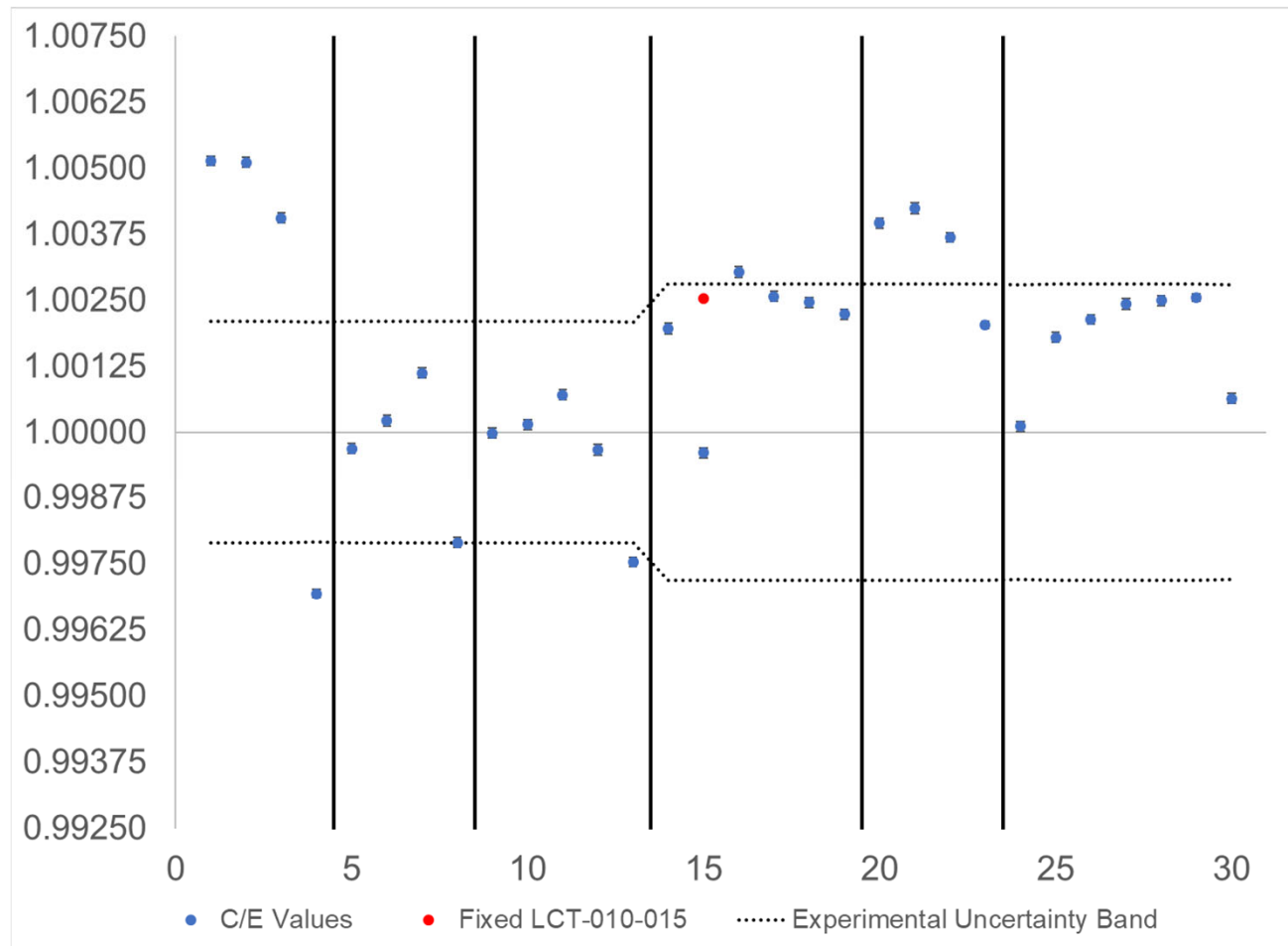
Code testing

- Careful (critical) examination of results leads to more insights on code performance
 - More than just validation!
- Examining trends in experiment series helps us understand what—if anything—is varying in the experiments that might indicate a bias in the data or bias in the code
- Codes and data are good enough now to allow identification of errors in models

Original results for LCT-010 with ENDF/B-VII.1 library



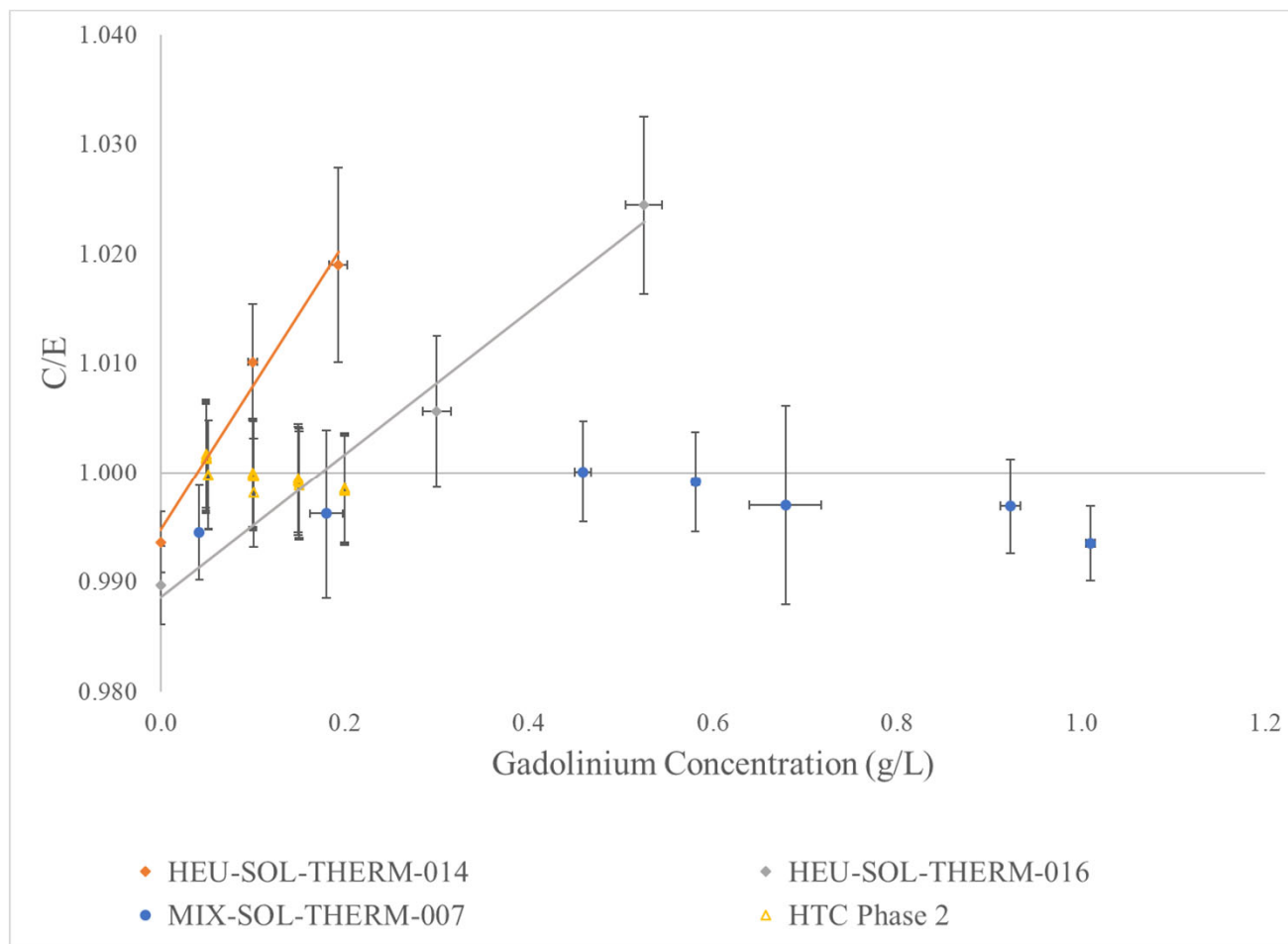
After the fix!



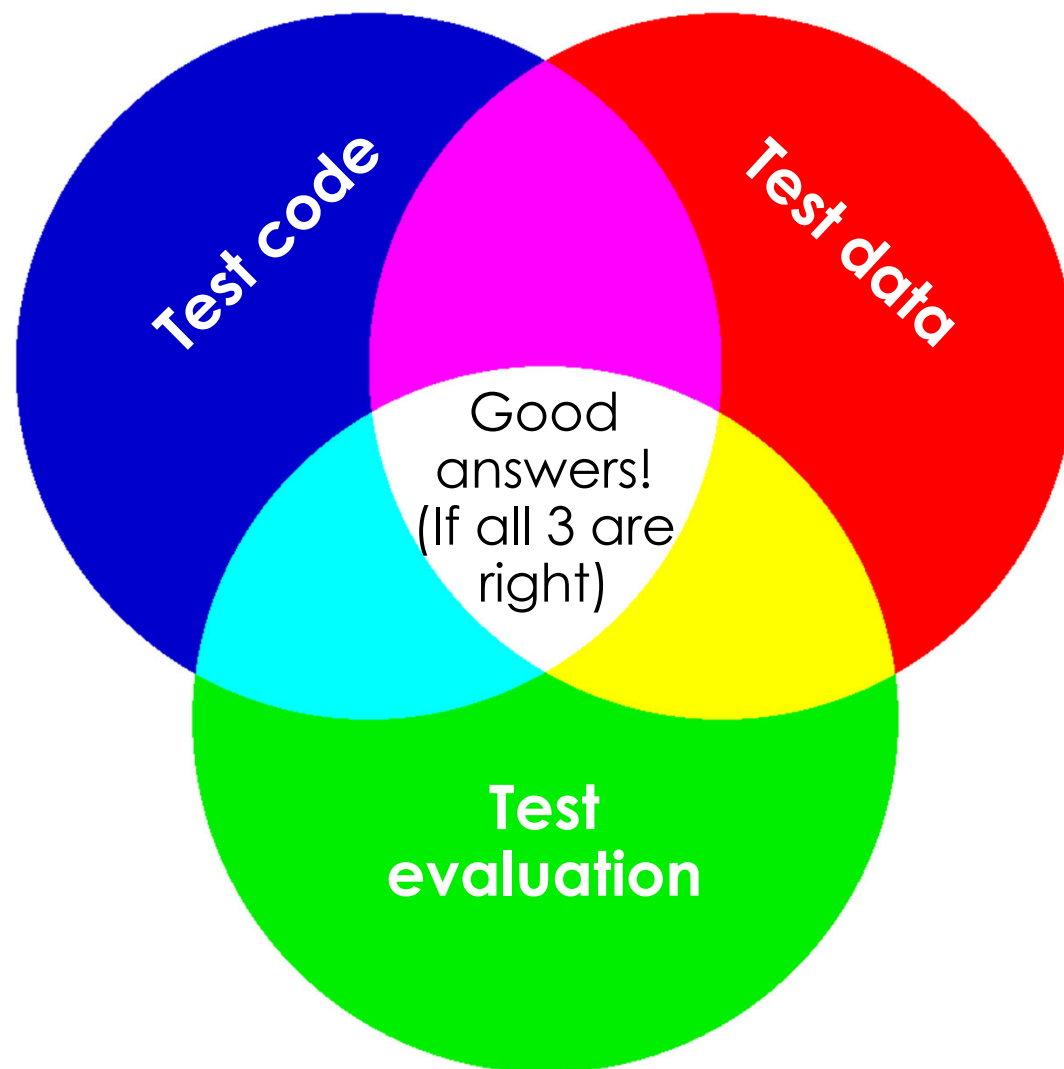
Last, but not least: evaluation testing

- No evaluation in the ICSBEP Handbook is perfect
 - The code and data testing rely on these evaluations, but some contain errors
- Comparing results from different evaluations can shed light on data problems, code problems, and/or evaluation problems
- Soluble gadolinium is an example of this last one
 - Much discussion about HST-014 through HST-019 is already ongoing in the international data community
 - Most of these thoughts were presented at the June ANS Meeting (Philadelphia)
- In a nutshell: the bias apparent in HST-014 & -016 is probably not real

C/E ratios for HST-014, HST-016, MST-007, HTC Phase 2



Summary



Thank you to the DOE NCSP
for funding this work and lots
of other work like it!

That's it – any
questions?

