# ADVANCE system update

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# ENDF/B Quality Assurance

## Pen-n-paper "Days of yore" (pre-2011)

ENDF/B Evaluation Review

Sample PHASE I review packet cover page (June 2000)

## Automated with ADVANCE (2011-present)


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

# Where to find the link to ADVANCE

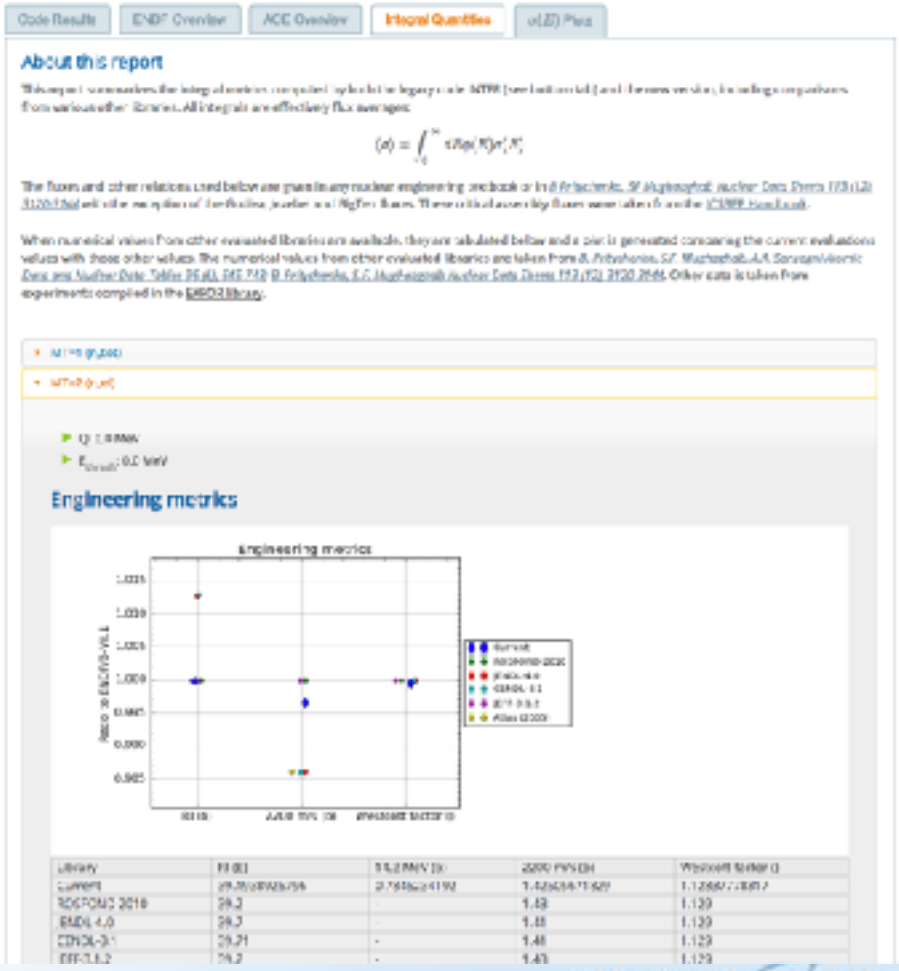

www.nndc.bnl.gov

Reactions tab

The link

# ADVANCE quality assurance system for ENDF

- On every commit of every evaluation automatically:
  - Run it through a battery of tests, including customer codes
  - Generate comparison plots
  - Generate HTML report
- New in FY17:
  - Update Fudge-4.2.1 add PREPRO GROUPIE
  - Aesthetic improvements (AJAX & MathJax)
  - Full library ACE file tarballs
  - Per-isotope error reports
  - Covariance and ACE overview
  - Rewrote INTER using FUDGE

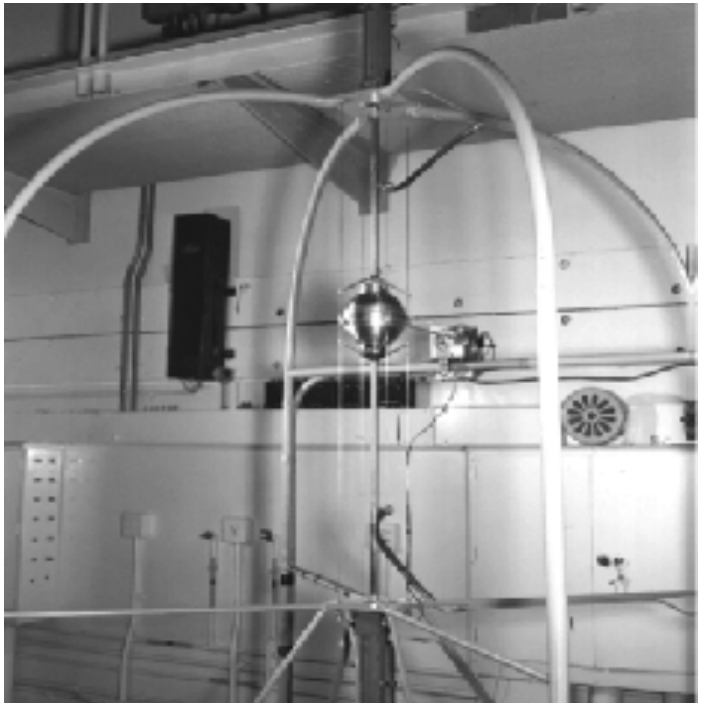


# To find out detailed lists of problems, go to ADVANCE, find your library's release notes

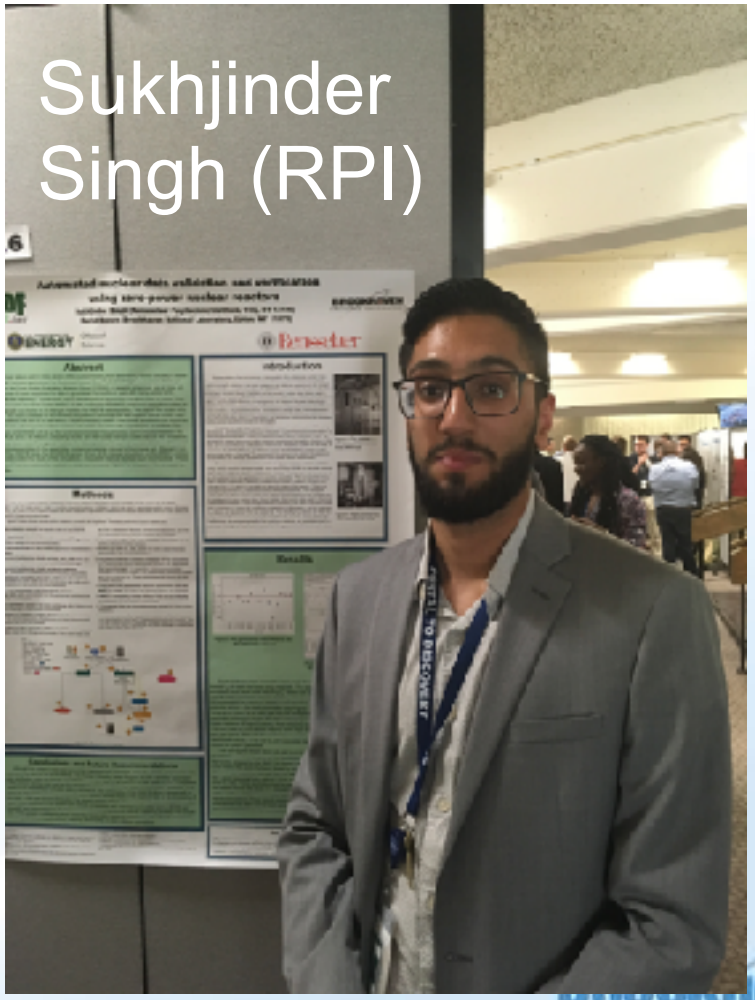
# Remaining big problems that are potentially fixable before release

- **ENDF header needs update for ENDF/B-VIII:**
  - Mod numbers
  - Dates
  - Directory
  - (most fixed already)
- **Angular distribution is negative:** 51 isotopes
- **Main energy grid is not monotonic:** n-042_Mo_096.endf, n-042_Mo_097.endf, n-092_U_241.endf
- **The elastic cross section is negative:** n-058_Ce_136.endf, n-062_Sm_150.endf
- **Outgoing ZA is wrong:** 17 isotopes
- **The cross section and an outgoing distribution don't span the same energy region:** n-004_Be_009.endf, n-094_Pu_238.endf, n-094_Pu_240.endf
- **MF32 resonance parameters don't match MF2 parameters:** n-020_Ca_047.endf, n-028_Ni_063.endf, n-078_Pt_192.endf
- **Primary gamma energy at threshold should be ≤ available energy (depending on which discrete level it ends up in):** n-006_C_012.endf
- **Many others that are not so fixable, given the time available**

# SULI student progress toward adding automated benchmarking

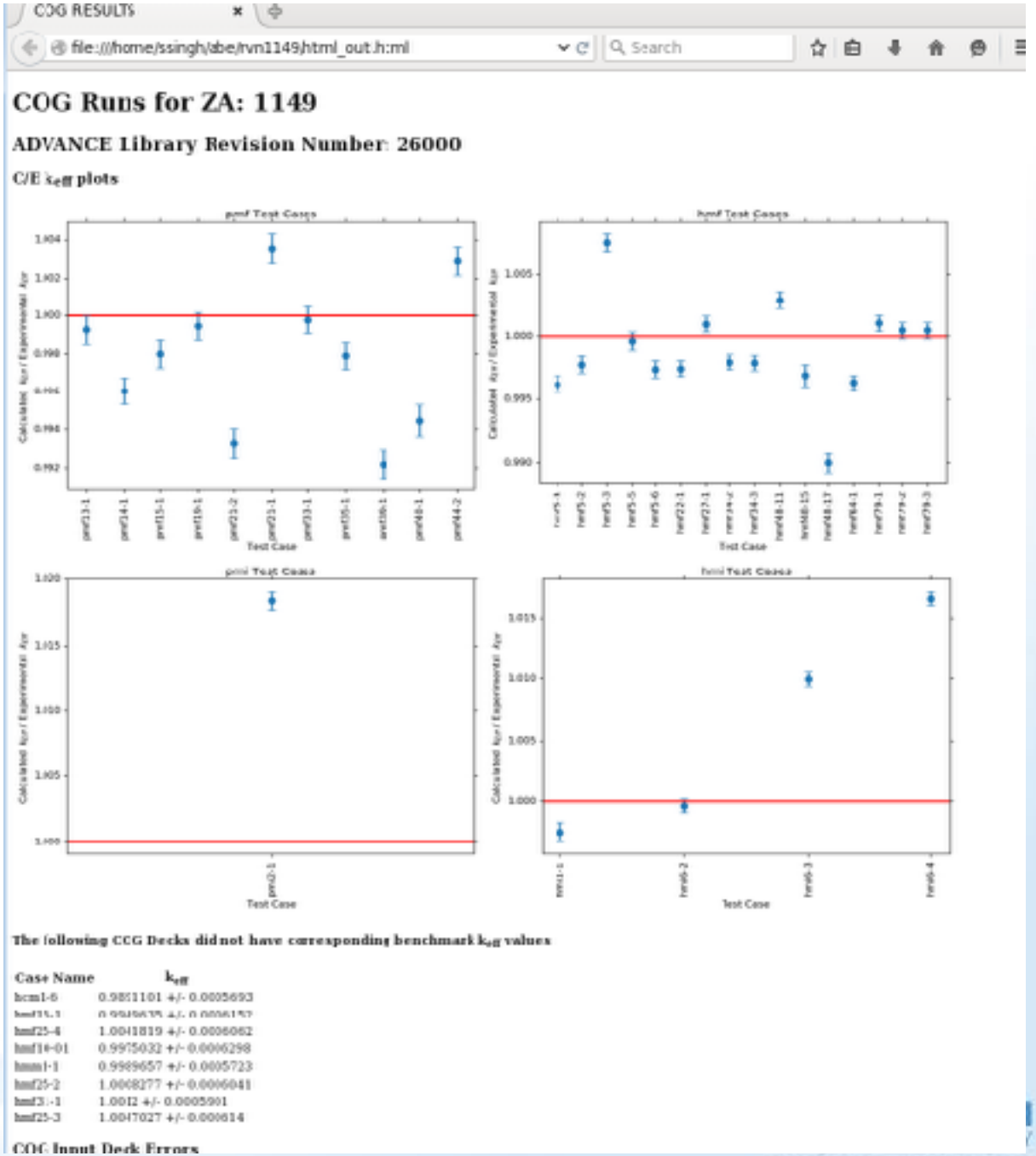


**JEZEBEL—A bare sphere of Plutonium-239 Metal (PMF001)**



- Simplified build-out — can deploy benchmarking system to new machine quickly
- COG “wrapped” by Python script
  - Problem setup and teardown
  - Input file generation
  - Output file parsing
- Automatic COG library setup
- Have database of tests, keyed off benchmark composition
- Interacts with BNL batch queue system
- Builds HTML report upon completion (see next page)

# Sample run report for $^{56}Fe$




**The following CCG Decks did not have corresponding benchmark $k_{eff}$ values**

| Case Name | $k_{eff}$ |
|---|---|
| hcm1-6 | 0.9851101 +/- 0.0005693 |
| hmf25-4 | 1.0041819 +/- 0.0006062 |
| hmf18-01 | 0.9975032 +/- 0.0006298 |
| hmm1-1 | 0.9989657 +/- 0.0005723 |
| hmf25-2 | 1.0008277 +/- 0.0006041 |
| hmf3.-1 | 1.0012 +/- 0.0005901 |
| hmf25-3 | 1.0047027 +/- 0.000614 |

**CCG Input Deck Errors**