

# GNDS status and development

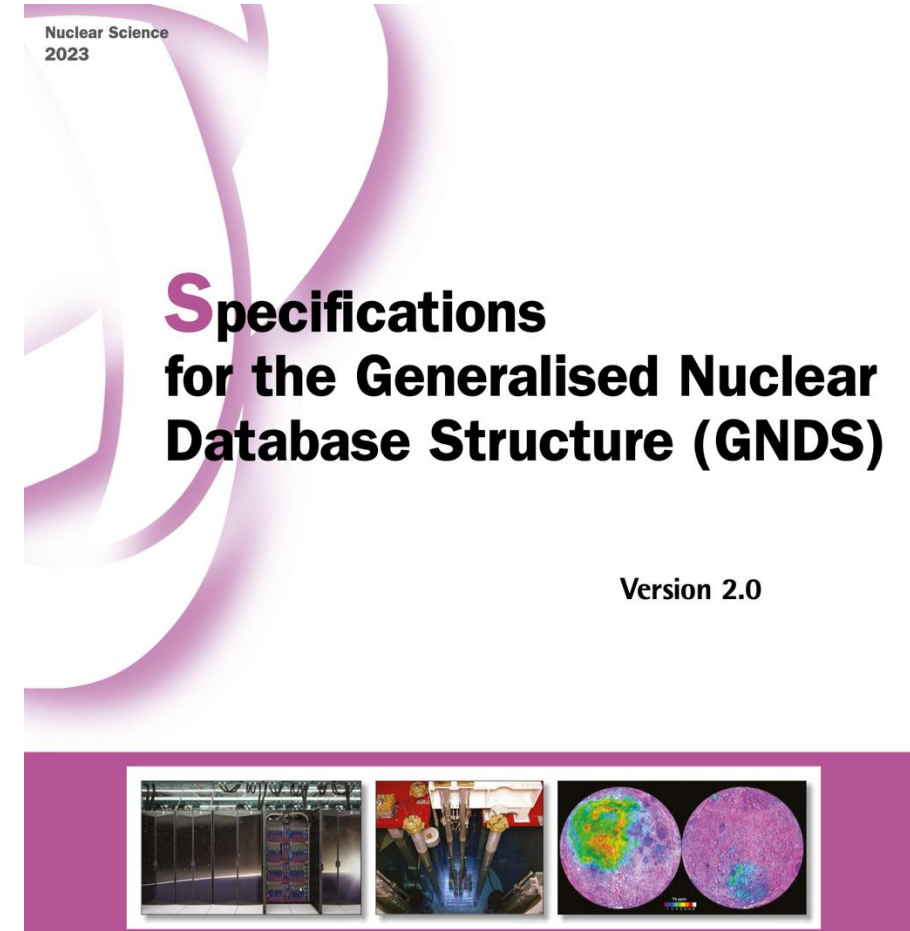
CSEWG formats / processing session  
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# Generalised Nuclear Database Structure (GNDS)

- Adopted in 2018 as a new international standard for storing evaluated and processed nuclear reaction and decay data
  - GNDS-1.9 was the first official version
- GNDS specifications version 2.0 [was published](#) in September 2023
  - Biggest impact was on the organization of TNSL data



# GND5-2.1 (tagged but not yet published) is mainly a bug-fix release BUT adds one important new feature

- Fixes broken links, fixes typos and clarifies language in the specification document, converts some data types into enumerated lists
- Adds the <targetInfo> section including isotopic abundance information

```
<targetInfo>
  <isotopicAbundances>
    <chemicalElements>
      <chemicalElement symbol="0">
        <nuclides>
          <nuclide pid="016" atomFraction="0.99762"/>
          <nuclide pid="017" atomFraction="0.00038"/>
          <nuclide pid="018" atomFraction="0.002"/></nuclides>
        </chemicalElement></chemicalElements>
      </isotopicAbundances></targetInfo>
```

# ENDF/B-VIII.0 and ENDF/B-VIII.1 are both available from the NNDC in GNDS format

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- VIII.1: <https://www.nndc.bnl.gov/endl-library/B-VIII.1/GNDS/>
  - Available in GNDS-2.0, with the TNSL sub-library in GNDS-2.1
- VIII.0: <https://www.nndc.bnl.gov/endl-b8.0/gndsfiles.html>
  - Available in GNDS-1.9 and 2.0
- Some evaluations still have format issues or internal inconsistencies that prevent translating to GNDS, but we are working with other library projects (JEFF, JENDL, TENDL) to try and ensure that future library releases translate ‘cleanly’ to GNDS

# What's next for GNDS development?

- Several new proposals for expanding the types of evaluated data in GNDS are already under development:
  - Vincent just presented on expanding PoPs to better support decay data from ENSDF.
  - GRIN project: need new ways of storing photon distributions to support better photon decay cascades, including continuum-to-continuum and continuum-to-discrete transitions.
  - Expand MT=504 incoherent photon scattering (in photo-atomic libraries) into multiple reactions to support scattering off specific electron subshells. Requires adding the Compton profile for each subshell, then outgoing photon and electron distributions can be obtained from the Compton profile.
    - Thanks to summer student Jordan Northrop for implementing this option in FUDGE and GIDplus!

# What's next for GNDS development?

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- Add more containers for storing derived / processed data, moving them from the 'applicationData' section into the main GNDS hierarchy
  - URR probability tables (and potentially full conditional cross-section pdfs)
  - Pre-summed multigroup data (e.g. transfer matrices summed over all reactions)
- Next EG-GNDS meeting will be held during WPEC, June 2 – 6 2025. Please participate if you are interested in contributing to GNDS development!



# Why is switching to GNDS worth the effort?

- GNDS takes advantage of off-the-shelf software: XML libraries, schema checking, XPath queries, XSLT for web visualization. JSON support is also coming soon.
- Search within a GNDS file either with an API like FUDGE or using standard tools like grep / text editors
- For now, *evaluated* data in GNDS is backwards-compatible with ENDF-6 so institutions can continue to write back and use an ENDF-based workflow. We encourage you to try using GNDS to better understand nuclear data libraries!



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