

NEA Data Bank

Progress report 2017-2018

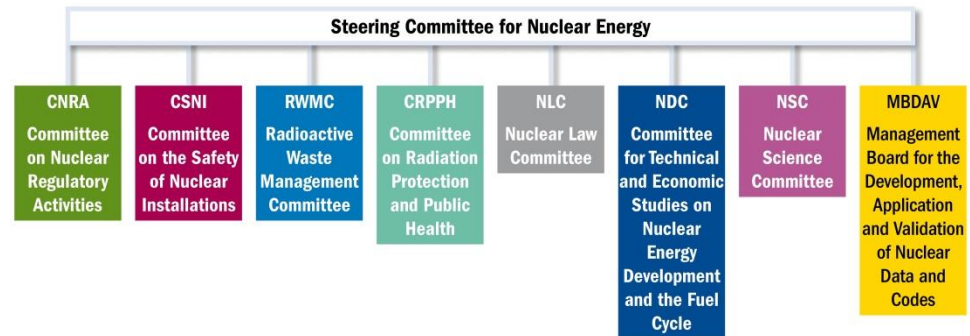
Kenya Suyama
Head of NEA Data Bank

Franco Michel-Sendis
Head of Nuclear Data Services

NRDC 2018 meeting, May 1, 2018
GCNEP, Bahadurgarh, India

The NEA: A Forum for Co-operation for the Most Advanced Countries in the World

- Founded in 1958
- 33 member countries
- 7 standing technical committees
- 71 working parties and expert groups*
- 22 international joint projects*



*As of January 2018

OECD, NEA and NEADB countries

OECD members(35)

 Chile  Estonia  Israel  Latvia  New Zealand

NEA members(33)

 Australia  Canada*  Iceland  Ireland  Luxembourg
 United States*

NEADB members(27)

 Argentina**	 Austria	 Belgium	 Czech Republic
 Denmark	 Finland	 France	 Germany
 Greece	 Hungary	 Italy	 Japan
 Mexico	 Netherlands	 Norway	 Poland
 Portugal	 Romania**	 Russia**	 Slovak Republic
 Slovenia	 Spain	 Republic of Korea	 Sweden
 Switzerland	 Turkey	 United Kingdom	

* RSICC service area

** Argentina, Romania and Russia are not member countries of the OECD (2017)

Data Bank

- **Founded in 1978**, out of the merging of two historical functions of (E)NEA :
 - *Computer Programme Services at Ispra, Italy*
 - *Neutron Compilation Centre at Saclay, France*
- Still today, these two functions are embodied in the core mission of the DB, which is to provide
 - **Computer Programme Services (CPS)**
 - **Nuclear Data Services (NDS)**
- Today the DB has 27 participating countries.
(Argentina and Romania joined in 2017)

Organization and Staff

- ❑ **Kenya Suyama** is the new Head of Data Bank since April, 2018
- ❑ **Data Bank has a staff of 11 working in 3 main areas : CPS, NDS, TDB**
- ❑ **Nuclear Data Services (NDS) has an allocated manpower of 3 official staff:**
 - **Franco Michel-Sendis** : Head of NDS,
Secretary to JEFF
Development of NDS, Support to WPEC
 - **Michael Fleming** : *(Will join NEA in May 3, 2018)*
Secretary to WPEC, Co-ordination of EXFOR compilation @ NEA
 - **Luca Fiorito** : Jr. Nuclear Data Scientist
(Joined September 2017)
Support to NDS, JEFF
- ❑ **Data Bank** co-ordinates maintenance of databases and tools with support from NEA-IT

Compilation & dissemination of EXFOR

Mission of DB in this area:

- ❑ **Update and maintain the EXFOR database (NEA DB areas)**
 - NEA DB is a founding member of the NRDC network
 - **Update and maintenance of the EXFOR database for data coming from DB countries**
 - Two areas concerned :
 - Neutron induced data (Area 2)
 - Charged particle induced data (Area O)
 - Revision of old entries is a significant part of the activity
 - NEA DB contributes about 300 new/updated entries every year
 - Compilations of data by NEA DB represent ~25% of EXFOR database

- ❑ **NEA effort in the coordination of entry compilation**
 - NEA/DB & IT: *O. Cabellos (until October 2017)*, N. Soppera, M. Bossant (IT)
 - **4 NEA consultants: S. Dunaeva, S. Babykina, M. Milhiauкова, M. Takacs**

Compilation & dissemination of EXFOR

- *EXFOR compilation effort is complex and well-organized*
- *EXFOR contractors are essential for the current operation*
- *“We address compilation of current articles, correct previous entries and add missing article”*
- *“It is a joint effort that is conducted in close cooperation with the NEA and IAEA”*

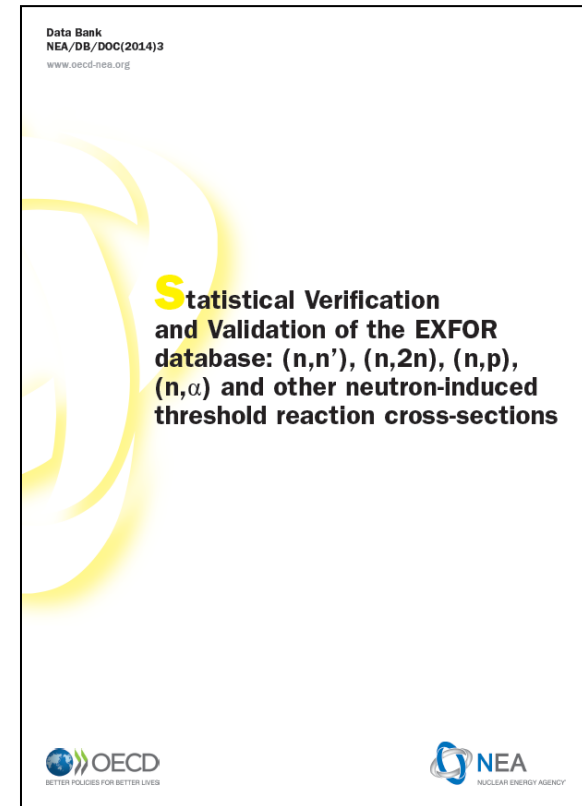
Year	Trans	Entry	
		New	Updated
2017	2252 (Jan 2017)	0	77
	2253 (Jan 2017)	20	36
	2254 (Feb 2017)	9	8
	2255 (Feb 2017)	3	24
	2256 (Mar 2017)	10	5
	2257 (Mar 2017)	0	20
	2258 (May 2017)	5	16
	2259 (Jun 2017)	5	22
	O059 (Jan 2017)	0	3
	O060 (Jun 2017)	43	2
	O061 (June 2017)	0	52
	Total	95	265
2018 (1st half)	2260 (Jan 2018)	7	6
	2261 (Jan 2018)	0	49
	2262 (Jan 2018)	2	12
	2263 (Jan 2018)	0	50
	2264 (Jan 2018)	0	9
	2265 (Jan 2018)	0	57
	O062 (Jan 2018)	1	1
	O063 (Jan 2018)	0	25
	Total	10	209


2017-2018 (1st half) : 579 new or updated entries by NEA DB


NEA DB - Quality checking EXFOR database

☐ Checking & Verification

- Peer-review of all NRDC prelim files
- “JANIS Trans Checker” tool developed by NEA/IT
 - A stand-alone web version
 - Integrated in JCPRG and VNIIEF tools
- EXFOR checking (“post-SG30” activities)
 - In-depth review of all threshold reaction cross-sections (2014) and non- threshold (2017)
 - Assessing the quality of EXFOR data using a statistical approach




 ELSEVIER


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Available online at www.sciencedirect.com

ScienceDirect

Nuclear Data Sheets 120 (2014) 277–280

Nuclear Data Sheets

www.elsevier.com/locate/nds

Cross-checking of Large Evaluated and Experimental Nuclear Reaction Databases

O. Zeydina,¹ A.J. Koning,² N. Soppera,³ D. Raffanel,¹ M. Bossant,³ E. Dupont,^{3,*} and B. Beauzamy¹

¹Société de Calcul Mathématique, Paris, France
²Nuclear Research and Consultancy Group, Petten, The Netherlands
³OECD Nuclear Energy Agency Data Bank, Issy-les-Moulineaux, France

Automated methods are presented for the verification of large experimental and evaluated nuclear reaction databases (e.g. EXFOR, JEFF, TENDL). These methods allow an assessment of the overall consistency of the data and detect aberrant values in both evaluated and experimental databases.

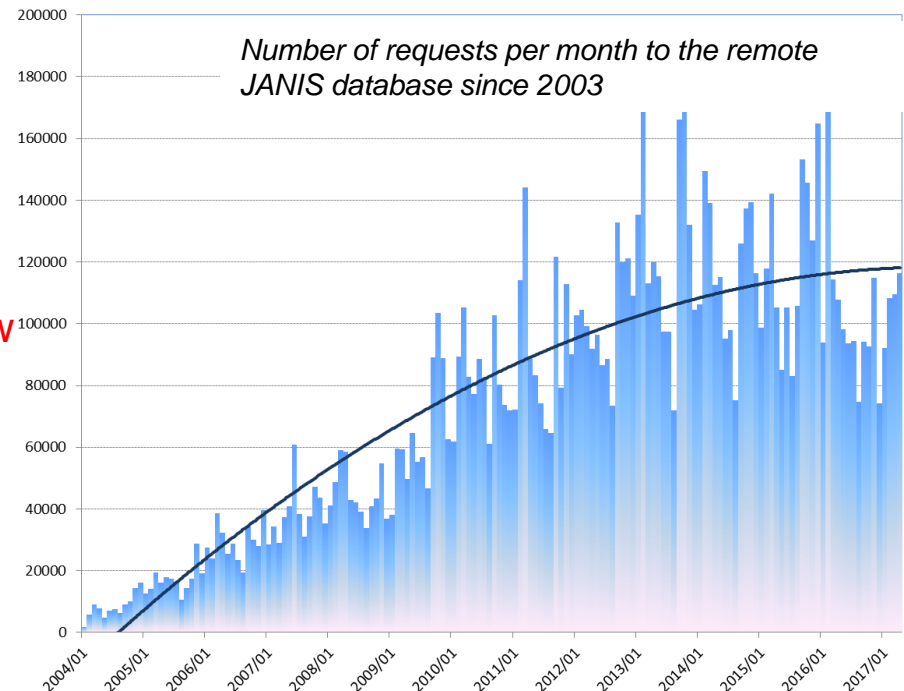
2017 : “Statistical verification and validation of the EXFOR database: (n,γ) , (n,n') , $(n,2n)$, (n,p) , (n,α) and other neutron-induced reaction cross-sections”, A. Koning

NEA DB - Dissemination of Nuclear data

- ❑ **JANIS 4.0 released online (www.oecd-nea.org/janis/) and on DVD**
 - JANIS provides access and visualization to all nuclear data libraries, and is continuously maintained
 - Latest data : **JEFF-3.3, ENDF/B-VIII.0, JENDL-PD2016, TENDL2017...**
 - BROND-3.1, FENDL3.1b, IRDFF-1.05

- ❑ **JANIS 4.1/5.0 further development**

- **JANIS libraries are processed with the new NEA tool: NDEC**
- Complete ENDF-6 coverage
- JANIS 'feeds' nuclear data to other NEA tools e.g. Nuclear Data Sensitivity Tool (NDaST)



NEA DB – “QA” of Evaluated Nuclear data

- ❑ NDEC (Nuclear Data Evaluation Cycle)
- ❑ Provides a systematic and automated process of ND libraries

NDEC Modules

NDEC modules that are independent are run in parallel. NDEC modules that need the output of another module as their own input are launched automatically when the needed file becomes available.

List of modules integrated in the current version of NDEC.

C&U	NJOY-2016	PREPRO-2017	NEA
checkr	moder	endf2c	relabel
psyche	reconr	linear	libcontent
fizcon	broadr	recent	splitting
inter	unresr	sigma1	mapping
	heatr	legend	benchmarking
	gaspr	activate	
	thermr	merger	
	purr	fixup	
	acer	dictin	
	groupr		
	errorr		
	covr		

NEA DB – “QA” of Evaluated Nuclear data

- ❑ NDEC output is available online, currently for the JEFF-3.3 neutron library release
- ❑ In the medium term, NDEC will process all major libraries

Short url : bit.ly/db_ndec

NDEC Access

Browse NDEC Output for JEFF-3.3 neutron data

Show entries

Search:

Z	A	State	File	C&U	NJOY-2016	PREPRO-2017	ENDF-6	ACE
1	1	0	1-H-1g.jeff33	1 err	12 warn	79 warn		
1	2	0	1-H-2g.jeff33	1 warn / 6 err	5 warn	402 warn		
1	3	0	1-H-3g.jeff33	0 msg	5 warn	153 warn		
2	3	0	2-He-3g.jeff33	0 msg	3 warn	7 warn		
2	4	0	2-He-4g.jeff33	0 msg	3 warn	199 warn		

Browse output of NDEC for all JEFF-3.3 files (562 files)

New : NDEC library content analysis

JEFF-3.3

Released in 2017

U-235-g

Neutron File

203

Sections in file

152

Updated

11

New

40

Unchanged

1

Erased

Updated sections in JEFF-3.3 file, with respect to reference : JEFF-3.2

Show entries

Search:

MF TYPE

MT TYPE

MF

MT

JEFF-3.3 matching

JEFF-3.2 matching

All

All

All

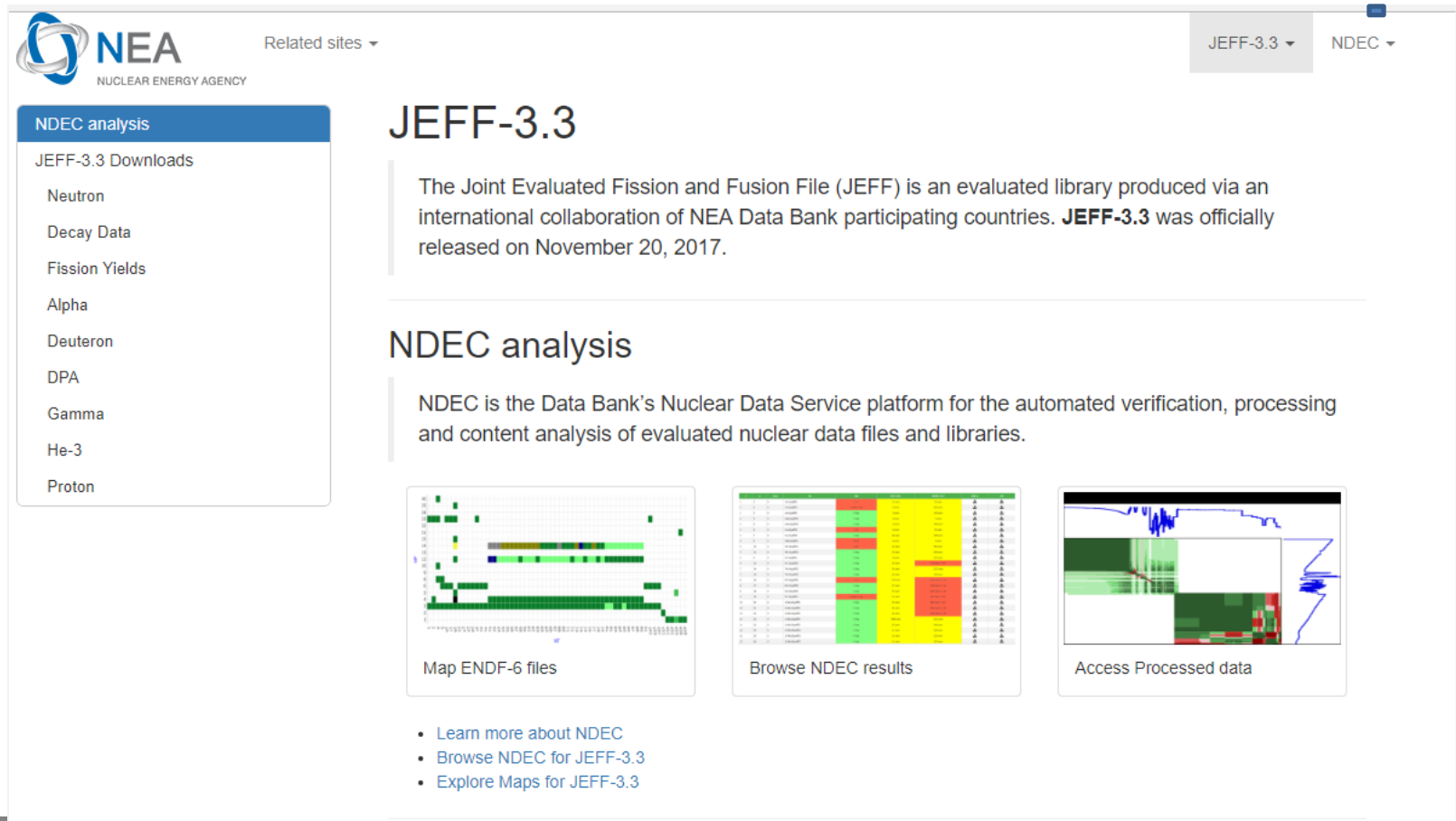
All

All

All

General information	descriptive data and directory	1	451	JEFF-3.3	JEFF-3.2
General information	total neutrons released per fission	1	452	JEFF-3.3	JEFF-3.2
General information	delayed neutrons released per fission	1	455	JEFF-3.1.1	JEFF-3.2
General information	prompt neutrons released per fission	1	456	JEFF-3.3	JEFF-3.2
General information	components of energy release due to fission	1	458	JEFF-3.3	ENDFB-7.0
Resonance parameter data	resonance parameters	2	151	JEFF-3.3	JEFF-3.1.1
Reaction cross sections	total	3	1	JEFF-3.3	JEFF-3.2
Reaction cross sections	elastic scattering	3	2	JEFF-3.3	JEFF-3.2
Reaction cross sections	total inelastic scattering	3	4	JEFF-3.3	JEFF-3.2
Reaction cross sections	anything	3	5	JEFF-3.3	JEFF-3.2

NEA DB - Dissemination of Nuclear data Providing standard tests



The screenshot shows the NEA Data Bank website interface. At the top left is the NEA logo and 'Related sites' dropdown. At the top right are 'JEFF-3.3' and 'NDEC' dropdown menus. A left sidebar contains a 'NDEC analysis' menu with items: 'JEFF-3.3 Downloads', 'Neutron', 'Decay Data', 'Fission Yields', 'Alpha', 'Deuteron', 'DPA', 'Gamma', 'He-3', and 'Proton'. The main content area features a 'JEFF-3.3' section with a descriptive paragraph, followed by an 'NDEC analysis' section with another descriptive paragraph. Below these are three interactive cards: 'Map ENDF-6 files' (with a heatmap), 'Browse NDEC results' (with a table), and 'Access Processed data' (with a plot). A list of links is provided at the bottom of the NDEC section.

NEA
NUCLEAR ENERGY AGENCY

Related sites ▾

JEFF-3.3 ▾ NDEC ▾

NDEC analysis

- JEFF-3.3 Downloads
- Neutron
- Decay Data
- Fission Yields
- Alpha
- Deuteron
- DPA
- Gamma
- He-3
- Proton

JEFF-3.3

The Joint Evaluated Fission and Fusion File (JEFF) is an evaluated library produced via an international collaboration of NEA Data Bank participating countries. **JEFF-3.3** was officially released on November 20, 2017.

NDEC analysis

NDEC is the Data Bank's Nuclear Data Service platform for the automated verification, processing and content analysis of evaluated nuclear data files and libraries.

[Map ENDF-6 files](#)

[Browse NDEC results](#)

[Access Processed data](#)

- [Learn more about NDEC](#)
- [Browse NDEC for JEFF-3.3](#)
- [Explore Maps for JEFF-3.3](#)

DB support to WPEC

Working Party on International Nuclear Data Evaluation Co-operation

WPEC is a forum to exchange information and a framework for co-operating activities between nuclear data file evaluation projects, aiming to

- Improve the quality and completeness of evaluated nuclear data libraries
- Promote the exchange of information on nuclear data evaluations, measurements, nuclear model calculations, validation, and related topics
- Assess ND improvement needs and address these needs by initiating joint efforts

❑ WPEC in numbers:

- ❑ **30th WPEC meeting, May 14-18 2018 (~ 80 participants expected)**
- ❑ Co-operation between major evaluation projects: ENDF, JENDL, JEFF (JEF, EFF/EAF), BROND, CENDL, TENDL, FENDL (& other IAEA projects)
- ❑ **Close collaboration with the IAEA Nuclear Data Section**
- ❑ Hundreds of participants from Europe, US, Japan, Korea, Russia, China
- ❑ **~46 short-term Subgroups, 39 completed, ~7 are very active**

WPEC 2018 meetings @ OECD

		CC 24	CC 18	Chateau E	CC 20	CC 4	
Monday May 14	09:00 - 12:30			SG-45 (VANDAL)			
	14:00 - 18:00				SG-44 (Covariances)		
Tuesday May 15	9:00 - 12:30			SG-42 (TSL data)	Joint Session SG 44 / SG 46		
	14:00 - 18:00			Joint Session SG-42 / SG-44 / GNDS			
Wednesday May 16	9:00 - 12:30	GNDS (SG-B)	SG-42 (TSL data)		SG 39 / SG 46 (I.E. adjustment, ND validation)		
	14:00 - 18:00	SG-43 (GNDS Code Infrastructure)		HPRL (SG-C)			
Thursday May 17	9:00 - 18:00				WPEC*		
Friday May 18	9:00 - 18:00						WPEC*

www.oecd-nea.org/science/wpec/meeting2018/

NEA DB – Training

- ❑ **CPS : 10 training courses organized in 2017**
 - ❑ **NJOY-2016 now open source**
 - 1st NJOY-2016 training took place in December 2017
 - 2nd NJOY-2016 training scheduled for October 29-31, 2018
- Registration : www.oecd-nea.org/dbdata/trainings/

NEA DB – Central to the ND community

- ❑ **NEA Nuclear Data weeks, sponsored workshops, conferences**
 - ❑ Two Nuclear Data weeks per year, in April and November
 - ❑ Organization of WPEC meetings
 - ❑ Cosponsoring of ND gatherings : WONDER-2018, ND-2019

Thank you for your attention



All NEA publications and institutional documentation available at
www.oecd-nea.org

