

A newsletter of the Nuclear Data Section (NDS)
Issue No. 47, May 2009

ISSN 0257-6376

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On-line News

Ongoing Service

The Nuclear Data Section is currently compiling an accessible electronic library of all documents produced by the IAEA pertaining to our Nuclear Data Services. These documents include IAEA-NDS, INDC and other NDS technical reports. Many only existed on microfiche or in paper form. All known documents will eventually be converted to PDF and placed on our web site.

This project is on-going and can be accessed on:

<http://www-nds.iaea.org/reports-new/>

Staff Items

Alan Nichols retired as Head of the Nuclear Data Section at the end of April 2009, after just over seven years employment with the IAEA. An impressive list of outputs and products is ample testimony to the high quality and standard of performance of the Nuclear Data Section during his tenure within the constraints of the procedures and resources of a large inter-governmental organization like the IAEA. Alan has mentored and nurtured talents in the Section to cope with all demands, as well as taken steps in all succession planning. We wish him both an active and healthy retirement.



Previous Nuclear Data Section Heads: Charles Dunford, 1993-1995 (left) and Joe Schmidt, 1968-1993 (right) with Alan Nichols (centre) on 16 April 2009.

Some Recent Programmatic Developments, 2008

(a). RIPL-3 (Reference Input Parameter Library, version 3) was brought to a highly successful conclusion during the course of 2008, after 14 years of challenging work undertaken in the form of three consecutive coordinated research projects. This work and the resulting databases are of immense value to theoreticians involved in the development and use of nuclear reaction modelling codes - the number of citations to this work within the open literature is already significant (arising from the authors' adoption of the RIPL-2 and RIPL-3 databases in their studies).

<http://www-nds.iaea.org/RIPL-3/>

(b). Evaluated Nuclear Data Files (ENDF) are normally developed and assembled at a national level, and have been brought together on an IAEA Web page for user convenience. The user-friendly nature of this work has progressed significantly over the previous two years, and has also been warmly welcomed worldwide.

<http://www-nds.iaea.org/exfor/endl.htm>

(c). Many long-term inadequacies and difficulties experienced by users of EXFOR to access all known measurements of nuclear cross sections have been eliminated. These significant improvements have been recognized and warmly welcomed by various Member States during the course of 2008.

<http://nds121.iaea.org/exfor2/exfor.htm>

(d). A new Web front page in July 2008 that covers all NDS nuclear data activities. Modern approaches were adopted to achieve greater clarity and transparency in the introduction and presentation of a wide range of nuclear databases.

<http://www-nds.iaea.org>

(e). After completing the evaluation of the international neutron cross-section standards in 2004, work was pursued in 2008 in support of the continuous updating of the experimental database for new evaluations of these standards, extension of their neutron energy ranges, and maintenance of the most important reference cross sections.

<http://www-nds.iaea.org/reports-new/indc-reports/indc-nds/indc-nds-0540.pdf>

(f). A significant number of applications databases have been assembled, assessed and reviewed, including non-standard β^+ emitters for positron emission tomography (PET), production cross sections for diagnostic and therapeutic radionuclides, nuclear data for safeguards, the International Reactor Dosimetry File, an extended/improved applications library for accelerator-driven systems (ADS), and tritium production within fusion devices. Other studies of this nature continue with respect to atomic and nuclear reaction cross sections, nuclear structure and decay data for fission and fusion applications, nuclear medicine, analytical sciences and basic nuclear physics research.

Coordinated Research Projects

IAEA Coordinated Research Projects (CRPs) are a valuable mechanism for stimulating research in IAEA Member States of relevance to IAEA programmes. CRPs of the Nuclear Data Section, both active and recently completed, can be found at:

<http://www.iaea.org/programmes/ripc/nd/crps.htm>

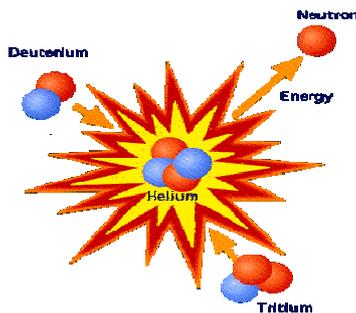
Database News

ENDF April 2007: 14 Evaluated Data Libraries for Nuclear Applications in original and pointwise formats:

- BROND-2.2
- ENDF6-Manual
- ENDF/B-VII-0
- ENDF/HE-VI
- IAEA-STD
- IRDF-2002
- JEFF-3.1
- JENDL-3.3
- CENDL-2
- ENDF/B-VI-8
- ENDF/B-VII-0-300
- IAEA-MEDICAL
- INDL/TSL
- IRDF-2002-G
- JEFF-3.1/A

Available on CD-ROM on request.

Computer Codes and Data Libraries



The following databases and libraries are available cost-free on CD-ROM on request:

EXFOR-CINDA Database and Retrieval System, version 1.99, data updated to March 2009:

- Integrated CINDA and EXFOR
- Advanced interactive search
- Help based on Dictionaries
- Interactive graphics with ZVView
- Does not need installation, can run from CD-ROM
- Works with Local and Remote Databases
- CINDA extended by charged particle and photo-nuclear reactions
- EXFOR and CINDA as MS-Access databases

Developed by V. Zerkin, Nuclear Data Section, IAEA, 2001-2009.

EndVer/GUI and EXFOR-CINDA package, February 2009:

An integrated software package for comparison of evaluated nuclear data files with experimental data from the EXFOR database (also contains interactive plotting).

Features:

- EndVer with Graphic User's Interface
- Integrated EndVer - PrePro-2007 - EXFOR
- PostScript graphics with PlotC4
- Plotting ENDF Files vs. EXFOR: MF4 (DA), MF5 (DE), MF6 (DAE), MF3+33 (SIG)
- Interactive graphics with ZVView
- Full EXFOR and CINDA databases
- Test version for Macintosh

IBANDL - Ion Beam Analysis Nuclear Data Library:

An Ion Beam Analysis Nuclear Data Library has been produced according to the recommendations of an IAEA Technical Meeting held in Vienna (29 and 30 October 2003). This data collection is the result of merging SigmaBase and NRABASE, and contains most of the available experimental nuclear cross-sections relevant to ion beam analysis. Excitation functions are presented both as graphs and data files, and the numerical data are in R33 format. All the entries are supplied with a reference to the data source. Data published only in graphical form have been digitized, and efforts have been made to ensure that the most accurate information was adopted.

The activity of the IBA community in the field of nuclear data is now supported through an IAEA Coordinated Research Project (CRP). A summary of the first CRP meeting describes the plans and goals. The second Research Coordination Meeting was held on 18 - 21 June 2007 at IAEA headquarters in Vienna. A new complete CD version of IBANDL has been prepared. Update of November 2008 is available on CD-ROM or on-line at:

<http://www-nds.iaea.org/ibandl/>.

Maintaining IBANDL as a dynamically developing collection of IBA nuclear data depends significantly on the activity of all members of the IBA community. Contributions to IBANDL are welcome. If you have new experimental results, upload your data now.

No guarantee can be given concerning the full validity of the data, and the IAEA accepts no responsibility for the usage of IBANDL.

Live Chart of the Nuclides



A tool has been devised to browse the chart of the nuclides in an interactive way. You can navigate the Live Chart like an online map, filter the visible nuclides by selecting their properties, and download a table with detailed data that describe the selected nuclides.

The Live Chart has evolved in such a manner as to show or discover patterns in nuclear data. Simple filtering shows how the nuclides far from the stability line disappear progressively when the lower limit of the half-life is increased, how β^+ and β^- decay are symmetric with respect to the stability line, and the relationship between even-even nuclei and J_{π} . More complex patterns can also be detected with ease, such as the asymmetry in β^+ and β^- nuclides when the maximum level energy is increased.

The Live Chart of the Nuclides is available for use on web site: <http://www-nds.iaea.org/livechart/>

Selected Charts, Reports and Documents



Chart of the Nuclides Prepared by Knolls Atomic Power Laboratory and distributed by Lockheed Martin (16th edition, revised to 2002). Available cost-free on request only for **teachers and scientists from developing countries**.

Chart of the Nuclides Book Prepared by Knolls Atomic Power Laboratory and distributed by Lockheed Martin (16th edition, revised to 2002). This book form of the Nuclides Chart is available cost-free on request only for **teachers and scientists from developing countries**.

Karlsruher Nuklidkarte Desk Chart of the Nuclides from Karlsruhe, 6th edition (1995). Updates from 1998. Available cost-free on request only for **teachers and scientists from developing countries**.

AEN/NEA Uncertainty and Target Accuracy Assessment for Innovative Systems Using Recent Covariance Data Evaluations, International Evaluation Co-operation, Volume 26, Nuclear Science 2008, Nuclear Energy Agency, OECD.

Nuclear Data Sheets Special Issue on Evaluated Nuclear Data File ENDF/B-VII.0, Volume 107, Number 12 (2006). Special Issue Editors: P. Oblozinsky and M. Herman. Limited hard copies available on request. Also available on CD-ROM.

Nuclear Wallet Cards 2005 7th Edition, by Jagdish K. Tuli, National Nuclear Data Center. These pocket size wallet cards are available as hard copy on request.

INDC(ITY)-0016 *Activity Report of the ENEA Nuclear Data Project in 2008*, Bologna, March 2009, prepared by A. Ventura, March 2009.

INDC(UK)-0092 *NPL Report IR 14, United Kingdom Nuclear Science Forum Progress Report, Data Studies During 2007*, edited by N.P. Hawkes, February 2009. This report is available as hard copy only.

INDC(NDS)-0526 *Re-evaluation of Microscopic and Integral Cross Section Data for Important Dosimetry Reactions*, prepared by K.I. Zolotarev, August 2008.

INDC(NDS)-0528 *Summary Report of First Research Coordination Meeting on Minor Actinide Nuclear Reaction Data (MANREAD)*, prepared by F. Kaepfeler and A. Mengoni, September 2008.

INDC(NDS)-0530 *Joint ICTP-IAEA Advanced Workshop on Model Codes for Spallation Reactions*, Trieste, Italy, 4-8 February, prepared by D. Filges, Y. Yariv, A. Mengoni, A. Stanculescu and G. Mank, August 2008.

INDC(NDS)-0531 *Summary Report of Consultants Meeting on IAEA International Database on Irradiated Nuclear Graphite Properties, 10th Meeting of the Technical Steering Committee*, Vienna, 26-27 March 2008, prepared by D. Humbert and A.J. Wickham, June 2008.

INDC(NDS)-0532 *Summary Report of Consultants Meeting on XML Schema for Atomic and Molecular Data*, Vienna, 15-16 May 2008, prepared by D. Humbert.

INDC(NDS)-0534 *Handbook of Nuclear Data for Safeguards – Database Extensions*, August 2008, prepared by A.L. Nichols, D.L. Aldama and M. Verpelli, August 2008.

INDC(NDS)-0535 *Summary Report of Consultants Meeting on High-Precision Beta-Intensity Measurements and Evaluations for Specific PET Radioisotopes*, Vienna, 3-5 September 2008, prepared by R. Capote Noy and A.L. Nichols, December 2008.

INDC(NDS)-0536 *Summary Report on Technical Meeting of the International Network of Nuclear Reaction Data Centres*, IPPE, Obninsk and Moscow State University, 22-25 September 2008, prepared by S. Dunaeva, A.L. Nichols and H. Henriksson, December 2008.

INDC(NDS)-0537 *Summary Report of Consultants Meeting on XML Schema for Atomic and Molecular Data*, Vienna, 26-27 August 2008, prepared by D. Humbert, October 2008.

INDC(NDS)-0538 *Summary Report on an IAEA Technical Meeting, 16th Meeting of the IFRC Subcommittee on Atomic and Molecular Data for Fusion*, Vienna, 17-18 April 2008, prepared by R.E.H. Clark, November 2008.

INDC(NDS)-0540 *Summary Report on Consultants Meeting on International Neutron Cross-Section Standards: Measurements and Evaluation Techniques*, Vienna, 13-15 October 2008, prepared by V.G. Pronyaev, A. Mengoni and A.D. Carlson, November 2008.

INDC(NDS)-0541 *Summary Report on Consultants Meeting on Prompt Fission Neutron Spectra of Major Actinides*, Vienna, 24-27 November 2008, prepared by R. Capote Noy, V. Maslov, E. Bauge, T. Ohsawa, A. Vorobyev, M.B. Chadwick and S. Oberstedt, January 2009.

INDC(NDS)-0543 *Summary Report of Technical Meeting on Reference Data Libraries for Nuclear Applications - ENSDF*, Vienna, 10-11 November 2008, prepared by D. Balabanski and A.L. Nichols, November 2008.

INDC(NDS)-0545 *ADS-2.0 - A Test Library for Accelerator Driven Systems and New Reactor Designs*, Vienna, prepared by D. Lopez Aldama and A.L. Nichols, December 2008.

INDC(NDS)-0547 *Summary Report from First Research Coordination Meeting on Nuclear Data Libraries for Advanced Systems - Fusion Devices (FENDL - 3)*, Vienna, 2 - 5 December 2008, prepared by Andrej Trkov, Robin Forrest and Alberto Mengoni, March 2009.

INDC(NDS)-0551 *Total Absorption Gamma-ray Spectroscopy (TAGS): Current Status of Measurement Programmes for Decay Heat Calculations and Other Applications*, Vienna, 27-28 January 2009, prepared by A.L. Nichols and C. Nordborg, February 2009.

All INDC series reports listed above are available online through:

http://www-nds.iaea.org/indc_sel.html

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Meeting Reports

IAEA Consultants Meeting on Total Absorption Gamma-ray Spectroscopy (TAGS) - Current Status of Measurement Programmes for Decay Heat Calculations and Other Applications, 27 - 28 January 2009

Total Absorption Gamma-ray Spectroscopy (TAGS) can play a very important role in defining with good accuracy the average decay energies of fission product radionuclides for which the necessary decay scheme data are known to be inadequate. This Consultants Meeting proved extremely beneficial in ensuring that all interested parties were brought up to date with current and proposed measurement programmes:

Lydie Giot and Muriel Fallout, Subatech, Nantes, France;
 Alejandro Algora, Dolores Jordan and Jose Luis Tain, Instituto de Fisica Corpuscular (IFIC), Valencia, Spain;
 Filip Kondev, Nuclear Engineering Division, Argonne National Laboratory, USA;
 Gopal Mukherjee, Physics Division, VECC, Kolkata, India;
 Claes Nordborg, OECD, Nuclear Energy Agency, France;
 Alan Nichols, Daniel Abriola and Mark A. Kellett, Nuclear Data Section, IAEA.

TAGS studies by the Valencia group from 2006 onwards were described in some detail, embracing the production, purification and collection of isotopically-pure Nb-101, Mo-105, and Tc-102, 104, 105, 106 and 107 for TAGS, and involving the facilities at the University of Jyväskylä, Finland. All data have been processed, and their appropriate β and γ strengths derived for decay heat calculations – their impact is suspected to be significant for U/Pu fuel cycle decay heat benchmark studies (see Report by the Working Party on International Evaluation Co-operation of the NEA Nuclear Science Committee, NEA/WPEC-25, OECD/NEA, Paris, 2007).

A new proposal has also been formulated and accepted for implementation at the University of Jyväskylä to study a number of important β^-n emitters: Br-87, 88, Rb-94, 95 and I-137 (of which Br-87, 88 and I-137 have been requested by WPEC Subgroup 25). This work is also strongly encouraged as part of the current efforts to improve the existing fission product decay databases.



The beta (β^-) decay process includes the emission of anti-neutrinos, and their spectral signal has been proposed to assess and monitor reactor operations, particularly with respect to a non-invasive method of detecting the clandestine production of fissile materials. Relevant decay scheme data are lacking for a number of fission products of importance in such studies, and recommendations were made to implement TAGS measurements – Lydie Giot/Muriel Fallot were actioned to provide a priority list of these radionuclides.

Plans for new TAGS facilities have been proposed:

(a) assembly is underway at the CARIBU facility, Argonne National Laboratory, USA (includes adoption of INL NaI(Tl) detectors of Greenwood *et al.*);

(b) initiation of an appropriate programme of work at VECC, Kolkata, India – will focus on requirements for the Th/U fuel cycle.

These new studies and developments were strongly endorsed, and participants encouraged to ensure that their experimental work overlaps and integrates in a fully complementary manner. Much work remains to be done. Good progress is being made, and TAGS measurements need to continue in order to assemble new and improved data files for applications, and to contribute to important research on nuclear structure. Further meetings of a similar type should be held on a two or three-year basis. More information can be found on: <http://www-nds.iaea.org/tagscm/>

Workshop on Modelling and Evaluating Nuclear Reaction Data for Transport Calculations, 15-19 December 2008



An IAEA-sponsored training workshop was organized at IAEA headquarters, Vienna, Austria on 15 - 19 December 2008. The workshop was dedicated to "*Modelling and evaluating nuclear reaction data for transport calculations*". Mike Herman (BNL, USA), Mihaela Sin (UB, Romania), Andrej Trkov (JSI, Slovenia) and Roberto Capote (IAEA) lectured and organized practical computer activities. A sensible combination of young and experienced researchers attended all activities. Training of 19 selected participants on the use of the EMPIRE system for both theoretical nuclear-reaction modelling and nuclear data generation was successfully achieved. EMPIRE 3.0 release was also distributed to workshop participants.

Reference Data Libraries for Nuclear Applications - ENSDF, 10-11 November 2008

A Technical Meeting on "Reference Data Libraries for Nuclear Applications – ENSDF" was held on 10-11 November 2008 at the IAEA Headquarters, Vienna, Austria. The purpose of this meeting was to review and discuss possible new European input to the ENSDF database (Evaluated Nuclear Structure Data File). These inputs are comprehensive mass-chain evaluations that constitute updated recommendations for the nuclear structure and decay data of nuclides assembled on the basis of mass number. Participants addressed seriously declining European effort in order to tackle emerging imbalances of responsibility around the world for the maintenance of this important database.

Attendees included:

Bulgaria: Dimiter Balabanski (INRNE), Kalin Gladnishki (University of Sofia), Stefan Lalkovski, (University of Sofia), Tsanka Venkova (INRNE);

Canada: Balraj Singh (McMaster University);

Finland: Heikki Penttilä (University of Jyväskylä);

France: Sydney Galès (GANIL);

Germany: Christoph Scheidenberger (GSI), Yuri Litvinov (GSI);
 Hungary: Janos Timár (ATOMKI), Zoltan Elekes (ATOMKI);
 Poland: Adam Maj (Instytut Fizyki Jądrowej PAN), Jerzy W. Jastrzębski (Warsaw University);
 Romania: Victor Zamfir (IFIN-HH), Dorel Bucurescu (IFIN-HH), Aurelian Luca (IFIN-HH), Alexandru L. Negret (IFIN-HH);
 Spain: Jose Maria Los Arcos (CIEMAT);
 Turkey: Melih Bostan (Istanbul University), Sefa Erturk (Nigde University), M. Nizamettin Erduran (Istanbul University);
 UK: Jon Billowes (University of Manchester), Zsolt Podolyak (University of Surrey);
 USA: Jagdish K. Tuli (NNDC-BNL), Filip G. Kondev (ANL);
 European Commission: Stefaan Pommé (EC – JRC, IRMM, Geel).

While European interest in contributing to the international efforts to develop and maintain ENSDF is judged to be significant, contributions to this important database by means of multinational mass-chain evaluations have fallen significantly over the previous 20 years. All were agreed that this important database needs to be maintained in a timely manner by knowledgeable nuclear structure physicists so that new measurements are incorporated into the evaluation process on a regular basis to aid all research and applied users. Europe needs to play a part in these evaluation activities commensurate with the region's world-renown technical expertise.

Consultations should be held with the main European players (Directors of national institutes/laboratories) in a concerted effort to launch a collaborative initiative to undertake mass-chain evaluations for ENSDF. Spokesmen were nominated (Dimitar Balabanski and Christoph Scheidenberger) to undertake these consultations over a relatively short time period (4 months), and prepare an agreed Memorandum of Understanding. Once established, this European collaboration should be brought together with the equivalent collaborative efforts of the USA and Rest of the World under the umbrella of the International Atomic Energy Agency, to constitute co-members of the International Network of Nuclear Structure and Decay Data Evaluators. All efforts should be made to achieve these goals in 2009.



On a mid-term timescale (two or three years), a collaborative initiative within Europe should be adopted and fall within the jurisdiction of NuPNET to recommend the necessary support from the national funding agencies, with a long-term aim to make these arrangements permanent (beyond three years).

Efforts will continue to explore and quantify the European interest in and viability of forming a European collaborative effort to support ENSDF through the contribution of regular mass-chain and horizontal evaluations, while the IAEA Nuclear Data Section and NNDC staff will assess the feasibility of holding a one-week workshop within Europe for would-be mass-chain evaluators already possessing nuclear structure expertise.

Consultants Meeting on International Neutron Cross-Section Standards: Measurements and Evaluation Techniques, 13-15 October 2008

A Consultants Meeting on International Neutron Cross-Section Standards: Measurements and Evaluation Techniques was held on 13-15 October 2008 at the IAEA Headquarters, Vienna. The purpose of this three-day meeting was to review the status of the international cross-section standards released in 2006 (<http://www-nds.iaea.org/standards/>), and to assess the possibility of extending the energy ranges and including new reactions that could be considered for adoption as reference cross sections. This data development project had been endorsed by the International Nuclear Data Committee at meetings in 2006 and 2008 as an important activity to be maintained under the auspices of the Nuclear Data Section of the IAEA.

During the course of the meeting, recommendations and actions were agreed on a number of proposals to reach the primary objective of developing/maintaining the IAEA data set of international neutron cross-section standards. These discussions focused on the following reactions:

- standards evaluation for ^{252}Cf spontaneous fission spectra and reference evaluation for $^{235}\text{U}(n_{\text{th}},f)$ fission neutron spectra;
- $^{197}\text{Au}(n,\gamma)$ reaction as a standard for capture cross-section measurements at energies of importance to astrophysics ($E_n < 200$ keV);
- reference cross sections for prompt gamma-ray production in fast neutron-induced reactions.



Common problems identified with the standards and reference cross-section evaluations were also discussed in detail, particularly the use of the standards data in the resolved resonance region, based on the analysis of high-resolution experimental data which were not used in the standards least-squares fit. The following more general problems were considered with respect to the standards and reference cross-section evaluations:

- differences between standard and reference cross sections;
- possible use of high-resolution data that are currently not a part of the experimental database for standards evaluation through the combined fit with inclusion of group-averaged cross-section data and covariances calculated from the evaluated resonance parameters;
- data in energy regions where contributions from the missed resonances may change the average cross sections;
- reliability of the physical model fits and the use of physical model calculations to smooth the evaluated data and covariances;
- relevant experimental groups should be requested to achieve speedier data processing and release of experimental results of importance to the neutron cross-section standards project;
- invite contributions to the project from theoreticians, experimentalists and evaluators who have not taken part in the Consultants Meeting, but are known to be actively working in the field;
- co-ordination of the work and communication between participants in the project;
- propose that the IAEA Nuclear Data Section consider holding another Consultants Meeting in the autumn of 2010.

Technical Meeting of the International Network of Nuclear Reaction Data Centres, IPPE, Obninsk, and Moscow State University, Moscow, Russian Federation, 22-25 September 2008

The IAEA Technical Meeting on the Co-ordination of the International Network of Nuclear Reaction Data Centres (NRDC) was held at IPPE, Obninsk, and Moscow State University, Russian Federation, from 22-25 September 2008. Twenty-four participants from twelve cooperating data centres in Hungary, Japan, Republic of Korea, the Russian Federation, Ukraine, USA, NEA and IAEA attended the meeting. S. Ganesan from BARC, India attended the meeting as an observer.

Meetings of the NRDC network are held annually. Main topics of the present meeting were associated with new staff at several data centres, updates to the EXFOR/CINDA dictionaries, intensified quality control in collaboration with NEA WPEC subgroup 30, as well as improved checking and correction procedures using this feedback and taking into account the needs of data evaluators. EXFOR Editor software was presented and recommended for use in all compilations for EXFOR. Thirty-eight working papers were presented at the meeting. The results of the discussions were summarized in twenty-six Conclusions and sixty-five Actions.



Moscow State University, Moscow, Russian Federation, 25 September 2009

Feedback received by evaluators on real or apparent mistakes in the EXFOR database was discussed, noting that while in a minority of cases actual mistakes had been found, in many cases the problems were misunderstandings of the data definitions or in converting EXFOR to the C4 format and further conversions of the data in users' applications. Close cooperation between NRDC and NEA WPEC Subgroup 30 (SG30) has been established, and the NRDC is analyzing and correcting several of the suspicious EXFOR data the SG30 group has found. A new database will be prepared that includes all suggested corrections for improvement of data, and this corrected database will be used when generating the full C4 file for EXFOR users.

Nuclear Data Services – contact points

For services to customers in USA and Canada:

US National Nuclear Data Center, Bldg. 197D, Brookhaven National Laboratory, P.O. Box 5000, Upton, NY 11973-5000, USA. Tel. +1 631-344-2902; Fax +1 631-344-2806; Email: nndc@bnl.gov; Worldwide Web: <http://www.nndc.bnl.gov/> For information regarding on-line services, contact: B. Pritychenko: pritychenko@bnl.gov. For information regarding general NNDC services, contact M. Blennau: blennau@bnl.gov

For services to customers in OECD/NEA Data Bank member countries:

NEA Data Bank: OECD Nuclear Energy Agency, Le Seine Saint-Germain, 12 blvd des Iles, F-92130 Issy-les-Moulineaux, France. Tel. +33 1 4524 (plus extension); Fax +33 1 45241110; Email: (name)@nea.fr or nea@nea.fr; Worldwide Web: <http://www.nea.fr> Contact: A. Hasegawa, ext. 1080.

For services to the countries of the former USSR:

Neutron data: Russia Nuclear Data Center, Centr Jadernykh Dannykh (CJD), Fiziko-Energeticheskij Institut, Ploschad Bondarenko, 249020 Obninsk, Kaluga Region, Russian Federation. Tel. +7 08439-9-8982; Fax +7 095-230-2326; E-mail: manokhin@ippe.obninsk.ru. Worldwide Web <http://rncd.ippe.obninsk.ru/> Contact: V.N. Manokhin.

Charged-particle data: Russia Nuclear Structure and Reaction Data Center (CAJAD), Kurchatov Institute, Kurchatov Square 1, 123 182 Moscow, Russian Federation. Tel. +7 095-196-9968; Fax +7 095-882-5804; Email: chukreev@polyn.kiae.su Contact: F.E. Chukreev.

Photonuclear data: Centre for Photonuclear Experiments Data, Centr Dannykh Fotoyadernykh Eksperimentov (CDFE), Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Leninskie Gory, 119 922 Moscow, Russian Federation. Tel. +7 095-939-3483; Fax +7 095-939-0896; Email: varlamov@depni.sinp.msu.ru or varlamov@depni.npi.msu.su. Worldwide Web <http://depni.sinp.msu.ru/cdfe/> Contact: V.V. Varlamov.

For services to customers in China:

China Nuclear Data Center, China Institute of Atomic Energy, P.O. Box 275(41), Beijing 102413, China. Tel. +86 10-6935-7275; Fax +86 10-6935-7008; Email: gezg@iris.ciae.ac.cn Contact: Ge Zhigang.

Computer codes of US origin to all countries:

Radiation Safety Information Computational Center (RSICC), Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-6362, USA. Tel. +1 865-574-6176; Fax +1 865-574-6182; Email: pcd@ornl.gov. Worldwide Web <http://epicws.epm.ornl.gov/> (there are charges and release restrictions)

Computer codes of non-US origin to all countries:

NEA Data Bank, see above, contact: E. Sartori, ext. 1072; Email: sartori@nea.fr (there may be release restrictions)

IAEA Nuclear Data Section offers data centre services primarily to non-OECD countries (except Russian Federation and China, see above). However, most products advertised in this Newsletter, specifically INDC reports,

IAEA-NDS-documents, etc., are provided upon request to customers in all countries. For on-line services see the first page of this Newsletter. Users of countries in Latin America and Caribbean may use IAEA-NDS mirror at

Worldwide Web <http://www-nds.ipen.br>

Users in India and neighbouring countries may use IAEA-NDS mirror at

Worldwide Web <http://www-nds.indcentre.org.in>



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Nuclear Data Newsletter

No. 47, May 2009

09-15071