NEA
NUCLEAR ENERGY AGENCY

Current Initiatives of the WPEC Nuclear Data Activities

Working Party on International Nuclear Data Evaluation Co-operation

Chair: Osamu Iwamoto, JAEA

Anastasia GEORGIADOU*

Antonio JIMENEZ-CARRASCOSA

Technical Secretariat

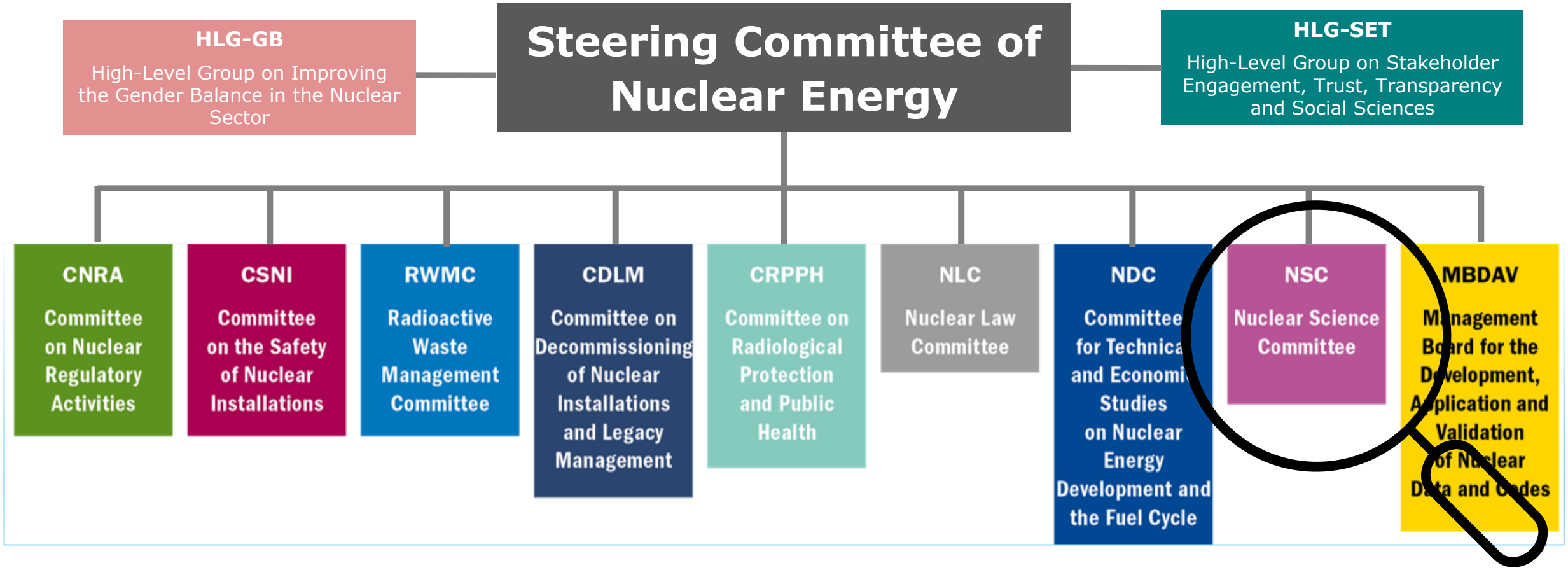
(NEA/SCI/DB)

NEA member countries

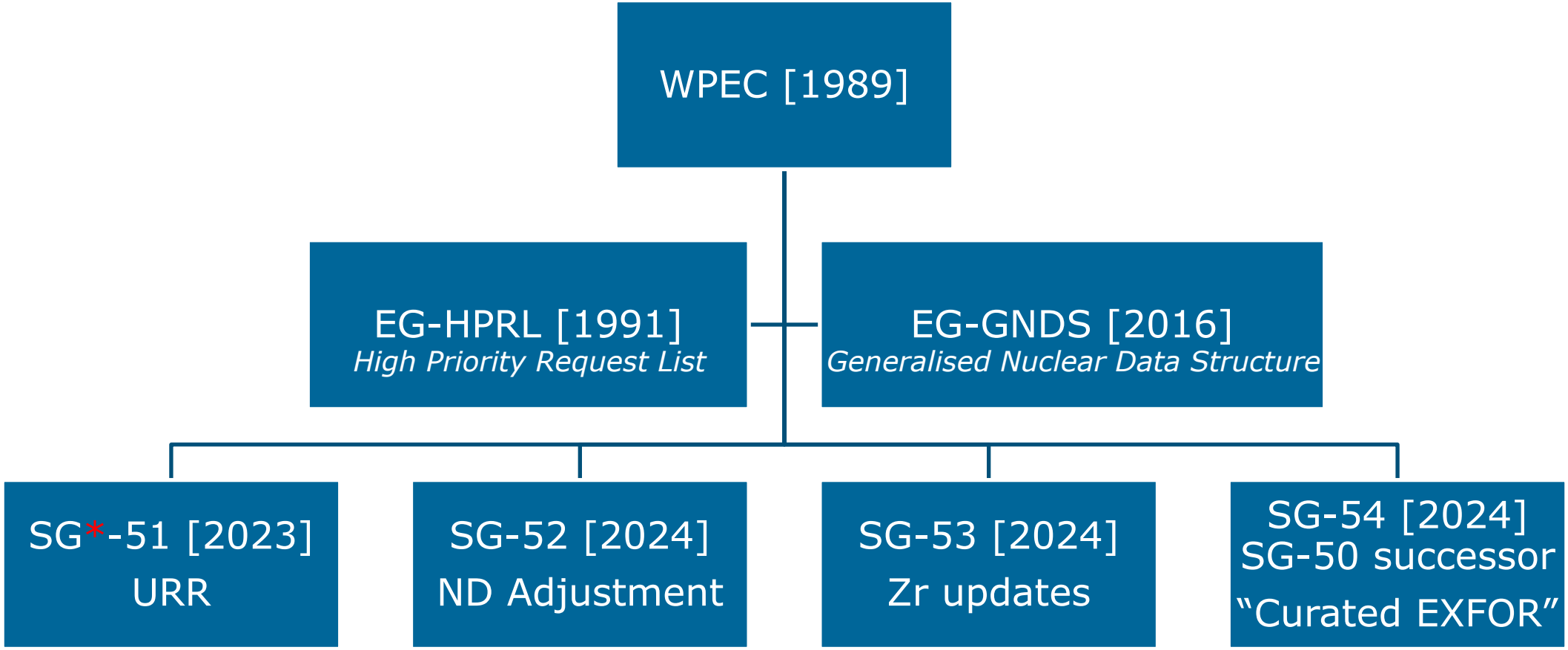
The NEA's current membership consists of 34 countries in Europe, the Americas and the Asia-Pacific region. Together they account for approximately 82% of the world's installed nuclear capacity.

NEA: International Nuclear Cooperation at Work

NEA Committee Structure



WPEC Organisational Chart



*SG - Subgroup

SG 51: Evaluation, Processing and Validation in the Unresolved Resonance Region *Active SGs*

Coordinators:
Vladimir Sobes, UTK
Jesse Brown, ORNL

Monitors:
Roberto Capote, IAEA
Kenichi Tada, JAEA

Meetings 2025:
WPEC Annual meeting
3 June 2025
Brussels, Belgium

Goals

- Quantification of application response differences for various definitions of beginning and end of the URR for fissile and non-fissile materials.
- Coordinated work planned across formats, processing codes, and transport applications based on SG32 recommendations.
- Next steps include defining sensitive benchmarks and establishing URR probability table validation exercises along with URR uncertainty quantification.

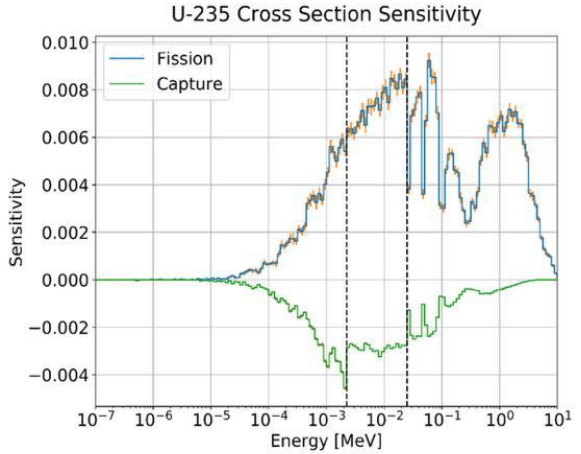


Figure 5: Optimized Teflon Sensitivity Profile, 2.276 cm Teflon Plates.

HEU-MET-INTER-011

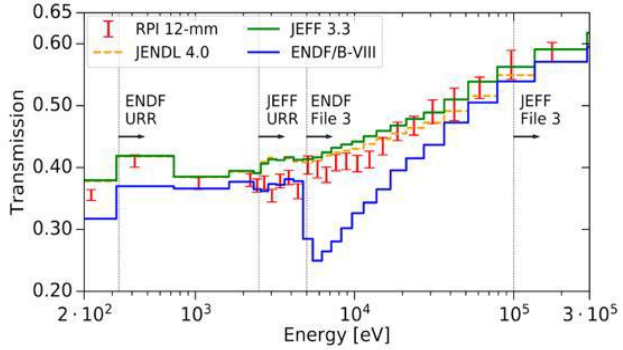


Figure 5.13: The grouped thick-sample transmission measurement in red, along with the MCNP calculated transmission using various evaluated cross section libraries.

Plots by J. Brown SG51 review WPEC meeting 03/06/2025

Secretariat: Antonio JIMENEZ-CARRASCOSA

SG 52: Development and Application of Advanced Methodologies to Produce Application Specific Nuclear Data *Active SGs*

Coordinators:
Mathieu Hursin, EPFL
Denise Neudecker, LANL
Jesson Hutchinson, LANL

Monitors:
Roberto Capote, IAEA
Oscar Cabellos, UPM

Meetings 2025:
WPEC Annual meeting
2 June 2025
Brussels, Belgium
Co-ordinators meetings
(online)

Context

SG refined its scope to achievable, well-defined nuclear data adjustment exercise.

A SG's participant survey was carried out after WPEC meeting, receiving 16 inputs.

Fast-range Pu-239 adjustment

1. Application sensitive to Pu-239.
2. Extra benchmarks to test adjusted data.
3. 8-stages gradual exercise (integral and differential data)
4. Several adjustment methods will be involved.

Adjustment Exercise Goal

Reproduce ENDF/VIII.1 starting from ENDF/VIII.0 using the same experimental data as the evaluators.

Input to adjust
- MF1/MT452
- MF3/MT2, 4, 16, 18, 102
- MF5/MT18
- MF6/MT91

Nuclear data
- ENDF/B-VIII.0 as prior information
- 51-group energy structure

Integral data
- JEZEBEL k-eff, spectra indices and leakage spectra
- EUCLID 3x2 k-eff, spectra indices and leakage spectra
- EUCLID 1x8 k-eff, spectra indices and leakage spectra

Differential data
- Marini neutron multiplicity and PFNS (CEA, LANL)
- TPC, LLNL (Snyder)
- ^{239}Pu(n,f)/^{235}U(n,f), NIFFTE (Dongwi)
- SACS-Cf (spectrum averaged)

Target application
- SNEAK 7A/B k-eff and spectra indices

Secretariat: Antonio JIMENEZ-CARRASCOSA

SG 53: Stable Zr evaluation and validation *Active SGs*

Coordinator:
Gustavo Nobre, BNL

Monitor:
Yaron Danon, RPI

Meetings 2025:
Kick-off meting (online), 20 Feb 2025
WPEC Annual meeting, 2 June 2025, Brussels, Belgium
SG53 meeting (online), 14 Oct 2025

Goals

Evaluate the neutron-induced reaction data for all stable Zr isotopes

Available for adoption by nuclear data libraries

Impact

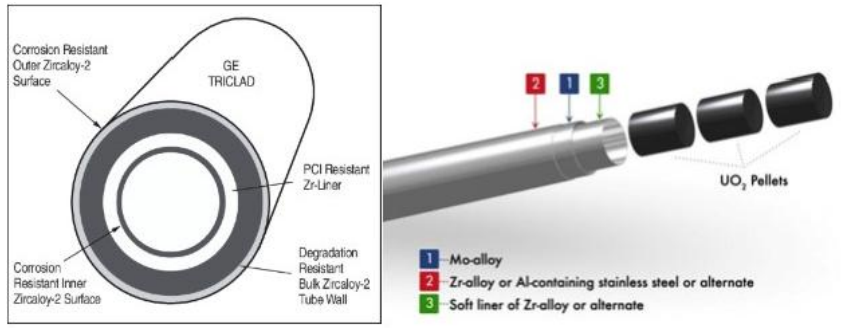
Zr is present in cladding alloys. The project is expected to reduce ND uncertainties in criticality experiments sensitive to Zr

New measurements

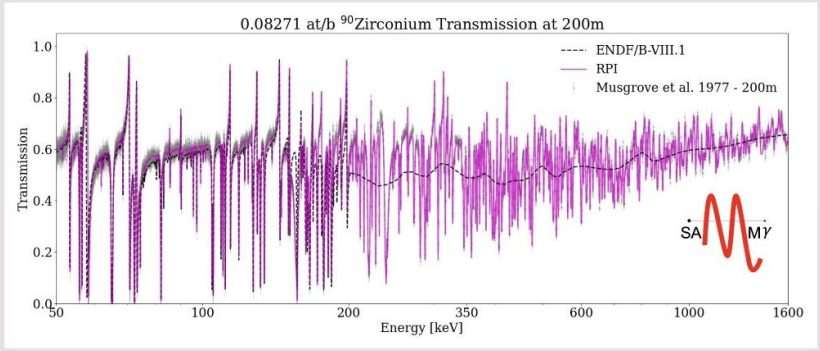
- R-Matrix fits of resonances
- Model calculations
- Adjustments to data, and
- Validation of evaluated files against integral benchmarks

Validation

The evaluations will be validated by ICSBEP and other available benchmarks



Resonance parameters fit to ^{90}Zr transmission data up to first excited state, 1764 keV. Limit of current ENDF/B-VIII.1 RRR is 200 keV.



Plots by G. Siemers,G. Nobre presentation SG53 meeting 14/10/2025

Secretariat: Anastasia GEORGIADOU

SG 54: Curated EXFOR: developing an automatically readable, comprehensive, and curated by evaluators experimental reaction database *Active SGs*

Coordinator:
Boris Pritychenko, BNL

Monitor:
Georg Schnabel, IAEA

Meetings 2025:
Kick-off meting (online), 17 March 2025
WPEC Annual meeting, 3 June 2025, Brussels, Belgium
SG54 meeting (online), 06 Oct 2025

Based on the work of SG50 MEDUSAL COLLABORATION

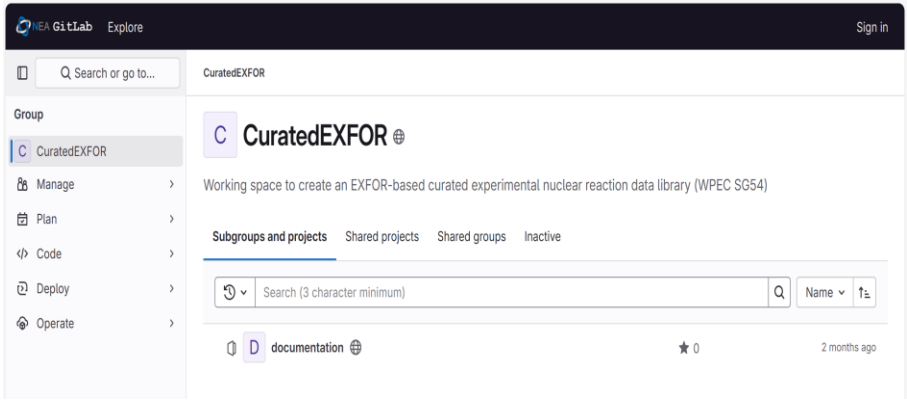
Specified new database structures and requirements so that valuable experimental data can be retained for future use

OUTCOMES

Finalise the JSON format for EXFOR

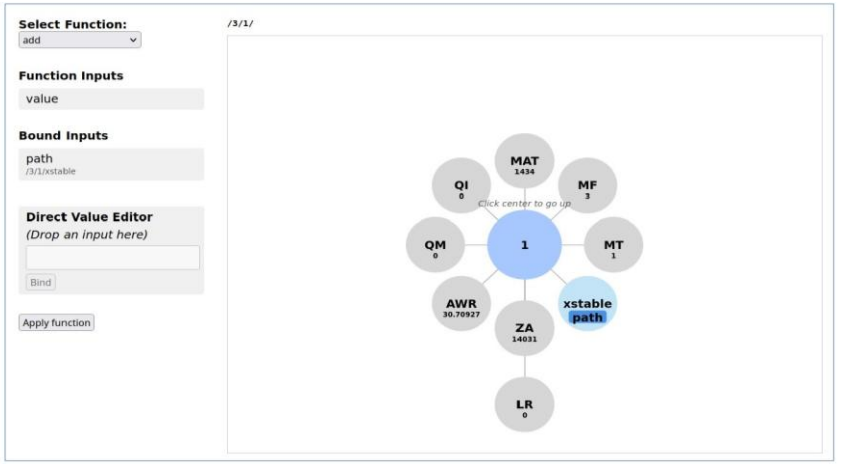
Publicly available curated database and repository with permissive open-source and data licenses

Demonstrate the use by producing test cases useful for ENDF/JEFF/JENDL evaluators



https://git.oecd-nea.org/curatedexfor

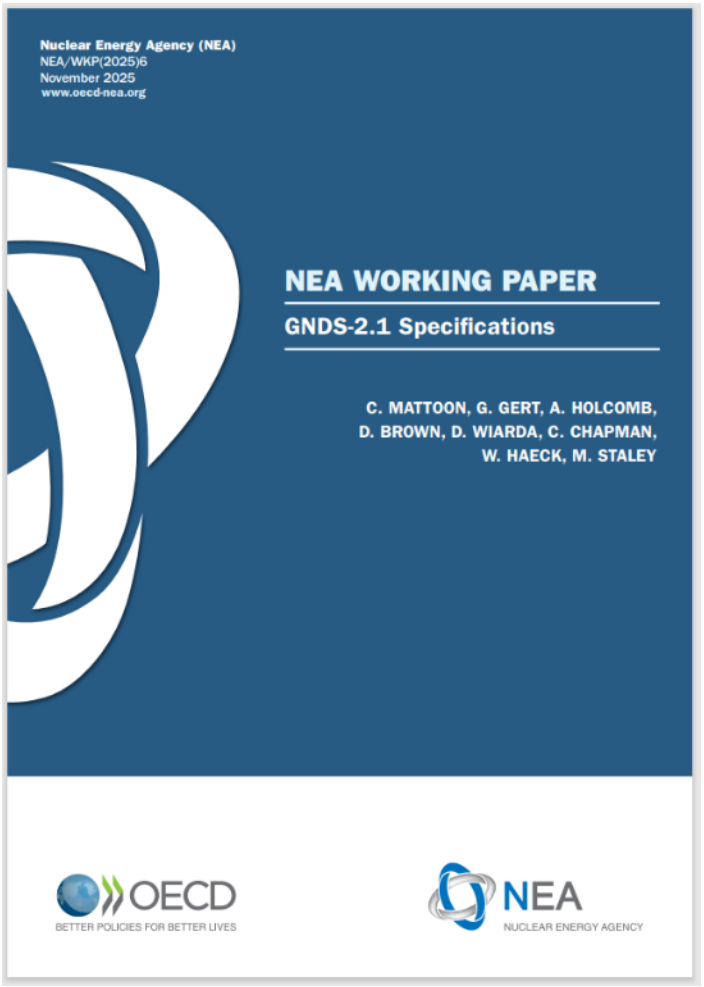
Prototype Graphical Editor



http://github.com/CodeVisionaries/json-patch-editor

Secretariat: Anastasia GEORGIADOU

Expert Groups 2025 Highlights



GNDS Updates for version 2.1

- GNDS v2.1 fixes many issues with consistency and clarity in the v2.0 specifications (typos, broken links, UTF8Text instead of XMLName, etc)
- GNDS v2.1 added a few more substantive changes, especially for evaluated TSL data.

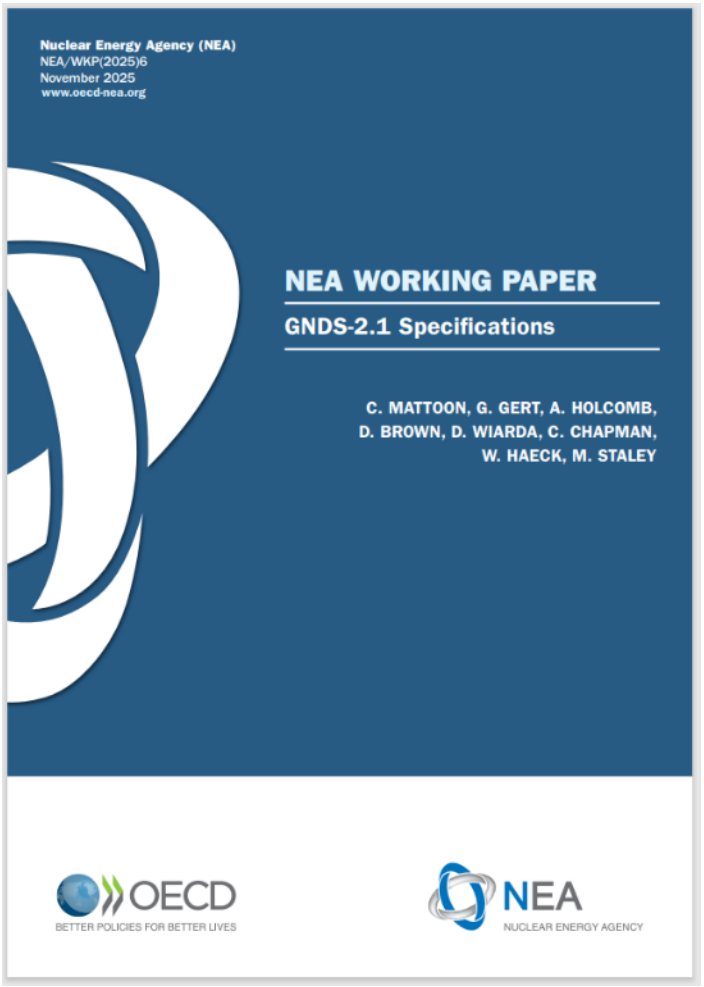
For evaluated libraries, the only major changes are in TSL (targetInfo)

GNDS-2.1 Specifications, NEA Working paper, Dec 2025
DOI: https://doi.org/10.82155/vx7d-az61

Chair: Caleb MATTOON, LLNL, USA

Secretariat: Anastasia GEORGIADOU

Expert Groups 2025 Highlights



Processing codes updates on progress towards GNDS support:
FUDGE, AMPX, NJOY, NDEX, GALILEE, NECP-ATLAS

GNDS processing intercomparison exercise to help validate new processing capabilities. Suggested starting points:

- ❑ Resonance reconstruction
- ❑ Photo-atomic and/or electro-atomic data
- ❑ Outgoing neutron transfer matrices *(Total and per-reaction)*
- ❑ Unresolved region *(Probability tables, Bondarenko factors)*
- ❑ Outgoing photon transfer matrices *(Include examples with MF=6, 12, and 13)*

GNDS-2.1 Specifications, NEA Working paper, Dec 2025
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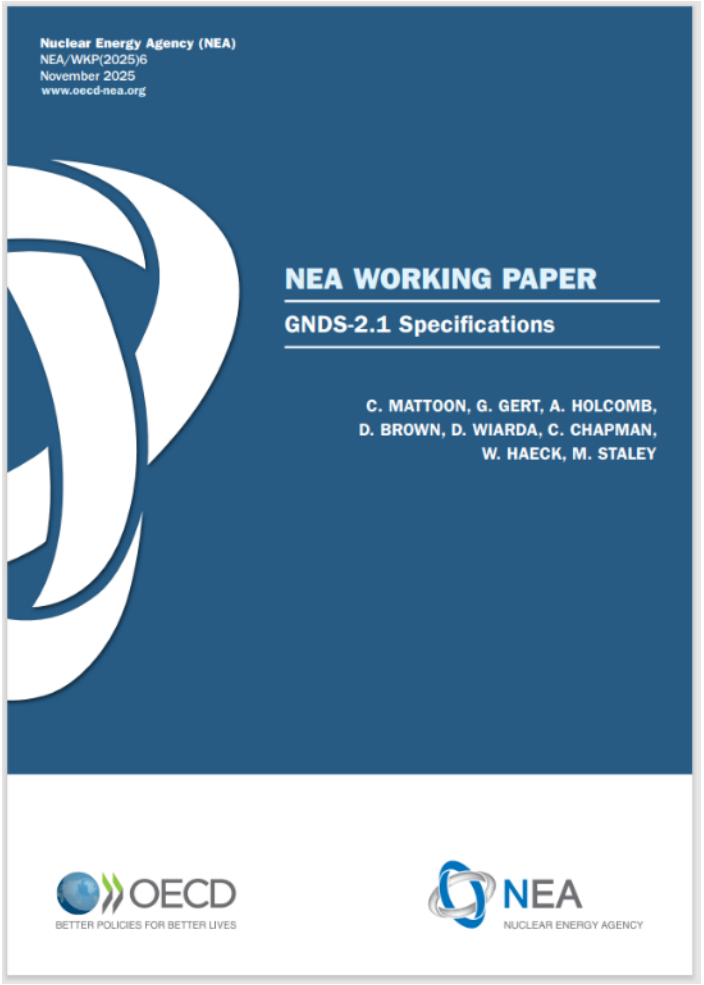

Some larger changes that may become part of future v3.0 release:

- Support higher-fidelity gamma cascades (part of the GRIN project)
- Support Compton scattering + ionization for photo-atomic data
- Several changes to PoPs (particle database) to simplify pulling data from ENSDF into GNDS
- Deprecate / remove MT numbers in favor of standardized reaction names?

Expected timeline for v3.0: at least a few years away

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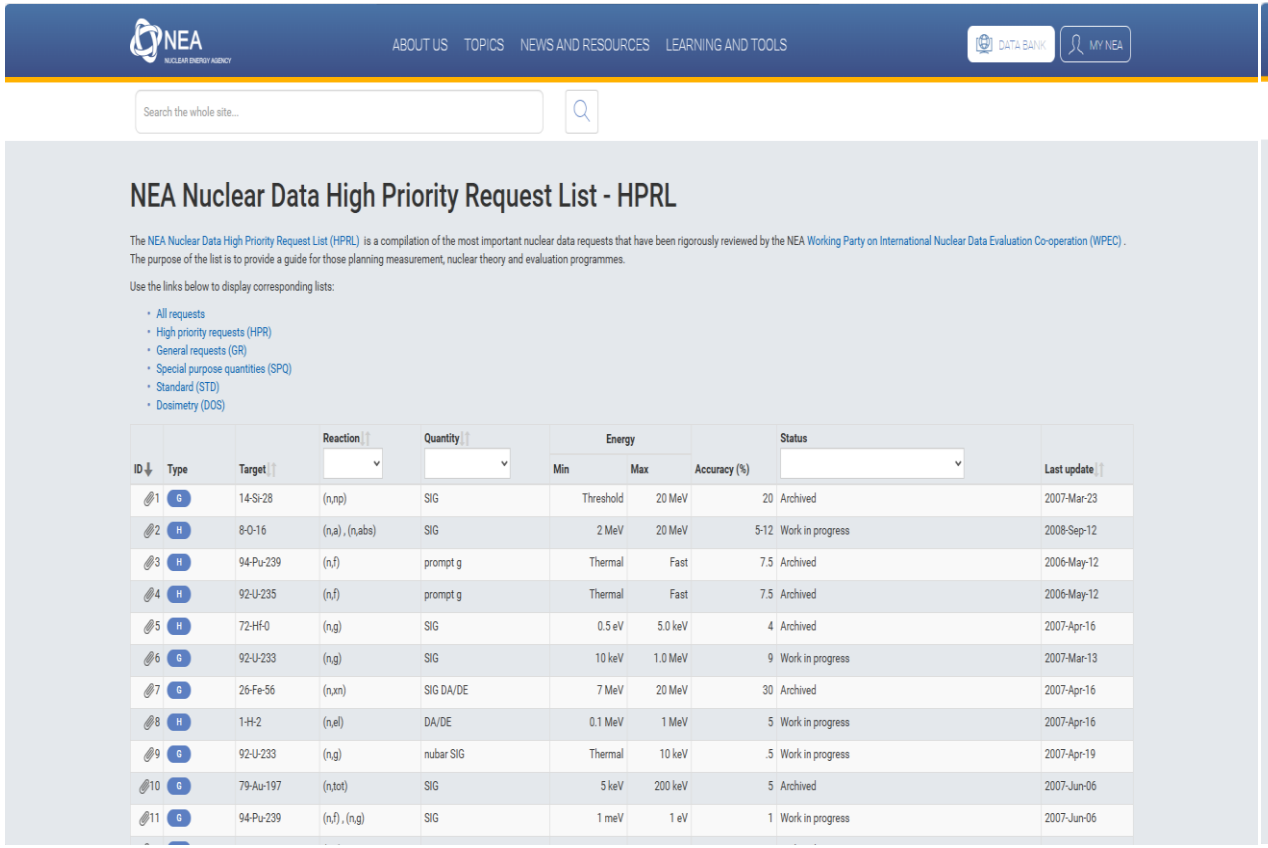
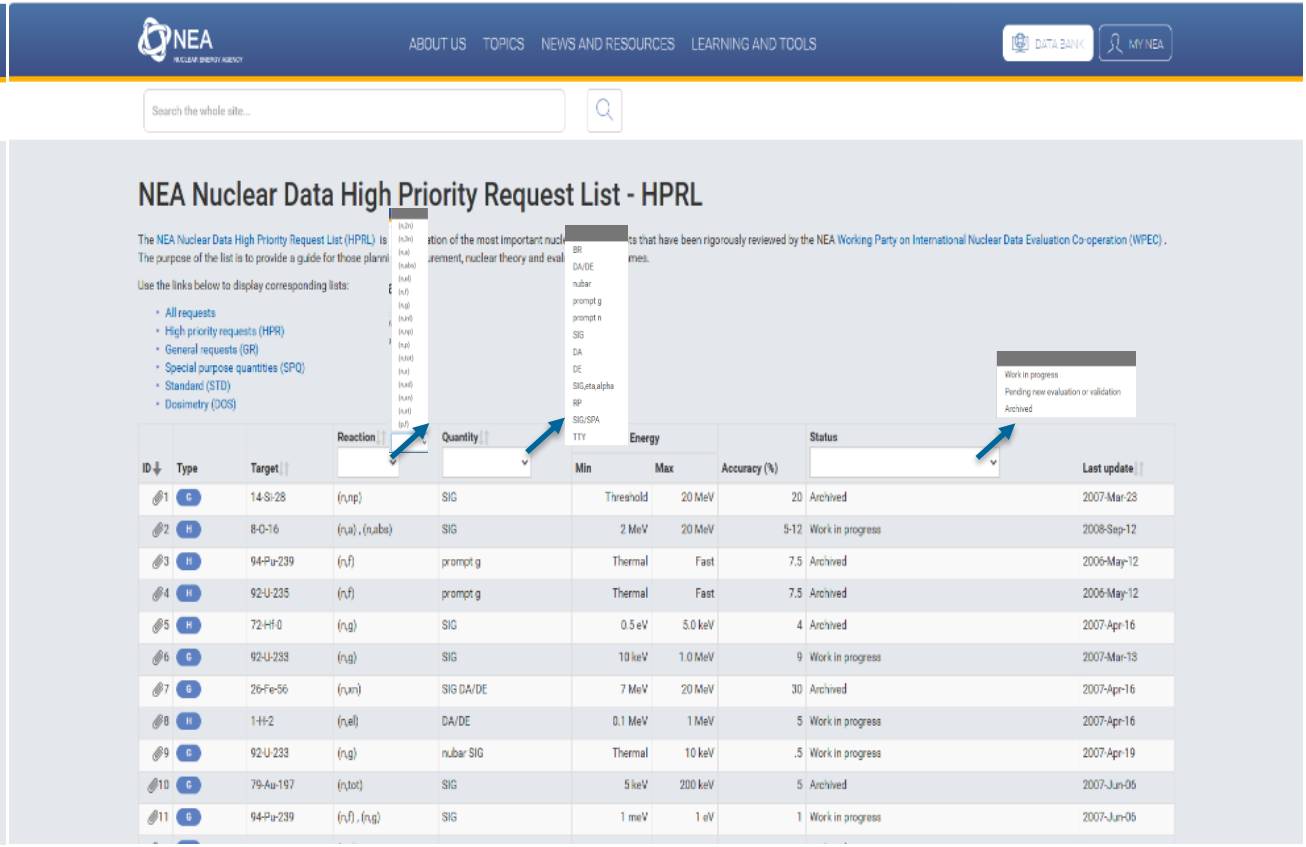
Expert Groups 2025 Highlights

NEW HPRL WEBPAGE: https://www.oecd-nea.org/jcms/pl_68746/hprlapp



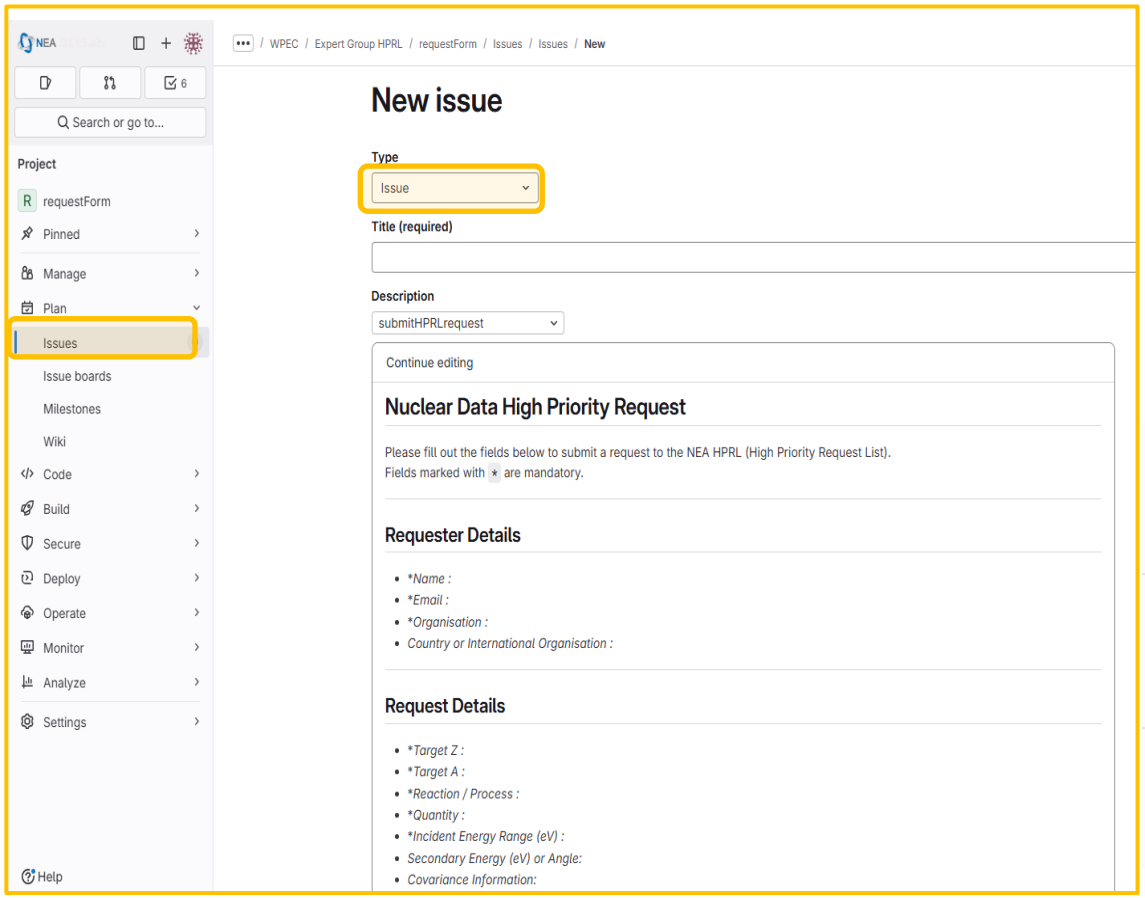


Chair: David BERNARD, CEA, France

Secretariat: Anastasia GEORGIADOU

Expert Groups 2025 Highlights

GitLab Repository: https://git.oecd-nea.org/science/wpec/hprl/requestForm



Transparent and Traceable requests

New requests can be proposed for inclusion via opening an Issue

Request Prioritization

- Fast-tracking by up voting 👍

Advanced features

- Milestones & assignments for transparent work planning
- Labels for article categorization:

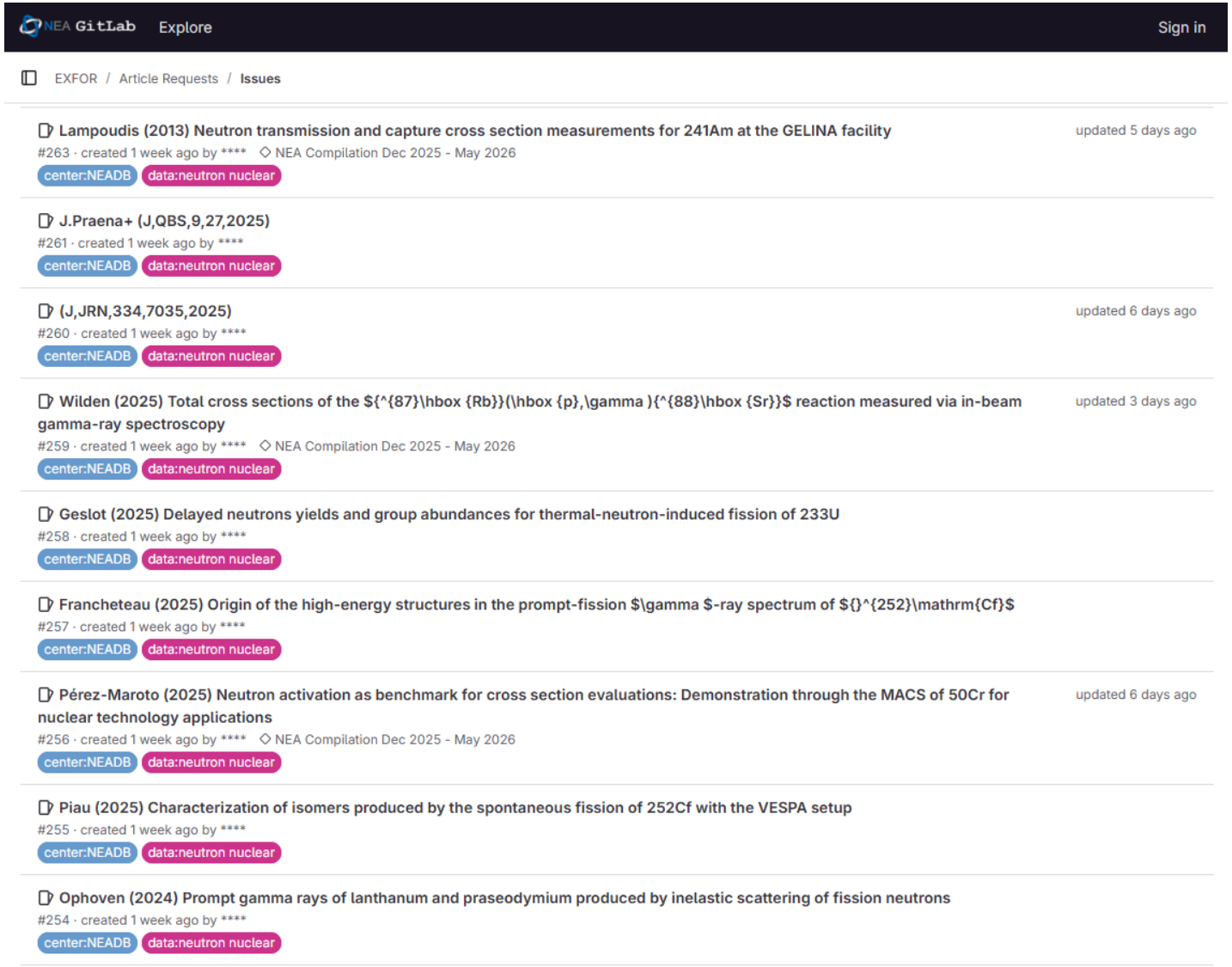
DOS	Dosimetry	SPQ	Special purpose quantities
GR	General Requests	STD	Standard
HPR	High Priority Request		

Nuclear Science / WPEC / Expert Group HPRL / requestForm

Chair: David BERNARD, CEA, France

Secretariat: Anastasia GEORGIADOU

NEA GitLab: EXFOR Article Requests allocated to NEADB



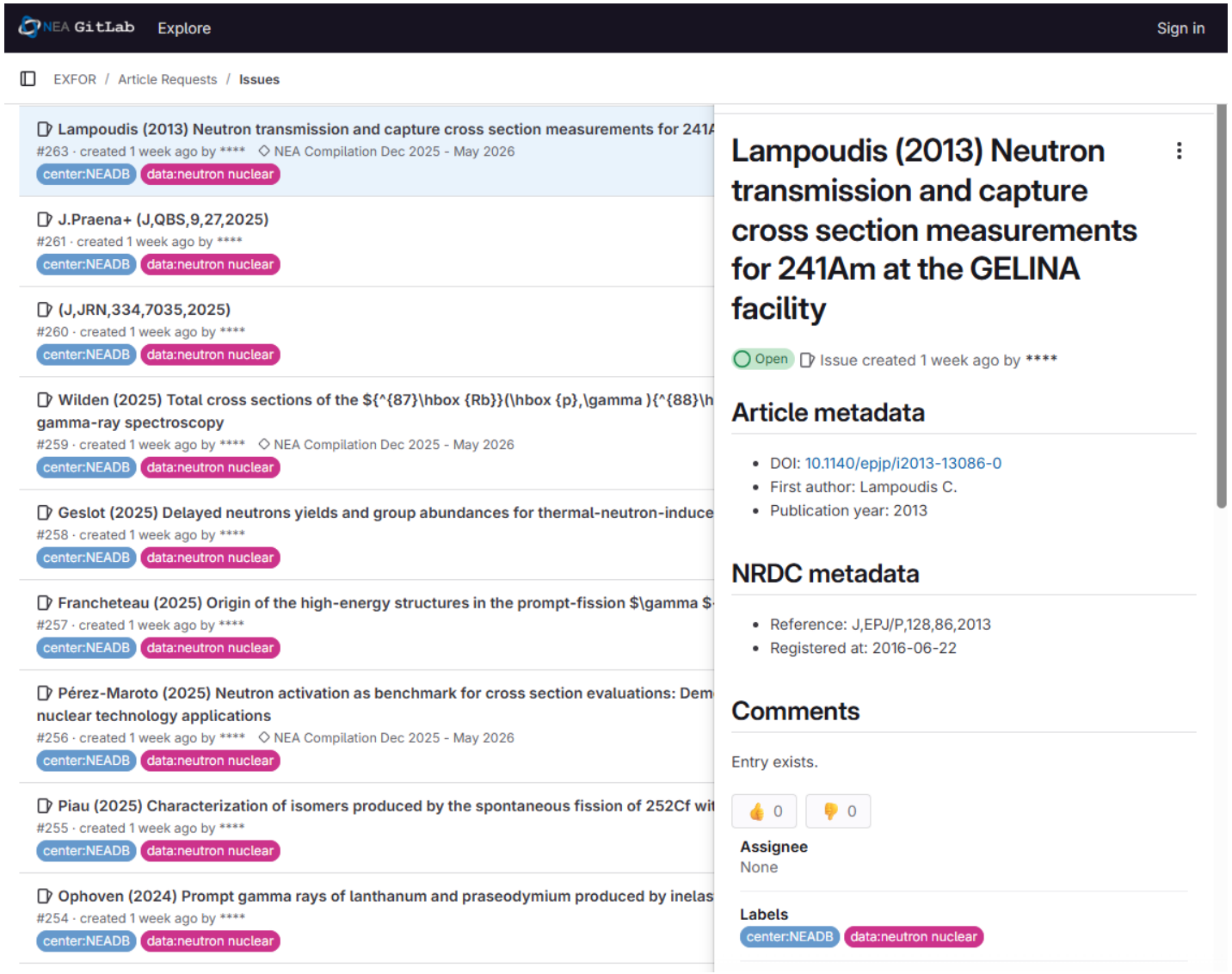
Transparent and Traceable Article Lists for Inclusion into Exfor

Article Requests

- New articles can be proposed for inclusion via opening an Issue

https://git.oecd-nea.org/exfor/articles/-/issues

NEA GitLab: EXFOR Article Requests allocated to NEADB



Transparent and Traceable Article Lists for Inclusion into Exfor

Article Prioritization

- Fast-tracking articles by up voting

Advanced features

- Milestones & assignments for transparent work planning
- Labels for article categorization by
  - Data type
  - Center
  - Article type

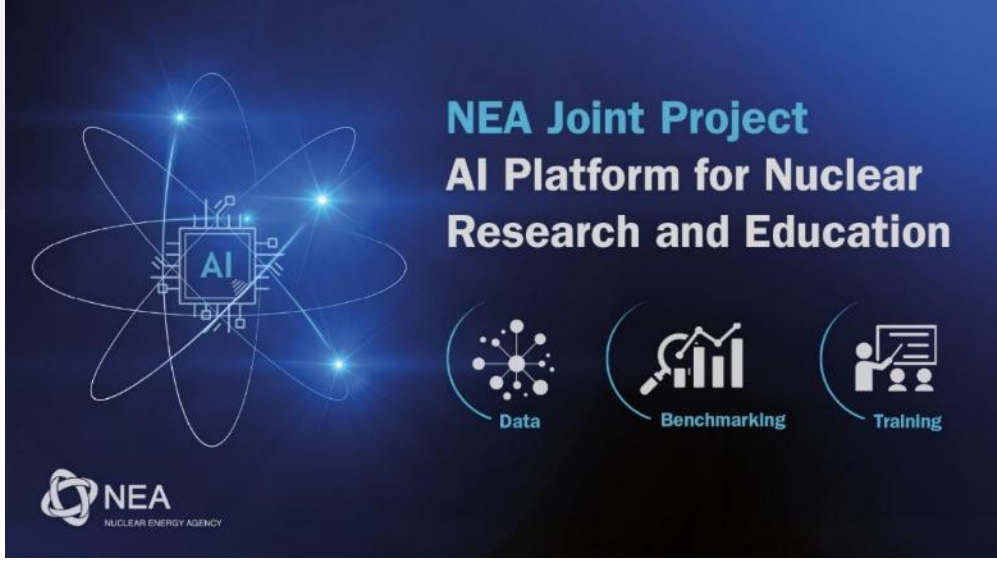
data:neutron nuclear

center:NEADB

low priority

https://git.oecd-nea.org/exfor/articles/-/issues

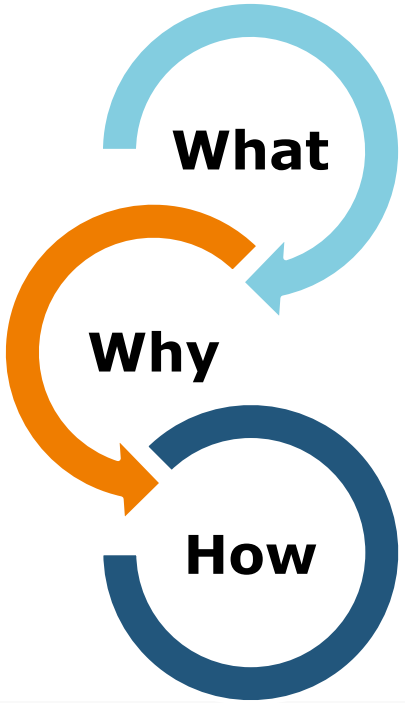
AIxpertise Project Objective



Establish a Joint Project within the Nuclear Energy Agency (NEA) to **harness the transformative potential of Artificial Intelligence (AI) and Machine Learning (ML)**

Contact: Oliver.BUSS@oecd-nea.org

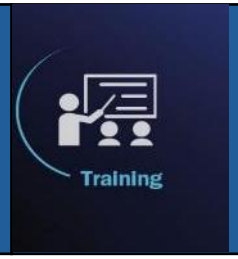
- Keep pace with **fast-advancing innovations in AI/ML**
- Ensure **readiness for regulatory review** of AI approaches
- Support innovation in reactor **operation** and **SMR deployment**



- **Demystify AI** solutions and **expand capacity**
- **Harness AI/ML** in a clear and defensible way

- Establish a **community-of-practice** ready to **learn by doing**
- Develop specific, structured deliverables

AIxpertise - AI Platform for Nuclear Research and Education

 Adapting/developing datasets for AI applications	 Building bridges between nuclear and AI domains to advance expertise	 Disseminating knowledge and training nuclear experts
AIxpertise Project Activities and Outputs		

AI-friendly internationally peer-reviewed, aggregated, and accessible datasets (FAIR data).
• **Extend the datasets** by including supplementary data.
• **Define hierarchical, machine readable data and meta data formats.**
• **Design APIs.**
• **Considered data: Halden legacy data, NSC datasets** (e.g. ICSBEP, SFCOMPO, IFPE), **time series data from research reactors, Subchannel and bundle test data.**
	International benchmarks for assessing and training AI algorithms.
	• **Data mining and knowledge management** (e.g. data mining for HRP, Nuclear Science Chatbot) .
	• **Scientific computing** (e.g. ML-enhanced CFD, Physics-informed neural networks, Multi-scale AI/ML integration for nuclear fuel materials).
	• **Health monitoring and reactor operation** (e.g., reactor time series analysis, optimisation of nuclear power plant core reloading patterns).
		Hands-on trainings on the use of AI algorithm for nuclear research and education.
		• **Workshops**
		  • **Data management for AI**
		  • **Secure usage of AI**
		  • **Deploying AI to the Cloud**
		  • **Explainable AI for safety**
		  • **Machine Learning Hackathon**
		• **Hands-on Training, e.g. “AI for Nuclear Asset Management”**

Online platform for collaboration of nuclear and AI experts for aggregated data, benchmark specifications, software, AI models, and interactive discussions and issue boards.		

AIxpertise - Project Development Timeline

11 Feb 2025:
Announced during World Governments Summit

15-16 Oct 2025:
AIxpertise Workshop, Remote

(45 organisations, 17 countries)

21 January 2026:
AIxpertise 2nd virtual Workshop – Review PoW

(45 organisations, 16 countries, presentations by CNSC, GRS, NRC, RegLab)

01 March 2026:
Feedback on legal agreement

30 March 2026:
Final version of legal agreement & start of signing process

End of May 2026:
AIxpertise Kick-Off Meeting (in-person)

Early 2025: Surveys among NSC stakeholders including national laboratories, regulators, to define AIxpertise programme of work

Q4 2025: Development of the detailed program of work through bilateral discussion

Q1 2026: Prioritization and review of legal agreement

Now

In a nutshell

- **Continued strong engagement with the international nuclear data community**
- **Goals**
  - Recommend nuclear data improvements (including covariance data) based on stakeholder input, new data, and advances in theory and modeling.
  - Suggest updates in codes, formats, methods, and practices for better evaluation processes.
  - Monitor and update the HPRL to stimulate measurement and evaluation activities.
- **Upcoming WPEC meeting:** 26 to 29 May 2026; BB10 OECD, Boulogne-Billancourt, France
- **Open Call for WPEC Subgroup Proposals: 2 tentative proposals for 2026**
- Increased focus on usability of the research data: Modern tools and approaches allow for easier use of data and utilisation of novel tools
- Joint Projects and Frameworks also represent possibility of getting international funding to support the research activities and use of infrastructure
- Invitation to **Join the new Aixpertise joint project** to shape the future of AI in nuclear research through hands-on collaborative work.

Thank you for your attention

Anastasia.Georgiadou@oecd-nea.org