



... for a brighter future

Questions to Reflect upon in the Post ENDF/B-VII.0 Era

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If virtually everyone worldwide uses one code system (NJOY/MCNP), why doesn't everyone? ... And perhaps everyone should?

RDM: That's a trick question, because I think that everyone today does use NJOY/MCNP. If not directly, then indirectly (as a standard).

I posed this question solely because virtually all of the validation calculations for ENDF/B-VII.0 utilized NJOY/MCNP. It does not seem correct to identify agreement between independent analyses with this package as verification of the methods (or even agreement with NJOY/TRIPOLI) – for the possibility of “single mode failure”. However, it does seem ludicrous to elevate that possibility above the certainty that other processing paths struggle to produce the “correct” answer.

It would be valuable for us to renew the identification and reduction or elimination of the small code differences.

If the ICSBEP Handbook contains almost 4000 configurations and our validation effort utilized only ~400 of them, then do we really need any more new benchmarks?

RDM: It will be natural for the activity of this benchmark project to “wind down” over time. In fact, in some sense, it already has. But this highlights the need for the continued benchmark effort to focus on measurements which either address current gaps in the benchmark data or **measurements which address current discrepancies in the performance of modern tools and data to predict benchmarks currently in the handbook**. That is, this is a particularly valuable time for the ICSBEP to utilize the results of the ENDF/B-VII.0 validation analyses to focus on benchmark data which address current discrepancies. Fortunately, I can assure you that the project has already been plugged into our preliminary testing and has already moved to address some of these needs. Not only will this important prioritization continue, but the close link between the ICSBEP and CSEWG to utilize the new benchmarks will continue.

[The ENDF/B-VII.0 validation effort also highlighted the need for “other than k-eff” benchmarks – but that comes up in a subsequent question.]

***There was only limited “reactor” testing of ENDF/B-VII.0.
(Fortunately, there was a good contribution from the EU.)
Does that mean the ENDF/B data has met their needs?***

RDM: Well as they say, “not exactly.” It is true that we have met most of their needs. Let’s face it, reactors have been (and continue to be) built using much poorer nuclear data. It means that the heralded resurgence in nuclear power in the US still has not evolved to the point of actual design of an advanced reactor. It is also true that advanced reactor design has greater need for other data, such as fuel and material property data. But it is acknowledged that improved nuclear data would lead to economic advantages in advanced reactors. The number one request for improved data from the advanced reactor community is: quality covariance data. (That is also at the top of ENDF/B-VII.1 priorities.) Fortunately, another of the strong data-related activities within the reactor activities is the WPEC SG 26 which is tasked with identifying (quantifying) their data needs. Another strong request (and current activity) is to capture and preserve “other than criticality” critical experiments. This would likely be better realized through support of the IRPhEP.

***Is ENDF/B-VII.0 an evaluated file or an adjusted file?
...To what extent should version VII.n be “tuned” to match
integral measurements?...Should we consider production
of ANDF/B-I, the Adjusted Nuclear Data File Version I, as
in the “Global Nuclear Data Initiative”?***

RDM: Well as they say, “yes, no, and yes.” At some point in the perhaps not too distant future, the GNDI concept would seem to be the most rigorous way to achieve good performance of the data files. As initially conceived this would require a tight linkage (read “total cooperation”) between the data producers and the data users. We can initiate this linkage with efforts like WPEC SG 26. We should also be answering some related questions:

Do the covariance data for ENDF/B-VII.0 reflect the inclusion of integral data, such as Godiva?

Should the covariance data for ENDF/B-VII.0 reflect its evaluation or its performance?

Should inclusion of integral data be done more formally or at all?

How are these covariance data to be applied?

Are there other evaluation/validation questions you have that would be good for us to consider?

Questions or Comments