Response to Recommendations by USNDP Review Panel

M. Herman
for USNDP

BROOKHAVEN NATIONAL LABORATORY
a passion for discovery

U.S. DEPARTMENT OF ENERGY | Office of Science

USNDP Advisory Committee

Create an external USNDP Advisory Panel, involving representatives from the major stakeholders across basic and applied nuclear physics, to critically assess current efforts and proposed activities.

Purpose and scope

- advise on improvements of programatic activities and foster the adoption of best practices
- evaluate future activities to address users' needs and suggest priorities
- convey to USNDP the specific data needs and identify new opportunities
- promote awareness of nuclear data among potential users

Membership - 8 members collectively representing

- nuclear structure and decay
- nuclear reactions
- nuclear astrophysics
- nuclear energy and industrial applications
- national and homeland security
- isotope production and medical applications
- nuclear data dissemination

At least 1 member representing international organizations (IAEA, NEA)

Considering circumstances discussion of this recommendation seems redundant

USNDP Mission Statement

DOE NP and USNDP should jointly develop an updated Mission Statement for USNDP that takes into account stakeholder interests and input. This should be widely distributed to guide future developments.

USNDP Mission Statement (2014)

The mission of the United States Nuclear Data Program (USNDP) is to provide current, accurate, authoritative data for workers in pure and applied areas of nuclear science and engineering. This is accomplished primarily through the compilation, evaluation, dissemination, and archiving of extensive nuclear datasets. The USNDP also addresses gaps in the data, through targeted experimental studies and the use of theoretical models.

Transparency

Develop a transparent mechanism, such as a periodic round table discussion of priorities, to ensure effective input and participation in decision making by partner institutions.

- USNDP Annual Reports and USNDP Plans have been prepared by USNDP PIs (since 2000)
- 4 teleconferences organized in January 2015 before Budget Briefing + 1 teleconference before this meeting

- Budget Briefing and NDAC presentations available to PIs for comments on the NNDC Dropbox

- Democratic election of the Structure and Decay Data group chairman

The communications between NNDC and partner institutions could be improved. The Data Week held once a year, a main communication vehicle within USNDP, is not sufficient to guarantee transparency.

White paper

A comprehensive document should be prepared that summarizes and prioritizes the possible future developments in the nuclear data program proposed by all USNDP participants. The prioritization should be developed by USNDP participants, in consultation with the advisory panel.

- Committee formed at USNDP meeting in 2014; awaiting input from NDAC
- White paper on nuclear data needs (NDNCA meeting in Berkeley)
- Target date for draft presentation: USNDP 2016 meeting, final paper at Budget Briefing Jan./Feb. 2017

White paper (cont.)

Possible future developments

- Address user needs expressed in future FOAs
- Campaign of measurements in support of isotope production
- Proton cross section library for scoping studies within BLIP energy range
- Web-based widget for searching isotopes with given characteristics
- Web-based widget for searching isotope production routes
- Expanding CIELO project - towards worldwide reaction library
- New data structure (format) replacing the current one
- High Priority Request List for ENSDF & ENDF
- Modernization of USNDP Web services
- Reaction rates for nuclear astrophysics
- Neutron resonance evaluation capability
- New Atlas of Neutron Resonances
- Digitization of the NNDC library

White paper (cont.)

Possible future developments (endorsed by the Review Panel)

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White paper (cont.)

International cooperation

It would be beneficial to USNDP, and also cost effective, to attract more international partners. Several examples offered in presentations are encouraging. Possible mechanisms to consider could be enlisting and recognizing foreign facilities (e.g. RIBF or ISOLDE) for inputting recent data into XUNDL. One could also consider organizing a training program in XUNDL

Existing collaborations:

- NSDD
- NRDC
- WPEC
- NNDC-IAEA
- NIST-LANL-IAEA (standards)
- ANL-Mass evaluation
- LBNL/UCB-Oslo

Career paths

DOE NP should be cognizant of the need for adequately funded career paths for sufficient new evaluators, recruited and trained by USNDP, to carry out the USNDP program.

- Jon Batchelder hired by UCB (ENSDF evaluation, structure experiments).
- Gulhan Gurdal under contract with NNDC (XUNDL compilation).
- Jun Chen took a position at Michigan State University funded through ANL. In 2016 should apply for direct funding from DOE-SC (ENSDF evaluation and XUNDL compilation).
- Gustavo Nobre hired by NNDC as replacement for S. Hoblit (EMPIRE development, ENDF evaluation, cross section calculations for isotope production).

Input on data needs

Submit Request

USNDP should devise effective and transparent mechanisms to solicit input and feedback from all stakeholders on nuclear data needs and priorities.

High Priority Request List for Structure and Decay Data - conceptual design ready, implementation started.

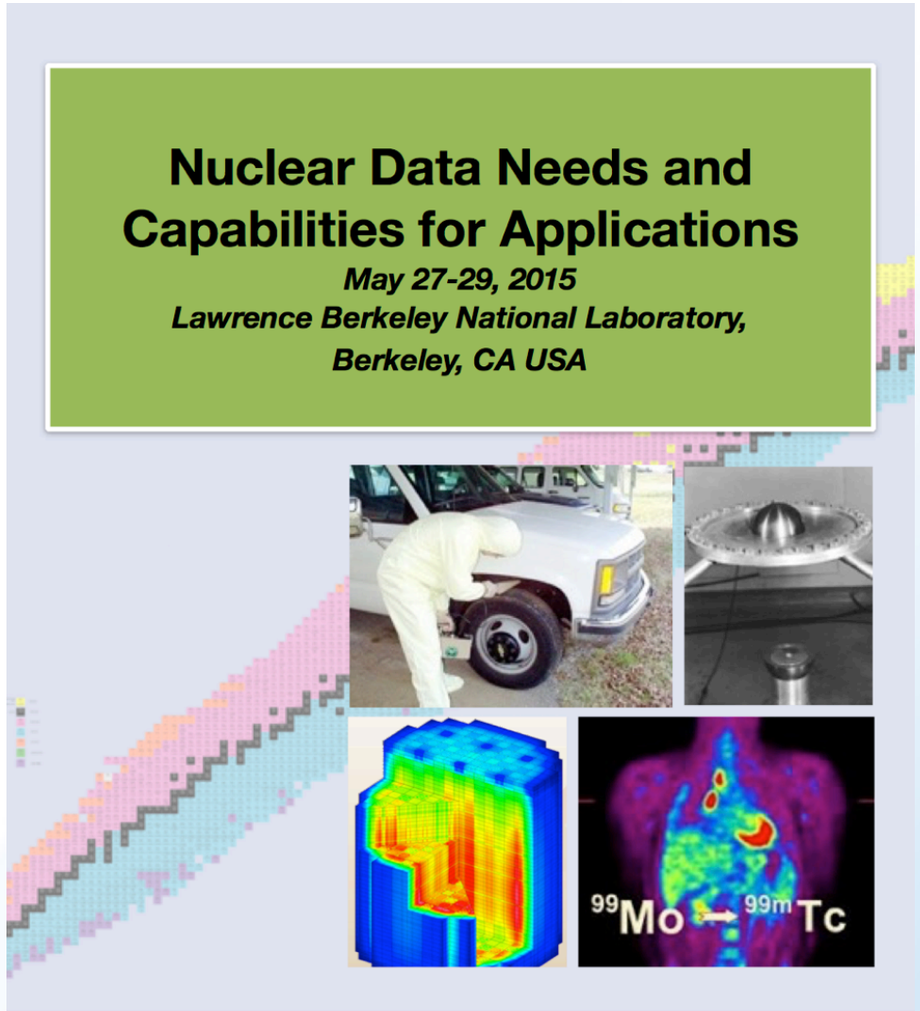
Users' Forum - reactivate extended talks on ND needs by representatives of users during USNDP meetings.

ND Advisory Committee

Participation in **Long Range Plan** preparation

Local communities (e.g., LANL, LLNL, BLIP)

Participation in **conferences and meetings** - promoting awareness of ND.

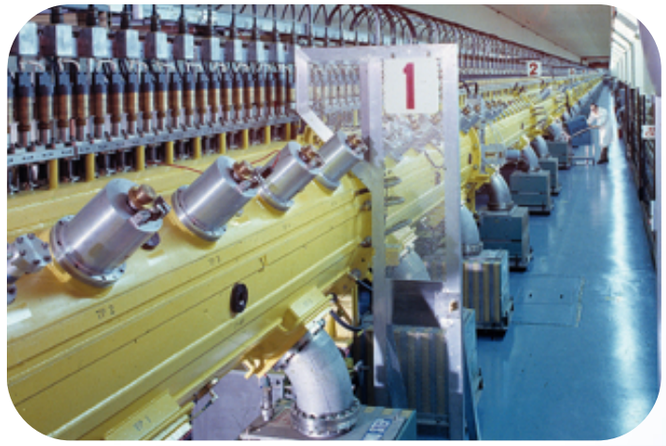


Work assignment among USNDP Labs

Work assignments at individual laboratories should be developed strategically based on “best value” to the USNDP program and the stakeholder community.

- Improved communication with users
  - NDNCA Workshop at Berkeley
  - newly formed ND Working Group
  - intensified interaction with ANS, APS, isotope production community, …
  - high-priority request list
- Limited flexibility within USNDP and networks (responsibilities assigned according to capabilities)
- Work assignments worked out at USNDP, NSDD, NRDC and CSEWG meetings and formalized in Annual Work Plan developed by the whole USNDP
- Recent reorganization of XUNDL compilation and handling of the NDS production after the retirement of a professional demonstrates USNDP ability of adapting to changing circumstances.
- NDAC advise

Support for isotope production



Pursue a potential collaboration between the USNDP and Brookhaven Linac Isotope Producer (BLIP) with the aim to expand this to collaborations with other DOE NP funded isotope production facilities such as at LANL and ORNL.

- Several measurements have been performed
- Results show great potential for significant improvements with very modest effort
- Essential issue - lack of manpower - good opportunity for a postdoc
- Isotope production oriented Web app could be developed if there is dedicated funding.

More details in presentation by Libby McCutchan

Performance metrics

Develop modified USNDP performance metrics that more closely reflect the total amount of work involved.

USNDP Review Panel:

- The performance matrix of the USNDP is deficient
- The number of A-chains evaluated does not seem to be an effective performance evaluation criterion.

- Desirable metrics' features (**FEERM**)
  - **F**air (reflects the total amount of work involved)
  - **E**asy to establish (can be simply and objectively determined)
  - **E**asy to explain (can be understood by higher management e.g., congressmen)
  - **R**esistant to deceiving (difficult to cheat, free of loopholes)
  - **M**eaningful (can be used to relate performance to the needs)

Performance metrics

- Proposed metrics
  - # of lines in the evaluation (F**E**ER_)
  - # of diffs compared to previous evaluation (**F**E_**R**_)
  - formula accounting for certain number of features, e.g., number of data sets, gammas, levels, new experiments,… (**F__R**_)
  - dividing all nuclides in 3-4 groups of increasing complexity (FE_R_)
  - count number of A-mass chains (_**EE**RM)
  - count number of evaluated nuclides (F**EE**RM) <= current solution
  - count each evaluated nuclide as 0.8 and 0.2 for review, the same (F**EE**RM) as above but counts reviews <= my addition

No metrics shall be absolutely fair