



**International Atomic Energy Agency**

# **NSR and ENSDF at IAEA-NDS**

**D. Abriola**

**Nuclear Data Section**

**Department of Nuclear Sciences and Applications**

**USNDP, NNDC, November 2007**

# NSR and ENSDF at IAEA-NDS

Section Head:

A.L. Nichols, Nuclear Data  
Physicist

Section Secretary:

J. Roberts, Clerk

Deputy Section Head:

D. Abriola, Nuclear Data  
Physicist

Atomic & Molecular Data Unit	Nuclear Data Services Unit	Nuclear Data Development Unit	Systems Development Unit
<p><u>R.E.H. Clark</u> (Head) Atomic Physicist</p> <p><u>D. Humbert</u> Atomic Physicist/ Programmer</p> <p><u>K. Sheikh</u> Database Clerk</p>	<p><u>A. Mengoni</u> (Head) Nuclear Data Physicist</p> <p><u>V. Zerkin</u> Nuclear Physicist/ Programmer</p> <p><u>Vacancy</u> Nuclear Data Physicist</p> <p><u>S. Dunaeva</u> Nuclear Physicist</p> <p><u>G. Bush</u> Production Programmer</p> <p><u>L. Vrapceniak</u> Secretary/Clerk (temp)</p>	<p><u>D. Abriola</u> (Head) Nuclear Data Physicist</p> <p><u>R. Capote Noy</u> Nuclear Physicist</p> <p><u>M. A. Kellett</u> Nuclear Physicist</p> <p><u>K. Nathani</u> Secretary/Clerk (temp)</p>	<p><u>W. Costello</u> (Head) Systems Analyst</p> <p><u>M. Verpelli</u> Database Analyst/ Programmer</p> <p><u>K. Nathani</u> Secretary/Clerk (temp)</p> <p><u>[M. O'Connell (25%)]</u> Applications Programmer</p>



# NSR and ENSDF efforts at IAEA-NDS

**1.01 – Data services, data networks and user support**

**1.02 – Nuclear data standards and evaluation methods**

**1.03 – Nuclear data for radiotherapy using radioisotopes and external radiation sources**

**1.04 – Atomic and molecular data for fusion experiments**

**1.05 – Nuclear data for Th-U fuel cycle**

**1.06 – Nuclear data for reactor dosimetry and analysis**

**1.07 – Nuclear data for advanced nuclear facilities**

# NSR and ENSDF efforts at IAEA-NDS

**1.01 – Data services, data networks and user support**

1.02 – Nuclear data standards

1.03 – Nuclear data for radiotherapy and radiation sources

1.04 – Atomic and molecular data for fusion experiments

1.05 – Nuclear data for Th-U fuel cycle

1.06 – Nuclear data for reactor instrumentation and analysis

**1.07 – Nuclear data for advanced nuclear facilities**

**NSR compilation  
ENSDF evaluation  
in close collaboration with  
NNDC**

**CRP on Updated decay data  
library for actinides, 2005-2009**



## NSR: background and IAEA coverage

- **Compilation began in September 2005**
- **Three journals covered by the IAEA (~20-30% of NSR entries):**
  - **Nuclear Physics A (NUPAB)**
  - **European Physical Journal A (ZAANE)**
  - **Physics Letters B (PYLBB)**

## IAEA/NNDC collaborative visits

**IAEA designated Mark A. Kellett as their NSR keyword compiler:**

- **Initial one week visit to NNDC, July 2005**
- **Second one week visit to NNDC, Dec 2005**
- **D. Winchell, one week visit to IAEA, June 2006**
- **Third one week visit to NNDC, Oct 2006**
- **M. Bhattacharya, one week visit to IAEA, Oct 2007**

## IAEA keyword compilation statistics

**IAEA has compiled the following:**

- **2005: 169 papers (from Sept to Dec)**
- **2006: 640 papers**
- **2007: 621 papers (so far)**
  
- **Total: 1430 papers**

# NSR and ENSDF efforts at IAEA-NDS

## Coordination Activities:

### Network of Nuclear Structure and Decay Data Evaluators (NSDD)\*

responsible for the evaluation and updating of nuclear structure data contained in the Evaluated Nuclear Structure Data File (ENSDF)  
- data also published in *Nuclear Data Sheets*



Alan Nichols

NSDD meetings are held biennially and are organized by IAEA-NDS meetings in Hamilton, Canada on 6-10 June 2005, and St. Petersburg, Russian Federation on 11-15 June 2007:

- seeking improved input from Europe;
- NDS to assist in preparation of NSR compilations;
- IAEA-NDS sponsorship of workshops at ICTP-Trieste

\* NSDD: 16 centres, IAEA-NDS Co-ordination, BNL/NNDC custodian of ENSDF



# NSR and ENSDF efforts at IAEA-NDS

**D. Abriola**

**Collaboration started in 2004**

**Visits to NNDC to work with Alejandro  
Sonzogni**

- **Jan-Feb 2005 A=94**
- **Jan-Feb 2006 Finished A=94, Started A=96**



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)



Nuclear Data Sheets 107 (2006) 2423–2578

**Nuclear Data  
Sheets**

[www.elsevier.com/locate/nds](http://www.elsevier.com/locate/nds)

## Nuclear Data Sheets for $A = 94$ \*

D. Abriola<sup>a</sup>, A.A. Sonzogni

*National Nuclear Data Center  
Brookhaven National Laboratory  
Upton, New York 11978-8000, USA*

*(Received October 10, 2005; Revised February 8, 2006)*

**Abstract:** Experimental data on ground- and excited-state properties for all known nuclei with mass number  $A=94$  have been compiled and evaluated. States populated in radioactive decay, as well as in nuclear reactions, have been considered. For these nuclei, level and decay schemes, as well as tables of nuclear properties, are given. The Hager-Seltzer internal conversion coefficients are listed for gamma rays of known multipolarity. This work supersedes the 1992 evaluation by J.K. Tuli (1992Tu02). Since 1992, many articles have been published which were incorporated in this evaluation. In summary, high-spin data using large arrays of Ge detectors have been obtained for <sup>94</sup>Kr (2000Rr02), <sup>94</sup>Sr (1998Ha20), <sup>94</sup>Zr (2002Fo03,2005Pa48), <sup>94</sup>Nb (2000Ma83), <sup>94</sup>Mo (1998Kh04), <sup>94</sup>Tc (2000Ch01), <sup>94</sup>Ru (1994Ju05,1994Ro08), <sup>94</sup>Rh (1994Ar33), and <sup>94</sup>Pd (2003Ma24). A new isomer was observed in <sup>94</sup>Y (1999Cs01). The low-spin levels in <sup>94</sup>Mo were systematically studied using a variety of experimental techniques (2005Fr02). Considerable effort was spent investigating the decay of <sup>94</sup>Ag and the levels of <sup>94</sup>Pd (2005Mu03,2005Mu13,2004BaZY,2004Pi01,2002La18), in particular, the (21+) level in <sup>94</sup>Ag is the first level observed to undergo both single and double proton radioactivity.

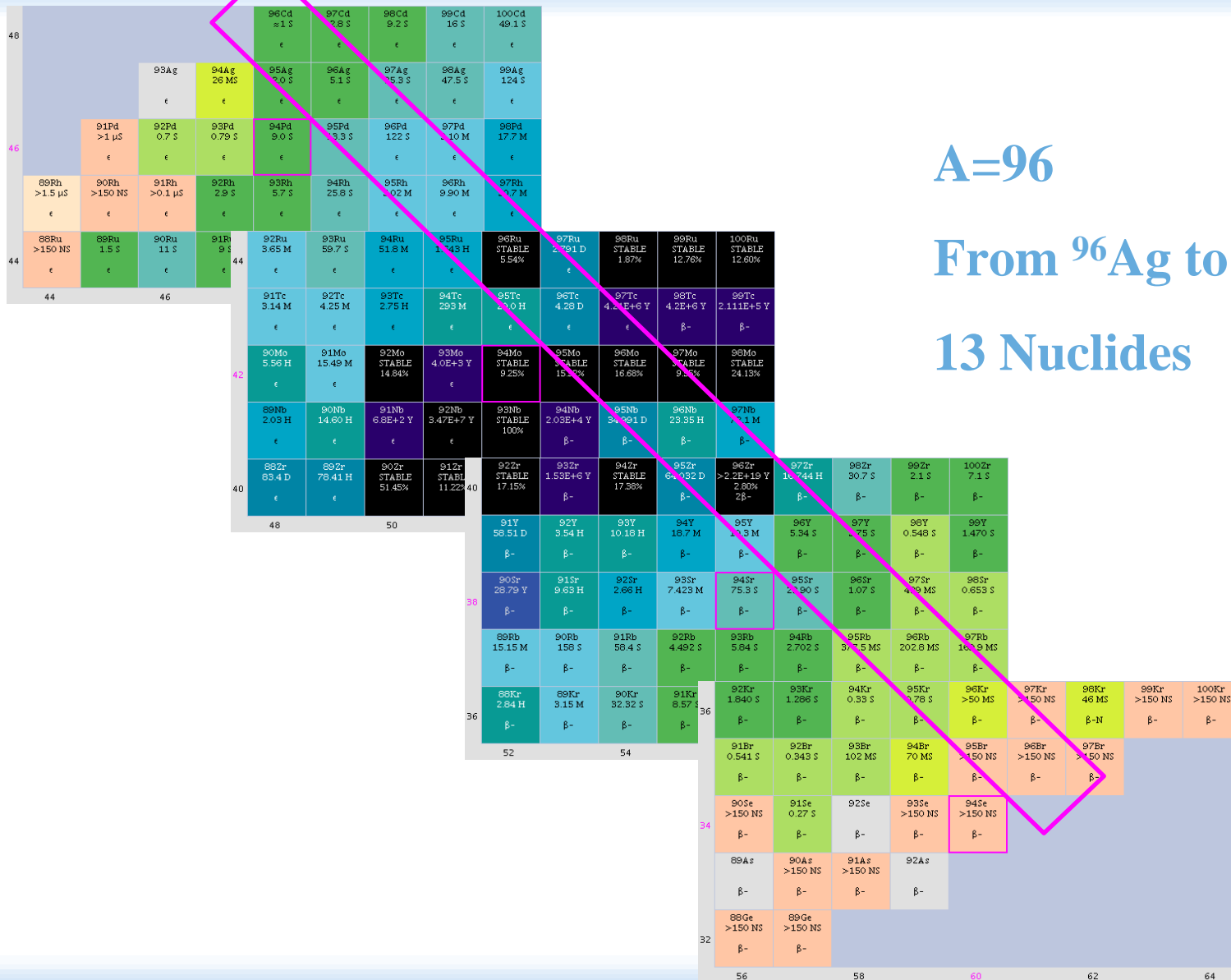
**Cutoff Date:** January 2006.

**General Policies and Organization of Material:** See the introductory pages.

**Acknowledgments:** The use of data from the XUNDL database has greatly helped to optimize the evaluation time.



# NSR and ENSDF efforts at IAEA-NDS



# NSR and ENSDF efforts at IAEA-NDS

**continued working on A=96 as part of  
IAEA-NDS sub-programme**

**A=96 Submitted Sep 2007**

**New mass chain to be agreed  
with J. Tuli ....**

# NSR and ENSDF efforts at IAEA-NDS

## IAEA-ICTP Workshops at Trieste

### Planned for 2008

- **Nuclear Structure and Decay Data: Theory and Evaluation, 28 April - 9 May**
- **Nuclear Reaction Data for Advanced Reactor Technologies, 18-30 May**

### Workshop in 2007

- **Nuclear Data for Science and Technology: Medical Applications, 12-23 November**

### Workshops in 2006

- **Nuclear Structure and Decay Data: Theory and Evaluation, 20 February to 3 March**
- **Atomic and Molecular Data for Fusion Energy Research, 28 August to 8 September**

### Workshops in 2005

- **Nuclear Data for Activation Analysis, 7-18 March**
- **Nuclear Structure and Decay Data: Theory and Evaluation, 4-15 April**

### Workshop in 2004

- **Nuclear Reaction Data and Nuclear Reactors: Physics, Design and Safety, 16 February - 12 March**



## IAEA-ICTP Workshops at Trieste

**2 weeks**

**20 to 40 participants**

**~ 10 lecturers**

**practical exercises and code demos**

**students' presentations**



# NSR and ENSDF efforts at IAEA-NDS

Could IAEA-NDS be of service to organize a technical meeting about an NSDD topic?

