

NEA Data Bank Progress Report 2018-19

NRDC 2019 IAEA, Vienna, Austria

9-12 April 2019

Michael Fleming
OECD Nuclear Energy Agency

michael.fleming@oecd-nea.org



NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data activities

JEFF

WPEC (Nuclear Science)

OECD
Nuclear Energy Agency
Data Bank

NRDC 2019
9-12 April 2019
IAEA, Vienna, Austria

NEA Data Bank
Progress Report
2018-19

Michael Fleming

2

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

- ▶ Kenya Suyama is the new Head of the Data Bank since April, 2018
- ▶ The Data Bank has a staff of 11 working in three main areas : Computer Programme Services (CPS), Nuclear Data Services (NDS) and the Thermochemical Database Project (TDB)
- ▶ <https://www.oecd-nea.org/databank/dbcontacts>

19

Mission of DB in this area:

- ▶ Update and maintain the EXFOR database (NEA DB areas)
- ▶ Update and maintenance of the EXFOR database for data coming from DB countries
- ▶ Two areas concerned:
 - ▶ Neutron induced data (Area 2)
 - ▶ Gamma and charged-particle induced data (Area O)
- ▶ Revision of old entries is a significant part of the activity
- ▶ NEA DB has contributed approximately 300 new or updated entries per year
- ▶ RO: M. Fleming with two IT support: N. Soppera and M. Bossant
- ▶ The NEA works closely with contractors and the IAEA NDS to deliver new and revised EXFOR entries

Table: Summary of the NEA DB transmissions to EXFOR

Year	Transmission	Entries	Subentries
2019	2276*	13	73
	2275*	20	225
	2274*	44	444
	2273*	46	341
	2272	20	112
	2271	14	61
	2270	78	380
	2269	27	236
	2268	22	235
	O066	29	194
O065	13	37	
2019	Total	326	2338

Table: Summary of the NEA DB transmissions to EXFOR

Year	Transmission	Entries	Subentries
2019	Total	326	2338
2018	O064	33	125
	2267	43	172
	2266	21	105
	O063	25	36
	2265	57	256
	O062	2	5
	2264	9	51
	2263	50	503
	2262	14	81
	2261	49	432
2260	13	138	
2018	Total	289	1668

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Table: Summary of the NEA DB transmissions to EXFOR

Year	Transmission	Entries	Subentries
2019	Total	326	2338
2018	Total	289	1668
2017	Total	282	1782
2016	Total	421	3915
2015	Total	153	990
2014	Total	373	2965
2013	Total	375	2035
2012	Total	351	1947
2011	Total	289	1678
2010	Total	333	1649
2009	Total	288	2016

6

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

OECD

Nuclear Energy Agency
Data Bank

NRDC 2019
9-12 April 2019

IAEA, Vienna, Austria

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

7

OECD
Nuclear Energy Agency
Data Bank

NRDC 2019
9-12 April 2019
IAEA, Vienna, Austria

19

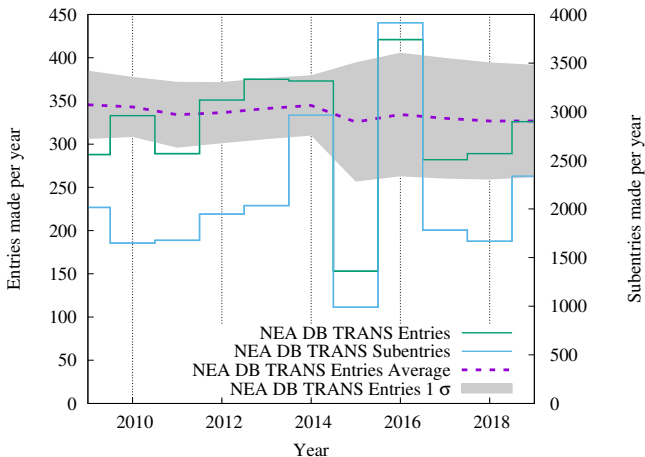


Figure: The total number of entries and subentries in NEA DB TRANS per year over the last decade. Note that 2019 figures include preliminary, unfinalised data in the IAEA-NDS open area as of April.

Table: Nuclear libraries added to the NEA JANIS database.

Data Type	Included Datasets
Radioactive data	ENDF/B-VIII.0, GEFY-6.2, JEFF-3.3, JENDL/DDF-2015
Incident neutron data	ENDF/B-VIII.0, GEFY-6.2, JEFF-3.3, JENDL-4.0/HE, JENDL/AD-2017, TENDL-2017
Incident gamma data	ENDF/B-VIII.0, JENDL/PD-2016, TENDL-2017
Incident proton data	ENDF/B-VIII.0, JENDL-4.0/HE, JENDL/AD-2017
Incident deuteron data	ENDF/B-VIII.0, TENDL-2017
Incident triton data	ENDF/B-VIII.0, TENDL-2017
Incident helion data	ENDF/B-VIII.0, TENDL-2017
Incident alpha data	ENDF/B-VIII.0, TENDL-2017

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

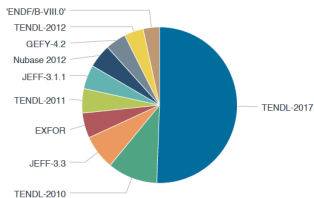
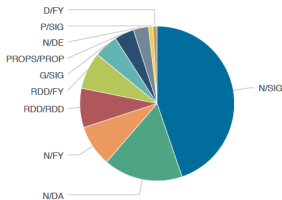
Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

9

- ▶ Because JANIS has multiple distribution technologies (WebStart, Download, Books) it is difficult to determine exact usage
- ▶ NEA actively monitor use to tailor maintenance and upgrades to user needs. Data from 2018:



- ▶ JANIS TRANS Checker is continuously updated with new dictionary content (when approved) and other fixes
- ▶ New modifications have allowed duplications in DATA lines to be identified and these are now showed when you use the online TRANS Checker:

<https://www.oecd-nea.org/janis/>

<https://www.oecd-nea.org/janis/trans-checker.html>

- ▶ Are these all errors? What guidance can we issue so that these 'raw' outputs can be translated into actions?

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

11

- ▶ Bibliographic errors are routinely submitted for NRDC preliminary TRANS, using direct connection to online official web materials
- ▶ NEA DB are continuously looking for new QA methods for EXFOR
- ▶ A new test was performed on all EXFOR bibliographic data to use the statistical information of the entries themselves where no online resource may be available
 - ▶ Subject of Memo CP-N/149

OECD
Nuclear Energy Agency
Data Bank

NRDC 2019
9-12 April 2019
IAEA, Vienna, Austria

19



NEA EXFOR practices

NEA GitLab Solutions

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

12

EXFOR compilations provided by the OECD-NEA Data Bank have utilised legacy methods up to 2018

- ▶ Many data stored on folders on some network drive(s)
- ▶ Little/no description/documentation on the versions (if versions are stored)
- ▶ Impractical to trawl emails of previous staff to find information
- ▶ ED to OC transition resulted in differences in approach
- ▶ Transition from OC to MF with months of interim caused additional burdens

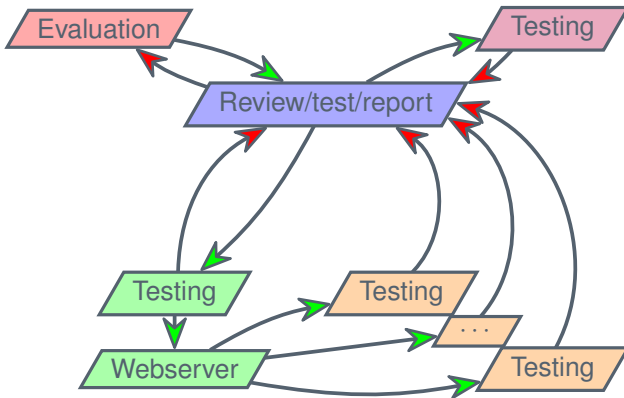
This is a **real, unembellished** case

OECD
Nuclear Energy Agency
Data Bank

NRDC 2019
9-12 April 2019
IAEA, Vienna, Austria

19

The NEA delivers through **contractors**, with **IT** support, submitting via the **IAEA**, reviewed by ~30 officials in the **NRDC**



NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

14

Humans are routinely performing tasks that can be automated:

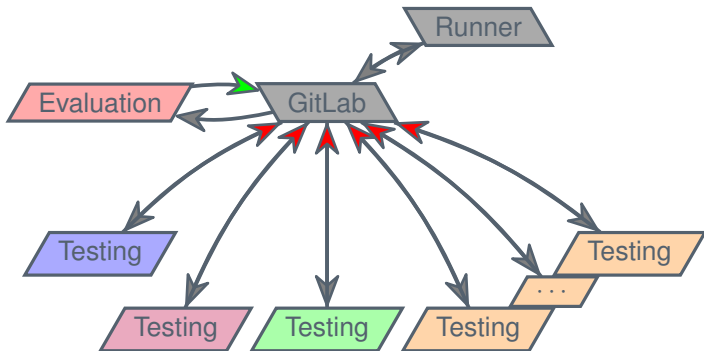
- ▶ Download file and run application on it
- ▶ Read output
- ▶ Write a summary
- ▶ Email to colleagues
- ▶ Administrators trawl through Outlook trying to ensure all feedback is responded to

As a result:

- ▶ Mistakes require more effort to avoid
- ▶ Many iterations performed, often with repeated feedback
- ▶ Verification is time-consuming and error-prone
- ▶ **Significant time and resources spent**

19

Use a **repository system** to collect, version control and test the data, providing immediate, organised and indefinite access to all relevant material to all relevant participants



<https://git.oecd-nea.org/databank/nds/exfor>

- ▶ JEFF-3.3 was released in November 2017, including several new evaluations from the WPEC/CIELO output for major isotopes including $^{235,238}\text{U}$, ^{239}Pu , ^{16}O and ^1H
- ▶ New evaluations for other materials, including Hf, ^{241}Am , Au, Na, Ni, Cr, Cu, W, and more
- ▶ Many new features and benchmarking as described in the draft JEFF-3.3 paper to be submitted for publication in 2019 (and developed via the NEA GitLab)
- ▶ You can find more information on the JEFF releases here:

<https://oecd-nea.org/dbdata/jeff>

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

17

- ▶ A new mandate for the JEFF WP was agreed and approved in 2018, covering a three year period to 2021
- ▶ The next JEFF meetings will be held 24-26 April 2019 at the NEA Headquarters and will be combined with a Joint JEFF-JENDL session and the MBDAV meeting
- ▶ A JEFF Nuclear Data Stakeholder's meeting will take place 6-7 June 2019 at the NEA Headquarters - for more information visit:

oecd-nea.org/dbdata/meetings/jeff_stakeholders_2019

The NEA Nuclear Science Committee oversees the Working Party on International Nuclear Data Evaluation Co-operation (WPEC) which has two Expert Groups:

- ▶ the Expert Group on the Recommended Definition of a General Nuclear Database Structure (EG-GNDS) and
- ▶ the Expert Group on the High Priority Request List for Nuclear Data (EG-HPRL).

Since 2018, the EG-GNDS has been ported into the NEA GitLab and is in very active development.

The HPRL is continuously updated with proposals from the Expert Group, including valuable feedback from the IAEA NDS



WPEC Subgroups

WPEC

NEA Data Bank
Progress Report
2018-19

Michael Fleming

Organisation

EXFOR

JANIS

JANIS updates

TRANS Checker

Bibliography checks

NEA GitLab

NEA DB NRDC/EXFOR

Other nuclear data
activities

JEFF

WPEC (Nuclear Science)

19

19

The current active subgroups include:

- ▶ Subgroup 43 on Code infrastructure to support a modern general nuclear database (GND) structure
- ▶ Subgroup 44 on the Investigation of Covariance Data in General Purpose Nuclear Data Libraries
- ▶ Subgroup 45 the Validation of Nuclear Data Libraries (VaNDaL) Project
- ▶ Subgroup 46 on the Efficient and Effective Use of Integral Experiments for Nuclear Data Validation
- ▶ Subgroup 47 on the Use of Shielding Integral Benchmark Archive and Database for Nuclear Data Validation

<https://oecd-nea.org/science/wpec>

OECD
Nuclear Energy Agency
Data Bank

NRDC 2019
9-12 April 2019
IAEA, Vienna, Austria

Thank you for your attention

