

NCSP 1st Qtr 2007 Accomplishments

INTERNATIONAL CRITICALITY SAFETY BENCHMARK EVALUATION PROJECT INL

- ICSBEP participants focused their efforts on new evaluations for FY-2007. Work progressed under a Continuing Resolution at a slower pace than could have been achieved if full funding was available at the beginning of the year. Currently, there are 29 evaluations in progress.
- Preliminary arrangements for the next ICSBEP Working Group Meeting were made. The meeting will be held Monday, May 7 through Friday, May 11, 2007 at the Palmer House Hilton Hotel in Chicago, Illinois.
- New experiments at VNIITF (Interstitial Ti and Partially-reflected HEU) are scheduled to begin in Jan. / Feb. of 2007. Vanadium experiments are scheduled for August. A Technical Audit of the Program is being arranged during the Vanadium Experiments. LANL researchers should be able to visit VNIITF for two weeks during this Audit.
- Efforts to arrange LANL Experimenter participation in French experiments and to partner with IRSN's Structural Material Experiment Program were initiated.
- ICSBEP representatives supported NDAG, CSEWG, CSSG activities and the NCSP End User's Forum. A proposal for FY-2007 ICSBEP activities was prepared and submitted.

NUCLEAR METHODS

ANL

- Providing support to ORNL in S Matrix evaluations for the unresolved resonance region.
- Processing and testing of ENDF/B-VII data files (beta2 release) completed in support of release of ENDF/B-VII files.
- Received MCNP ENDF/B-VII _2 library from LANL and continue resolution of VIM and MCNP library intercomparisons.
- Development of the VIM2COG translator code has been written and awaits verification.
- Three "Methods and Codes" paper summaries were submitted and accepted for ICNC2007.

LANL

- The MCNP Team presented a 1-week class on "Criticality Calculations with MCNP5" at the Y12 plant during December. The class was attended by 24 people from Y12 and ORNL.
- NJOY development focused on updates necessary to process ENDF/B-VII.
- An invited talk on the status of NJOY and ENDF/B-VII data testing was given at an NEA Workshop in Cadarache, France.
- All ENDF/B-VII evaluations have been processed into MCNP format by NJOY at several temperatures. Extensive QA testing is now underway.
- FY08 NCSP Task Proposals were submitted during December.

ORNL

- SCALE 5.1 was released via RSICC in November.
- SCALE/KENO customer support functions: Issued 216 responses to SCALE users who requested technical assistance via e-mail and the SCALE website.
- SCALE/KENO/AMPX software maintenance functions: Updates to SCALE were performed on 14 SCALE modules and program libraries.
- RSICC customer support functions: Sent out 313 software packages; packaged 5 new software updates; received electronic notebook entries in SCALE and MCNP; distributed monthly issues of the RSICC newsletters to over 4700 customers.

NCSP 1st Qtr 2007 Accomplishments

- AMPX Maintenance:
 1. PUFF covariance processing software updated to process ENDF compact covariance format that was approved at the November 2006 CSEWG meeting.
 2. Provided PUFF covariance processing support for processing ^{233}U , ^{235}U , ^{238}U , and ^{239}Pu resonance parameter covariance files prepared as part of Nuclear Data Evaluation task – prepared 44-group and 15-group covariance files.
 3. Updated processing modules to support CE-KENO library development and testing.
- AROCAD:
 - Javapeno has been further enhanced to allow the user to display tables of the data represented in 2D and 3D plots, a calculator was created for manipulating data in 2D plots, a configuration file was added so users can save a preferred format for 2D and 3D plots, and numerous minor enhancements were incorporated. Javapeno 5.1 is now ready for release in SCALE 5.1.
 - Two papers (example validation exercise with TSUNAMI and presentations of automated differentiation software) were submitted and accepted for presentation at ANS Winter Meeting.

NUCLEAR DATA

ANL

- D. Smith (ANL-STA) has been consulting with BNL and LANL to advance covariance data methodologies.
- D. Smith continued to produce all of the Phase I reviews for all available ENDF/B-VII covariance files.
- Contribute/chair Nov. 2007 NDAG meetings.
- Processing and testing of latest ENDF/B-VII data files (beta2 release) performed in support of release of ENDF/B-VII.0 files.
- Participation in planning of “Low Fidelity Covariance Data Files” at the Nov. 2007 CSEWG meeting.
- Two “Nuclear Data” paper summaries for ND2007 and another for ICNC2007 were submitted and accepted.
- Publication: A. B. Smith, “Neutron Scattering from an Asymmetric Rotor: ^{197}Au ,” Nucl. Sci. & Engr., 155 74-83 (2007).

BNL

- ENDF/B-VII.0 was officially released in December 2006 after considerable testing and benchmarking. All evaluations sponsored by criticality safety were included in the library.
- “Big paper” on ENDF/B-VII.0 was published in the refereed journal in December 2006. The paper represents unique reference describing the library, including covariances of interest for criticality safety (Gd).
- Review of thermal values and resonance integrals for fission products was completed for the ENDF/B-VII.0 release.

NCSP 1st Qtr 2007 Accomplishments

LANL

- ENDF/B-VII.0 was officially released by the NNDC on December 15, 2006. Many Los Alamos evaluations were included as part of ENDF/B-VII.0.
- The journal article “ENDF/B-VII.0: Next Generation Evaluated Nuclear Data Library for Nuclear Science and Technology” was published in December. The lead author and 15 additional co-authors were from Los Alamos.
- We participated in the CSEWG and NDAG meetings at BNL in November (also organized a session on planning for “Low-Fi”).
- We continued to develop MCNP models of ICSBEP benchmarks for ENDF/B-VII data testing.
- FY08 NCSP Task Proposals were submitted during December.

ORNL

- Revision to the ENDF/B Compact Covariance Format (CCF) approved at November 2006 CSEWG meeting--format modification needed to support resonance parameter covariance evaluation efforts.
- ²³⁹Pu: new resolved resonance parameter file prepared and ready for integral testing at ORNL.
- ²³⁵U, ²³⁸U, and ²³⁹Pu resonance parameter covariance files.
 - Generated full matrix in ENDF/B format and combined with high-energy covariance data provided by LANL.
 - Processed full matrices into 44-group covariance data files for testing with TSUNAMI sensitivity/uncertainty (S/U) software in SCALE.
 - Processed full matrices into 15-group covariance data files for testing with ANL S/U tools—provided to ANL in December 2006.
 - Developed prototypic reduced matrix for ²³⁸U in new ENDF/B Compact Covariance Format (CCF)—currently testing to evaluate tradeoffs in memory reduction versus accuracy of matrices.
- ⁵⁵Mn: preliminary set of resonance parameters obtained with resolved resonance covariance matrix.
- ^{35,37}Cl resonance covariance evaluations updated and tested with PUFF and SAMMY.
- Mike Dunn named ENDF/B Formats Chair for CSEWG.
- Dr. Choong Sup-Gil (KAERI) visited ORNL for 4 weeks to work with Nuclear Data Group on cross-section covariance analyses.

DIFFERENTIAL MEASUREMENTS

ORELA/ORNL

- Short test runs of ORELA performed during reporting.
- Guard vacuum system refurbished in all four sections.
- Accelerator vacuum maintained at 10⁻⁷ torr.
- Power level maintained at 4-5 kW during operation.

INTEGRAL EXPERIMENTS

LANL

- Much of the first quarter of FY07 was dedicated to the CEF PDSA update. This effort was successful in that the SBRT approved the PDSA which in turn has led to the approval of CD3D.
- Successfully supported all required DAF TSR surveillances, maintenance activities and the semi-annual MC&A inventory.

NCSP 1st Qtr 2007 Accomplishments

- Continued to pursue implementation of the Nuclear Material Handling and Measurement Project which will support all future handling operations for the future.

INFORMATION PRESERVATION AND DISSEMINATION

Hanford ARH-600

- General code cleanup in preparation for beta release.
- Discussions with many entities to define what is needed to place CritView on the web for beta testing.

Hanford Database

- ANS Winter meeting transactions/abstracts were screened.

LANL

- 60K was transferred to ORNL to ORELA Video Production.
- Work on CSIRC website has been reactivated.
- Website restructuring nearly complete, needs about 3 weeks of work to finish.

LLNL

- Updated LLNL database with additional 300 entries.
- Tested and deployed 4-Day Criticality Safety training class registration web pages.
- Processed 2384 hardcopies full text listing of bibliography documents.
- Initiated scanning hardcopy bibliography documents into PDF files.
- Enhanced date specific searching for both LLNL and Hanford databases.
- Participated in CSEWG and NDAG activities and meetings in November 2006 at BNL
- Participated in all CSSG activities.

TRAINING AND QUALIFICATION

LLNL

- \$400K budget request.
- 8 classes planned for FY07.
- 2 classes completed for DOE/NNSA NA-40 (in October 2006 and February 2007)
- 2 additional NA-40 courses are scheduled for FY07/Q2.
- Shielding the neutron detector on one side has minimized high neutron background problems.

LANL

- NCSE is 90% complete; completion pending NCS PIP and budget.

ANL

- Participated in the CSSG meeting and the NCSP review in Albuquerque.
- Prepared summary meeting notes during the quarter. Participated in CSSG telecons and in preparing CSSG responses to taskings as required.

NCSP 1st Qtr 2007 Accomplishments

- Continued development of NDA NCSET modules: completed cross section module (under external review); prototype criticality safety multi-media training module presented at Nov. ANS meeting; second of two hand calculation methods modules completed and awaiting final review completion.
- Participation in final comment resolutions for revision to STD-3007.

ORNL

- University of New Mexico faculty participated in the October-November TSUNAMI workshop and initial discussion of the TSUNAMI primer.

NUCLEAR CRITICALITY SAFETY PROGRAM SUPPORT

LANL

- Rick Anderson participated in the Sandia infraction/incident review.
- Rick Anderson attended the summer meeting of the CSSG and has participated in various teleconferences as requested.
- Rick Anderson attended the CSSG meeting in Washington, DC, held early September.

ORNL

- ORNL CSSG members (Calvin Hopper, Davis Reed and Mike Westfall) participated in the CSSG teleconferences.
- Westfall served on the new CSSG member nominating committee.
- Westfall and Hopper developed input for November 2006 CSSG meeting.
- Hopper attended CSSG meeting and NCSP workshop.

End Users

- DOE NCSP and End-Users Workshop was held November 18, 2006.