EG-GNDS
STATUS REPORT

DAVID BROWN (NNDC, BNL)
GOALS FOR EG-GNDS MEETING

- GNDS-1.9 & other news
- Publication status
- SG-43 news
- Approve (and name) next GNDS release
- “Lessons learned” from preparing next GNDS
- Plan for future
  - Format areas of focus (atomic, FPY, particle properties)
  - Mandate extension

AGENDA

<table>
<thead>
<tr>
<th>Duration</th>
<th>PDT (CA, USA)</th>
<th>CEST (Paris)</th>
<th>JST (Tokyo)</th>
<th>Topic</th>
<th>Presenter</th>
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<td>Welcome</td>
<td>D. Brown</td>
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<td>19:10</td>
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<td>API status / SG43</td>
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<td>Specifications vs requirements / ENDF-6</td>
<td>D. Brown</td>
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<td>Discussion on next release</td>
<td>C. Mattoon,</td>
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<td>Version numbers</td>
<td>J. Conlin</td>
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<td>Review of the GNDS Schema Build System</td>
<td>G. Gert</td>
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<td>Requests for format improvements</td>
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<td>Mandate extension</td>
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</table>
GNDS-1.9 & OTHER NEWS
What is being published?

1. GNDS-1.9 specifications @ 342 pages
2. ‘Policy Brief’ for general/high-level audience @ 2 pages
GNDS reading/writing implementations

<table>
<thead>
<tr>
<th>Code Name</th>
<th>Institution</th>
<th>Status</th>
<th>Availability when / where</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUDGE</td>
<td>LLNL</td>
<td>Full Implementation</td>
<td>Now / github</td>
</tr>
<tr>
<td>GIDI+</td>
<td>LLNL</td>
<td>Full Implementation</td>
<td>Now / github</td>
</tr>
<tr>
<td>AMPX</td>
<td>ORNL</td>
<td>Partial Implementation (1D XS + Cov)</td>
<td>Soon / ORNL site</td>
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<tr>
<td>NJOY</td>
<td>LANL</td>
<td>In progress</td>
<td>?</td>
</tr>
<tr>
<td>GALILEE</td>
<td>CEA</td>
<td>In progress</td>
<td>2021? / NEA</td>
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<tr>
<td>FRENDY</td>
<td>JAEA</td>
<td>Planned</td>
<td>2023? / NEA</td>
</tr>
</tbody>
</table>
Demonstration of capability

- LLNL transport codes have been updated to run problems using GNDS data via GIDI API
GNDS VS. ENDF-6

- All MF/MT’s in ENDF-6 manual have GNDS analogs
- All low level formats in ENDF-6 are either obsolete or have GNDS analogs
- Developed 4 page summary showing connection between ENDF-6 and GNDS.
  - Suggest making it an appendix to specifications
- TO DO: detailed (LIP/LAW/whatever level) comparison between formats
GNDS VS. SG-38 REQUIREMENTS

- Approved map/library/xsdir/etc file markup
- Proper treatment of EOS in TNSL data
- Some elements of atomic data
- Improved FPY markup
- Processed data types
- Radiation damage
- $dE/dx$

- Resonance things: Brune transform, CP RRR
- Improved TNSL markup
  (see proposal/TNSL)
- Improved documentation markup
  (see proposal/documentation)
- Support for the sandwich formula
  (see proposal/sandwichProduct)
- TO DO: detailed comparison between format and each requirement sub-bullet

Generally unwise to force format discussion until we see what evaluators can provide & see what users need
APPROVE & NAME
NEXT GNDS RELEASE
### Key: Needed for ENDF-6 Data, SG-38 Requirement

- ✓ = Approved
- 🚧 = Under Construction
- 😞 = We’ll Discuss

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>multiGroupStyleFix</td>
<td>Improve multi group data style</td>
<td>✓</td>
</tr>
<tr>
<td>interaction</td>
<td>Denote what kind of reactionSuite we’re dealing with</td>
<td>✓</td>
</tr>
<tr>
<td>childFunctions</td>
<td>Add functional container organization to low-level containers</td>
<td>✓</td>
</tr>
<tr>
<td>pids</td>
<td>Resolve possible discrepancy between branchings &amp; PoPs</td>
<td>✓</td>
</tr>
<tr>
<td>fissionFragmentData</td>
<td>Consolidate &amp; clean up fission data support</td>
<td>✓</td>
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<tr>
<td>TNSL</td>
<td>Improved TNSL markup, per requirements document</td>
<td>✓</td>
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<tr>
<td>atomicConfigurations</td>
<td>Support for electron sub shells, per ENDF-6 format</td>
<td>✓</td>
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<tr>
<td>externalFiles</td>
<td>Denote external resource that may need to be read before processing</td>
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<tr>
<td>orphanProduct</td>
<td>Fix inconsistency in orphan product organization</td>
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<td>Support for “sandwich product” covariance, per requirements document</td>
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<td>documentation</td>
<td>Improved documentation markup, per requirements document</td>
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<tr>
<td>outerDomainValue</td>
<td>Rename ‘value’ attribute for clarity in multi-D containers</td>
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<td>res_v1</td>
<td>Option #1 for resonance re-arrangement</td>
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<tr>
<td>res_v2</td>
<td>Option #2 for resonance re-arrangement</td>
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</table>
WHAT NEXT?

• “Push the button”

• Merge 12 approved formats into development branch

• Deconflict & merge development, master & NEA-publication branches

• Next version will be version 2.0; there are too many important changes for anything less!

• Figure out last 2+ proposals

• Create and process a few more we feel are needed for 2.0

• Will require a few extra meetings to push this through
LESSONS LEARNED FROM THIS RELEASE PROCESS
Specification Build System

1. JSON specification
   - Originally from XSD and GNDS Examples

2. Convert JSON to TEX
   - Specification text
   - Examples

3. Convert TEX to PDF

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**FOLDERS**

- gndsFormat
  - Conventions
  - DataContainers
  - Documentation
  - grokGNDS
  - PoPs
  - Styles
  - TopLevel
    - bibliography.bib
    - bibliography.tex
    - GNDDesignPhilosophy.md
    - GNDXMLStyleGuide.md
  - index_style.ist
  - intro.tex
  - Makefile
  - preamble.tex
  - README.md
  - specifications.tex
  - TODO.txt

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Slide from G. Gert
Proposed Improvements

- **Visualization Tool**
  - Complement to Schema Report
  - Sourced from either XSD or JSON
    - Compare XSD to JSON
    - Remove inconsistencies
    - Translate between XSD and JSON

- **General Updates**
  - Reduce Complexity
  - Compliment dynamic examples with static ones
General Updates

- Expand use of `__namespace__`
  - Resolve incorrect links:
    - `reactionSuite/reactions/reaction/outputChannel/products/product`

- Ordering of nodes
  - Should it be imposed?

- Static TEX files for examples in GNDS report
  - Complement existing dynamic examples from JSON

- Official JSON schema specification
  - Latest draft: September 2019
  - [https://json-schema.org](https://json-schema.org)
PLANNING FOR THE FUTURE
On unifying the definition of discrete, excited and isomeric states across the nuclear data model and form frames

J.-Ch. Sublet
UH-NDSU
International Atomic Energy Agency
Nuclear Data Section

"WalletCraft" - Object-oriented databasing for nuclear data

Adam Hayes, Benjamin Shu, Libby McCutchan, Shaofei Zhu, Alejandro Sonzogni
National Nuclear Data Center
Brookhaven National Laboratory
WPEC EG-GNDS
12 May 2020

Meeting of the WPEC Expert Group on the Recommended Definition of a General Nuclear Database Structure (EG-GNDS)

Atomic Data

Sandra Parlati¹, Maria Grazia Pia², Elisabetta Ronchieri³, Paolo Saracco²

¹INFN Laboratori Nazionali del Gran Sasso, Assergi, Italy
²INFN Sezione di Genova, Italy
³INFN CNAF, Bologna, Italy

Foreword

Due to limited time allocation, mainly an introduction to topics for discussion

FISSION PRODUCT YIELDS

D. Brown, A. Sonzogni, A. Mattera (NNDC, BNL)
On unifying the definition of discrete, excited, and isomeric states across the nuclear data model and form frames. J.-Ch. Sublet, UH-NDSU, International Atomic Energy Agency, Nuclear Data Section.

NAMING CONVENTION & UNIFICATION OF BOUND & UNBOUND STATES IN GNDS


FISSION PRODUCT YIELDS
D. Brown, A. Sonzogni, A. Mattera, NNDC, BNL.

FPY EVALUATIONS ARE HARD AND WE ONLY HAVE A PARTIAL PICTURE OF FORMAT NEEDS

Fissile Product Yields

Foreword
Due to limited time allocation, mainly an introduction to topics for discussion.

PRODUCT NEEDS

INFN NEEDS SUPPORT TO HELP KEEP UP VALIDATION WORK + THERE ARE NEW FORMATS TO DEVELOP.
BIG QUESTION: DO WE SUBSUME THE WORK OF SG-43 INTO EG-GNDS?

- SG-43 is wrapping up
- The work isn’t done — it should be an ongoing task!
- The effort is tightly coupled with the format development itself
- This is a joint decision for SG-43 and EG-GNDS
- EG-GNDS is OK with it