ADVANCE: *Automated Data Verification and Assurance for Nuclear Calculations Enhancement*

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BROOKHAVEN
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a passion for discovery

U.S. DEPARTMENT OF ENERGY | Office of Science

Every evaluation needs to be checked and we humans can't seem to do it right
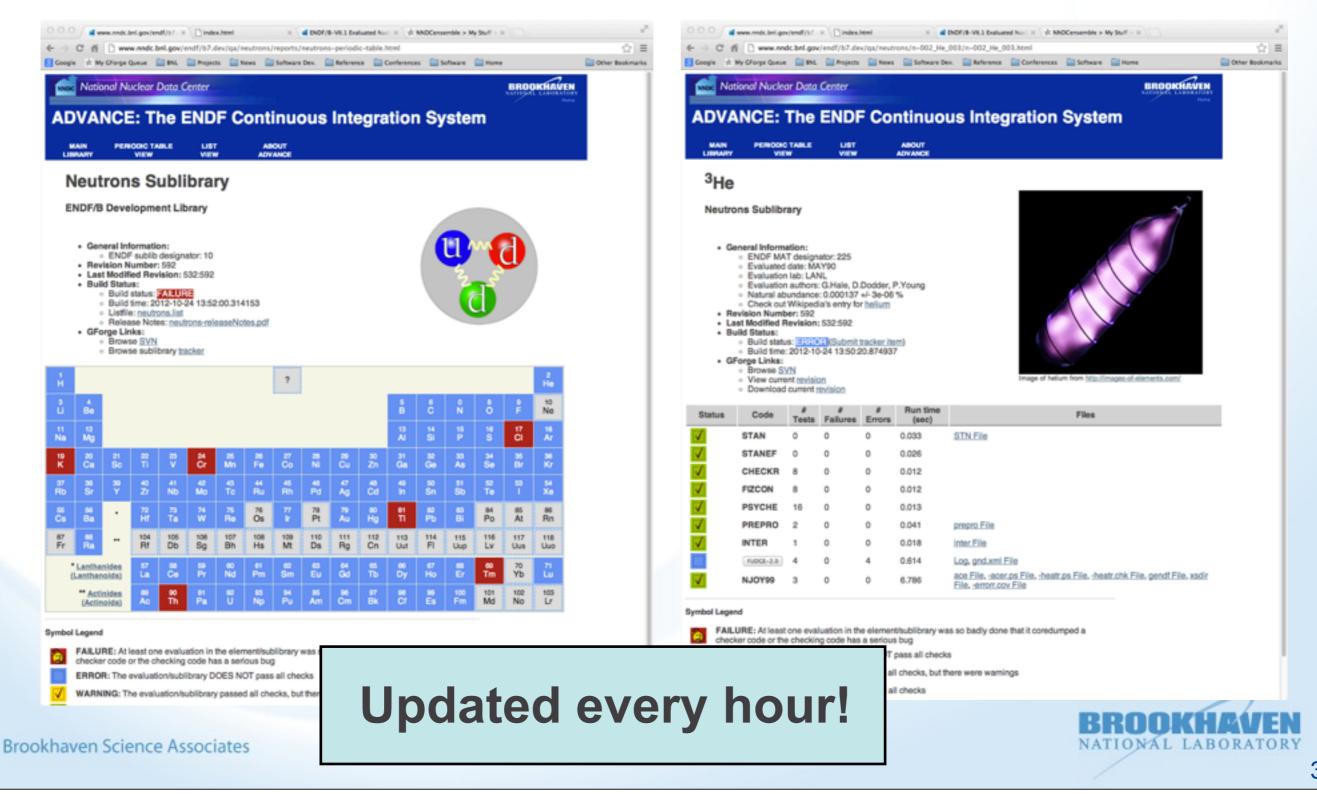
- **The Problem:**
  - No evaluator remembers to run basic checks (CHECKR, FIZCON) on the evaluations
  - We should not have rely on users to tell us if NJOY barfed...
- **A Solution:** "continuous integration", a common practice in software development. Every commit or every hour (you pick), retest any evaluation that changed.
- As a result, bugs are discovered *as soon as data is committed*

ADVANCE: Online Data Verification System (*A*utomated *D*ata *V*erification and *A*ssurance for *N*uclear *C*alculations *E*nhancement)

Visit http://www.nndc.bnl.gov/endf/b7.dev/qa/

Updated every hour!

Current ADVANCE build workflow

Wednesday, November 7, 12

And now for Ramon...

To do

- **More reports**:
  - Cross section plots vs. EXFOR
  - Plots of integral quantities (MACS, RI, Cf spectrum ave.)
  - Better energy balance report
  - Covariance QA report
  - The ENDF documentation
- **ACE quality control w/ ACELST, COMPLOT**
- **Full library tarballs** (ACE, gnd, gendf)

- **More processing codes:**
  - AMPX/PUFF
  - coggen (is that what it's called?)
  - PREPRO/sigma1, sixpack
  - CALENDF
- **Comments page**
- **Database of errors:**
  - processing code error mining
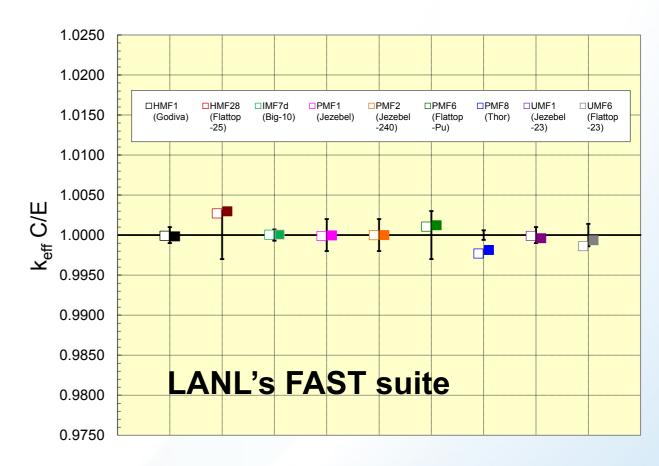 - regressions
- **Benchmarking....**

What else would you like added?

Next logical step: automate simulation of critical assemblies and other benchmarks

- **Criticality benchmarks are already the core of our data testing regimen**

- **Many other tests check things of importance to NCSP**
  - Reaction rates in irradiated foils target individual reactions
  - SINBAD shielding benchmarks can be used to benchmark decay/ activation data

LANL's FAST suite

Legend: HMF1 (Godiva), HMF28 (Flattop-25), IMF7d (Big-10), PMF1 (Jezebel), PMF2 (Jezebel-240), PMF6 (Flattop-Pu), PMF8 (Thor), UMF1 (Jezebel-23), UMF6 (Flattop-23)

Y-axis: k_{eff} C/E

Current testing is human-driven and ad-hoc:
- We often test outdated libraries (ENDF/B-V??)
- We rerun same tests (do we need to run JEZEBEL again?)
- We often don't run tests because of lack of resources: models, codes computing and/or manpower

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Proposed tiers of benchmark participation

Full •**automatic run** •**automatic report**	Client runs on your machine. NNDC server pushes jobs to your machine, you run your tests and report results to NNDC for automatic collation.
Voluntary •**automatic run** •**voluntary report**	Client runs on your machine. Client polls svn and runs your tests. It is then up to you what results you report back to NNDC.
Ad-hoc •**voluntary run** •**voluntary report**	ControlTier server sends you an email. You control the client by hand and decide if you want to run. If you do, you report back what you want to NNDC.

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