American Nuclear Society

Nuclear Criticality Safety Division Newsletter

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Paul Felsher, Editor

Message from the Chair

Robert Wilson, NCSD Chair

Nuclear Criticality Safety Specialists as a Community

A recent letter from ANS headquarters indicates our division membership is at 715. As we have grown from a fraction of the current size, we seem to have retained our congeniality and mutual respect. This is an important attribute as safety professionals occasionally deliver unwelcome news to the facilities they support and being backed up by peers is periodically necessary. Criticality Safety people communicate well with each other, meet often, and tend to agree on a wide range of issues affecting our discipline. This has resulted in a good set of technical standards and excellent support of technical meetings and publications. Other groups find us pessimistic and reluctant to compromise, but we seem to value others of our kin. However, our tendency to look for failure paths (and perhaps our stubbornness) means that our conflicts with the sites we serve occur out of proportion with our numbers.

The ANS Special Committee on Ethics has received a number of complaints from those threatened with or experiencing job losses due to reporting of criticality safety issues. The committee's charter is policy and is not an investigation body, so both sides of these conflicts have not been available to us. However, the frustration and anguish of balancing professional responsibility and ethics against career prospects is clear. An unfortunate tendency of some working groups is to isolate those with ethical dilemmas regardless of the merits of the concern. I expect this is rarely the case in criticality safety groups. Employees who are willing to say that something is wrong are an essential asset in our work environment and society. We need them and they need us and criticality safety staffs can see this clearer than most. A recent news article on the internal whistleblowers at Enron relayed that of all the things that bother those who report problems internally or externally, the social isolation is the worst. Continuing to value and to socialize with colleagues experiencing conflict on technical issues with our employers is a contribution we can all make to the well being of our organizations.

USDOE Nuclear Criticality Safety Program

One of the bright spots in our field has been the development over the last few years of the US Department of Energy's Nuclear Criticality Safety Program. The products of this program are generally available to all criticality safety practitioners and have significantly improved the practice of our craft. Yet greater heights are envisioned. The program elements are:

CRITICAL EXPERIMENTS: Support continuing operation of critical experimental facilities and new experimental benchmarks for testing our analytic models.

BENCHMARKING: Provide authoritative documentation on benchmark data from past experimental work.

NUCLEAR DATA: Provide basic physics data on various materials used in safety basis calculation.

ANALYTICAL METHODS: Support and enhance criticality safety computer codes used to determine safety basis.

APPLICABLE RANGES OF BOUNDING CURVES AND DATA: Provide methods and tools to interpolate and extrapolate from existing data and determine sensitivities of uncertainties in that data.

INFORMATION PRESERVATION AND DISSEMINATION: Collect, preserve, and make available criticality safety information, including early and historic experiments.

TRAINING AND QUALIFICATION: Provide training material and courses for criticality safety practitioners.

This extensive effort is providing essential services to all of us. Although we believe this effort is cost effective, it needs political support. Those in the USDOE family need to affirm our use of these products to our organizations.

Epitaph for a Laboratory

Robert E. Rothe, Former Rocky Flats Critical Mass Laboratory Scientist

The Critical Mass Laboratory (CML) at Rocky Flats was born in desperate times; or so it seemed. Events last September demonstrate that mankind seems never to be free of desperate times. Nonetheless, the cold war was dropping in temperature in the mid-1960s while conflict in Korea were heating up - a (political) thermodynamic equilibrium of sorts. The United States' government's decision, in 1952, to build what newspapers happily termed an "A-Bomb Plant" was heralded as a rich plum for Denver; and the CML followed several years later. That laboratory would improve confidence in nuclear criticality safety advice at the still-young plant which manufactured weapons components out of plutonium, enriched uranium, and a number of other uncommon materials.

The Assembly Room "blockhouse", the room wherein some 1700 critical approach experiments would be performed over almost the next three decades, grew of concrete and rebar in the summer and fall of 1964. A simple Office Area sprouted to the north; and the finished CML facility was officially granted permission by the AEC to conduct nuclear experiments on January 28, 1965. The dream of a clever young scientist, Clarence Lee Schuske, had finally become a reality. This transplant from the hills of Tennessee had adapted well to the majestic beauty of the rugged Rocky Mountains just to the west of the plant; and this laboratory would be his legacy.

The new laboratory demanded additional personnel; so Schuske hired a trio of young scientists to perform these sometimes-risky experiments. Grover Tuck, Douglass Hunt, and this historian brought very little experience with them. The building wasn't even finished when the three joined the force; and frequent walks to the construction site showed progress. This author recalls clearly those excursions. They were a source of cold sweats! Before coming to Colorado, he wasn't really sure what criticality meant; and he never uttered his internal fears when Schuske informed him he would be in charge of over 500 kg of enriched uranium in the form of Uranyl Nitrate Solution. This fresh, young, PhD had no idea what a Raschig ring was!

The CML and its dedicated staff produced copious amounts of useful data with world-wide applicability in spite of these tenuous beginnings. Papers were published, ANS meetings attended, and, slowly, the reputation of Schuske's team earned some degree of respect. The Rocky Flats CML had become a partner to a few other similar facilities in contribution toward the safe handling of exotic materials. The FBI raid of June, 1989, and other complications around plantsite sounded the death knoll for the plant as well as the laboratory. This eventual demise was neither recognized nor accepted as evidenced by the plant's efforts during the early 1990s toward "resumption". Few held out any hope for resurrection by 1995. The CML was one of the first few buildings on site to yield to the figurative wrecker's ball.

The CML, Building 886, was explosively fractured on Saturday, April 13, 2002, and demolished the following day. This author - who had watched the building's birth in 1964 and its Christening the following January - had the tearful opportunity to witness the sad demise of this once-proud

facility. He watched the demolition of the office areas to the north in March and, then, visited the site once again on April 18th to view the rubbled remains of the building which had housed his entire professional career. Ponder, dear reader, the emotions rampant at such a moment.

Editor's note: Dr. Rothe has written a book, which is not yet published, detailing the often-colorful history of the Rocky Flats Critical Mass Laboratory. A brief history of Rocky Flats precedes a description of the evolution of criticality safety at the plant. The principal thrust of the book, however, is the laboratory itself. Its people, experimental programs, nuclear fuels, and the physical facility are given in elaborate detail. A typical critical-approach experiment is described for the benefit of those who will never witness such an intriguing event. Off-normal events, spills, and accidents are presented in forthright detail to help others avoid similar problems in the future.

The book is titled: "A (Technically-Useful) History of the Critical Mass Laboratory at Rocky Flats". Los Alamos National Laboratory sponsored the work and will be publishing the book with an expected release date by the end of 2002.

Program Committee

Mark D. DeHart

The ANS Winter Meeting is scheduled for November 17-22, 2002 in Washington, D.C. The NCSD sessions are below.

Data, Analysis, Operations for Nuclear Criticality Safety - Contributed. This session is the general session for NCSD papers, which do not fit any other session topic. Session Organizer: Mark DeHart, (865-576-3468, dehartmd@ornl.gov)

Nuclear Criticality Safety Standards Forum – Panel. Session Organizer: Tom McLaughlin, (505-667-7628, tpm@lanl.gov)

Criticality Alarm System and Evacuation Zones – Invited and Contributed. Session Organizer: Debdas Biswas (803-502-9806, depdas.biswas@wxsms.com)

"New and Improved" Computational Tools for NCS Analysis – Contributed. Session Organizers: Mark DeHart (865-576-3468, dehartmd@ornl.gov) and Steve Bowman (865-574-5263, bowmansm@ornl.gov)

Transitioning Criticality Controls to Prepare for Extended Shutdown or Decommissioning – Invited and Contributed *(Full Papers)*. Session Organizers: Valerie Putman (208-526-9529, vputman@inel.ogv) and Lon Paulson (910-675-5460, lon.paulson@gnf.com)

Burnup Credit For Storage and Transportation Systems - Contributed. Session Organizers: Thomas Doering (702-295-4381, thomas_doering@notes.ymp.gov) and Mark DeHart (865-576-3468, dehartmd@ornl.gov)

Nuclear Criticality Safety Division (2001-2002)

Officers

Chair:	Robert Wilson, robert.wilson@rf.doe.gov
Vice Chair:	Michaele Brady-Rapp, michaele.bradyraap@pnl.gov
Secretary:	Christa Reed, christareed@att.net
Treasurer:	Tom Doering, thomas_doering@notes.ymp.gov

Executive Committee and Committee Chairs

2002 Kathleen Bhanot, International Relations, keb3@bnfl.co.uk
2002 Kevin Kimball, kkimball@nisyscorp.com
2002 Richard Taylor, rgt@ispchannel.com
2003 Jerry McKamy, Membership, jerry.mckamy@eh.doe.gov
2003 Lon Paulson, Education lon.paulson@gnf.com
2003 Valerie Putman, Honors and Awards, vputman@inel.gov
2004 Mark DeHart, Program Committee, dehartmd@ornl.gov
2004 Paul Felsher, Publications, paul.felsher@juno.com
2004 Chris Robinson, ycr@y12.doe.gov
Mark DeHart, Program Committee Chair, dehartmd@ornl.gov
Thomas McLaughlin, ANS-8 Chair, tpm@ornl.gov
Jack Bullington, Nominating Committee Chair, jack.bullington@srs.gov
John Schlesser, ANS-8 Liaison, john.schlesser@srs.gov
R. Michael Westfall, Fellow Award-Coordinator, rwe@ornl.gov

NCSD Election Results

The results of the NCSD election of division officers and executive committee members are:

Chair: Michaele Brady-Rapp
Vice Chair: James Baker
Secretary: Kevin Reynolds
Treasurer: Christa Reed

Executive Committee (2002-2005)
James Felty
Keyes Niemer
Bonnie Rumble

NCSD Special Awards

At the 2001 Winter ANS meeting, Bob Busch and Lester Petrie were recognized with the following special awards for their work supporting the NCSD community:

Distinguished Service Award
awarded to:
Robert D. Busch

Bob Busch is recognized for his distinguished service in the form of his sustained, outstanding accomplishments in carrying out the activities and offices of the Nuclear Criticality Safety Division (NCSD) of the American Nuclear Society. Bob Busch's prominent roles in the NCSD can be characterized as those of an outstanding leader and educator. He has amply demonstrated his dedication to achieving the purpose and objectives of the Division.

During his 15 year NCSD membership, Bob Busch has served as Division Secretary, Treasurer, Vice-Chair and Chair, as well as several terms on the Division's Executive and Program Committees. He has served as a chair and member of several ANSI/ANS-8 standards writing committees and on the N-16 standards steering committee. Additionally, he has taken a very active role in facilitating nuclear criticality safety training by organizing and conducting summer workshops. Also, he has instituted formal nuclear engineering education and research programs at the University of New Mexico. He has consistently demonstrated a high level of professionalism in supporting the activities and technical program of the American Nuclear Society, its topical meetings and the International Conferences on Nuclear Criticality (ICNC).

Bob Busch has served as a model for outstanding membership and leadership in the Nuclear Criticality Safety Division.

Technical Excellence Award
awarded to:
Lester M. Petrie

Lester Petrie is recognized for leadership in the development of criticality safety and reactor physics software, including software management systems, at the Oak Ridge National Laboratory for over three decades. In this capacity Lester Petrie has been the principal author of the very popular KENO series of Monte Carlo criticality safety codes. In its sixth major version, KENO has served as the "workhorse" analytical tool for the evaluation of multi-dimensional fissionable systems in the United States and throughout the world.

With a rare combination of expertise in neutral particle transport methods and state-of-the-art computational skills, Lester Petrie has defined and developed analytical software with ever-increasing capabilities and sophistication. He has had a most important role in the formulation and definition of the SCALE software management system, which includes automated sequences for performing criticality safety evaluations based around KENO and other modules. SCALE has benefited enormously from Lester Petrie's conceptualization of the methods and implementation of the physics.

Just as important from the perspective of the criticality practitioner has been Petrie's assistance in the correct use of this software. Several hundred analysts have participated in week-long, "hands-on" workshops instructed by Petrie and innumerable analysts have received direct assistance from Petrie in the performance of their evaluations. Truly, Lester Petrie has made a major contribution to criticality safety.