



Isotopes Project



LAWRENCE BERKELEY NATIONAL LABORATORY

C.M. Baglin (Project Leader)

**Nuclear Structure and Decay Data Evaluation and
Dissemination Activities During Fiscal Year 2004**

Report prepared for the USNDP Annual Meeting, November 3-5, 2004 at Brookhaven
National Laboratory.

Structure and Decay Data Evaluation

Personnel:

C. Baglin 0.6 FTE

S. Basunia 0.5 FTE

E. Browne 0.43 FTE

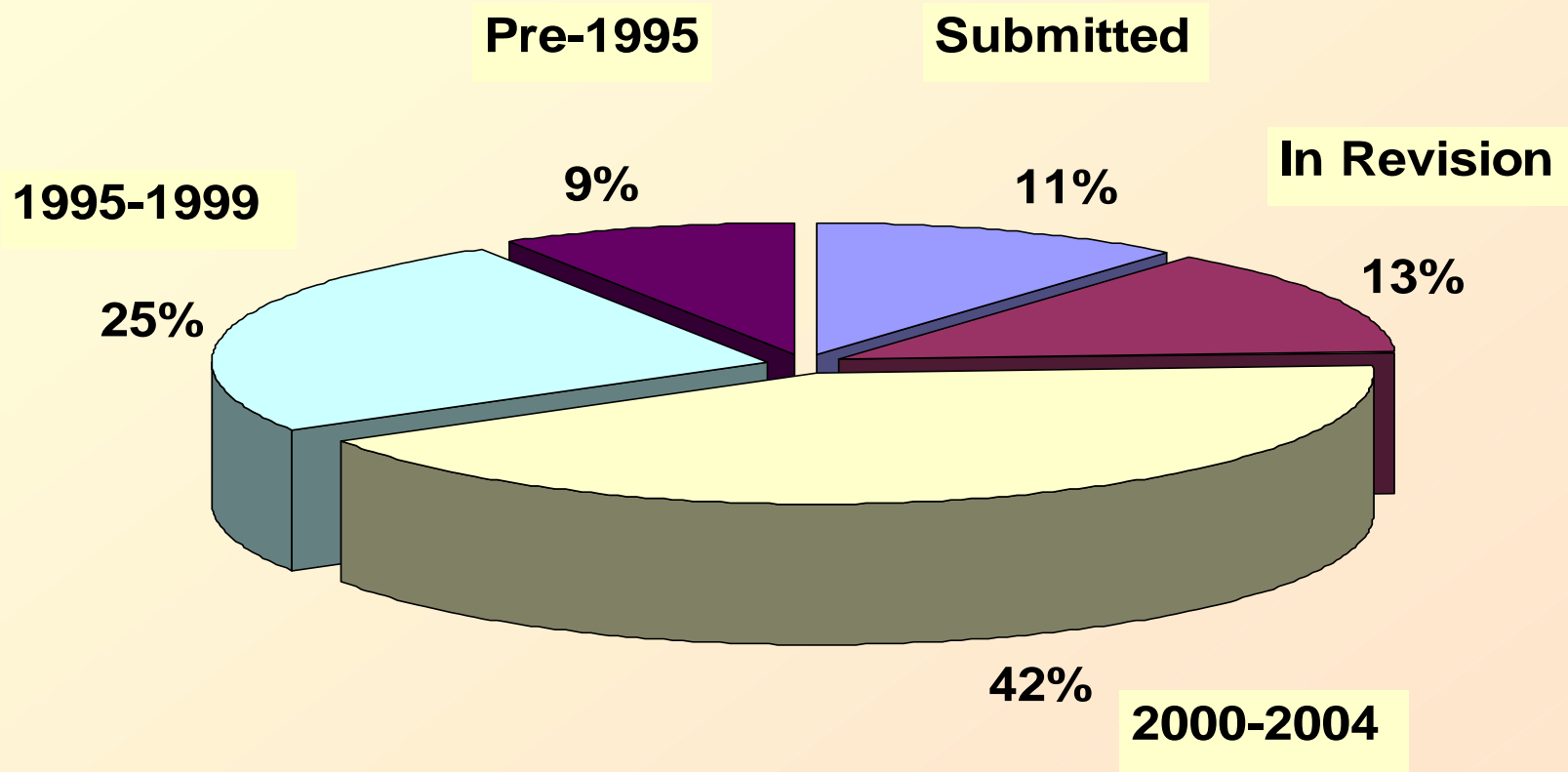
R. Firestone 0.55 FTE

Shiu-Chin (Alice) Wu (Visitor) 0.3 FTE

Mass Chain Responsibilities (~630 nuclides):

A = 21-30, 59, 81, 83, 90-93, 166-193 (except 188, 190), 210-212, 215, 216, 219, 220, 223, 224, 227, 228, 231, 232, 235, 236, 239.

Literature Cutoff Dates for Assigned Mass Chains



Structure, Decay Data Evaluation continued

Mass Chain Evaluations:

- Submitted: $A=169, 175, 185, 212$ (49 nuclides, including 3 priority nuclides)
- Published: $A=175, 180, 211$
- Reviewed: $A=73, 175$

Nuclide Evaluations:

- 3 nuclides (^{92}Kr , ^{171}Hg , ^{184}Bi); already added to ENSDF

DDEP Evaluations:

- Coordinated DDEP international collaboration
- Evaluated 2 decays (^{56}Co , ^{243}Am)
- Reviewed 3 radionuclide decays (^{56}Co , $^{123\text{m}}\text{Te}$, ^{125}Sb)

Structure, Decay Data Evaluation continued

Evaluated Gamma-ray Activation File (EGAF):

- IAEA TECDOC publication with CD-ROM, resulting from the recently completed IAEA-CRP on “*Development of a Database for Prompt Gamma-ray Activation Analysis*”, now available on the web and on CD-ROM (since Dec. 2003).
- Selected data from the associated EGAF database were published in *Handbook of Nuclear Chemistry* (Kluwer, 2003) and in the *Handbook of Prompt Gamma-ray Activation Analysis with Neutron Beams* (Kluwer, 2004).
- EGAF database files for $A=1-20$ were revised but not yet added to the database.
- Began advising on nuclear-structure aspects of statistical model quasicontinuum photon cascade calculations which will ultimately be combined with discrete-line data from EGAF and used to update ENDF database (with LLNL).

Nuclear Data Dissemination

Personnel:

R. Firestone 0.25 FTE

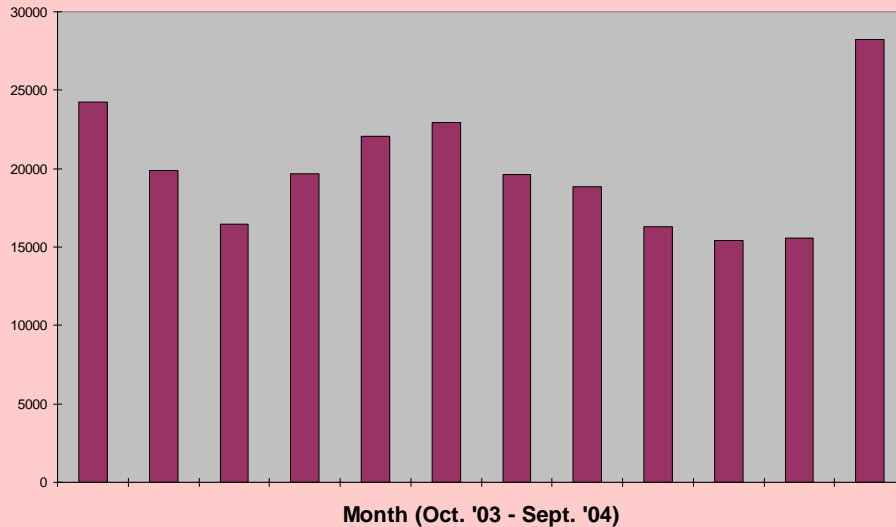
(assisted by two students visiting from EVTEK, Finland)

Accomplishments:

- Maintained and updated numerous web pages and Isotope Explorer software as needed
 - Added pages enabling users to perform interactive searches of atomic mass data or of ENSDF Adopted Levels, Gammas data (analogous to WWW of Radioactive Isotopes searches) (work done in collaboration with two students visiting from EVTEK, Finland)
 - Revised WWW Table of Radioactive Isotopes page to enable searches on β endpoint energies and on pairs of γ -ray energies.

Web Usage in FY04:

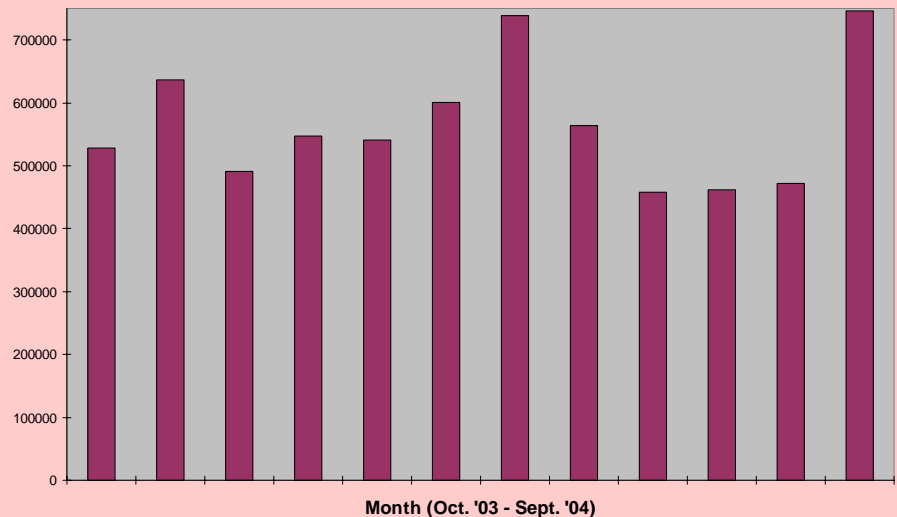
Distinct Hosts Served / Month (FY04)



15K to 28K distinct hosts served per month

458K to 746K successful data requests per month; *Analog 5* analysis (no google, gsa-crawler, ultraseek robots)

Successful Requests / Month (FY'04)



Publications

Mass Chain Evaluations: 3 papers

- *Nuclear Data Sheets for A=180*, S.-C. Wu and H. Niu, Nuclear Data Sheets **100**, 483-705 (2003).
- *Nuclear Data Sheets for A = 175*, M.S. Basunia, Nuclear Data Sheets **102**, 719-900 (2004).
- *Nuclear Data Sheets for A=211*, E. Browne, Nuclear Data Sheets **103**, 183 (2004).

Reports, Books: 6 items

- *Database of Prompt Gamma Rays from Slow Neutron Capture for Elemental Analysis*, R.B. Firestone, H.D. Choi, R.M. Lindstrom, G.L. Molnár, S.F. Mughabghab, R. Paviotti-Corcuera, Zs. Révay, V. Zerkin, and C.M. Zhou, IAEA-TECDOC and CD-ROM, December 2003 (in press).
- *Reference Data Appendices*, R.B. Firestone and G.L. Molnár, in Volumes 1, 3, and 5 of *Handbook of Nuclear Chemistry*, eds. A. Vértes, S. Nagy, Z. Klencsár, Kluwer Academic Publishers (2003).
- *Appendix: Table of the Nuclides*, R.B. Firestone and G.L. Molnár in Volume 2 of *Handbook of Nuclear Chemistry*, eds. A. Vértes, S. Nagy, Z. Klencsár, Kluwer Academic Publishers (2003).
- *Gamma-Ray Spectrum Catalogue*, Zs. Révay and R.B. Firestone, Part B of *Handbook of Prompt Gamma Activation Analysis with Neutron Beams*, ed. G.L. Molnár, Kluwer Academic Publishers, 2004.

- *Appendix: Tables of Atomic and Nuclear Data*, R.B. Firestone in *Handbook of Prompt Gamma Activation Analysis with Neutron Beams*, ed. G.L. Molnár, Kluwer Academic Publishers, 2004.
- *The Evaluation of Gamma Ray Emission Probabilities*, D. MacMahon and C. Baglin, International Conference on Nuclear Data for Science and Technology, Santa Fe, 26 Sept. – 1 Oct., 2003.

Invited Talks: 8 Talks

- *ENSDF – Reaction Data*, Coral M. Baglin, two 90-minute lectures at the IAEA/ICTP *Workshop on Nuclear Structure and Decay Data: Theory and Evaluation* held in Trieste, November 2003.
- *ENSDF – Adopted Levels and Gammas*, Coral M. Baglin, two 90-minute lectures at the IAEA/ICTP *Workshop on Nuclear Structure and Decay Data: Theory and Evaluation* held in Trieste, November 2003.
- *ENSDF - Decay Data*, Edgardo Browne, two 90-minute lectures at the IAEA/ICTP *Workshop on Nuclear Structure and Decay Data: Theory and Evaluation* held in Trieste, November 2003.
- *The Evaluated Gamma-ray Activation File (EGAF)*, R.B. Firestone, International Conference on Nuclear Data for Science and Technology, Santa Fe, NM, 26 Sept. – 1 Oct. 2004.
- *Nuclear Data for the Present Age*, Coral M. Baglin, International Conference on Nuclear Data for Science and Technology, Santa Fe, NM, 26 Sept. – 1 Oct. 2004.