Resonance and Covariance Processing in GNDS

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General comments

- Since AMPX always inherits from a base container each element optionally has a label, index, value and valueType (default Float64)
- If a value attribute is used without a valueType attribute, AMPX does not know how to handle it:
  - Currently that happens for spin (given as a fraction) for J element in unresolved resonance range
- Spin in PoPs has units, do we want units for spin in the resonance range?

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Converting between ENDF and GNDS

- If converting from ENDF to GNDS sometimes there is no direct conversion. Examples:
  - Covariance matrices for lumped reaction with undefined lumped reaction in ENDF
  - Degree of freedom in the URR (do we want to allow double or only integer).
- If we want to convert back, these inconsistencies need to be preserved. Caleb suggested a flag to preserve/omit these inconsistency.
- How should this flag be used for official GNDS release?

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Resonance discussion

- Option to set the penetrability on reaction basis not only globaly. It is written that way in the GNDS manual, but not set by FUDGE.
- Radius information needs to be changeable from the default values in URR and RR. GNDS manual already allows a PoPs override, current GNDS files do not contain it.

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Resonance Range Covariance Data

- The resolved range in File 32 can have a different range (smaller) than in File 2.
  - Currently explicitly stated for URR
  - rowData element can take this information but it is not currently set (this occurs in ENDF/VIII.0 for example for n-013_Al_026m1-covar.xml)
  - We should/do require one resonance parameter block for a resonance parameter covariance matrix. This is explicitly stated for RR but not for URR. In URRR there should be a container element averageParameterCovariances with a link to the resonance parameters. We would still need to test that the link in averageParameterCovariances is compatible with the one in averageParameterCovariance.
  - We could give the range in averageParameterCovariances as opposed to in gridded2d in averageParameterCovariance, as the range should be the same for all gridded2d.

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Resonance Range Covariance Data cont.

- We asked for U235 resonance parameter covariance and thank you for adding it. Unfortunately, I can’t read it due to our choice of XML parser - so I cannot test the matrix. There is a workaround by changing parser but I did not have time to investigate.
- Currently Caleb added two evaluated styles that do not inherit from one another.
  - How do we handle overlap, i.e. avoid double counting in the RR.
  - How do we make the inheritance clear.

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Processing of Covariance Data

- There were some differences if processing covariance and comparing ENDF and GNDS formatted files.
  - LB=2 matrix is not translated correctly – Caleb already fixed in his FUDGE version
  - Compact matrix: Correlation elements (given as integers) need to have 0.5 added to it according to the ENDF (and SAMMY) manual.
  - Radius uncertainty is given as uncertainty not as matrix element – FUDGE does not translate correctly.
  - For MLBW compact format, uncertainties are given, not matrix elements - FUDGE does not translate correctly.

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