



Fall 2003

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Paul Felsher, Editor

# American Nuclear Society

## Nuclear Criticality Safety Division Newsletter

### Message from the Chair

James Baker, [jbaker@lanl.gov](mailto:jbaker@lanl.gov)  
(505) 665-2814, NCSD Chair

Recently I was discussing the history of the Nuclear Criticality Safety Division with Dave Smith, the retired former group leader of the Los Alamos Criticality Safety Group. Dave recommended that I look over the Proceedings from the Nuclear Criticality Safety Topical meeting from 1966. This meeting was sponsored by the Trinity Section of the ANS under the general chairmanship of Dr. Hugh Paxton and was the stimulus for the formation of our Division. (For further information on this, see the article written by Dave Smith in the Winter 2000 newsletter.) One of the many interesting articles in the 1966 Topical Proceedings is a panel discussion among some pioneers of our business on "Nuclear Safety Attitudes and Practices". Part of Dixon Callihan's address caught my attention. He stated: "There is a severe imbalance between the emphasis on safety and the radiation incident record within the nuclear industry. There is an equally severe imbalance between the official attitudes toward safety in the nuclear industry and the safety in other industrial activities within this country. The official attitude spills over onto the ill-informed public, which, being impressed by all the reviews, investigations and approvals necessary to a nuclear operation, can only surmise that each individual sits atop something worse than the proverbial powder keg. Automobiles are still being built and operated without severe

interference from regulatory agencies. Would that this were true in the nuclear industry as well."

I was struck by how these words still ring true today. Some would say the imbalance is even worse. Our profession is about minimizing risk. So it should concern us when we see large imbalances in the perception of risk. For example, some of the same people who fret over a few millirem of radiation dose are a menace on the public highways, oblivious to the danger they create. I believe that we, as safety professionals, should help others appreciate risk in perspective. I know that it is not easy. But I believe it is part of our duty to fellow citizens.

The false fear that every millirem represents an unacceptable risk is probably the main root cause of the nuclear industry's decline. Meanwhile, we gladly accept medical X-rays and radiation treatments for various illnesses. More importantly, the evidence against the "Linear No-Threshold" hypothesis condemns it as bad science (refer to numerous paper summaries in the Biology and Medicine section of ANS Transactions over the last ten years). Policies based on the LNT hypothesis are bad for society because they do not properly balance risk. We should challenge this sort of error wherever we find it. Do not accept mistakes simply because they have been around for a long time. I urge you to keep working to ensure that we truly minimize risk to our co-workers and to society as a whole.



I look forward to working with all of you to continue the many good things that our division is doing, and I will keep working to make it even better. I hope you find this newsletter useful and informative. Feel free to send your comments to me or to Paul Felsher ([pfelsher@lanl.gov](mailto:pfelsher@lanl.gov)). My warmest regards to each of you.

## Division Metrics

James Baker, [jbaker@lanl.gov](mailto:jbaker@lanl.gov)  
(505) 665-2814, NCS D Chair

For the last year, the ANS Professional Divisions Committee (PDC) has been working on establishing metrics for ANS Division activities. This is intended to give the leadership of each division measures of how it is doing in the general areas of Meetings, Governance, Contributions to Society, and Services to Membership. This information will eventually be provided to the ANS Executive committee and Board of Directors. The table below shows the components of each general area.

There was lengthy discussion in recent PDC meetings about how to appropriately measure division performance in each activity. This can be difficult because the divisions vary considerably in size

and the emphasis of their technical activities. For example, some divisions prefer to use topical meetings more frequently than others. Some divisions are large enough to support special student scholarships, while others are not. Despite these issues, there was general consensus to implement these metrics, with the understanding that they may be adjusted as appropriate in the future. Some PDC members expressed concerns that divisions could be pressured to improve in areas they consider unimportant. It was agreed that these measures are only to be used by the individual divisions for their own guidance.

NCS D outgoing chair Mikey Brady-Raap corrected some glitches in the initial metric data. An incorrect number was used for topical meeting attendance. Also, Mikey convinced the PDC that efforts in ANSI/ANS standards should be included in the Non-Meeting Publications metric. After this was done, the metrics show that NCS D is doing well in all areas, except for Division Planning and Succession Planning. This was no surprise to the division leadership. Mikey has already initiated a team to work on the NCS D strategic plan. I will be leading an effort to improve the

succession planning for division officers. If anyone would like to help with these efforts, feel free to contact either Mikey ([michaele.bradysraap@pnl.gov](mailto:michaele.bradysraap@pnl.gov)) or myself ([jbaker@lanl.gov](mailto:jbaker@lanl.gov)). Follow-up information and updated metrics will be provided in a future newsletter.

## NCS D Best Paper

Valerie Putman  
Honors and Awards Chair  
Congratulations to Rene Sanchez, David Loaiza, and Robert Kimpland. Their paper, *Criticality of a Neptunium-237 Sphere*, presented by Rene Sanchez, was judged the best NCS D paper presented at the June 2003 meeting.

## Special Recognition

Valerie Putman  
Honors and Awards Chair  
NCS D best-paper judges extend a special recognition to Darby Kimball, the daughter of Kevin Kimball. This bright, young lady had about three days, during the recent June 2003 ANS meeting, to prepare to present *Incorporation of NCS Requirements into the DSA*, by K. Kimball, B. Wilson, J. Chandler, and D. Heal. Her preparations included learning about the subject and its associated politics and developing a talk complete with witticisms, slides, and challenges to the audience. Ms. Kimball's presentation was so admirable that, with the well-written paper, it was judged third best in a field of many well-written and well-presented papers. Moreover, Ms. Kimball completed her preparations while also doing an excellent job in finishing her organizer duties for the last student conference and helping organizers of the next student conference.

Division Meetings	Division Governance	Division Contributions to Society	Division Services to Membership
National Meeting Participation	Succession Planning	ANS Position Statements	Professional Development
Class I & Class II Topicals	Membership Trends	Participation w/ Outside Professional Societies	Scholarships
Class III Topicals	Communications	Society Leadership	Peer Recognition/Awards
	Division Planning	Non-Meeting Publications	Student Support

## 2003 Election Results

The results of the 2003 NCSD election for officers are as follows:

Jim Baker	Chair
Christa Reed	Vice Chair/ Chair Elect
Kevin Reynolds	Treasurer
Kevin Kimball	Secretary
Nigel Guilliford	Exec. Comm.
Dennis Mennerdahl	Exec. Comm.
Fritz Trumble	Exec. Comm.

## NCSD Special Awards

Congratulations to George Bidinger and Tom Reilly who were recognized at the 2002 Winter ANS meeting with the following special awards for their work supporting the NCSD community.

**George H. Bidinger** - NCSD Award for Distinguished Service - *The division recognizes your dedicated leadership roles in governance, program and standards development; as well as your substantive pragmatic technical impact on safety practice.*

**Thomas A. Reilly** - NCSD Award for Technical Excellence - *The division recognizes your leadership role in providing technical bases for effective and useful application of nuclear criticality safety guides and standards, often for novel and complex applications.*

## ANS-8 Standards News

The following summarizes were extracted from the November, 2002 ANS-8 meeting minutes.

ANS-8.14, *Development of Subcritical Limits of Fissile Materials in Solutions of Neutron Absorbers*: T. A. Reilly - The working group (WG) is completing resolution of comments from the ANS-8 ballot. Those members providing comments have been contacted regarding the proposed resolution. When the resolution is complete, the draft will go back to ANS-8 for another ballot.

ANS-8.24, *Development of Validation of Neutron Transport Calculational Methods Applied to Nuclear Criticality Safety Analyses*:

R. D. Busch – About 90% of the text of the body of the standard has been completed. Members of the WG are assessing use of the standard by applying the draft to actual real-world situations.

ANS-8.25, *Development of Postings for Nuclear Criticality Safety*: G. F. Couture - The WG is determining what should be in the standard and what should be in appendices. Their goal is to have the standard to ANS-8 in 2003.

ANS-8.26, *Development of Nuclear Criticality Safety Specialist Training and Qualification*: J. A. Morman - The WG is addressing a concern raised by the American Society of Safety Engineers that the standard should only cover the content of the training program and not its implementation. A draft of the standard is expected to be submitted soon to ANS-8 for review.

ANS-8.27, *Development of Burnup Credit for Nuclear Criticality Safety Analyses*: D. B. Lancaster - The WG has a rough draft of the proposed standard for discussion and will be resolving different considerations for storage and transportation.

## Nuclear Criticality Safety Division (2003-2004)

### Officers

Chair:	James Baker, <a href="mailto:jbaker@lanl.gov">jbaker@lanl.gov</a>
Vice Chair:	Christa Reed, <a href="mailto:cbreed@mcdermott.com">cbreed@mcdermott.com</a>
Secretary:	Kevin Kimball, <a href="mailto:kkimball@nisyscorp.com">kkimball@nisyscorp.com</a>
Treasurer:	Kevin Reynolds, <a href="mailto:reynoldskh1@oro.doe.gov">reynoldskh1@oro.doe.gov</a>

### Executive Committee and Committee Chairs

2004 Mark DeHart, Program Committee,	<a href="mailto:dehartmd@ornl.gov">dehartmd@ornl.gov</a>
2004 Paul Felsher, Publications,	<a href="mailto:paul.felsher@juno.com">paul.felsher@juno.com</a>
2004 Chris Robinson,	<a href="mailto:ycr@y12.doe.gov">ycr@y12.doe.gov</a>
2005 James Felty,	<a href="mailto:james.felty2@ns.doe.gov">james.felty2@ns.doe.gov</a>
2005 Keyes Niemer,	<a href="mailto:kaniemer@dukeengineering.com">kaniemer@dukeengineering.com</a>
2005 Bonnie Rumble,	<a href="mailto:brumble@nisyscorp.com">brumble@nisyscorp.com</a>
2006 Fitz Trumble,	<a href="mailto:fitz.trumble@wxsms.com">fitz.trumble@wxsms.com</a>
2006 Dennis E. Mennerdahl,	<a href="mailto:dennis.mennerdahl@ems.se">dennis.mennerdahl@ems.se</a>
2006 Nigel "Jim" Gulliford,	<a href="mailto:jim.gulliford@bnfl.com">jim.gulliford@bnfl.com</a>

## NCSD Web Page

**Question:** *Where can you find a current list of NCSD officers, archived executive committee meeting minutes, archived newsletters, links to other NCS organizations, NCS fact sheets, membership list, and much more NCS related information?*  
**Answer:** *The NCSD web page ([ncsd.ans.org](http://ncsd.ans.org)).*

**Question:** *How can you help keep this valuable resource up to date with the latest NCS information?*

**Answer:** *Volunteer to become the new NCSD webmaster. You don't have to be web-savvy; all addresses and information are stored in text-based files with no HTML. Anyone that can handle telnet and a UNIX editor can do the updates. Of course if you are web-savvy, you can use your expertise and creative talents to add new and exciting features to the web page. If you are interested in volunteering, please contact either Mark DeHart ([dehartmd@ornl.gov](mailto:dehartmd@ornl.gov)) or Jim Baker ([jbaker@lanl.gov](mailto:jbaker@lanl.gov)).*

## Program Committee

Richard Taylor,  
[rtaylor238@comcast.net](mailto:rtaylor238@comcast.net),  
(865) 482-8086

The **2003 ANS Winter Meeting** will be held on November 16-20, 2003 in New Orleans, Louisiana. There will be a total of seven NCSD sessions at the meeting:

Data, Analysis, and Operations for Nuclear Criticality Safety - I, II, & III

On-the-Floor Implementation of Nuclear Criticality Safety - I & II

Nuclear Criticality Safety Standards – Forum

Regulatory Expectations for Nuclear Criticality Safety – Panel

The **2004 ANS Annual Meeting** will be held June 13-17, 2004 in Pittsburgh, Pennsylvania. A total of six sessions have been proposed for the meeting. Summaries describing the sessions are shown below. The deadline for summary submission is January 9, 2004, and the Call for Papers for the meeting is available on the Internet at

<http://www.ans.org/meetings/docs/2004/am2004-cfp.pdf>.

**(1) Data, Analysis, and Operations for Nuclear Criticality Safety** – Contributed. The purpose of this session is to provide a forum for timely presentation of general issues in the area of NCS that are not covered in other special session topics. **Session Organizer:** Richard Taylor, (865) 482-8086, [rtaylor238@comcast.net](mailto:rtaylor238@comcast.net)

**(2) Nuclear Criticality Safety Standards Forum** – Panel. Subcommittee ANS-8, *Operations with Fissile Material Outside Reactors*, meets to discuss various technical and administrative aspects of the approximately 20 national consensus standards under its purview. In addition to status and progress updates by representatives of individual working groups, formal presentations on the technical bases of numerical values such as subcritical limits and experiences with applications of particular standards are solicited. **Session Organizer:** Tom McLaughlin, (505) 667-7628, [tpm@lanl.gov](mailto:tpm@lanl.gov)

**(3) Student Research in Nuclear Criticality Safety** – Contributed. A session devoted solely to research in any area related to NCS that is being conducted by graduate and undergraduate students. **Session Organizer:** Robert Busch, (505) 277-8027, [busch@unm.edu](mailto:busch@unm.edu)

**(4) Demonstration of Sensitivity and Uncertainty Analysis Tools and Methodology (TSUNAMI) within SCALE5** – Tutorial. Use of TSUNAMI (Tools for Sensitivity and UNcertainty Analysis Methodology Implementation) for determination of areas of applicability of

benchmarks will be demonstrated in tutorial/demonstration format. TSUNAMI consists of several sensitivity and uncertainty analysis tools within SCALE5, which is planned to be publicly available late in 2003 or early in 2004. These tools allow analysis of critical experiments to assess applicability to the validation of a particular application through several integral parameters. Cross section uncertainties are carried through the analysis and utilized in determining the applicability of benchmark experiments and assessing the penalty one must accept due to limited applicability of existing critical experiments. **Session Organizer:** Sedat Goluoglu, (865) 574-5255, [goluoglus@ornl.gov](mailto:goluoglus@ornl.gov)

**(5) Alternate Criticality Detection Devices** – Contributed. In responding to the requirements of ANSI/ANS-8.23 for criticality detection devices, there are often instances where a completely installed, fixed criticality accident alarm system (CAAS) is not practical. In these instances, portable CAAS or personal dosimeters can be considered. This session will promote discussion of issues and experiences associated with use of portable CAAS or personal dosimeter in lieu of a completely installed, fixed CAAS and the situations under which they are appropriate. **Session Organizer:** Debdas Biswas, (803) 502-9806, [debdas.biswas@wxsms.com](mailto:debdas.biswas@wxsms.com)

**(6) History of Nuclear Criticality Safety** – Contributed/Invited. NCS grew from nuclear criticality experiments beginning in the middle 1940's that were used to establish limits for laboratory and production operations. As nuclear industry and defense needs grew,

additional experimental facilities were constructed and operated until the perceived need for them diminished resulting in many of them being shut down. This session will encourage the sharing of the history of nuclear criticality experiments with emphasis on what drove or motivated particular experimental series, what was learned from them, and anecdotes about experimental activities from the people who performed them.

**Session Organizer:** R. Michael Westfall, (865) 574-5269, [westfallrm@ornl.gov](mailto:westfallrm@ornl.gov)

**2005 Topical Meeting** - The NCSO solicited local sections for expressions of interest to host a nuclear criticality safety topical meeting in 2005. A total of seven local sections expressed interest and two of them submitted proposals that were evaluated by a committee formed by the executive committee. The proposal of the Oak Ridge local section to host the meeting in Knoxville, Tennessee, during September, 2005, was accepted. Planning for the meeting is in its early stages and the Oak Ridge section has named Joe Thomas as the Honorary Chair, Calvin Hopper as the General Chair, and Trent Primm as the Technical Program Chair.

**Upcoming Meetings** - Dates and locations of additional national ANS meetings through 2006 are listed below:

Nov 14-18, 2004, Washington, DC

June 5-9, 2005, San Diego, CA

Nov 13-17, 2005, Washington, DC

June 4-8, 2006, Reno, NV

Nov 12-16, 2006, Albuquerque, NM

## DOE Nuclear Criticality Safety Program (NCSP)

On Friday (November 21) at the 2003 Winter ANS meeting, representatives of DOE management, and the DNFSB (member, Staff and Site Representative) will discuss the status of NCS in DOE. A speaker from the NRC will discuss potential impact of regulatory changes on the oversight of NCS. The program elements of the Nuclear Criticality Safety Program will be addressed (status report). The afternoon session is a forum for interactions led by members of the End-Users Group. This session will report on recent communications with EFCOG DSA personnel and documents sent to EH. The presentations are based on the NCSP, but because of the global application of the work supported by the NCSP, feedback is encouraged from anyone interested in the needs of a diverse, well-organized criticality safety program. International, NRC and licensee NCS personnel are encouraged to attend.

## SCALE 5

Version 5 of the Standardized Computer Analyses for Licensing Evaluation (SCALE) computer software system developed at Oak Ridge National Laboratory (ORNL) is scheduled for release in late 2003. SCALE 5 has been rewritten in FORTRAN 90 and contains several significant new modules and sequences for nuclear safety analyses and marks the most important update to SCALE in more than a decade. New features and enhancements include continuous energy flux spectra for processing multigroup problem-dependent cross sections, one-

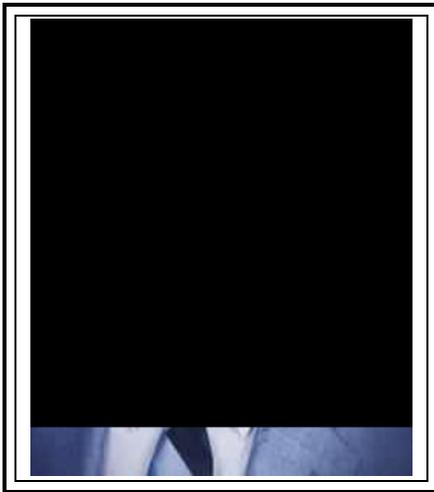
dimensional and three-dimensional sensitivity and uncertainty analyses for NCS evaluations, two-dimensional flexible mesh discrete ordinates codes, automated burnup-credit analysis sequence, and one-dimensional material distribution optimization for NCS.

Some of these new sequences should be particularly of interest to NCS specialist performing benchmarking studies and safety evaluations as they were developed to help address some of the long standing challenges encountered by the NCS community. Module names (e.g., TSUNAMI, SMORES, Javapeno) alone of some of the new sequences should spark your interest.

Another SCALE development effort of great interest to the NCS community is the Graphically Enhanced Editing Wizard (GeeWiz). The GeeWiz Graphical User Interface (GUI) is compatible with KENO V.a and KENO-VI in SCALE 4.4a or 5 and runs on Windows-based PCs. It replaces CSPAN and CSPAN-VI. GeeWiz provides input menus and context-sensitive help to guide users through setup of their input. It includes a direct link to KENO3D to allow the user to view the components of their geometry model as it is constructed. Once the input is complete, the user can click a button to run SCALE and another button to view the output.

To learn more about the latest developments in SCALE, visit their webpage at [www.ornl.gov/scale](http://www.ornl.gov/scale). Another great user resource is the SCALE Electronic Notebook: [www.ornl.gov/scale/scale\\_notebook.html](http://www.ornl.gov/scale/scale_notebook.html)

## Roger Carter 1929-2003



**Roger Carter**, 74, passed away June 29, 2003 in Richland, Washington after a lengthy illness.

He was a key member of the criticality safety community at Hanford and of the national criticality safety organizations. He provided insightful input to the governance of the criticality safety division, participated in the development of several of the National Standards, and contributed numerous technical presentations at national and international meetings. His most significant and lasting contribution to criticality safety is the ARH600 Criticality Safety Handbook. He and his co-authors provided innumerable parameter analyses in a three volume set of graphs and tables that have been extensively used and referenced by most criticality analysts. At Hanford he will be especially remembered for his extensive, meticulous criticality

safety analyses, for his relentless efforts to obtain benchmark data, his exceptional collection of criticality safety documentation, and his push to get bigger and better computers and more sophisticated analysis tools. Parts of his library are still in existence. He had an especially good memory of his past work. Even in recent times when asked about a criticality safety evaluation twenty years ago, he would explain details as if he had just completed the analysis.

During the 1986 Nuclear Criticality Technology and Safety Project (NCTSP) meeting, Roger Carter, as chairman of the Evaluation Techniques Working Group, submitted a proposal to develop a generalized quality-assured database for criticality safety experiments to be used for validation of computer codes and cross section data. Roger's proposal was never funded; however, his persistent emphasis on the need for this work became the motivation for what has now become the International Criticality Safety Benchmark Evaluation Project (ICSBEP). Roger was one of the original participants on this project and made significant contributions to the design and early execution.

Roger was born in Kansas and grew up in Pawhuska, Oklahoma. He received his college education at the University of Oklahoma and Oklahoma State University. After completing a Master's degree in

Nuclear Physics 1952, he was recruited by General Electric to work on the Hanford Project. He became a reactor physicist. Following the departure of General Electric from Hanford, Roger switched into criticality safety for the fuel and plutonium processing plants at Hanford. He retired from his Hanford job in 1989 and became a criticality safety consultant for Mohr and Associates in Richland. His major assignment as a consultant was at Oak Ridge for nearly ten years.

Roger's away from work interests included reading, playing bridge, aircraft and genealogy. He loved to read and had an extensive library of books on science fiction, history, fantasy and aircraft. The long bus rides from Richland to the reactors along the Columbia provided ample opportunity to further his love of reading.

Roger was married to Bobbi for nearly 45 years. They had three sons and one daughter. He and his wife enjoyed traveling, especially to England and France and on genealogy trips within the United States.

Roger will be remembered by all of us for his technical contributions, for his pursuit of major and minor details and perfection in his work, for his friendship, for his humor and his endless source of knowledge.