NPL Decay Data Service

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Introduction

- Why is decay data important?
- Current Projects
  - Decay data of actinides
- Data recommended by NPL
  - Decay Data Evaluation Project
  - XG Standards (Mark II)
  - NUDAT, LARA, JANIS
- Decay data advice service
- Other issues

Why is it important to get the right data?

- **^{209}Po (yield tracer for ^{210}Po)**
  - half life in JEFF, NUDAT, *Radiochemical Manual* 102 (5) years - all based on single publication in 1956
  - Latest measurements (Collé et al) suggest the true value is 25 % higher, suggesting mass spec based activity measurements of ^{209}Po will be 25 % too high
- **^{121}Te (common impurity in ^{123}I radiopharms)**
  - Half life given in Lund *WWW Table of Radioactive Isotopes* is 16.78 (35) days
  - However latest recommended value is 19.15 (5) days – 14 % longer

Current Projects

- **“Updated decay data library for Actinides”**
  - Coordinated Research Project to replace IAEA technical report 261
  - Uses rules from and wiill feed into the “Decay Data Evaluation Project”
  - NPL providing evaluations of ^{232}U, ^{232}Th, ^{228}Ac, ^{231}Pa and ^{223}Ra

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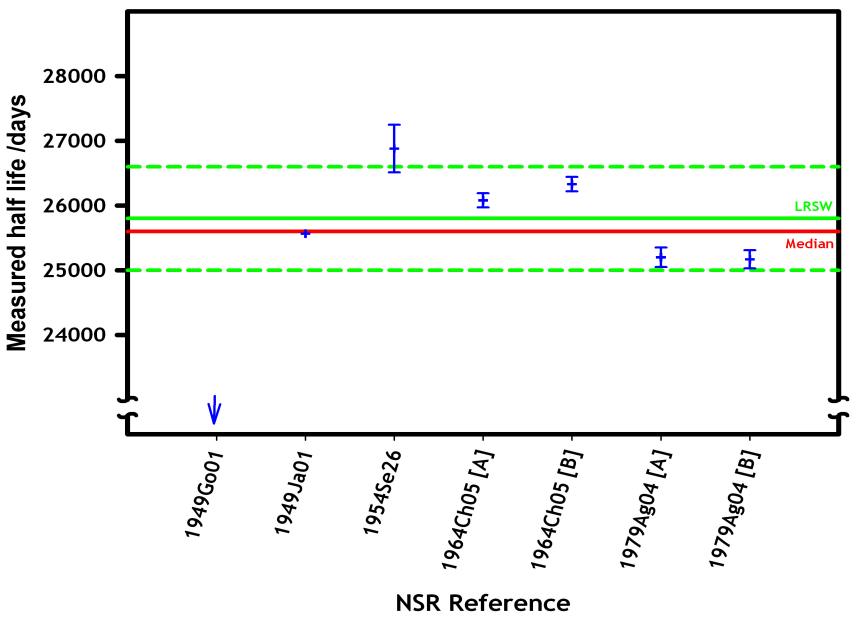
Recommended Decay Data



- www.nucleide.org/DDEP_WG/DDEPdata.htm
- 1st Choice: Decay Data Evaluation Project
- Data evaluated by internationally agreed methodology and peer-reviewed

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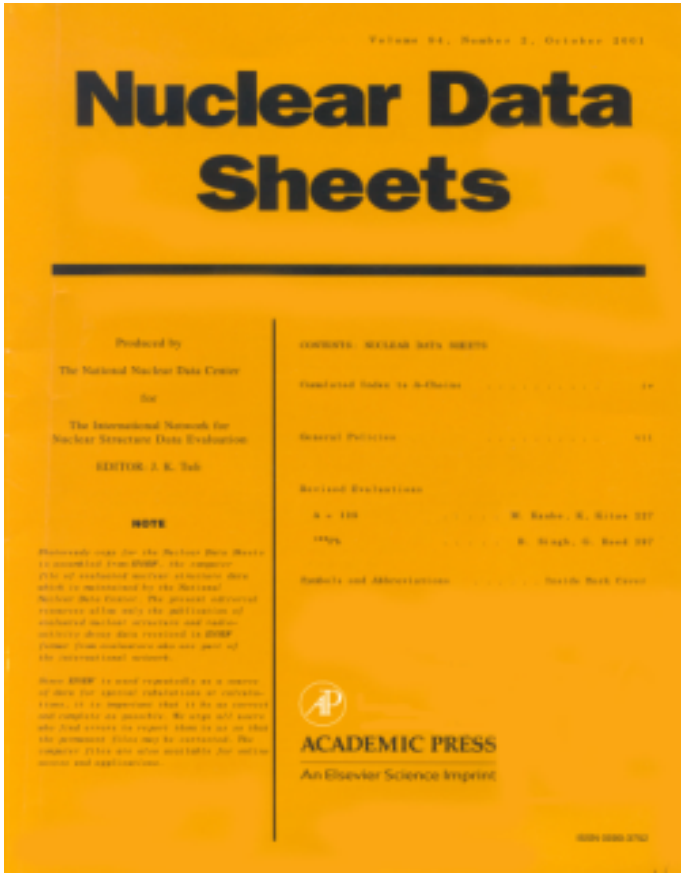
Recommended Decay Data

- www-nds.iaea.org/xgamma_standards/
- Primarily X- and gamma emitting radionuclides for detector calibration
- Replaces IAEA TECDOC-619
- 2nd choice – best for some important radionuclides not in DDEP (e.g. ^{134}Cs)
- Finally published as technical report STI/PUB/1287

Recommended Decay Data

- www.nndc.bnl.gov/nudat2
- Data from *Nuclear Data Sheets* presented in more accessible format
- Generally good, although some issues with specific data
- Recommended for nuclei not covered by DDEP or IAEA



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Other useful data sources

- laraweb.free.fr
- Excellent tool for gamma spectrometry
- Fast line search facilities
- Data from DDEP, ENSDF and LNHB (=French NPL)

- www.nea.fr/janis/
- Access to the JEFF 3.1.1 library via JAVA application
- Replacement for JEF-PC

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Decay Data Advice Service

- Free DIUS-funded consultation service available on decay data:
- Andy Pearce
  - email: andy.pearce@npl.co.uk
  - or tel: 020 8943 6699
- Arzu Arinc
  - email: arzu.arinc@npl.co.uk
  - or tel: 020 8943 8510

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Rounding of Measured Data

- From UKAS Guide M3003:
  - *"The number of figures in a reported uncertainty should always reflect practical measurement capabilities...it is seldom justified to report more than two significant figures"*
  - *The numerical value of the measurement result should normally be rounded to the least significant figure in the value of the expanded uncertainty...the normal rules of rounding apply however if the rounding decreases the value by more than 5 % the rounded up value should be used"*

Rounding of Measured Data

- How this is applied at NPL:
  - All uncertainties (without points and with leading or trailing zeros removed) have a numerical value between 3-25
  - The measurand is expressed rounded to the same extent as the uncertainty
  - Values are rounded at k=1 and doubled to get k=2
    - Why?

Rounding of measurement data

Measured Value	Uncertainty	Rounded Result
18.8658 kBq	0.41644 kBq	18.9 kBq ± 0.4 kBq
834.972 Bq	118.824 Bq	830 Bq ± 120 Bq
5.12303 kBq	25.7458 Bq	5.12 kBq ± 0.03 kBq
26.4154 kBq	2.27625 kBq	26.4 kBq ± 2.3 kBq
0.977332 Bq	0.0849453 Bq	0.98 Bq ± 0.09 Bq

Finally...

- Thank you for your attention..
- Any Questions?