# NCSP Activities at BNL (FY21)

Task manager report
NCSP Technical Program Review 2022

David Brown

National Nuclear Data Center

15 February 2022

# Outline

- FY21 budget and spending summary
- COVID-19 impacts
- Highlights:
  - Nuclear Data
    - ENDF/CSEWG management changes
    - ENDF library status
    - ENDF infrastructure status
  - Analytical Methods:
    - GNDS status
    - URR physics
  - Technical Support: see talk by G. Nobre (Wednesday)

# Each presentation should be limited to 15 minutes

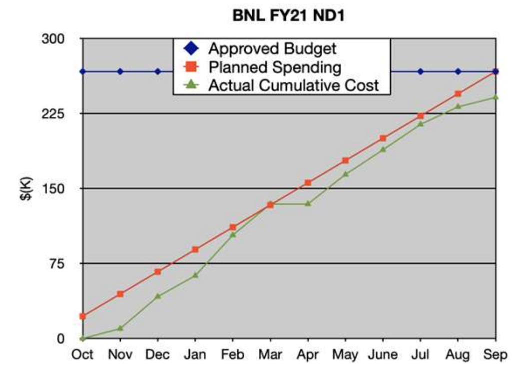
- Budget – AOK this year, but AM ending
- COVID impacts – Matteo, virtual CSEWG, mini-CSEWG
- Highlights:
  - ENDF status
    - Delay
    - Transition
    - Evaluation reviews
    - New evaluations
    - Mini-CSEWG & CSEWG updates
  - GNDS-2.0 status & EG-GNDS transition & TNSL
  - BRR – see Gustavo's talk
  - AM –
    - See LLNL talk about TNSL
    - PDF

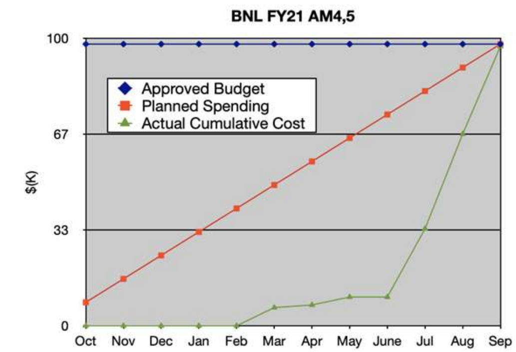
# FY21 Budget and spending summary

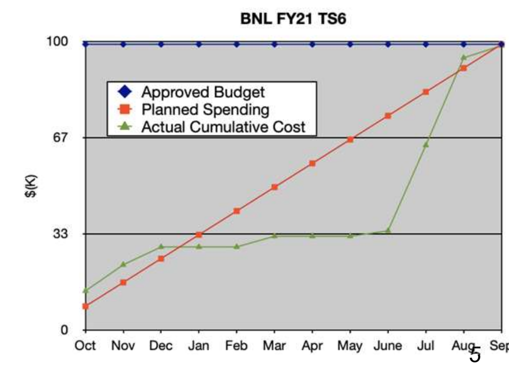
# Our budget & spending is AOK

- All 3 (ND, AM, TS) tasks on time and slightly under budget
- Total BNL carry over into FY22: $48.416k (10.0%)
- Burn rate odd because AM, TS work done in collaboration with student interns
- FY22 concern/opportunity: PD (M. Vorabbi) inadvertently got some NSCP relevant skills and we don't want to lose them!  We are working on plan to convert to staff.

| Task | FY20 c/o (k$) | FY21 funding (k$) | FY21 spent (k$) | FY21 c/f (k$) | FY21 c/f |
|---|---|---|---|---|---|
| ND 1 | 13.325 | 267 | 241.118 | 39.207 | 14.0% |
| AM 4,5 | 2.483 | 98 | 97.186 | 3.297 | 3.3% |
| TS 6 | 5.413 | 99 | 98.502 | 5.912 | 5.7% |



# COVID impacts

# COVID Impacts

**CSEWG collaboration wide**

- **Meetings continue to be held virtually**
  - Mini-CSEWG, 16-19 Aug. 2021 (minutes available)
  - CSEWG, 15-19 Nov. 2021
  - Executive committee meetings
- **Hackathon paused until in-person meetings possible**
- **Nuclear Data Week(s) 2021**: 175 Registrations for CSEWG, USNDP and NDAG combined

**NNDC personnel**

- NDIAWG funded experiments at LANL and LBNL stalled ~2 years, until late-2021
- Main project of postdoc (M. Vorabbi) essentially dead
- Retasked to NSCP AM 4,5: will give highlights later in talk

# Next ENDF release

The release of ENDF/B-VIII.1 has been delayed…

…for 1 year to Feb 2024!

- COVID pandemic delayed many experiments: New data are expected
- Need more time to setup proper review process
- Not enough time for proper testing and validation
- Time deal with a potentially serious issue at high reactor burn-up


Accompanying Big Paper ready at around the same time!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# ENDF/CSEWG Highlights

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# Feedback from Executive Committee meetings

- The CSEWG executive committee met (virtually) on October 12$^{th}$ and again on November 1$^{st}$
- **Announce new ENDF Library Manager**
- **Develop Code of Conduct**
- **Postpone ENDF/B-VIII.1 until February 2024**
- Defines Roles and Responsibilities of CSEWG committee (co)chairs and subcommittee chairs
- **Develop agenda for PHYSOR 2021 Workshop “New physics, new capabilities, what's changing in ENDF/B”**

# New ENDF Library Manager: Gustavo Nobre

- **2015 to present - staff scientist, National Nuclear Data Center (NNDC), Brookhaven National Laboratory, NY.**
- **2011 to 2015 - Postdoctoral research associate at the National Nuclear Data Center (NNDC), Brookhaven National Laboratory, NY.**
- 2008 to 2011 - Postdoctoral researcher at Lawrence Livermore National Laboratory, CA.
- Jun. 2007 - Ph.D. obtained on the work "Estudo do Potencial de Polarização e Fusão de Íons Pesados" (Study of the Polarization Potential and Fusion of Heavy Ions) at the Physics Institute of the Universidade de São Paulo, in São Paulo, Brazil.
- Oct. to Dec. 2005 - Internship at the University of Surrey, UK.
- Dec. 2002 - B.Sc. degree at the Physics Institute of the Universidade de São Paulo, in São Paulo, Brazil.

# Draft CSEWG Code of Conduct
## (based on APS meeting Code of Conduct)

It is the policy of the Cross Section Evaluation Working Group (CSEWG) that all participants, including attendees, vendors, staff, volunteers, and all other stakeholders will conduct themselves in a professional manner that is welcoming to all participants and free from any form of discrimination, harassment, or retaliation. Participants will treat each other with respect and consideration to create a civil, collegial, inclusive, and professional environment at the meeting. Creating a supportive environment to enable scientific discourse is the responsibility of all participants.

Participants will avoid any inappropriate actions or statements based on individual characteristics such as age, race, ethnicity, sexual orientation, gender identity, gender expression, marital status, nationality, political affiliation, ability status, educational background, or any other characteristic protected by law. Disruptive or harassing behavior of any kind will not be tolerated. Harassment includes but is not limited to inappropriate or intimidating behavior and language, unwelcome jokes or comments, unwanted touching or attention, offensive images, photography without permission, and stalking.

Violations of this code of conduct policy should be reported to the organizers. Sanctions may range from verbal warning, to ejection from the meeting, to notifying appropriate authorities. Such disciplinary actions will be performed in accordance with the host organization's policies. Retaliation for complaints of inappropriate conduct will not be tolerated. If a participant observes inappropriate comments or actions and personal intervention seems appropriate and safe, they should be considerate of all parties before intervening.

# PHYSOR 2022

- I am organizing a ½ day workshop

  **“New physics, new capabilities, what's changing in ENDF/B”**
- Originally conceived as an ENDF/B-VIII.1 advertisement, now more of an extended status report


AGENDA

- Welcome – David Brown (BNL)
- TSL changes – supports adv. reactor and micro reactor thrusts – Ayman Hawari (NCSU)
- INDEN overview: structural materials – Gustavo Nobre (BNL) and Marco Pigni (ORNL)
- INDEN overview: actinides- **Volunteers?**
- Break
- FPY – A. Mattera (BNL) with help from A. Lovell (LANL)
- GNDS-2.0 – Dave Brown (BNL) and Caleb Mattoon (LLNL)
- Summary/Discussion – Gustavo Nobre (BNL)

# We held a mini-CSEWG in August 2021

- Virtual
- DOE/SC PuRe initiative and ENDF implications
- Contributions for neutron, TSL, CP & photonuclear sublibraries
- Evaluation review
- Validation
- Discussion and poll: To adjust or not to adjust? (spoiler: we are not adjusting)

Figure 1: Zoom group photo from the mini-CSEWG meeting.

https://indico.bnl.gov/event/12258/attachments/35490/61392/mini-csewg-mini-minutes-final.pdf

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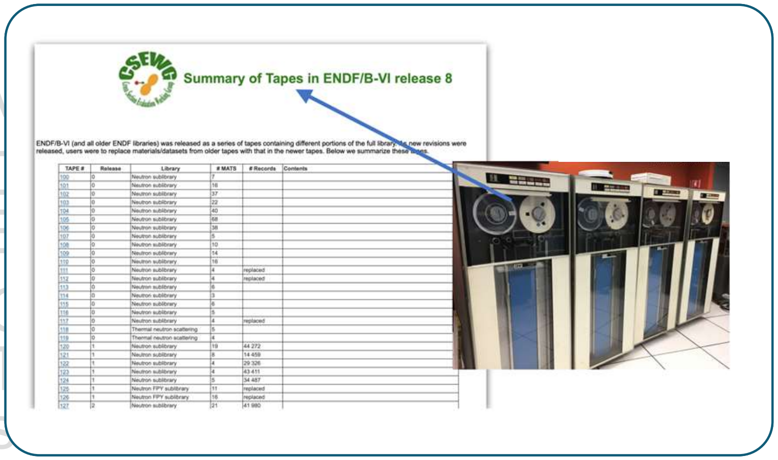


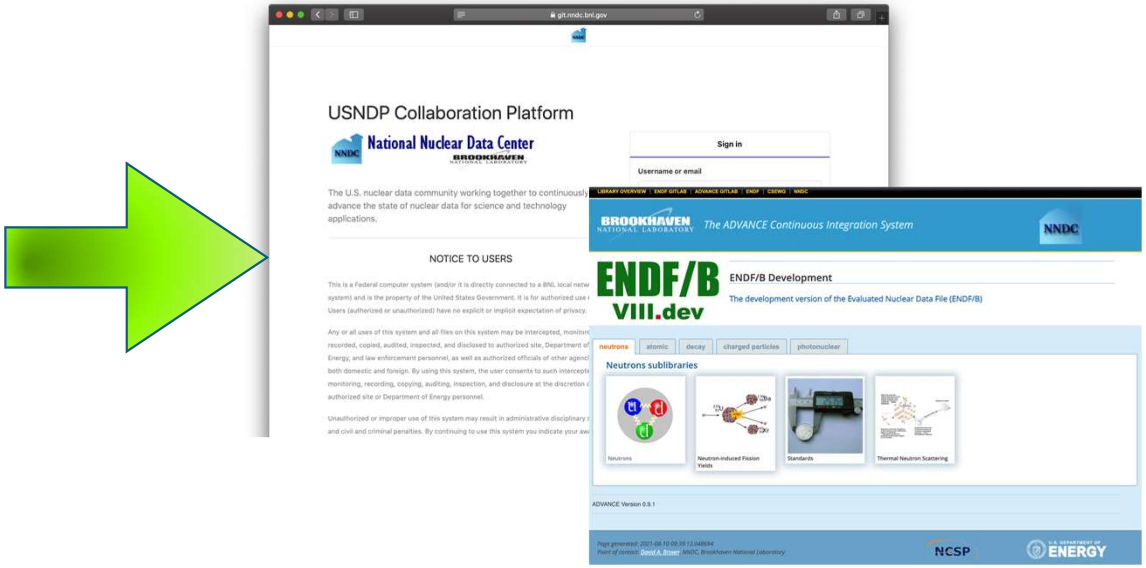


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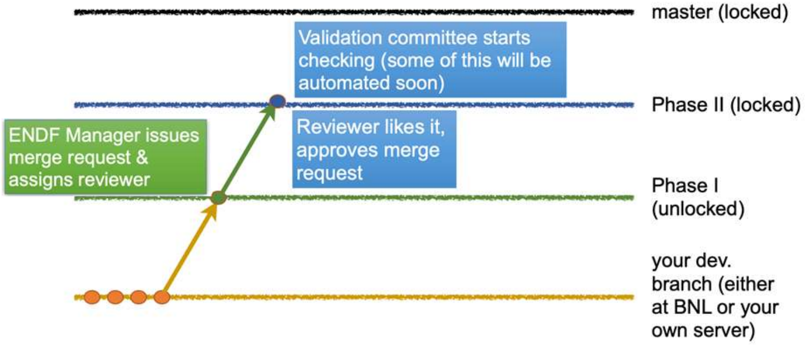


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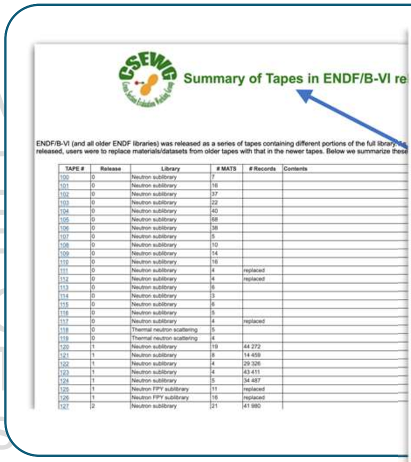


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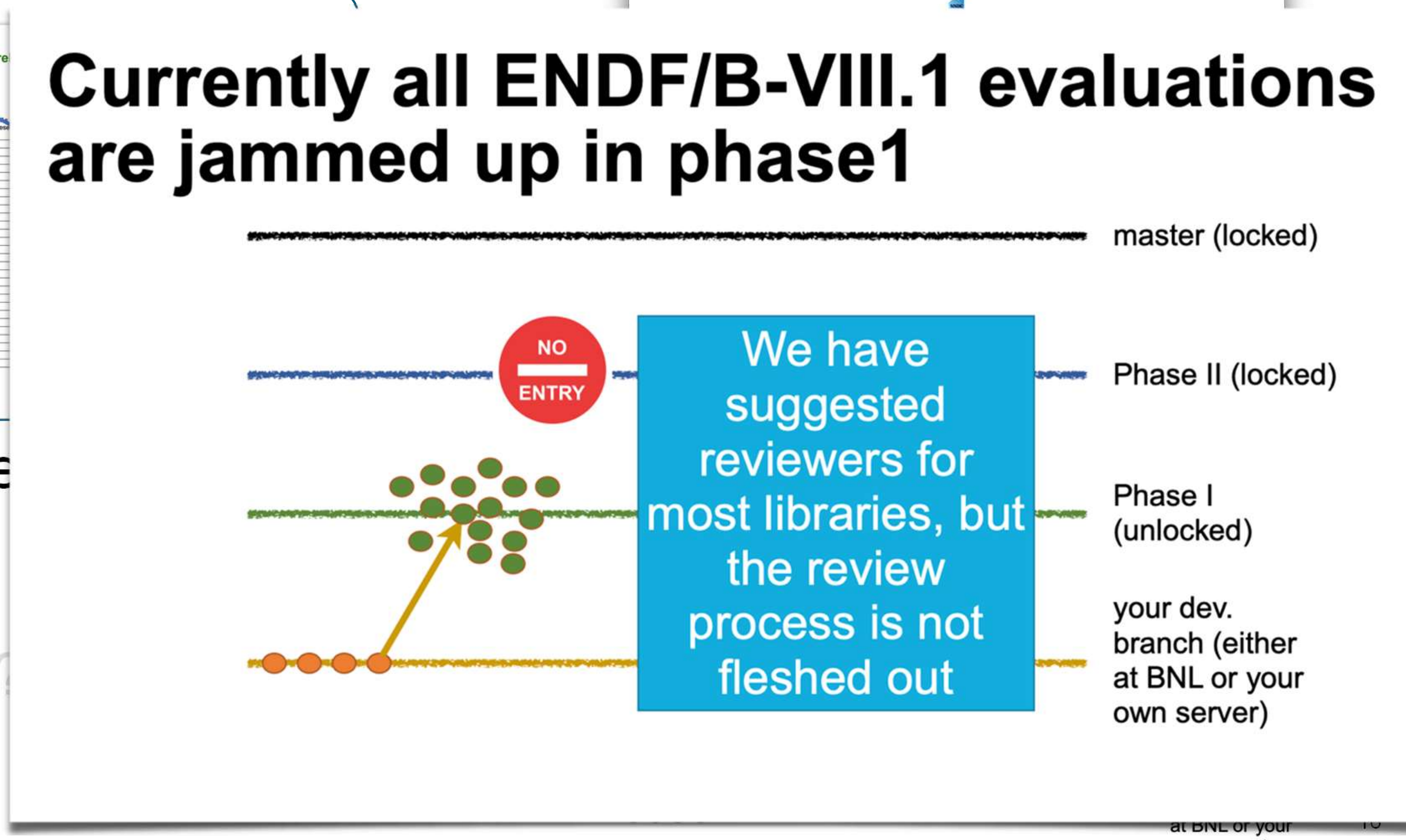


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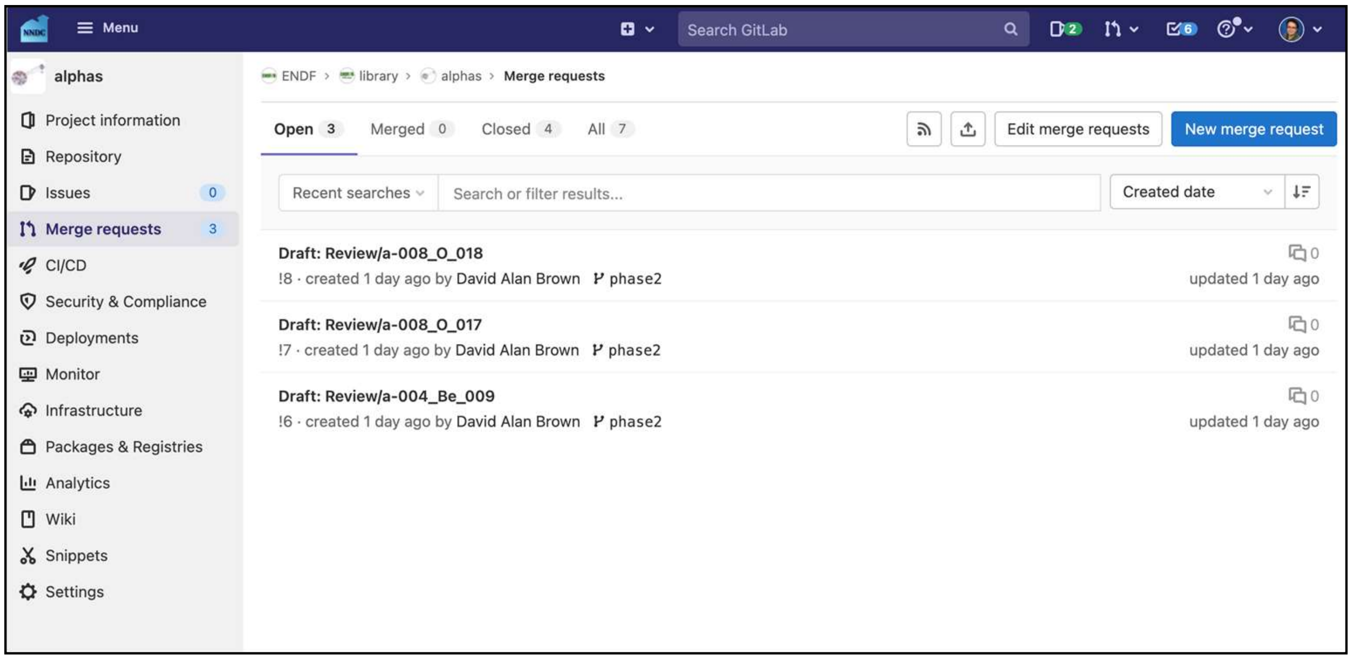
# Review system is working!

- Testing galore!

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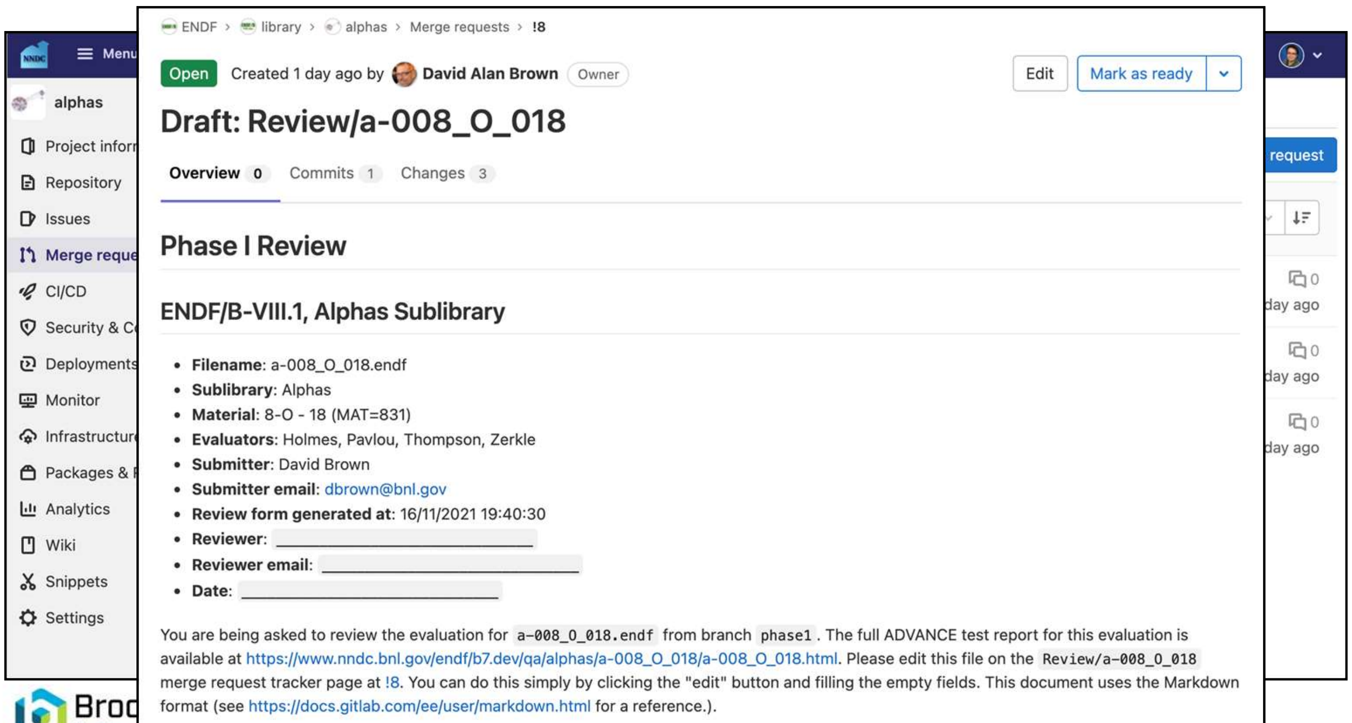


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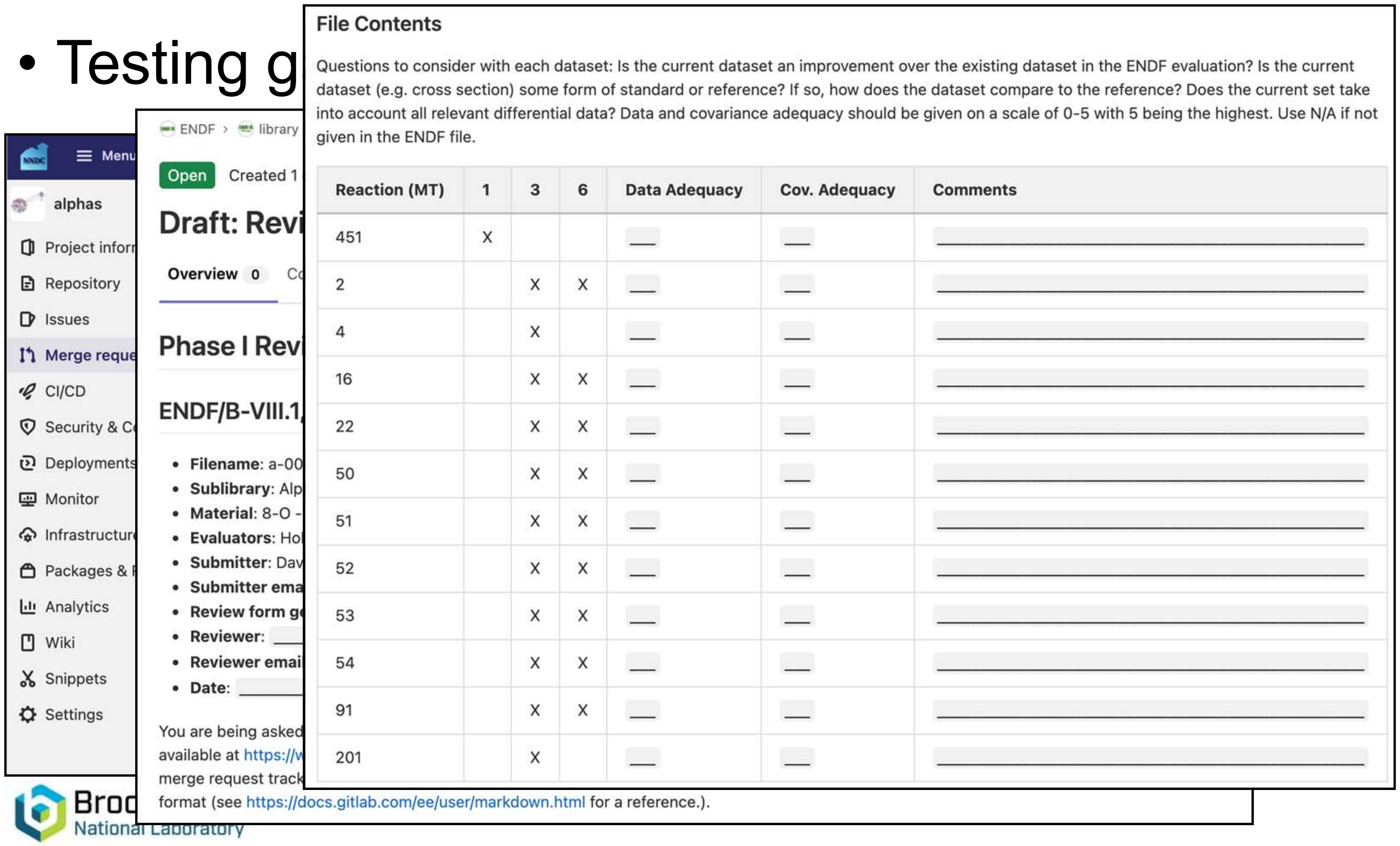


File Contents

Questions to consider with each dataset: Is the current dataset an improvement over the existing dataset in the ENDF evaluation? Is the current dataset (e.g. cross section) some form of standard or reference? If so, how does the dataset compare to the reference? Does the current set take into account all relevant differential data? Data and covariance adequacy should be given on a scale of 0-5 with 5 being the highest. Use N/A if not given in the ENDF file.

| Reaction (MT) | 1 | 3 | 6 | Data Adequacy | Cov. Adequacy | Comments |
|---|---|---|---|---|---|---|
| 451 | X | | | ___ | ___ | ___ |
| 2 | | X | X | ___ | ___ | ___ |
| 4 | | X | | ___ | ___ | ___ |
| 16 | | X | X | ___ | ___ | ___ |
| 22 | | X | X | ___ | ___ | ___ |
| 50 | | X | X | ___ | ___ | ___ |
| 51 | | X | X | ___ | ___ | ___ |
| 52 | | X | X | ___ | ___ | ___ |
| 53 | | X | X | ___ | ___ | ___ |
| 54 | | X | X | ___ | ___ | ___ |
| 91 | | X | X | ___ | ___ | ___ |
| 201 | | X | | ___ | ___ | ___ |

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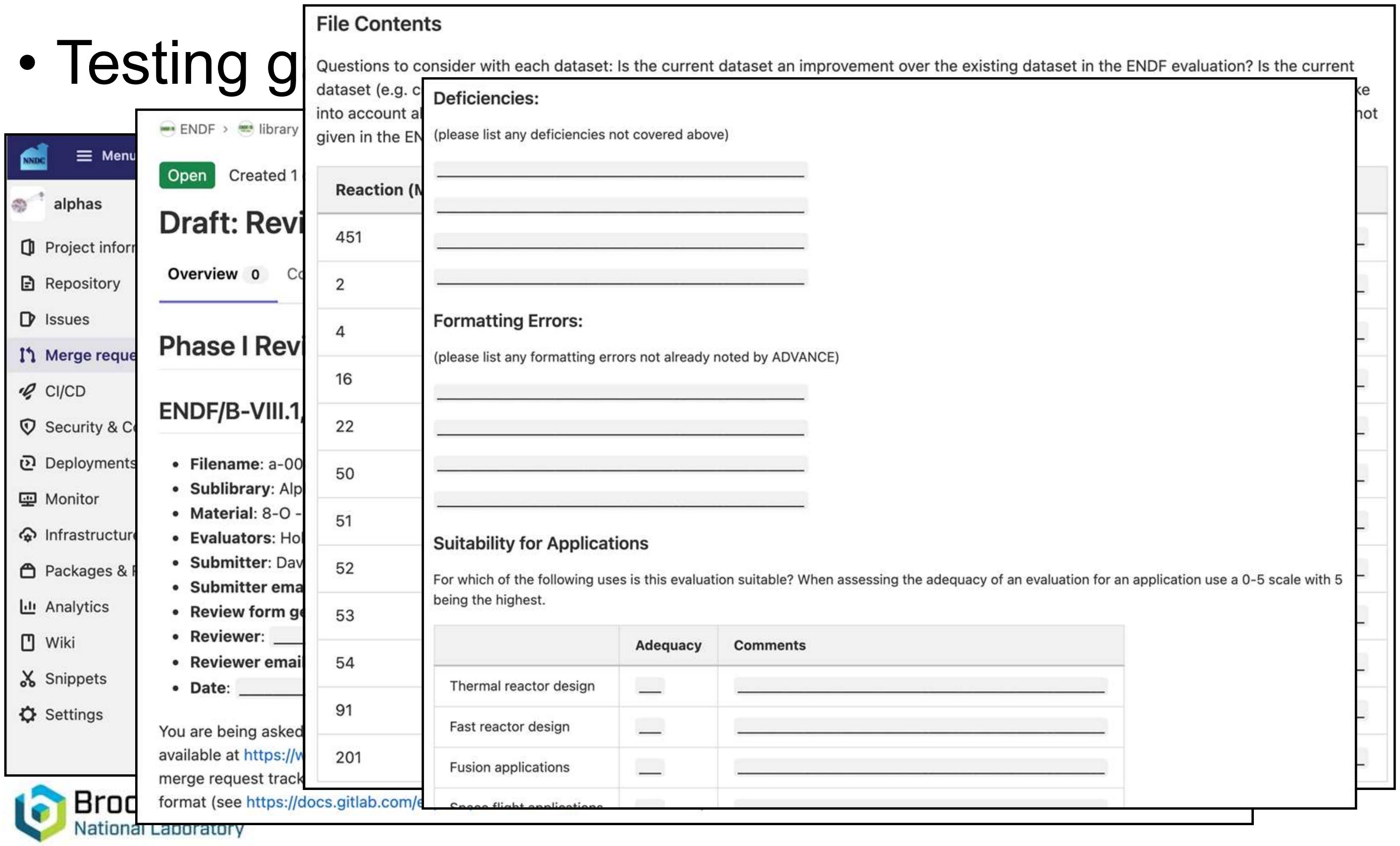


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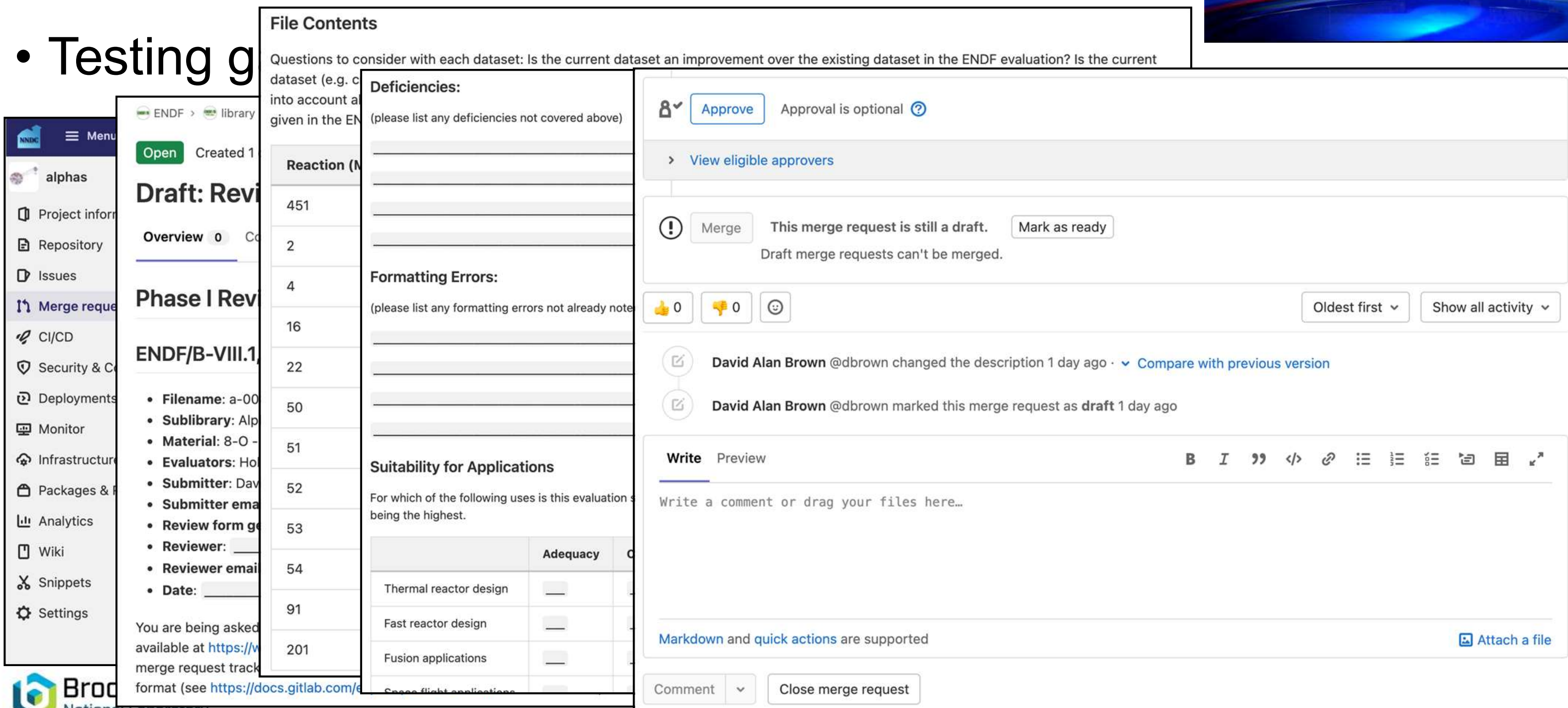
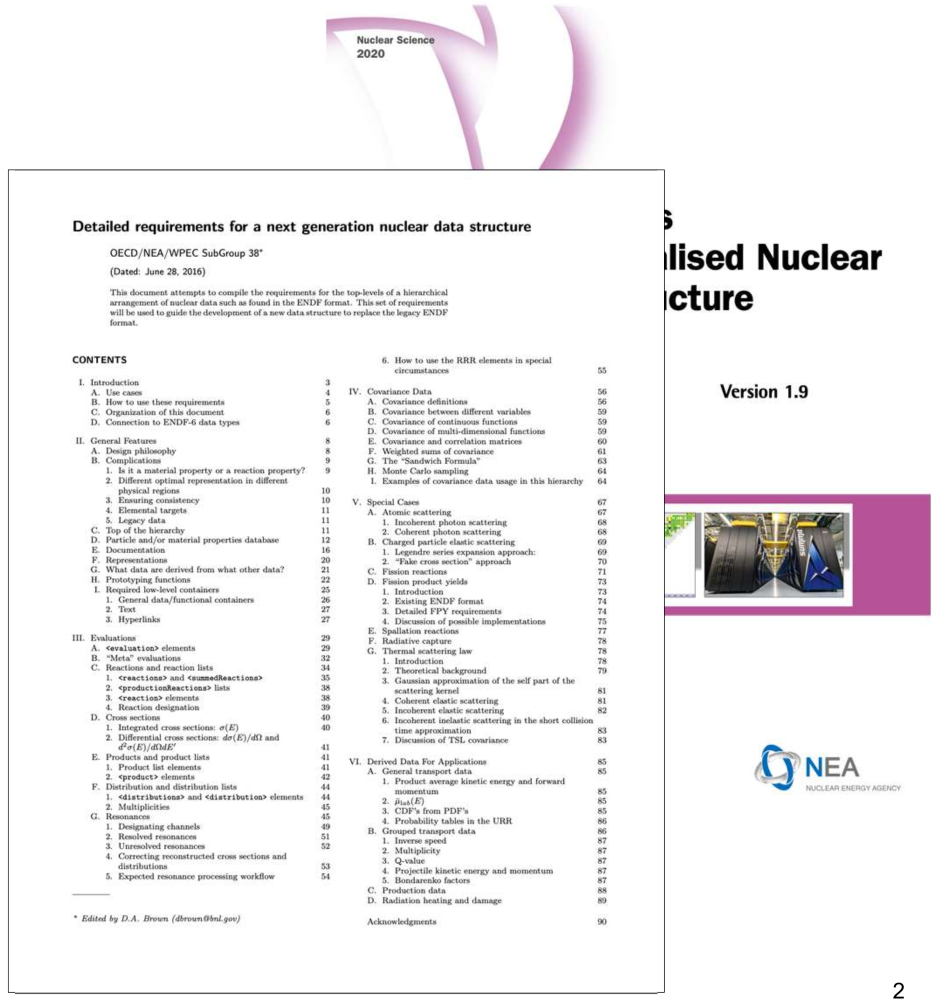


# Analytical Methods Highlights

See also next presentation:
“TSL Implementation and Testing with FUDGE”, C. Mattoon (LLNL)

# GNDS-2.0 status

- **GNDS-2.0 approved in Fall 2021 WPEC meeting**
- **Major changes:**
  - `<map>` format
  - `<documentation>` format supporting metadata for DOI assignment
  - Major TNSL rewrite: mixed moderators & covariance support
- **Met all SG-38 requirements**
- **Expect final version of specifications in May 2022 WPEC meeting**




**Detailed requirements for a next generation nuclear data structure**


OECD/NEA/WPEC SubGroup 38*



(Dated: June 28, 2016)



This document attempts to compile the requirements for the top-levels of a hierarchical arrangement of nuclear data such as found in the ENDF format. This set of requirements will be used to guide the development of a new data structure to replace the legacy ENDF format.


**CONTENTS**




* *Edited by D.A. Brown (dbrown@bnl.gov)*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# What’s next

- **Expect major format changes post-GNDS-2.0:**
  - Synchronize nuclear structure formats with ENSDF as part of ENSDF modernization
  - Revamp uncertainty/covariance to make more ML friendly
  - Atomic data additions
  - FPY formats per FIRE collaboration/CSEWG recommendations
  - Re-envisioning of URR probability distributions

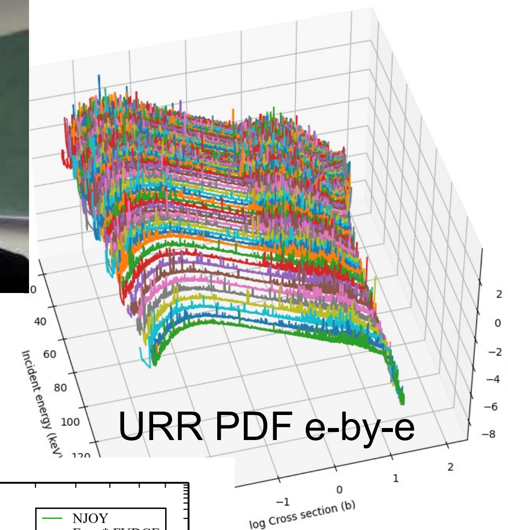
- **ENDF to GNDS transition:**
  - ENDF/B-VIII.0 released in GNDS-1.9
  - Expect at least next release to be in both ENDF-6 and GNDS formats
  - Transition is slow; we must walk together and we can only go as fast as the slowest among us

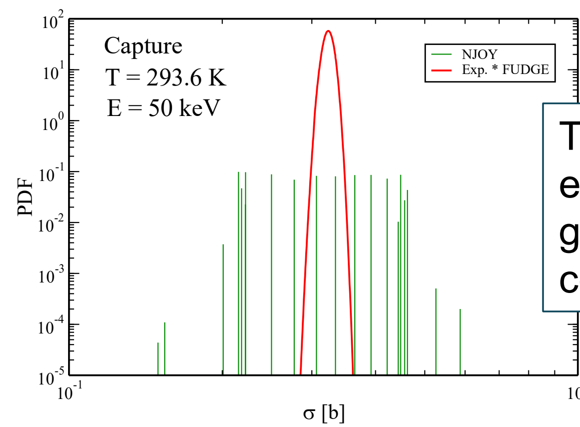
- **EG-GNDS Transition:**
  - This is David Brown’s last version as Expert Group chair, in May 2022 we will elect a new chair

# URR Physics

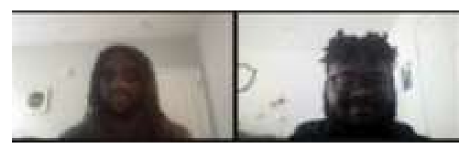
- **Original AM task:** Implement URR PT in FUDGE. *We got distracted…*
- **What do we mean by URR probability table?**
  - Really want probability distribution (PDF) for cross sections
  - Can get by theory (this is what we do when we do resonance ladders in URR)
  - Can get by experiment (ignored in URR)
- **Completely different take on covariances in URR**
- **Which PDF depends on energy resolution and use-case**
  - Traditional Doppler broadened
  - Event-by-event


U238 capture 0.0K




Theory + experiment give tightest constraints



NPT Students: K. Mbacke, M. McLaurin

**Lab report is NCSP FY21 deliverable, paper in preparation**

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# Questions?

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