

International Atomic Energy Agency

**WPEC Subgroup 25: Assessment of
Fission Product Decay Data and Decay
Heat Calculations**

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Fission Product Decay Data and Decay Heat Calculations

Decay heat calculations

- avoidance of nuclear theory (minimal usage)
- experimental TAGS data
- experimental decay scheme data: β - and γ -feeding

Aims of WPEC Subgroup 25

- identify nuclides that contribute significantly between 10 and 5000 secs
- possible inadequate decay data (pandemonium effect)
- new β -feeding measurements by means of TAGS
- determine β -decay directly to daughter ground state



Fission Product Decay Data and Decay Heat Calculations

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Fission Product Decay Data and Decay Heat Calculations

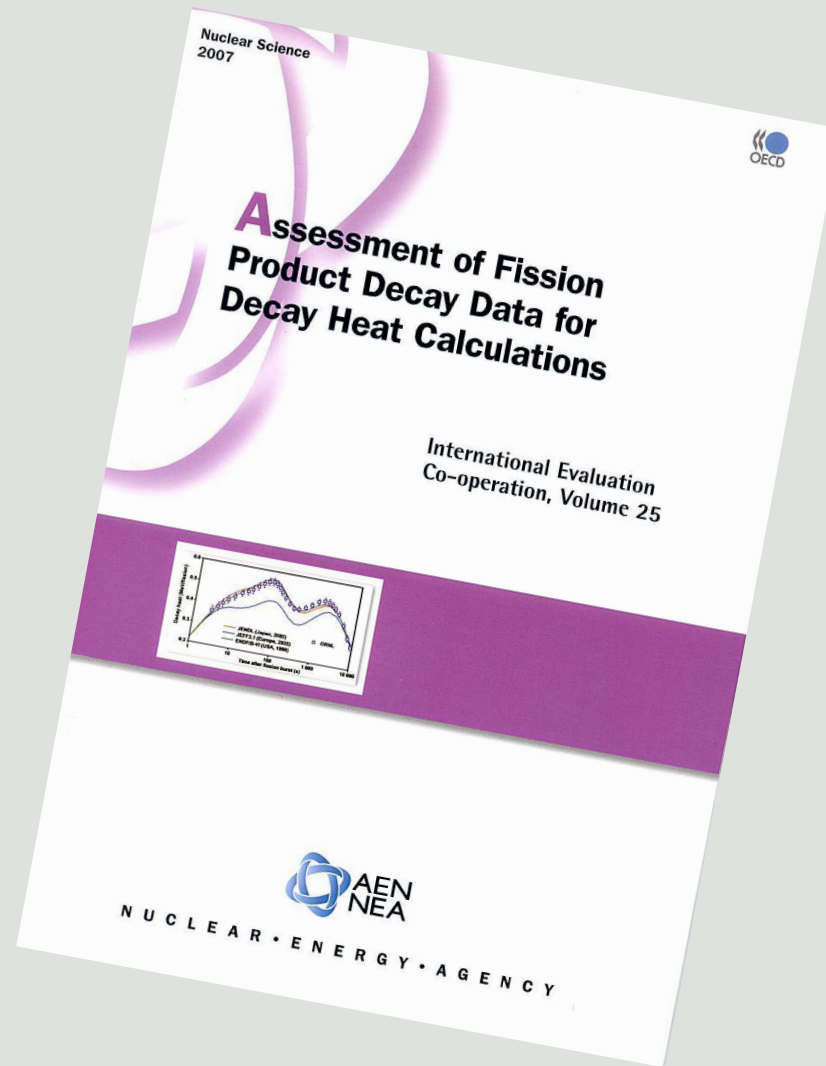
Subgroup 25: proposed aims accepted for WPEC action in April 2005

December 2005: first meeting at the IAEA

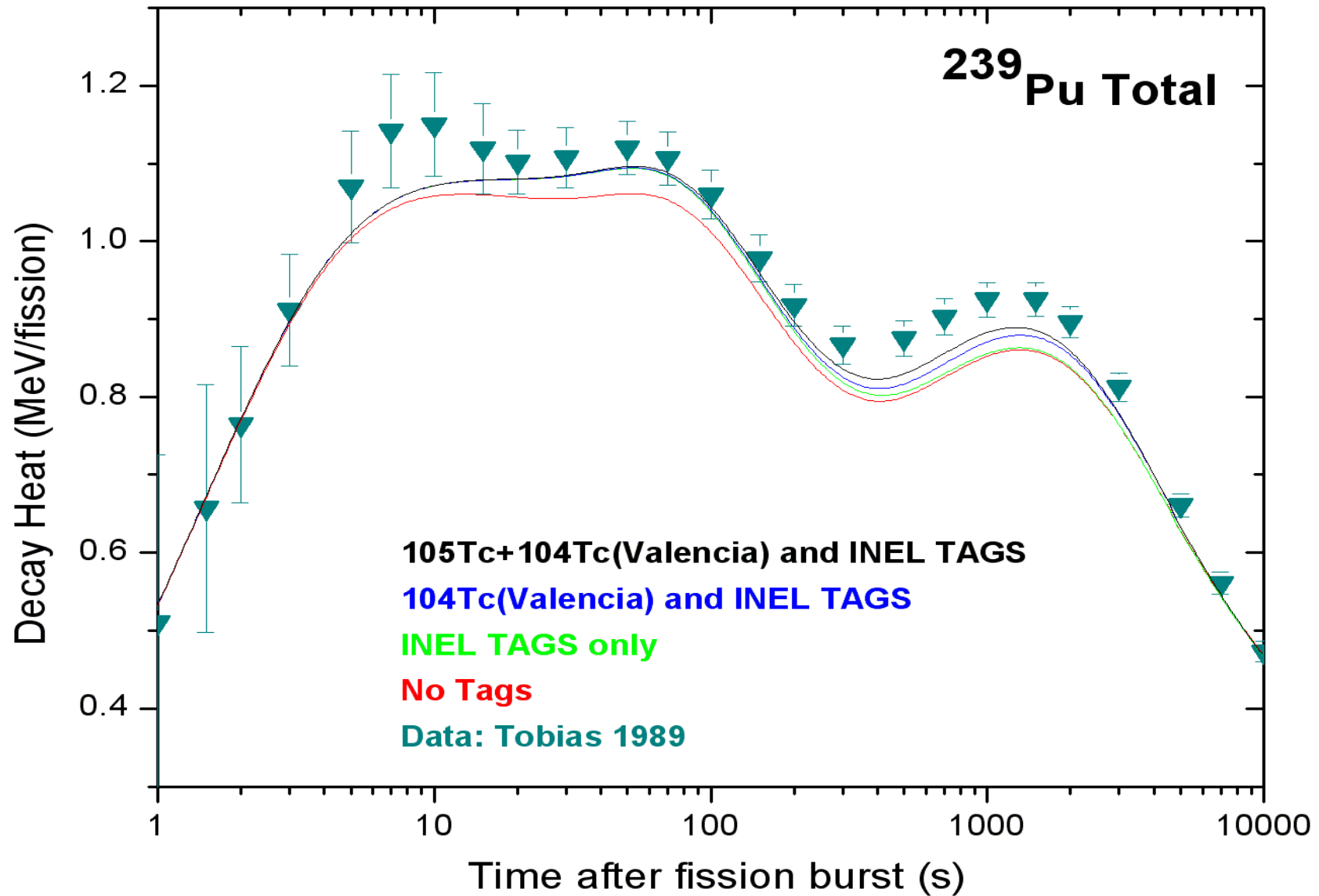
May 2006: second meeting at OECD/NEA

NEA/WPEC-25 report published in 2007

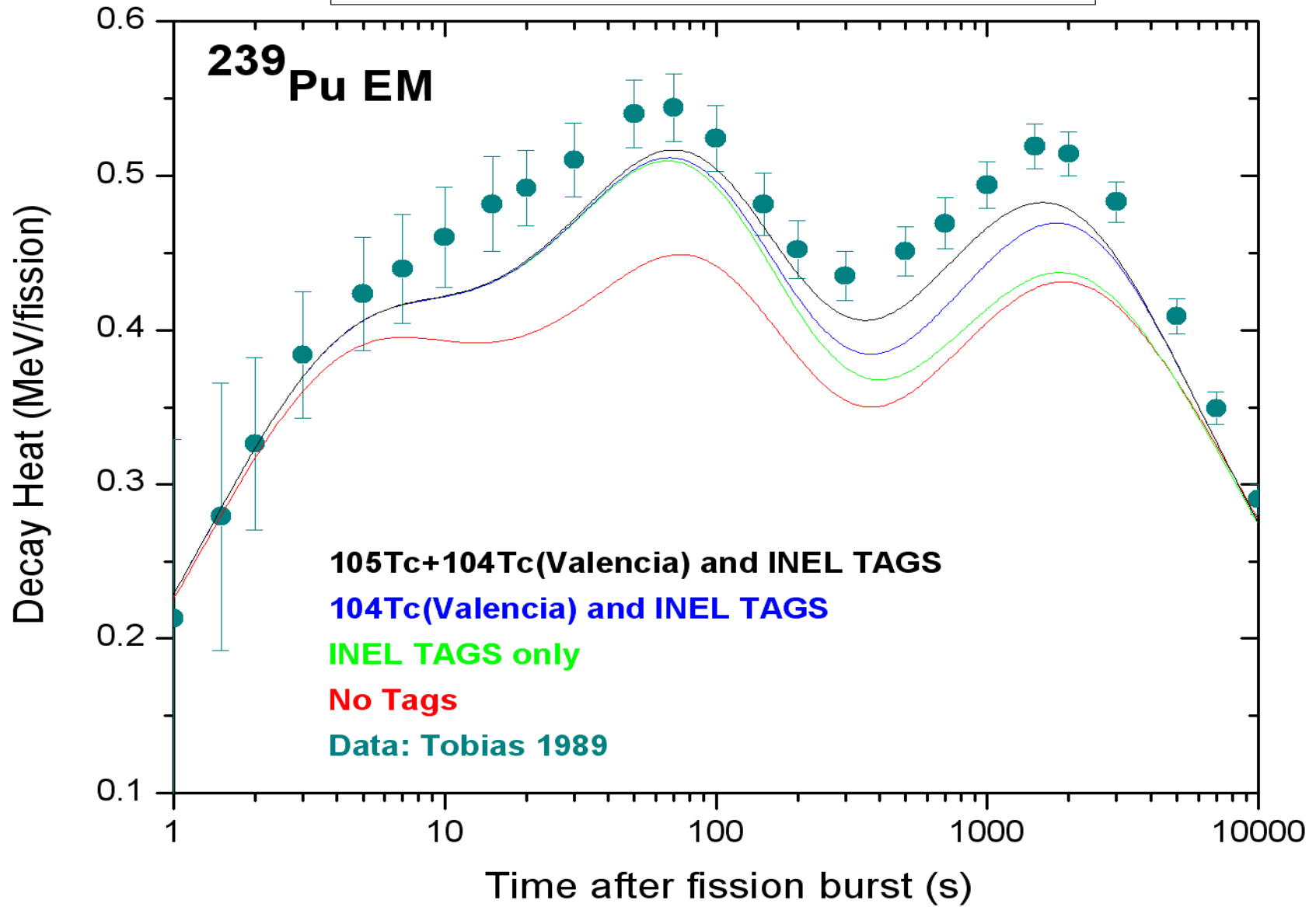
Fission Product Decay Data and Decay Heat Calculations



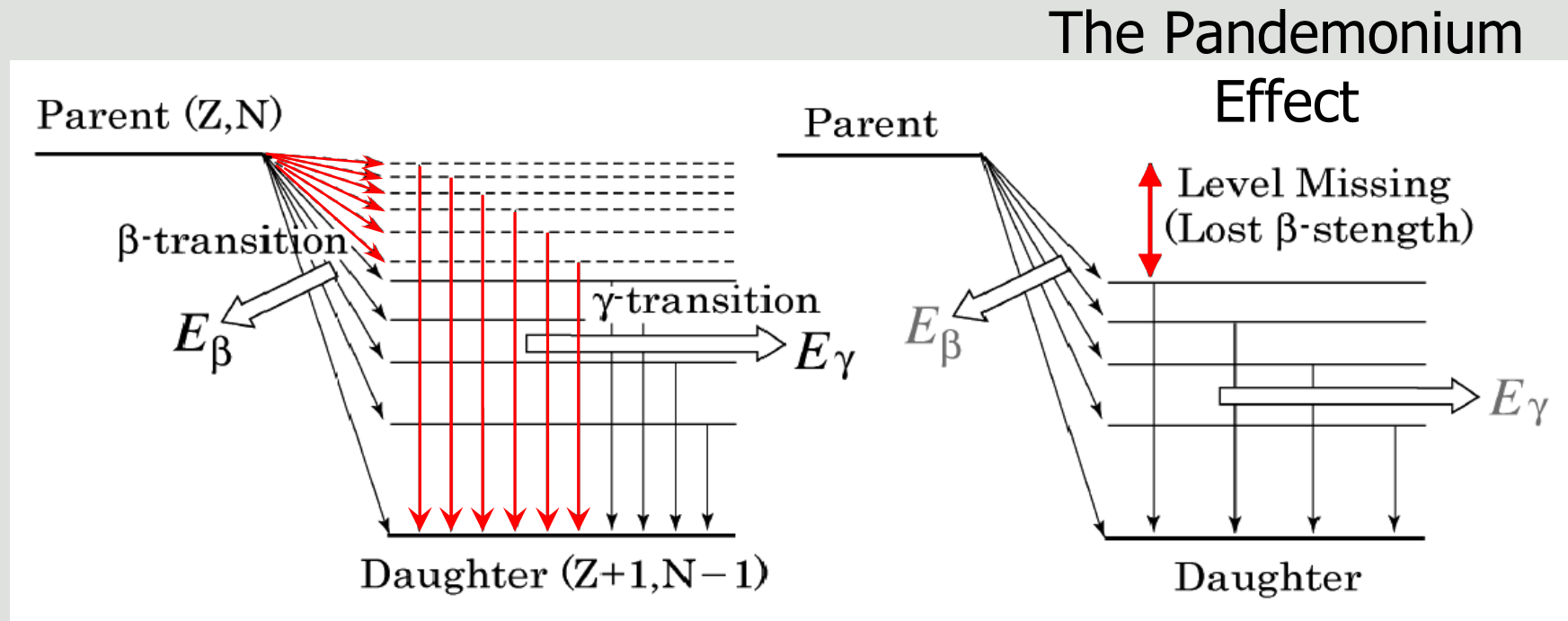
ENDF/B-VII Decay Data Library



ENDF/B-VII Decay Data Library



Fission Product Decay Data and Decay Heat Calculations



Fission Product Decay Data and Decay Heat Calculations

Priority 1:

Radionuclide	Half-life	Radionuclide	Half-life
35-Br-86	55.1 s	43-Tc-103	54.2 s
35-Br-87	55.65 s (β^- ,n)	43-Tc-104	18.3 min
35-Br-88	16.36 s (β^- ,n)	43-Tc-105	7.6 min
36-Kr-89	3.15 min	43-Tc-106	35.6 s
36-Kr-90	32.32 s	51-Sb-132	2.79 min
41-Nb-98	2.86 s	53-I-136	83.4 s
41-Nb-99	15.0 s	53-I-136m	46.9 s
41-Nb-100	1.5 s	53-I-137	24.13 s (β^- ,n)
41-Nb-101	7.1 s	54-Xe-137	3.82 min
42-Mo-103	67.5 s	54-Xe-139	39.68 s
42-Mo-105	35.6 s	54-Xe-140	13.6 s
43-Tc-102	5.28 s		



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Priority 2:

Radionuclide	Half-life	Radionuclide	Half-life
37-Rb-90m	258 s repeat INL TAGS	41-Nb-102	1.3 s
37-Rb-92	4.49 s small (β^- ,n)	43-Tc-107	21.2 s
38-Sr-89	50.53 d	52-Te-135	19.0 s
38-Sr-97	0.429 s possible (β^- ,n)	56-Ba-145	4.31 s repeat INL TAGS
39-Y-96	5.34 s	57-La-143	14.2 min repeat INL TAGS
40-Zr-100	7.1 s	57-La-145	24.8 s repeat INL TAGS



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Priority 3:

Radionuclide	Half-life
40-Zr-99	2.1 s
55-Cs-142	1.69 s (β^- ,n)



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NEA/WPEC-25, pages 37/38:

“Progress made by the experimentalists over 2006-2008 should be monitored by staff of the IAEA Nuclear Data Section, hopefully in late 2008.” - today’s meeting

**And more: re-definitions for decay heat calculations?
new requirements?**