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**NUCLEAR ENERGY AGENCY  
MANAGEMENT BOARD FOR THE DEVELOPMENT, APPLICATION AND VALIDATION OF  
NUCLEAR DATA AND CODES**

**The Joint Evaluated Fission and Fusion (JEFF) Nuclear Data Library Co-ordination  
Group**

**Joint Evaluation Fission and Fusion (JEFF) Co-ordination Group Meeting**

**Summary Record**

E125358

1 December 2023  
Hybrid Meeting  
NEA Headquarters, Boulogne-Billancourt and Zoom

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**JT03535677**

## Opening and introduction of the participants

1. The Chair of the Co-ordination Group (CG), **Mr. Arjan PLOMPEN**, opened the meeting and welcomed the participants. The list of participants is provided in **Appendix 1**.
2. **Mr. Arjan PLOMPEN** mentioned that the Nuclear Data Week program was successful, featuring numerous valuable contributions. There is considerable work in progress, although not all of it is specifically tied to JEFF-4.

## Adoption of the Agenda

3. **Mr. Alexey Stankovskiy** suggested adding a point on the documentation of evaluations and on the preparation of the JEFF-4 paper. The proposed agenda (**Appendix 2**) was approved with that modification.

## Co-ordination Group membership

4. **Mr. Gasper Zerovnik** informed the CG that he will leave his current position and will be replaced by **Mr. Bor Kos** as JSI representative.
5. **Mr. Arjan Plompen** observed that following Mr. Luiz Leal's retirement, the IRSN no longer maintains a representative in the CG. It is at the discretion of the IRSN to choose whether to appoint a replacement or not.

## JEFF-4T3 release

### *Discussion:*

6. The U-238 file presents significant challenges, affecting the planned December 15 release date for JEFF-4T3. The decision at hand involves either sticking to the schedule with the U-238 from JEFF-4T2.2 or delaying the release until a new reliable U-238 file is available.
7. **Mr. Robert Mills** expressed the importance of the U-238 file, suggesting that it is preferable to wait for it to properly test the library. The decision hinges on the speed of its completion.
8. **Mr. Cyrille De Saint Jean** mentioned that the U-238 file could potentially be ready in January. CEA-BRC aims to address the file's issues and collaborate with Cadarache colleagues by the end of the year or the beginning of January. Substantial effort has been invested in the evaluators' work on the Big-3, involving new experiments, models, and significant changes. The consideration revolves around the prospect of a new and improved Big-3 set for JEFF. The dilemma lies in whether it should be flawless or if the progress made so far can be appreciated. Anticipating a new U-238 file in a few months, the decision arises: should we await its completion or stick with the previous version?
9. **Mr. Arjan Plompen** pondered the purpose of a test release for the library. The primary aim is to efficiently progress towards a JEFF-4 version worthy of release. Meeting deadlines is not a primary objective. The intention is to release a JEFF-4 version with completed testing. While December next year is a target, the flexibility to delay by half a year exists if conviction is lacking.
10. **Ms. Daniela Foligno** remarked that while deadlines are crucial, they can, at times, be the cause of issues. The rushed assembly of the U-238, leading to its deficiencies, could be attributed to the need to meet a deadline.

**Conclusions:**

11. The release of JEFF-4T3 will be postponed until the delivery of the new n+U-238 file. CEA is tasked with providing the Databank (**Daniela Foligno**) with a planning and delivery date for the file. The correctness and behaviour of the file in all prevalent calculations will be verified by consulting with testers before the JEFF-4T3 release. The preferred delivery date is in January or no later than the end of February, while emphasizing the importance of a correct file over meeting the deadline.
12. TENDL-2023, which will be released at the end of 2023, will be used for all the current TENDL-2021 files in JEFF-4T2. Identified JENDL-4 adopted files in JEFF-4T2 (Cf-250, Cf-251, Am-242, Am-242m) will be substituted with JENDL-5 files, pending verification of their correct processing by **Alexey Stankovskiy** and **Oscar Cabellos**. (Task completed, December 2024, JENDL-5 files can be processed with NJOY).
13. **Mr. Helmut Leeb** will identify available n and p-induced ENDF-formatted files for higher energies, incorporating them into JEFF-4T3 before the deadline. **Mr. Alexey Stankovskiy** will provide support based on studies conducted at SCK CEN in relation to MYRRHA development. This process can continue after the release of JEFF-4T3. Files identified for inclusion after the release of JEFF-4T3 will be included in JEFF-4T4.

**JEFF-4.0: plan, validation, and documentation****Plan**

14. The current planning involves a targeted release on December 15, 2024. The Coordination Group will decide to go ahead with the release on December 15, 2024, or otherwise, in its meeting on November 29, 2024.
15. Satisfactory performance is the key consideration for the release. The Coordination Group outlined the criteria including benchmarking against JEFF-3.3, expanded-scope benchmarking, library completeness, and file processing. **Mr. Arjan Plompen** and **Ms Daniela Foligno** will invite the CG to draft a list of criteria that JEFF-4 benchmarking will need to meet.
16. The reference database for JEFF-4 transport/general purpose files is the AME2020 recommended mass table.
17. **Mr. Olivier Serot** will propose a new section on uncertainties for the energy release in fission to align with FY and DD sub-libraries. These sections will concern thermal fission of U-235 and Pu-239.
18. Covariances not representable in ENDF format will be provided in a text format, considered an official part of the JEFF-4 library. The evaluators will propose the text format.
19. **Mr. Alexander Konobeev** and **Mr. Dieter Leichtle** will explore the feasibility of including a DPA library in the JEFF-4 release. An alternative option involves deferring this matter to the processing stage. If producing the DPA library is free from new research, creating the processing route at NEA is the preferred solution.
20. The Coordination Group has opted not to develop a dedicated activation file specifically for JEFF-4. Instead, the processing phase is expected to facilitate the creation of pertinent JEFF-4 activation data. Notably, processing for FISPACT-II at NEA will establish the standard route for the essential group-wise activation library (used by FISPACT-II). **Mr. Mark Gilbert** will contact **Jean Christophe Sublet** and the IAEA evaluators responsible for the INDEN files, which presently do not conform to the necessary PREPRO requirements. The objective is to arrive at either:

- a. Implementing an alternative processing route at NEA for INDEN files, or
- b. Modifying the INDEN files to meet the requirements adopted for JEFF-4.

## **Validation**

### Depletion

21. Depletion testers are encouraged to consistently perform calculations for the UAM pin cell, enabling the comparison of results across different processing routes, core calculations, and depletion solvers, establishing a mutually agreed numerical benchmark.
22. Depletion testers are urged to explore the feasibility of utilizing the Duke IRPHE benchmark, as presented by **Steven van der Marck** and **Bernard Erasmus**, as a reference experimental benchmark. This approach facilitates direct comparisons of methods and calculation schemes. Detailed information about the Duke benchmark, including insights from the IRPHE review process, would be particularly valuable.
23. CEA will undertake an investigation to determine if the Fessenheim startup data can be transformed into an experimental benchmark suitable for systematic depletion testing.
24. The aforementioned considerations should not dissuade depletion testers from providing feedback based on their preferred benchmarks. On the contrary, independent feedback is actively encouraged.

### ICSBEP

25. **Mr. Oscar Cabellos** submitted detailed model inputs to the NEA GitLab. Ensuring consistent presentation of the Mosteller results, using the same format and model for each benchmark, is preferred. The option to develop a script for generating identical plots after each library update is available.
26. Standardization for the broader range of ICSBEP cases identified by IRSN would be beneficial, encompassing the submission of inputs to NEA and the creation of standardized plots.

### Fast reactor

27. Depletion testing received significant attention, but there was insufficient focus on and representation of fast reactor testing. Urgent re-evaluation and prioritization of fast reactor benchmarking are needed. CG members are tasked with exploring and promoting such benchmarking efforts.

### Inventory estimation

28. Inventory estimation testing should be delineated as a distinct section in the JEFF paper. CG members are urged to promote and support such testing initiatives.

## **Documentation**

29. JEFF-4 documentation will include a brief summary paper and more detailed papers for added clarification and supplementary information.
30. **Mr. Arjan Plompen** will engage in negotiations with the editors of EPJA (or EPJN) regarding the potential publication of a special issue containing both the summary paper and the detailed papers in a single volume.
31. The timeline for the paper aims for the submission to be ready by the release date of the JEFF-4 library on December 15, 2024. The actual publication, including the summary paper and the special issue, may be subject only to delays associated with the review process.

32. Preparation of the JEFF4 paper will use Latex in an Overleaf environment provided by NEA.
33. **Mr. Arjan Plompen** presented the paper's structure, following the JEFF-3.3 paper with modifications. Further adjustments will be made dynamically as needed.
34. **Mr. Arjan Plompen**, in consultation with the bureau and the CG, will identify contributors and lead authors of the different sections. An initial proposal is appended, based on the current selection of session chairs and recent JEFF contributions.
35. The current section 6 of the overview paper establishes conventions for contributors. These conventions can be refined in consultation with contributors but will be finalized after the JEFF CG meeting on April 26, 2024. The section will remain in the document for reference until submission to the editor.
36. The current author list is provided as an example, derived from the JEFF-3.3 paper. It should be erased and re-established based on incoming contributions. Conventions for adding and removing authors should be verified. The script, not currently activated automatically, is required for proper author affiliation list sorting, considering that the EPJ template does not automatically sort affiliations in order of appearance. The author list, listed alphabetically with exceptions for lead authors, is currently a proposal and may be adjusted based on contributions. (Note: Manual changes made in Overleaf may show incorrect numbering, and the script will be rerun from time to time to correct the author and affiliation lists.

### **Adjustments**

37. The JEFF Coordination Group has endorsed the establishment of a JEFF-4 adjustment working group. The objective of the working group is to produce a JEFF-4 adjusted library that has the support of the entire community of JEFF evaluators. The working group will define its scope, specific goals, working methods, and develop a comprehensive plan. **Mathieu Hursin** from EPFL, will serve as the coordinator for this working group.
38. It was collectively agreed that the JEFF-4 general-purpose file, as agreed for release, will serve as the prior for the adjusted data file. Consequently, it is imperative for the JEFF-4 general-purpose library to include a comprehensive set of covariances.
39. The terminology used will avoid the term 'unadjusted', with the phrase 'general-purpose file' denoting the file scheduled for release on December 15, 2024

### **Next JEFF Nuclear Data Week**

40. The JEFF Nuclear Data Weeks scheduled for 2024 are as follows:
  - a. April 22-26, 2024
  - b. November 25-29, 2024
41. Fusion sessions are planned for April 22, 2024, and November 25, 2024.
42. Coordination Group (CG) meetings are scheduled for the mornings of April 26, 2024, and November 29, 2024.
43. The sequence of sessions from Tuesday through Thursday will be as follows:
  - a. Experiments
  - b. Thermal Scattering
  - c. Fission Observables

- d. Decay Data
  - e. Theory
  - f. Evaluations
  - g. Processing
  - h. Benchmarking
  - i. Depletion
  - j. JEFF-4 Status
44. The duration and timing of sessions on Tuesday through Thursday will be determined by the number and length of contributions, with finalization occurring up to 3 weeks before each respective JEFF meeting. This proposed schedule will be published on the NEA JEFF webpage before the conclusion of 2023.

### The APRENDE project

45. The Coordination Group (CG) will oversee the advancement of the APRENDE project and actively promote the timely delivery of its outcomes to bolster the development of the JEFF-4.1 library release. The envisaged timeframe positions the JEFF-4.1 release in the period subsequent to the conclusion of APRENDE in 2028, making a release in 2029 deemed suitable. This timeline is recommended to be explicitly incorporated into the upcoming JEFF mandate.

### Access to non-DataBank members: JEFDOCS vs test libraries

#### *Discussion*

46. **Mr. Mark Kellet** highlighted the distinction between JEFDOCS and test libraries, noting that they serve different purposes. JEFDOCS were intentionally unavailable to encourage the presentation of preliminary or confidential information within the JEFF community. In contrast, for test libraries, feedback from non-DB members is welcomed and considered differently.
47. **Mr. Oscar Cabellos** believes that JEFDOCS should be accessible to everyone, similar to presentations from CSWEG meetings, where individuals could choose not to share their presentations by not uploading them to INDICO. However, if they decided to share, the information would be open to everyone. Conversely, he suggests that the test library should only be accessible to those actively working on it, with only final releases made public.
48. **Mr. José Ignacio Marquez Damian** emphasized the importance of collaborating with CSEWG. Some JEFF members already have access to their GitLab. He suggested that it would be beneficial to make efforts toward cross-comparing the libraries through a bilateral agreement, enabling access to each other's systems for validation purposes. The concern arises when sharing is not reciprocal, as seen with the Chinese. However, Ignacio expressed that with the Americans, establishing a formal agreement for mutual sharing would be beneficial.
49. **Mr. Robert Jacqmin** conveyed that regarding private exchanges with other scientists, individuals are free to engage as they see fit. Nevertheless, in the context of formal inquiries concerning JEFF policy and procedures, a distinct process is invoked. The formulation of high-level decisions necessitates the submission of a formal proposal.
50. **Ms. Daniela Foligno** explained her reason for adding this point to the agenda, stating that some US members proposed volunteering to test the library. For instance, Charles Wemple volunteered

to test fission yields. Daniela sought permission from Arjan, who granted it, allowing Charles to test the files, identify an issue, provide feedback, and contribute valuable insights. Similarly, Caleb Mattoon volunteered to process T3 with Fudge to detect any processing issues in GNDS. Daniela encounters such issues and faces the question of whether to grant access or not. She expressed the need for clarity on whether to draft a protocol to streamline such exchanges and make the process more straightforward.

51. **Mr. Arjan Plompen** expressed his appreciation for the voluntary sharing of information, highlighting the benefit of avoiding the formal permission process typically associated with publishing. He pointed out that presentations from the US undergo screening and approval by their senior management, which limits the extent of a free exchange of information. He expressed that providing unrestricted access to documents shared in the past, including his own, would not be feasible as clearance for display was never sought. Making historical records available to a broader audience would require a collective decision and agreement with the data bank management and MBDAV members. However, he noted that such a change could potentially impede a fully open exchange of information. On a different note, he suggested that for the test libraries, exceptional access could be granted exclusively to individuals willing to assist in testing.
52. **Mr. Mark Gilbert** noted that if access to the test libraries is extended to individuals outside the JEFF community, it is crucial to clarify the terms of use. Reporting issues openly could be irreversible, as it becomes permanently associated with JEFF-4 unless properly managed. Mark emphasized the need for clear conditions if external individuals are involved in testing and validation. Those willing to contribute to testing without any intention of reporting or publishing elsewhere would be acceptable, as long as they understand the specific terms of their contribution. Additionally, he highlighted that if individuals offer to test something and are tasked with specific testing, the understanding should be that they report back to the JEFF community, not to anyone else. This protocol is essential for external contributors to comprehend.

**Conclusions:**

53. Individuals who are not Databank members will be granted access to JEFF-4 pre-releases based on their relevance to the JEFF project. It is expected that their feedback will be directed to the project and not shared with third parties.
54. JEFF documents (jefdoc, effdoc) will not be publicly accessible.
55. Requests for access or consultations by non-Databank members will be subject to approval by the JEFF chair, who will seek agreement from the JEFF bureau or Coordination Group (CG) in case of doubt.
56. Similar procedures apply to attendance at JEFF meetings for non-Databank members.

## Need for new evaluators

57. The Coordination Group (CG) acknowledges the necessity for collaborative efforts to enhance future evaluation capacity and commitment.
58. **Mr. Arjan Plompen** will develop a concise informational leaflet, drawing from insights gained at the IAEA CG67 event and the NEA Stakeholder event. This leaflet can be utilized to seek support from decision-makers.
59. Training initiatives will be communicated to the community, such as the Nuclear Resonance Analysis School scheduled for May 13-17 in Geel, Belgium, organized by JRC+SCK CEN.

60. CG members will advocate to their respective management, emphasizing the significance of the issue and the imperative for a sustainable solution.

### Appendix 1: List of participants and initials

Initials	Name	SURNAME	COUNTRY
OC	Oscar	CABELLOS	SPAIN
CDSJ	Cyrille	DE SAINT JEAN	FRANCE
DF	Daniela	FOLIGNO	NEA
MG	Mark	GILBERT	UNITED KINGDOM
MK	Mark A.	KELLETT	NEA
IK	Ivan Alexander	KODELI	SLOVENIA
HL	Helmut	LEEB	AUSTRIA
DL	Dieter	LEICHTLE	GERMANY
JIMD	Jose Ignacio	MARQUEZ DAMIAN	ARGENTINA
RM	Robert W.	MILLS	UNITED KINGDOM
AP	Arjan	PLOMPEN	EC
DR	Dimitri	ROCHMAN	SWITZERLAND
OS	Olivier	SEROT	FRANCE
AS	Alexey	STANKOVSKIY	BELGIUM
TW	Tim	WARE	UNITED KINGDOM
GZ	Gasper	ZEROVNIK	SLOVENIA
MH	Mathieu	HURSIN	SWITZERLAND
AH	Andrew	HOLCOMB	NEA
SVDM	Steven	VAN DER MARCK	NETHERLANDS
RJ	Robert	JACQMIN	FRANCE
AK*	Alexander*	KONOBEEV*	GERMANY

\* This person did not attend the meeting, but is mentioned in the Summary Record

## Appendix 2: Agenda

1. Co-ordination Group membership
2. JEFF-4T3 release
3. JEFF-4.0: plan, validation, and documentation
  - a. Plan
  - b. Validation
    - i. Depletion
    - ii. ICSBEP
    - iii. Fast reactor
    - iv. Inventory estimation
  - c. Documentation
  - d. Adjustments
4. Next JEFF Nuclear Data Week
5. The APRENDE project
6. Access to non-DataBank members: JEFDOCS vs test libraries
7. Need for new evaluators

### Appendix 3: List of actions

Action number	Responsible	Action
1	DF	Remove Luiz Leal and Maurizio Angelone from the CG mailing list, and replace Gasper Zerovnik with Bor Kos (done)
2	CEA	Provide a new n+U-238 file before the end of February
3	DF	Replace TENDL-2021 files with TENDL-2023, and JENDL-4 files with JENDL-5
4	Validators	Test the new U-238 file before the adoption into the library
5	OC, AS	Process the JENDL-5 files to be sure that they can be processed correctly (done)
6	HL	Identify available n and p-induced ENDF-formatted files for higher energies and incorporating them into JEFF-4T3
7	All	Precisely articulate the anticipated performance of JEFF-4.0, encompassing comparisons with JEFF-3.3 through benchmarking, broader benchmark assessments, comprehensive library coverage, and file processing. The purpose of establishing these criteria is to prevent any potential misunderstandings upon the release.
8	Evaluators	Use AME2020 as reference databases for atomic masses and reaction energies
9	OS	Propose a new section on uncertainties for the energy release in fission to align with FY and DD sub-libraries.
10	Evaluators	Provide covariances in a text format in case they are not representable in the ENDF format
11	AK, DL	Explore the feasibility of including a DPA library in the JEFF-4 release
12	MG	Contact Jean Christophe Sublet and the INDEN evaluators about the processing issues for FISPACT-II
13	Depletion testers	Consistently perform calculations for the UAM pin cell
14	OC	Find a second depletion test case that everyone can use
15	Depletion testers	Explore the feasibility of utilizing the Duke IRPHE benchmark
16	CEA	Determine if the Fessenheim startup data can be transformed into an experimental benchmark for depletion testing
17	Validators	Provide a consistent presentation of the Mosteller results, using the same format and model for each benchmark
18	CG	Exploring and promoting fast reactor benchmarking efforts
19	CG	Exploring and promoting inventory estimation testing
20	AP	Engage in negotiations with the editors of EPJA (or EPJN ) regarding the potential publication of a special issue

21	AP	Identify contributors to different sections of the JEFF-4 paper
22	MH	Coordinate the JEFF-4 adjustment working group
23	DF	Replacing the term 'unadjusted' with the phrase 'general-purpose file' when denoting the file scheduled for release on December 15, 2024
24	DF	Book the rooms for the next JEFF Nuclear Data Week and publish a draft schedule on the website
25	CG	Oversee the advancement of the APRENDE project and actively promote the timely delivery of its outcomes to bolster the development of the JEFF-4.1 library release
26	DF	Grant access to JEFF-4 pre-releases to non-DB members based on their relevance to the JEFF project. Clarify that their feedback must be directed to the project and not shared with third parties
27	DF	Maintain restricted access to JEFF documents (jefdoc, effdoc) and do not make them publicly available.
28	DF	Seek approval from the Chair of the JEFF project to allow the participation of individuals who are not members of the Data Bank in the JEFF meetings.
29	AK	Investigate the possibility of having a JEFF-4 displacement library, important for the fusion community
30	AP	Write a concise informational leaflet about the need for new evaluators
31	All	Highlight the need for additional evaluators to the attention of their respective management and request a lasting solution.
32	AP, DF	Mr. Arjan Plompen and Ms Daniela Foligno will invite the CG to draft a list of criteria that JEFF-4 benchmarking will need to meet.