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INFORMAL REPORT

Citation Guidelines for Nuclear Data Retrieved from Databases Resident at the Nuclear Data Centers Network

written by

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on behalf of the

Nuclear Data Centers Network

July 1996

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Introduction

This document outlines the proper method of citing data obtained from each of the Nuclear Data Centers Network databases.

The Nuclear Data Centers Network[1] is a world-wide cooperation of nuclear data centers under the auspices of the International Atomic Energy Agency. The Network organizes the task of collecting, compiling, standardizing, storing, assessing, and distributing the nuclear data on an international scale. Information available at the Centers includes bibliographic, experimental, and evaluated databases for nuclear reaction data and for nuclear structure and radioactive decay data. The objective of the Network is to provide the information to users in a convenient, readily-available form. To this end, online data services have been established at three of the centers: the National Nuclear Data Center (NNDC), the Nuclear Data Section of the International Atomic Energy Agency (NDS), and the OECD Nuclear Energy Agency Data Bank (NEADB). Some information is also available at the NNDC and NEADB WorldWideWeb sites.

Data source

Data obtained from the databases residing at the member organizations of the Nuclear Data Centers Network should be properly cited. In general, there should be a citation of the original source of the information used, as well as of the database from which the data were extracted. The source of the information should be cited as:

- Data retrieved *(or extracted)* from the *(center name)* Online Data Service,
- Data retrieved *(or extracted)* from the *(center name)* WorldWideWeb site,
- Data received by electronic file transfer from *(center name)*,
- Data received from *(center name)*[2].

These data bases may contain essential information which does not exist in a published article. Since the databases are periodically updated, it is important to include the date and/or revision number of the version of the database used.

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[1] The Nuclear Data Center Network and the participating centers are described in report **INDC(NDS)-324** (1995).

[2] For information received by mail or electronic mail.

Bibliographic Information

When information retrieved from one of the Centers' bibliographic databases is used in a review article or other survey of available information, the database used should be cited; the citation should include the version (date) of the database used.

Nuclear Science References (NSR)

Data included in Nuclear Science References are compiled, checked, organized, and distributed by the National Nuclear Data Center.[3] The database should be cited as follows.

> National Nuclear Data Center, **Nuclear Science References**, version of (date). Information extracted from the NSR database *[Source]*.

The citation to be used when citing the NSR formats is:

> S. Ramavataram and C.L. Dunford, *Nuclear Science References Coding Manual*, Report **BNL-NCS-51800**, Rev. 08/96 (1996) Brookhaven National Laboratory, U.S.A.

Computerized Index to Neutron Data (CINDA)

Data included in CINDA are compiled by the Neutron Data Centers (i.e., NNDC, NEADB, NDS, and the Russian Nuclear Data Center (CJD)). The database should be cited as follows.

> Nuclear Data Centers Network, **CINDA95, Index to the Literature and Computer Files on Microscopic Neutron Data**,[4] (International Atomic Energy Agency, Vienna, Austria, 1995). Information extracted from the CINDA database, version *(date)*, *[Source]*.

The CINDA format should be cited as follows:

> NEA Data Bank, ***CINDA Coding Manual***, unpublished, February 1990.

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[3] Contributions to the compilation of Japanese references are made by the Institute of Physical and Chemical Research (RIKEN), Japan, and of Russian references by at the St. Petersburg Nuclear Physics Institute, Gatchina.

[4] The CINDA publication is issued every year. Please refer to the latest issue.

Experimental Reaction Data

The data in the Experimental Nuclear Reaction Database are compiled in the EXFOR format and exchanged among the members of the Nuclear Data Centers Network (see Appendix A).[5]

Referencing individual data sets

When citing data extracted from this database, always cite the individual references. However, the data entries are often more up-to-date than the original reference; the entries may be updated, sometimes repeatedly, either when the author revises the data, or when the EXFOR compiler receives additional information about the data. Therefore, for unique identification of the data used, the EXFOR data set should also be referenced, and the date of the last revision should be given.[6] (Note that the authors receive proof copies of the data before it is entered into the database and in the case of any major revision to the data set).

Example:

A.B. Author, et al., ***J. Nucl. Phys.*** **12**, 345 (1979). Data retrieved from the CSISRS database, file EXFOR 12345.002 dated April 5, 1980 *[Source]* .

Notes on finding the information needed to reference a data set:

1. The authors of an EXFOR/CSISRS data set may be found under the keyword 'AUTHOR' in the BIB section.

2. References for the data given in an EXFOR entry may be found under the keyword 'REFERENCE' in the BIB section. If more than one reference is given, the first is the primary reference.

3. The subentry number of the data set (*e.g.*, 12345.002) will be given at the beginning of each data set displayed in an online retrieval, or, for a file in the EXFOR format, may be found on the SUBENT record of the data set, immediately following the SUBENT keyword.

4. The revision date will be given at the beginning of each data set displayed in an online retrieval, or, for a file in the EXFOR format, is given on the SUBENT record of the data set, immediately following the data set number. The format of the date is *yymmdd*, where *yy* is the last 2 digits of the year, *mm* is the integer equivalent for the month, and *dd* is the day of the month.

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[5] This data is available from the CSISRS database at NNDC and NDS, and from the EXFOR database at NEADB.

[6] Do not use old EXFOR retrievals. In case of doubt, check with the Data Center responsible for the database from which you retrieved the data.

Referencing the EXFOR format

To reference the EXFOR data in general, for example, when discussing the EXFOR format, the citation to be used is:

> Nuclear Data Centers Network, *EXFOR Systems Manual: Nuclear Reaction Data Exchange Format*, Report **BNL-NCS-63330** (1996), compiled and edited by V. McLane, National Nuclear Data Center, Brookhaven National Laboratory, U.S.A.

Plots

When using plots produced from the CSISRS database, the citation should read:

> Plots produced using the code BNL325, written by C.L. Dunford, National Nuclear Data Center, Brookhaven National Laboratory.

Evaluated Data Libraries in the ENDF Format

Five major evaluated nuclear data libraries are produced in the ENDF format and exchanged by the members of the Nuclear Data Centers Network: BROND, CENDL, ENDF/B, JEF, and JENDL. Each of these libraries is maintained by one of the member Centers.

Referencing individual evaluations

For individual evaluations, the reference should contain the author of the evaluation, along with a reference to the appropriate documentation. In addition, the library name, MAT number, the MOD or revision number, and the institution(s) which are responsible for the evaluation should be included. All these data are readily available in File 1, MT 451, of each evaluation. Where a published document prepared by the authors of the evaluation is available, this document should be cited directly. If such a document does not exist, the documents describing the contents of the library from which the data has been extracted should be used as a reference (see Referencing an Evaluated Library, following).

> A.B. Name, Report **ANL/NDM-129** (1994), Argonne National Laboratory, U.S.A., ENDF/B-VI evaluation, MAT # 4831, Revision 1, July 1995; data retrieved from the ENDF database *[Source]* .

Referencing an evaluated library

The following citations are proposed for referencing a specific evaluated data library in its entirety.

BROND-2

The Russian Library of Evaluated Neutron Reaction Data is produced and maintained by the Russian Nuclear Data Center (CJD). The most current version of this library is BROND-2; the citation should read:

> A. I. Blokhin, et al., *Current Status of Russian Nuclear Data Libraries*, **Nuclear Data For Science and Technology**, Volume 2, p. 695, edited by J. K. Dickens (American Nuclear Society, LaGrange Park, IL, 1994).

CENDL-2

The Chinese Evaluated Nuclear Data Library is produced by the Chinese Nuclear Data Center and the Nuclear Data Committee of China, and is maintained by the Chinese Nuclear Data Center. The most current version of this library is CENDL-2; the citation should read:

> Chinese Nuclear Data Center, *CENDL-2, The Chinese Evaluated Nuclear Data Library for Neutron Reaction Data*, Report **IAEA-NDS-61, Rev. 3** (1996), International Atomic Energy Agency, Vienna, Austria.

ENDF/B-VI

The Evaluated Nuclear Data File (ENDF/B) is produced by members of the Cross Section Evaluation Working Group, and is maintained by the National Nuclear Data Center. The current version of this library is ENDF/B-VI; the citation should read:

> Cross Section Evaluation Working Group, *ENDF/B-VI Summary Documentation*, Report **BNL-NCS-17541 (ENDF-201)** (1991), edited by P.F. Rose, National Nuclear Data Center, Brookhaven National Laboratory, Upton, NY, USA.

JEF-2

The Joint Evaluated File (JEF) is produced by the NEA Joint Evaluation Project, and maintained by the NEA Data Bank. The current version of this library is JEF-2; the citation should read:

> C. Nordborg, M. Salvatores, *Status of the JEF Evaluated Data Library*, **Nuclear Data for Science and Technology**, edited by J. K. Dickens (American Nuclear Society, LaGrange, IL, 1994).

JENDL-3

The Japanese Evaluated Nuclear Data Library is produced by the JAERI Nuclear Data Center and the Japanese Nuclear Data Committee, and is maintained by the JAERI Nuclear Data Center; the current version of the library is JENDL-3; the citation should read:

> T. Nakagawa, et al., *Japanese Evaluated Nuclear Data Library, Version 3, Revision 2*, ***J. Nucl. Sci. Technol.*** **32**, 1259 (1995).

Referencing the ENDF format

The citation to be used when referencing the ENDF format is:

> The Cross Section Evaluation Working Group, *Data Formats and Procedures for the Evaluated Nuclear Data File ENDF-6*, Report **BNL-NCS-44945 (ENDF-102)** (1995) edited by V.McLane, et al., National Nuclear Data Center, Brookhaven National Laboratory, U.S.A.

Plots

When using tables and drawings produced from the ENDF database through the Online Data Service at NNDC or NDS, the citation should read:

> Plots produced using the Online Service retrieval code package written by C. L. Dunford, National Nuclear Data Center, Brookhaven National Laboratory.

Multigroup Libraries

If the evaluated data are used to generate a multigroup library, the report describing the multigroup library should contain a table referencing the evaluations used. The table should include the library name and version, material, material number (MAT), modification number (MOD) or revision number, authors, and institution for each evaluation.

Example:

Library	Material	MAT #	MOD	Author	Institute
ENDF/B-VI	^{58}Ni	2825	2	D. Larson, et al.	ORNL
JENDL-3	^{62}Ni	2837	3	S. Iijima	NAIG

Evaluated Nuclear Structure Data

Evaluated Nuclear Structure Data File (ENSDF)

ENSDF is produced by the International Nuclear Structure and Decay Data Network (see Appendix B), and is maintained by the National Nuclear Data Center.[7] The data are available at the National Nuclear Data Center, the NEA Data Bank, IAEA Nuclear Data Section, the Russian Nuclear Data Center (CJD), and the Russian Nuclear Structure and Reaction Data Center (CaJaD) (see Appendix A).

Referencing individual evaluations

To reference individual mass chains or parts of mass chains, cite the author and the published version of the evaluation. This will be found under MASS_STATUS when accessing the ENSDF database through the Online Data Service, or toward the end of the COMMENTS data set of the mass chain. The citation will automatically be generated if the data are displayed using the code ENSDAT.[8]

Example:

COMMENT section records:

```
56  C AUTH     HUO JUNDE
56  C CIT$NDS 67, 523 (1992)
```

Citation:

Huo Junde, ***Nucl. Data Sheets* 67**, 523 (1992). Data extracted from the ENSDF database, version (date), *[Source]* .

Many mass chains are periodically updated between published evaluations. In this case, a reference to the database version should be included in the citation. For example, an evaluation published in the **Nuclear Data Sheets** in 1990 will have 90NDS on the first record of the ENDF-formatted data set; if the data set was revised in 1993 based on new data, 90NDS+93 will appear at the right on this record, followed by the date of entry into the database. The COMMENTS data set will contain information on the revision, and there should also be documentation in the data set.

Example:

1st record of COMMENT section:

```
50  COMMENTS                                    90NDS+93  931112
```

Citation:

T.W. Burrows, ***Nucl. Data Sheets* 61**, 1 (1990), and interim evaluation, T.W. Burrows (1993). Data extracted from the ENSDF database, revision of Nov. 11, 1993, *[Source]*.

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[7] The Network is described in the ***IAEA Nuclear Data Newsletter***, issue 20 (1994).

[8] For data processed through the Online Service at NNDC or NDS, the plots are generated using the code ENSDAT.

Referencing ENSDF

When referencing the Evaluated Nuclear Structure Data File (ENSDF) as a whole, for example, if the data used span many mass chains as in a study of systematics, the citation should include the revision date of the database. The citation should read, for example:

> Data extracted using the NNDC On-Line Data Service from the ENSDF database, file revised as of *(date)*. M. R. Bhat, *Evaluated Nuclear Structure Data File (ENSDF)*, **Nuclear Data for Science and Technology**, page 817, edited by S. M. Qaim (Springer-Verlag, Berlin, Germany, 1992).

Referencing the ENSDF format

The reference to be used when citing the ENSDF format is:

> J.K. Tuli, *Evaluated nuclear structure data file*, ***Nucl. Instr. Meth.*** **A 369**, 506 (1996).

For the reference to be used when citing the ENSDF database, see Online Data Service, page 10.

Prepublication Data

Data obtained from the prepublication data base should be treated as a preprint. It should not be cited without express permission of the authors.

Tables and Figures

When using tables and figures produced by the NNDC or NDS Online Service, the citation should read:

> Plots produced using the code ENSDAT, written by R.R. Kinsey, National Nuclear Data Center, Brookhaven National Laboratory, Upton, NY, U.S.A.

MIRD

When using data extracted from the MIRD database, the citation should read, for example:

> Data produced using the MIRD Program, and extracted from the Evaluated Nuclear Structure Data File (ENSDF), *date*, *[Source]* . Additional calculations performed by the program RADLST, T.W. Burrows, *The Program RADLST*, Report **BNL-NCS-52142** (1988), National Nuclear Data Center, Brookhaven National Laboratory, U.S.A.

NUDAT

Data retrieved from the NUDAT database should have the following citation with reference to the Online Data Service used and the version date of the file.

> R. R. Kinsey, et al., *The NUDAT/PCNUDAT Program for Nuclear Data*, paper submitted to the 9th International Symposium of Capture Gamma-Ray Spectroscopy and Related Topics, Budapest, Hungary, October 1996. Data extracted from the NUDAT database, version (date), *[Source]* ...

QCALC

To reference calculations performed by the program QCALC:

> Data produced by the code QCALC, written by T.W. Burrows, National Nuclear Data Center, Brookhaven National Laboratory, and based on the Audi-Wapstra Atomic Mass Tables, G. Audi and A.H. Wapstra, *The 1995 Update to the Atomic Mass Evaluation.*, ***Nucl. Phys.*** **A595**, 409 (1995).

Photo-Atomic Interaction Data

When referencing calculations from the XRAY program, the Online Data Service from which the data were extracted should be referenced. The following specific citations should be made depending on the calculations performed.

> Data extracted from the XRAY database, version (date), *[Source]* ...

The following citations should be appended depending on the type of data used.

Attenuation Coefficients

> ...using a modification of the program XCOM, M.J. Berger and J.H. Hubbell, *XCOM: Photon Cross Sections on a Personal Computer*, Report **NBSIR 87-3597** (1987), National Institute for Standards and Technology, U.S.A.

Polarized Scattering

Photon-interaction Data

> ...using photon-interaction data are taken from the ENDF/B-VI library, D.E. Cullen, et al., *Tables and Graphs of Photon-Interaction Cross Sections from 10 eV to 100 GeV Derived from the LLNL Evaluated Photon Data Library (EPDL)*, Report **UCRL-50400**, Vol. 6, Parts A+B (1989), Lawrence Livermore National Laboratory, U.S.A.

Polarized scattering calculations

> ...and based on work by A.L. Hanson, ***Nucl. Instr. Meth.*** **A 290**, 167-171 (1990), ***Nucl. Instr. Meth.*** **A 264**, 471-483 (1988), and ***Nucl. Instr. Meth.*** **A 264**, 484-487 (1988).

Atomic Masses

Data taken from the MASSES library, should be referenced as follows.

G. Audi and A.H. Wapstra, *The 1995 Update to the Atomic Mass Evaluation.*, ***Nucl. Phys.*** **A595**, 409 (1995). Data extracted from the MASSES library *[Source]*.

Online Data Service

The reference to be used in citing the Online Data Service systems are:

At NNDC and NDS:

C.L. Dunford and T.W. Burrows, *Online Nuclear Data Service*, Report **IAEA-NDS-150** (NNDC Informal Report **NNDC/ONL-95/10**), Rev. 95/10 (1995)[9], International Atomic Energy Agency, Vienna, Austria.

At NEADB:

General User's Guide to the NEA Online Services, Report **DBG-030.11** (1993), NEA Data Bank, Paris, France.

[9] Periodically updated.

Appendix A

Nuclear Data Centers Network

National Nuclear Data Center
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Brookhaven National Laboratory
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Upton, NY 11973-5000
U.S.A.

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Fax: +1 516-344-2806
Internet: nndc@bnl.gov
WorldWideWeb: http://www.nndc.bnl.gov
Telnet (online): bnlnd2.dne.bnl.gov
username: NNDC; code: GUEST
FTP: bnlnd2.dne.bnl.gov
username: ANONYMOUS

OECD Nuclear Energy Agency Data Bank
Le Seine Saint-Germain
12, Boulevard des Iles
92130 Issy-les-Moulineaux
FRANCE

Contact: Dr. Nigel Tubbs
Phone: +33 1 4524 1071
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Internet: nea@nea.fr
WorldWideWeb:
http://www.nea.fr/html/dbdata/dbdata.html
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username: NEADB; code: GUEST
FTP: ftp.nea.fr; username: ANONYMOUS

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Appendix B

International Nuclear Structure and Decay Data Network

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