Expansion of the Verified, Archived, Library of Inputs and Data (VALID)

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NCSP Technical Program Review
Albuquerque, NM
February 21-23, 2023

U.S. DEPARTMENT OF ENERGY

Outline

1. Brief project overview

2. Reminder of cases added in FY2021

3. Cases currently in progress

4. Future plans for VALID

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Brief project overview

- VALID is a QA-like process to generate high quality models from reliable reference descriptions and make those models available to users.
  - Separate origination and review by qualified individuals
  - Documentation of model generation, results, and checks
  - Results are controlled to prevent inadvertent modification

- Proposal submitted for FY20 for $340k to expand VALID by:
  1. Creating TSUNAMI models for 190 ^{233}U benchmarks modeled in KENO
  2. Incorporating models generated in FY18 university task
  3. Other benchmarks of high value and programmatic priority

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Brief project overview (2)

- Funding requested for FY 2020 – 2024
  - $140k in FY20 and $50k in FY21 – FY24

- Proposal accepted but deferred a year

- $139k NCSP funding spent in FY21 on VALID expansion
  - Some support also provided by NRC for systems of interest
  - AM2 also provides some funding for work in VALID

- $50k NCSP funding in FY22 and FY23

- Other participants include: T.M. Greene, A.M. Shaw, A. Lang, M.N. Dupont, J.B. Clarity, E.M. Saylor, Sum. 21 & 22 Midshipmen

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2021 VALID Expansion: 138 Benchmarks

Experiment class	ICSBEP experiment numbers	Number of configurations
HEU-MET-FAST	1, 63, 72, 73, 84, 85	40/41[a]
HEU-MET-INTER	6	4
HEU-SOL-INTER	1	2
HEU-SOL-THERM	4, 20	9
IEU-SOL-THERM	2, 3	59
LEU-COMP-THERM	25	4
PU-MET-FAST	24, 35, 40	3
PU-MET-MIXED	2	5
PU-SOL-THERM	16	11

[a]Includes both the "Godiva" and "shell" models for HMF-001.

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Cases currently in progress

- Progress in FY22 mainly incremental

- Many new cases started, significant TSUNAMI work

Experiment class	ICSBEP experiment numbers	Number of configurations
PU-MET-FAST	1, 3, 4, 9, 11, 16, 27, 28, 29, 30, 31, 32, 33, 36, 37, 39, 41	52
PU-MET-MIXED	3	5
PU-SOL-THERM	34	15
HEU-MET-FAST	2, 3, 4, 28	20
HEU-MET-THERM	10, 16, 34	4
HEU-SOL-THERM	27, 36, 49	33
ICT/ICM/ICI	Several evaluations with cross references	135
IEU-SOL-THERM	4, 5	2
LEU-COMP-THERM	22, 23, 24, 39, 53, 57, 60, 70, 74, 79, 96, 97, 101	225
LEU-SOL-THERM	7, 8, 9, 10, 11, 12, 13, 20, 21, 22, 23, 24, 25	67
LEU-MET-THERM	7	6
MIX-SOL-THERM	3, 6	16
Deuterium	A veritable cornucopia of different categories	69

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Future plans for VALID

- Working on revision 3 of SCALE computational procedure that governs VALID
  - Migrate to GitLab for tracking
  - Use GitLab repository for library

- Internal repository implementation and tracking should simplify documentation and review – less time and money per case

- Mirror of internal repository to external site should facilitate sharing with external users

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Conclusions

- VALID continues as a library of high-quality models used for testing SCALE and nuclear data

- Expansion in FY22 was limited by staff availability and lack of a procedure update

- Huge number of cases in the pipeline
  - Backlog is likely 3-7 FTE: additional time and/or staff needed to clear
  - Two FY22 hires entering training and qualification pipeline
  - Two earlier hires should complete qualification in FY23

- Future plans should simplify process and increase availability of models and results for external users

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Acknowledgment

This presentation was supported by the Nuclear Criticality Safety Program, funded and managed by the National Nuclear Security Administration for the Department of Energy.

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Questions?