

American Nuclear Society
Nuclear Criticality Safety Division Newsletter
Spring 2014



Editor: Madison E. Martin

Website: <http://ncsd.ans.org>

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Message from the Chair

This issue focuses on the ANS 8 Standards, the cornerstone of safe operations in the Nuclear Criticality Safety industry. The NCS D Education Committee recently polled members for topics that they would like more information about and the Standards process topped the list. So you asked for it, you got it! This issue contains a summary of every ANS 8 Standard including the Working Group Chair and the current status. This information is also discussed at the ANS Standards Forum at every Summer and Winter ANS meeting, usually held during the Thursday morning session of the conference. The Standards Approval process is also summarized and the titles of the inactive standards are given. See if you can name them all before turning to page 4!

If you weren't able to attend the Division's topical meeting, NCS D2013, a summary is included and the presentations are on the NCS D website at http://ncsd.ans.org/site/papers_Wilmington_2013.html. Mark your calendars for international topical meeting, ICNC 2015, to be hosted by NCS D September 14-18, 2015 at the OMNI Hotel in Charlotte NC. The NCS D Program Committee is also busy filling the Summer and Winter meetings with excellent papers. The government travel restrictions and budgets have made it difficult for some to get approval to attend the meetings far enough in advance to submit a paper. However, the limited budgets make submitting a paper more important now than ever because it will give you an advantage when your company chooses who they send to a conference. As I stated in the Summer 2013 newsletter, I encourage those working in operating facilities to look around you for paper topics. It may seem like nothing you are doing is new or different. However, as the expectations for the content of a criticality safety evaluation continue to rise, your site has something to share. It may be best practices, lessons learned or data collected to support using realist models in lieu of overly-conservative models. These topics were also requested for conference sessions in the recent Education Committee survey. The Program Committee has tried to organize these sessions but without you writing the papers, the session doesn't happen and everyone loses out!

If you would like to become more involved in NCS D, please contact me at sandi.larson@nuclearassociates.com and I will plug you into an area that you are interested in. Check out the list of committee chairs at <http://ncsd.ans.org>.

Sandi Larson, *NCS D Chair*

Nuclear Criticality Safety Standards, ANSI/ANS-8 Series

Contributor: Larry Wetzel

The basis of nuclear criticality safety in the United States is the ANSI/ANS-8 series of standards. These standards have been developed over many years and are constantly being reviewed and revised to keep the guidance current and relevant. The standards are designed to tell a practitioner what to do, not how to do it. They are not procedures. Subcritical limits in the standards are based on experimental data, empirical methods and, more recently, calculations.

There are three key words in the standards: shall, should and may. The word “shall” is used to denote a requirement; the word “should” is used to denote a recommendation; and the word “may” is used to denote permission, neither a requirement nor a recommendation.

A standard is composed of the forward, the body and the appendices. The requirements, recommendations and permissions are contained in the body. The forward and the appendices are not considered part of the standard and cannot contain requirements, recommendations and permissions.

Current Standards:

There are currently 18 active ANS-8 standards. To re-familiarize you with the active standards, each is listed along with its scope and the current working group chair.

ANS-8.1 (Revision), Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors,

Work Group Chairs: Doug Bowen/Nick Brown

This standard is applicable to operations with fissionable materials outside nuclear reactors, except for the assembly of these materials under controlled conditions, such as in critical experiments. Generalized basic criteria are presented and limits are specified for some single fissionable units of simple shape containing ^{233}U , ^{235}U , or ^{239}Pu , but not for multiunit arrays. Requirements are stated for establishing the validity and areas of applicability of any calculational method used in assessing nuclear criticality safety. This standard does not include the details of administrative controls, the design of processes or equipment, the description of instrumentation for process control, nor detailed criteria to be met in transporting fissionable materials.

ANS-8.3 (Revision), Criticality Accident Alarm System,

Work Group Chair: Shean Monahan

This standard is applicable to all operations involving fissionable materials in which inadvertent criticality can occur and cause personnel to receive unacceptable exposure to radiation. This standard is not applicable to detection of criticality events where no excessive exposure to personnel is credible, nor to nuclear reactors or critical experiments. This standard does not include details of administrative actions or of emergency response actions that occur after alarm activation.

ANS-8.5 (Maintenance), Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material,

Work Group Chair: Jerry Hicks

This standard provides guidance for the use of borosilicate-glass Raschig rings as neutron absorber for criticality control in ring-packed vessels containing solutions of ^{235}U , ^{239}Pu , or ^{233}U . The chemical and physical environment, properties of the rings and packed vessels, maintenance inspection procedures, and operating guidelines are specified.

ANS-8.6 (Maintenance), Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ,

Work Group Chair: Bill Myers

This standard provides safety guidance for conducting subcritical Neutron-Multiplication Measurements where physical protection of personnel against the consequences of a criticality accident is not provided. The objective of in situ measurements are either to confirm an adequate safety margin or to improve an estimate of such a margin. The first objective may constitute a test of the criticality safety of a design that is based on calculations. The second may effect improved operating conditions by reducing the uncertainty of safety margins and providing guidance to new designs.

ANS-8.7 (Maintenance), Nuclear Criticality Safety in the Storage of Fissile Materials,

Work Group Chair: Kevin Kimball

This standard is applicable to the storage of fissile materials. Mass and spacing limits are tabulated for uranium containing greater than 30 wt-% ^{235}U , for ^{233}U , and for plutonium, as metal and oxides. Criteria for the range of application of these limits are provided.

ANS-8.10 (Revision), Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement,

Work Group Chair: Andy Prichard

This standard is applicable to operations outside of nuclear reactors with ^{235}U , ^{233}U , ^{239}Pu , and other fissile and fissionable materials in which shielding and confinement are provided for protection of personnel and the public, except the assembly of these materials under controlled conditions, such as in critical experiments. Criteria are provided that may be used for criticality control under these conditions. The standard does not include the details of administrative procedures for control, which are considered to be management prerogatives, nor details regarding the design of processes and equipment or descriptions of instrumentation for process control.

ANS-8.12 (Revision), Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors,

Work Group Chair: Debdas Biswas

This standard is applicable to operations with plutonium-uranium oxide fuel mixtures outside nuclear reactors, except the assembly of these materials under controlled conditions, such as in critical experiments. Basic criteria are presented for plutonium-uranium fuel mixtures in single units of simple shapes containing no more than 30 wt% plutonium combined with uranium containing more than 0.71 wt% ^{235}U . The limits for uniform aqueous mixtures (solutions) are applicable to homogeneous mixtures and slurries in which the particles constituting the mixture are uniformly distributed and have a diameter no larger than 127 μm (0.005 in.), i.e., are capable of being passed through a 120 mesh screen. This standard does not include the details of

administrative controls, the design of processes or equipment, the description of instrumentation for process controls or detailed criteria to be met in transporting fissionable material.

**ANS-8.14 (Maintenance), Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors,
Work Group Chair: Larry Berg**

This standard provides guidance for the use of soluble neutron absorbers for criticality control. This standard addresses neutron absorber selection, system design and modifications, safety evaluations, and quality control programs.

**ANS-8.15 (Revision), Nuclear Criticality Control of Special Actinide Elements,
Work Group Chair: Charlie Rombough**

This standard is applicable to operations with the following: ^{232}U , ^{234}U , ^{237}Np , ^{236}Pu , ^{238}Pu , ^{240}Pu , ^{242}Pu , ^{241}Am , $^{242\text{m}}\text{Am}$, ^{243}Am , ^{242}Cm , ^{243}Cm , ^{244}Cm , ^{245}Cm , ^{246}Cm , ^{247}Cm , ^{249}Cf , and ^{251}Cf . Subcritical mass limits are presented for isolated fissionable units. The limits are not applicable to interacting units.

**ANS-8.17 (Maintenance), Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors,
Work Group Chair: Brian Kidd**

This standard provides nuclear criticality safety criteria for the handling, storage, and transportation of LWR fuel rods and units outside reactor cores.

**ANS-8.19 (Revision), Administrative Practices for Nuclear Criticality Safety,
Work Group Chair: R. W. "Bill" Carson**

This standard provides criteria for the administration of a nuclear criticality safety program for outside-of-reactor operations in which there exists a potential for nuclear criticality accidents. Responsibilities of management, supervision, and the nuclear criticality safety staff are addressed. Objectives and characteristics of operating and emergency procedures are included.

**ANS-8.20 (Revision), Nuclear Criticality Safety Training,
Work Group Chair: Ron Knief**

This standard provides criteria for nuclear criticality safety training for personnel associated with operations outside reactors where a potential exists for criticality accidents. It is not sufficient for the training of nuclear criticality safety staff.

**ANS-8.21 (Revision), Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors,
Work Group Chair: Dave Erickson**

This standard provides guidance for the use of fixed neutron absorbers in an integral part of nuclear facilities and fissionable material process equipment outside reactors, where such absorbers provide criticality safety control.

ANS-8.22 (Maintenance), Nuclear Criticality Safety Based on Limiting and Controlling Moderators,

Work Group Chair: Michael Crouse

This standard applies to limiting and controlling moderators to achieve criticality safety in operations with fissile materials in a moderator control area. This standard does not apply to concentration control of fissile materials.

ANS-8.23 (Maintenance), Nuclear Criticality Accident Emergency Planning and Response,

Work Group Chair: Jim Baker

This standard provides criteria for minimizing risks to personnel during emergency response to a nuclear criticality accident outside reactors. This standard applies to those facilities for which a criticality accident alarm system, as specified in American National Standard “Criticality Accident Alarm System,” ANSI/ANS-8.3-1997 (R2003) is in use. This standard does not apply to nuclear power plant sites or to licensed research reactor facilities, which are addressed by other standards.

ANS-8.24, (Maintenance) Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations,

Work Group Chair: Larry Wetzel

This standard provides requirements and recommendations for validation, including establishing applicability, of neutron transport calculational methods used in determining critical or subcritical conditions for nuclear criticality safety analyses.

ANS-8.26, (Maintenance) Criticality Safety Engineer Training and Qualification Program,

Work Group Chair: Jim Morman

This standard presents the fundamental content elements of a training and qualification program for individuals with responsibilities for performing the various technical aspects of criticality safety engineering. The standard presents a flexible array of competencies for use by management to develop tailored training and qualification programs applicable to site-specific job functions, facilities and operations.

ANS-8.27, (Maintenance) Burn-up Credit for LWR Fuel,

Work Group Chair: Dale Lancaster

This standard provides criteria for accounting for reactivity effects of fuel irradiation and radioactive decay in criticality safety control of storage, transportation, and disposal of commercial LWR UO₂ fuel assemblies. This standard assumes the fuel and any fixed burnable absorbers are contained in an intact assembly. Additional considerations could be necessary for fuel assemblies that have been disassembled, consolidated, damaged, or reconfigured in any manner.

Proposed Standards:

Currently, ANS-8 has two standards that are proposed.

Proposed ANS-8.28, Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety,

Work Group Chair: Ernie Elliott

This standard is in development. The PINS has been approved, but the draft has not been submitted to ANS-8 for approval.

Proposed ANS-8.29, Nuclear Criticality Safety in Reprocessing,

Work Group Chair: Adolf Garcia

This standard is in the PINS development stage.

With this many standards, there are always working groups in need of members. Groups that need members now are:

ANS-7, Nuclear Criticality Safety in the Storage of Fissile Materials, contact [Kevin Kimball](#)

ANS-8.14, Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors, contact [Larry Berg](#)

ANS-8.23, Nuclear Criticality Accident Emergency Planning and Response, contact [Jim Baker](#)

If there is a standard that you are interested in working on, but they do not have an immediate need, you can still contact the chair and express your interest.

Missing Standards

As you may have noticed, there are missing numbers. Some of these are standards that were withdrawn from service and some are ones that the PINS (Project Initiation Notification System) was approved but the standard was never issued. Listed below are the ANS-8 standards that fall into this group.

- ANS-8.2** Computer Codes (Never named or issued)
- ANS-8.4** Shipping Containers (Never named or issued)
- ANS-8.8** Criticality Safety Limits for Special Applications (inactive)
- ANS-8.9** Nuclear Criticality Safety Criteria for Pipe Intersections Containing Aqueous Solutions of Fissile Material (inactive)
- ANS-8.11** Validation of Calculational Methods for Nuclear Criticality Safety (Historic)
- ANS-8.13.1** Criteria for Establishing and Applying a Solid Angle Method for Nuclear Criticality Safety (inactive)

- ANS-8.13.2** Guide for Evaluation Interaction Between Units of Low Enriched Uranium Using the Surface Density Method (inactive)
- ANS-8.16** Criteria Solid Angle Method for Nuclear Criticality Safety (inactive)
- ANS-8.18** Use of Chlorinated Polyvinyl Chloride (CPVC) as a Neutron Poison (inactive)
- ANS-8.25** Postings (never issued)

Development of a Standard

There are several stages in the development of a standard. The basic process is:

A New Standard

- A need is identified
- Working Group is formed
- Initiate Project (PINS)
- Develop Standard
- The draft is submitted to ANS-8 for ballot
 - The WG must resolve comments from ANS-8 to achieve consensus
- The draft is submitted to Nuclear Criticality Safety (previously known as N16) Consensus Committee for ballot with concurrent public review.
 - The WG must resolve comments from NCS to achieve consensus
- The ANS Standards Board certifies the ballot process.
- All documents related to the ballot are submitted to ANSI for approval
- When approved by ANSI, a standard is born.

Standards must be maintained. At the 5 year mark or before, the revision process is begun. The PINS must be approved before official work can begin on the revision. If a revision is not needed, the WG can request reaffirmation of the standard. In the reaffirmation process, nothing is revised, but the standard must be balloted on.

The members of ANS-8 are:

Lon Paulson, Chair
Brian Kidd, Vice-Chair
Michael Crouse, Secretary
Jim Baker
Ernie Elliott
Dave Erickson
Adolf Garcia
Kevin Kimball

Dave Kupferer
Shean Monahan
Jim Morman
Tom McLaughlin
Tom Reilly
Hans Toffer
Chris Tripp
D. "Fred" Winstanley

The current members of NCS are:

Robert D. Busch, Chair
Larry L. Wetzel, Vice-chair
Patricia Schroeder, Secretary
Lawrence J. Berg
George H. Bidinger
William Doane
Robert S. Eby
Calvin M. Hopper
Ronald A. Knief

Thomas Marenchin
Scott P. Murray
Lon E. Paulson
Ronald E. Pevey
Raymond L. Reed
Randy Shackelford, Secretary Pro-tem
Richard G. Taylor
R. Michael Westfall

Program Committee

Chair: Allison Miller

Upcoming Events

At a Glance

Dates	Meeting	Location
June 15-19, 2014	ANS Annual Meeting	Reno, NV
November 9-13, 2014	ANS Winter Meeting	Anaheim, CA
June 7-11, 2015	ANS Annual Meeting	San Antonio, TX
September 14-18, 2015	ICNC 2015	Charlotte, North Carolina
November 8-12, 2015	ANS Winter Meeting	Washington, DC

NCSD 2013

Organizer: Lon Paulson

The ANS Wilmington Area Local Section was proud to host the once-every-four-year, Class I, Stand Alone Topical event held by the ANS Nuclear Criticality Safety Division September 29-October 3, 2013. The chosen theme was entitled, “Criticality Safety in the Modern Era: Raising the Bar”. The web site developed for the Topical is available via ncsd2013.org.

The NCSD2013 organizing, technical program and technical review committee members delivered an outstanding conference to promote and advance the field of nuclear criticality safety. In addition to a SCALE Tutorial Sunday afternoon, a total of 73 papers were presented in 7 **single track** AM/PM sessions as shown in Figure 1 conference schedule.

	Sunday 9/29	Monday 9/30	Tuesday 10/1	Wednesday 10/2	Thursday 10/3
8:00	SCALE Tutorial	Opening Keynote/Plenary	Methods II	Programs / Training / Risk Assessment / Post-Fukushima	Methods III
8:30		Methods I			
9:00		AM Break*	AM Break	AM Break	AM Break
9:30		Methods I	Methods II	Programs / Training / Risk Assessment / Post-Fukushima	Methods III
10:00		Lunch Break*	Lunch Break		Lunch Break
10:30		Analysis & Experiments I	Analysis & Experiments II	Criticality Accidents and Response	Buses Leave
11:00		PM Break*	PM Break		PM Break
11:30		Analysis & Experiments I	Analysis & Experiments II	Criticality Accidents and Response	GEH/GNF Tour
12:00		NCS D Exec. Committee Mtg.			
12:30				Cocktail Hour at Wilmington Convention Center	
13:00				Banquet at Wilmington Convention Center with Keynote Speaker (GEH/GNF sponsors)	
13:30					
14:00					
14:30					
15:00					
15:30					
16:00					
16:30					
17:00					
17:30					
18:00					
18:30	Sunday Evening Welcome Reception at the Hilton				
19:00					
19:30					
20:00					
20:30					

Figure 1: NCSD2013 Conference Schedule

The plenary **speakers** included:

- Calvin Hopper (Honorary Chair) – “The Role of Administration in Nuclear Criticality Safety”
- Dick Malenfant – “An Historic Perspective: The Real Basis of Nuclear Criticality Safety”

A total of ~ 142 registered attendees participated. Broad **domestic participation** included EPRI, B&W Y-12, ORNL, AECL, USDOE, AREVA, USEC, PSC, LANL, UNM, GE Hitachi., NFS, NSA, SAIC,

SANDIA, Spectra Tech, LLNL, Babcock, Sigma Science, Novare Solns., Bettis, URS, USNRC, NC State, Univ. of FL, Univ. of Tenn., Univ. of Mich., Univ. of NM, and Cape Fear Comm. College.

International participants were in attendance representing France, China, Canada, Sweden, the United Kingdom, Belgium, Finland, Germany, and others.

The Tuesday banquet dinner was sponsored by GEH and **Kevin Walsh** (GEH Sr. Vice President) was the invited speaker who shared some fuel cycle experiences and “Raising the Bar” efforts at GEH.

Regarding publications –150 program booklets and 200 CDs were published (extra 50 CDs were sent to ANS HQ for future sales). The NCSD division website will include presentations for those submitting “consent” forms.

A total of 32 participated in the onsite GNFA fuel fabrication facility tour. We had 15 people attend the Brunswick plant tour. At the **hotel** we had about 490 room nights booked. Our contractual requirement was 320 and the room block was 375 room nights. We also met our food and beverage for the conference hotel ~\$15.8K expenditures.

Financially, NCSD2013 turned out in the “black” column; with ~\$100k total revenue; ~\$70K expenses; leaving ~\$30K anticipated “profit” for ANS HQ (50%), NCSD (25%), WALC (25%) distribution.

In summary, numerous positive comments were received about the overall accommodations and execution of NCSD2013. A sincere thank you goes out to all who contributed and participated to the success of 2013 NCSD Topical!

"Participating as a Plenary Speaker for the ANS NCSD 2013 Topical Meeting, Criticality Safety in the Modern Era: Raising the Bar, was a distinct pleasure and honor. So very many developments have occurred over the recent past, present and expected future in the field of nuclear criticality safety (NCS). The NCS community has benefitted greatly from the contributions of the ANS NCS "Pioneers" and their ever increasing levels of quality expectations and standards. The Pioneers moved from one level of a modern era to another. Today, we are now standing in our own new era with substantial resources that include hugely capable computational tools, numerous evaluated criticality safety benchmark experiments with the potential for performing other benchmark experiments, excellent ANS NCSD ANSI/ANS-8.XX standards, NCS training resources, a national commitment to operational efficiency and safety. These substantial resources create the illusion of NCS omniscience. However, those resources impose greater programmatic pressures in nuclear designs and NCS thereby requiring an ever vigilant and increasing level of effort to improve the quality of safety designs, analyses, applications, and operations. It is apparent from the technical and administrative subject matter of the NCSD 2013 papers and presentations that the NCS community has evolved to another level of maturity thereby. NCS stands in a new "time portal" of capabilities and needs that has caused NCS to raise the bar on safety analyses, designs, and applications."

– Calvin Hopper

“I was honored to be invited to serve as the Plenary Speaker at the American Nuclear Society Nuclear Criticality Safety Division Topical Meeting in Wilmington, North Carolina, September 30-October 3, 2013. An appropriate topic for the Plenary appeared to be the history of nuclear criticality safety. When I have described historical experiments on several occasions over the last few years, audience members (considerably younger than me) have commented, "Gee, we couldn't do that now." The Plenary provided the opportunity to place the origins of nuclear criticality safety in perspective. Safety has always been

incorporated in experiments involving multiplying systems. This can be illustrated by the work on the Dragon Machine, the reactor that operated in early 1945 on prompt fissions alone. The name Dragon was provided by Richard Feynman who, along with Enrico Fermi, was a member of the safety review committee. I believe that the basis of nuclear criticality was established in a memo that was written by Raemer Schrieber following the fatal accident of May 21, 1946. Schrieber was present at the accident, and documented observations and recommendations to Darol Froman, Deputy Director of the laboratory. With the advantage of 50-50 hindsight, we are often too quick to point out the errors made that resulted in accidents. I attempted to put the early history of experience, including accidents, into perspective by challenging the audience to consider them in the light of the knowledge and computational capability at the time. I also pointed out that detailed cross-sections were generally unavailable and had to be measured to support the experiments that were done. How many students today can make a hand, or slide rule, calculation of the kinetics of a nuclear system?

I don't know if I was successful. However, I was pleased when a few of those present indicated that they had never considered the early work in the context of the data available at a time so long ago. It is likely that much of that work could not be done in the same manner today, including some in which I was a participant. The nuclear safety community has over 50 years of experimental work on which to base evaluations of safe operation."

- Dick Malenfant

ICNC 2015

General Chairman: Robert Busch

Every 4 years the international nuclear criticality safety community gathers to discuss technical, operational, computational, and regulatory issues in the practice of nuclear criticality safety.

ICNC 2015 (International Conference on Nuclear Criticality) allows specialists from around the globe to come together to discuss, analyze and study the latest developments in the area of nuclear criticality safety. This is a unique opportunity to exchange ideas with industry experts, leaders, colleagues and peers. For the first time in 20 years, ICNC is back in the U.S. meeting in Charlotte, North Carolina. The meeting will include a 4-day technical program covering all areas of nuclear criticality safety in nuclear operations, a social program with multiple opportunities to see old friends from the international community and make new friends, and technical tours to check out nuclear facilities in the area.

Start thinking about paper topics – abstract submission will open in the fall with abstracts due March 1, 2015.

Put the dates on your calendar – September 14-18, 2015 and start working on travel approval so you can join us in Charlotte at ICNC 2015.

When: September 14-18, 2015

Where: Omni Charlotte Hotel, 132 E. Trade Street, Charlotte, North Carolina

Organizing Committee:

General Chairman: Robert Busch

Assistant General Chair: Sandi Larson

Co-Technical Program Chairs: Michael Brady Raap, Larry Wetzel

International Advisory Committee: Chair, Cecil Parks

Publications Chair: Allison Miller



Education Committee

Chair: Katherin Goluoglu

The Education Committee met during the November meeting in Washington, D.C. During this meeting several issues were discussed.

The educational program for future meetings was discussed. A tutorial on criticality-related aspects of uranium and plutonium chemistry is planned for the next summer meeting, and the education committee is currently enlisting experts on these topics to participate in this tutorial. The session is expected to last one day, with the morning portion covering uranium chemistry, and the afternoon session addressing plutonium chemistry. UPDATE: This tutorial has been postponed, pending identification of speakers that can attend the conference.

Executive committee comments on the “Integrating Safety into Design” white paper have been received. The comments are currently being addressed and the paper will be returned to the executive committee for final approval.

Finally, the term for education chair Katherin Goluoglu has passed, and the committee is working to have a new chair approved. UPDATE: A candidate has been selected, but not appointed as of yet.

Executive Committee

Chair: Sandi Larson

Division Officers	
<ul style="list-style-type: none"> • Chair: Sandi Larson sandi.larson@nuclearassociates.com Phone: 865-483-8247 Nuclear Safety Associates • Vice Chair: Jerry Hicks jerry.hicks@nnsa.doe.gov Phone: 505-845-6287 NNSA 	<ul style="list-style-type: none"> • Treasurer/Finance: Deb Hill deborah.a.hill@nnl.co.uk Phone: (+44) 1772-764359 National Nuclear Laboratory • Secretary: John A. Miller jamiller@sigmasci.com Phone: 505-284-0875 Sigma Science, Inc.

Executive Committee		
<p>Through June 2014:</p> <ul style="list-style-type: none"> • Allison Miller admille@sandia.gov Phone: 505-301-7426 Sandia National Lab. Inc. • Michael Corum michael.corum@nuclearassociates.com Phone: 803-873-9591 Nuclear Safety Associates • Chris Haught mailto:haughtcf@y12.doe.gov Phone: 865-576-5522 BWXT Y-12, LLC 	<p>Through June 2015:</p> <ul style="list-style-type: none"> • Thomas Miller tmmiller77@aol.com Phone: 865-574-9909 Oak Ridge National Lab • John Bess john.bess@inl.gov Phone: 208-526-4375 Idaho National Lab • Brian C. Kiedrowski bckiedro@lanl.gov Phone: 505-665-0110 Los Alamos National Lab 	<p>Through June 2016:</p> <ul style="list-style-type: none"> • Catherine M. Percher percher1@llnl.gov Phone: 925-423-9345 Lawrence Livermore National Lab • Ellen M. Saylor saylorem@ornl.gov Phone: 865-574-1938 Oak Ridge National Lab • James S. Baker james.baker@srs.gov Phone: 803-952-7838 Savannah River Nuclear Solutions, LLC

NCSD Executive Committee Meeting Notes (Abridged)

Minutes from the ANS NCSD Executive Committee

Omni Shoreham – Diplomat Ballroom
Washington DC
ANS Winter Meeting
Sunday 10th November, 2013

1. Call to Order

The Executive Committee Chair, Sandi Larson, convened the meeting at approximately 3pm. All of the Division Officers except the Treasurer/Finance Chair were present or called in via the conference line. A total of seven out of nine members of the Executive Committee were present or called in via the conference line. Approximately 20 additional NCSD members were present providing broad nuclear industry representation.

2. Approval of Previous Meeting Minutes

The minutes from the previous 2013 Summer Meeting (in Atlanta, GA) were approved by email prior to this meeting. However, it was noted that ANS National indicated potential legal issues with electronic voting at this time and therefore a motion was made to approve the previous meeting minutes. The vote resulted in approval without objection.

3. Chair's Report

The Chair provided an update on the Division Chairs meeting with the ANS President. Some of the key discussion points were as follows:

- a) In the past each division was allowed a single one-day registration for invited speakers. Now each division is allowed up to five one-day registrations and that the division chair must extend a formal invite. This resulted in discussions about potential to combine a couple one days into a single full registration.
- b) Workshops no longer have to have a fee associated with them and they can count as a technical track towards the Division's metrics.
- c) It was noted that first time attendees have a ribbon on their badge.
- d) There is a proposal to drop the Thursday sessions and instead have a poster session combined with some type of reception on Wednesday night to address issues with many attendees leaving early. This resulted in several discussions/comments ranging from:
 - i. Would it be a separate session or would we promote the best paper(s) from other sessions to also present a poster. Poster sessions have a bad rap.
 - ii. Travel issues for justifying traveling two days to attend a three-day meeting.
 - iii. Consideration for moving Sunday activities to Monday and meetings go through Thursday.
 - iv. It was noted that the NCSD gets good attendance on Thursdays while others don't so it might hurt us.
 - v. Concerns that it would reduce the amount of technical sessions and make it hard for people to attend other divisions' papers. The idea for cross-pollination or

fertilization at the poster session, on the other hand, is a positive and should be emphasized.

- e) It was noted that dues have increased for 2014.

4. Vice Chair's Report

The Vice Chair provided an update on general ANS National Organization News. Some of the key discussion points were as follows:

- a) ANS National has streamlined the financial side of the society.
- b) ANS National would like to attract other people in the nuclear related fields into ANS (e.g. Military personnel, other corporate entities)
- c) ANS national are working on roadmaps/strategies to keep people involved in ANS (e.g. after a few years of graduating a significant number of students drop out of the society.)
- d) There's a new website: NuclearConnect.org for the Center for Nuclear Science and Technology.
- e) ANS national would like us to engage more in public relations.
- f) ANS National has an IT initiative that includes updating and using newer technology to help with Division and ANSI standards work and will be implemented next fall.

5. Treasurer's Report

In the absence of the Treasurer, the Chair noted that the NCSD Division was in good financial shape with an "Excess Over Budget Funds" figure of \$21,714. The NCSD Dinner was cancelled for this meeting as discussed below in the Honors and Awards Division Committee Section. A discussion about a \$250 outlay to support the young members group is included in the budget but NCSD requested justification for how the money would be used prior to providing it. Allison Miller committed to getting a response and reporting back to the NCSD chair. The budget was approved by email prior to this meeting, however, it was noted again that ANS National indicated potential legal issues with electronic voting at this time and therefore a motion was made to approve the 2014 budget provided as part of Appendix B. The vote resulted in approval without objection. *{Refer to Appendix B for the full Treasurer's Report (including Budget Sheets)}*

There was a comment that the NCSD as a whole consider moving some of our reserves to the scholarship fund. After discussion it was decided that this issue should be considered after we receive money from the topical and potentially ICNC down the road.

6. Division Committee Reports

Program Committee: Allison Miller

Allison noted that the Program Committee had convened immediately prior to the Executive Meeting. A full technical program was planned for this week. It was noted that the sessions this week were moved around into different rooms. She reported that the new online process for assigning rooms and getting our sessions worked well but there were some minor issues. Also one paper on Thursday would not be presented. Additionally, there had been some discussion relating to the proposed Sessions at the 2014 Summer Meeting and the 2014 Winter Meeting.

Endowed Scholarship Special Committee: Deb Hill

The Chair noted that the Scholarship Fund was currently at approximately \$15,715. It was noted that donations are welcomed and tax-free.

Scholarship Committee: Andy Prichard

Andy stated that the committee was looking for more students to apply. Last year was a good year and we always need/want more good applicants.

Education Committee: Katherin Goluoglu

Katherin noted that the Education Committee had convened prior to the Executive Meeting. Some of the key discussion points were as follows:

- a) There is a white paper out to the executive committee for approval on Integrating NCS into Design.
- b) There is a white paper on NCS Evaluations in revision that will be provided to the Executive Committee shortly.
- c) Other white papers to be reviewed for accuracy and periodic adequacy review requirements.
- d) Consideration by the education committee to look at a future white paper on “Best Practices”.
- e) Planned workshops, tutorials, panels for upcoming conferences
 - i. Chemistry in NCS- tutorial
 - ii. NCS training/staffing/administration- maybe a future panel session?
 - iii. Event Lessons Learned Panel session to start sharing what went wrong and what was done to correct the event.

Membership Committee: Megan Pritchard

Megan noted that she was able to get Canberra to become members of ANS National as well as the NCSD. She mentioned going to Texas A&M to interface with students. Also it was noted that there was a NCSD table at the Monday luncheon in the Expo to recruit and provide information about the Division.

Publications/Newsletter/Web Site: Larry Wetzel

Larry stated that the latest newsletter was sent out, a bit late but it was completed. He stated that there haven't been many changes to the website but that most of the NCSD Topical presentations were there now.

Honors and Awards Committee: Andy Prichard

There was a need for judges for the presentations at this conference. Andy got the necessary volunteers. The NCSD Dinner was cancelled prior to the meeting. There was concern that the government shutdown and recent Topical meeting would have impacted the conference attendance and we would not be able to meet the requirements of 50 people to cover the associated costs. A motion was made and vote resulted in approval without objection to hold a dinner at the June 2014 meeting to present the 2013 awards.

7. NCSD 2013 Topical Meeting

Lon Paulson announced that the NCSD Topical Meeting on “Nuclear Criticality Safety in the Modern Era: Raising the Bar” was very successful. In summary, the topical meeting was well attended and included significant foreign involvement. The conference made ~\$30,000 of which NCSD will receive ~\$7500. The \$2500 from NCSD was dispersed to seven students to help them with travel and registration cost. Only one student presented but all had a wonderful time.

8. ICNC 2015 Meeting

Bob Busch is the technical chair for the 2015 ICNC in Charlotte, NC. It is scheduled for September 14-18, 2015. He discussed that the conference is in the planning stage and that they are working the paperwork for approvals.

9. ANS Student Conference Presentation

Representatives from the ANS 2014 Student Conference Organizing Committee announced that the next conference on the “Innovations in Nuclear Technology” is scheduled to be held at The Pennsylvania State University in State College, PA from April 3rd – April 6th, 2014. Full details are available on the dedicated website (<http://meetings.ans.org/student2014>). They have a Nuclear Criticality Safety track and are looking for judges.

10. Old Business

John Bess discussed the PHYSOR 2014 meeting scheduled for next September and that there was no intent to step on the toes of NCSD. He is the liaison to the meeting and is working on providing a review team including NCSD.

11. New Business

The Education Committee has provided a white paper on Integrating NCS into Design to the executive committee for final approval. It was discussed that a one-week review time would be given and then a teleconference would be set up for a vote on approval of the document.

The Education Committee will review and send to the NCSD Executive Committee for their review another white paper on nuclear criticality safety evaluations. A vote allowing that paper to be posted on the website for comment is desired as well.

It was discussed that ANS National has standard presentations for education, common discussions and PR aspects on their site. The question was posed if the NCSD should also have a standard set of presentations that members could pull from. The thought is that the education committee would review as necessary and then follow the normal approval process to have these added to the NCSD website.

It was noted as informational that the Math and Comp. Division topical was going to include a criticality safety track. The discussions were should NCSD consider cosponsoring or something else. The decision was to bring it up at the Professional Divisions Committee.

12. Adjourn

The Executive Committee Meeting was adjourned on time at approximately 4:30 pm after a motion was made, seconded and unanimously approved.

For full meeting minutes please see the NCS D Website.

NCS D Website

Webmaster: Larry Wetzel

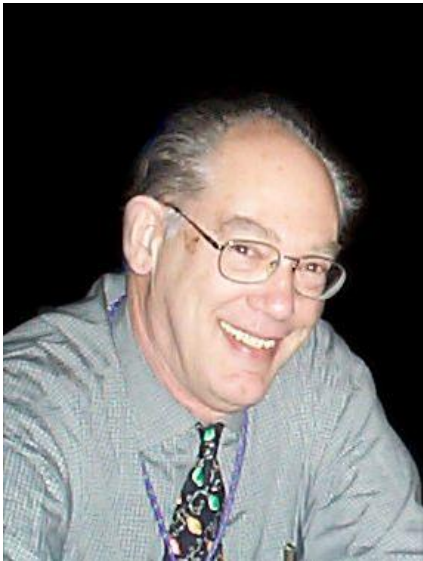
The NCS D website is a resource for NCS D members. Presentations from the November 2008 through the NCS D meeting this year are available. I know there is more information and links that would be useful, so as always, I looking for content that would benefit the membership. If you have suggestions for improvements to the website, please email them to Larry Wetzel (llwetzel@babcock.com).

NCS D Pioneers Scholarship

The donations have slowed significantly in the last year. Currently, the total stands at \$16,916. Our goal is \$60,000 to establish the endowed scholarship. Please donate to the scholarship fund. It is good cause and will benefit our industry for years to come. To donate, go to <http://ncsd.ans.org/site/index.html>.

Passings

Dick McKnight



Richard D. McKnight (Dick) first came to Argonne National Laboratory in the early 1970s to work on his Ph.D. dissertation and wound up spending his entire career there. He cut his teeth on the analysis of fast-reactor critical experiments, developing skills and perspective that served him well in all of his technical endeavors.

The use of experimental data and uncertainty analysis to understand calculational and nuclear data issues was a recurring theme throughout Dick's long career. That was at the heart of his analysis work at the ZPR-6 and 9 critical facilities. From those early days to the present, he was an active participant in the Cross Section Evaluation Working Group (CSEWG), especially in the area of validation. He was an important contributor to Argonne's work on data adjustment – using integral experiment data to adjust microscopic cross section data within their uncertainties. Near the end of Dick's career, he had become a beacon of logic and insight into many nuclear data and analysis issues.

In his work to implement modern core-follow analysis of the EBR-II reactor in the 1990s, Dick was a key player in populating the Physics Analysis Data Base and using radiochemistry measurement data to

validate the calculational analysis. In his work regarding post-9/11 terrorist threats, Dick contributed to the effort to combine measurement and calculational results to identify the source of potential so-called dirty bombs. In the realm of criticality safety, Dick advocated for safety limits informed by hard data.

Even more than his deep technical knowledge and ability, it was Dick's qualities that made him so special and influential. Dick was polite, kind, considerate, generous and respectful. These attributes, in turn, won him respect. Dick was articulate, presenting technical positions with clarity and sound logic. Dick also was hard-working and a man of impeccable integrity. Everyone knew that, when he agreed to do something, it was sure to be delivered and he often would offer to do more than his share.

Dick was a leader. Whether it was advisory groups, conference session organization, working party subgroups, workshops, training programs, or city tours and evening entertainment, he was always willing to stick his neck out and lead. He served as the chairman of the U.S. Nuclear Data Advisory Group since its inception and as the U.S. representative to the OECD NEA Working Party on International Nuclear Data Evaluation Cooperation (WPEC) and Working Party on Nuclear Criticality Safety.

Dick was a major contributor of benchmark experiment evaluations and a respected reviewer for both the International Criticality Safety Benchmark Evaluation Project (ICSBEP) and the International Reactor Physics Experiment Evaluation Project (IRPhEP) since the early days of those projects. Dick was recognized and respected by his international colleagues. He was looked to by peers and students alike for guidance and understanding and was always willing to take the necessary time to answer their questions. Dick and his wife, Pam hosted the 2007 ICSBEP Meeting in Chicago, a memorable event for all participants.

A first-rate reactor physicist and an extraordinarily kind and principled man, Richard D. McKnight succeeded far more than most in leaving the world a better place than he found it. He died on 28 August 2013.

Joe Thomas



Joseph (Joe) Thomas Thomas, age 87 of Norris passed away January 22, 2014 at the University of Tennessee Medical Center from complications following surgery compounded by chronic health issues. Joe was a native of Detroit, Michigan, born April 23, 1926. He attended Cass Technical High School where he helped build a small airplane. After graduating, Joe enlisted in the United States Navy in 1944. The Navy initially trained Joe as a machine gunner, but his experience in aircraft mechanics was soon recognized. He was then reassigned to be stationed in Hawaii where he became a Flight Engineer before the end of his two years of service. Returning home, he attended the University of Detroit where he earned a B.S. degree in Mechanical Engineering, and in 1951 he received an M.S. degree in Applied Mathematics from the University of Michigan. He was then accepted in the Oak Ridge School of Reactor Technology. Joe's professional career began in 1952 performing research and design studies for the Convair Aircraft Nuclear Propulsion Program. In

1953 Joe returned to Oak Ridge National Laboratory (ORNL). Joe worked at ORNL for 37 years, eventually becoming the Criticality Safety Studies Project Leader and Chair of the ORNL Criticality Safety Review Committee, until retirement in 1990. This work required frequent travel to many areas of the United States as well as several countries in Europe. He was a member of the American Physical Society and the American Association for the Advancement of Science. He was very active in the American Nuclear Society (ANS) and, for a time, was Chair of the ANS Nuclear Criticality Safety Division (NCSD). He has received several professional accolades including the Distinguished Service Award of the ANS-NCSD in 1974, and he became an ANS Fellow in 1982. In 1993, Joe was received and the ANS Standards Service Award in 1993. He was the chair of the ANS-8 Subcommittee responsible for developing standards for fissionable materials outside reactors from 1982 - 1990 and chaired the ANS-8.7 and -8.9 working groups for many years.

Joe was a senior experimenter with the elite ORCEF team that performed generalized and specialized critical experiments in support of US nuclear design and safety programs. The work spanned the years of the US Atomic Energy Commission. He performed well in excess of 1,000 critical experiments of one kind or another until the closure of ORCEF in 1974. That type of research work requires tedious attention to detail, patience, and a foundation in the theory of neutron interactions. His generalized experiments included single units and arrays of units that were 93% enriched uranium metal, damp oxides, and solution as well as single units and arrays of ^{233}U solutions (Joe lost a pull and tug with Admiral Rickover's staff regarding the ^{233}U materials for those later experiments). All of the numerous experiments provided the data to support safety analyses throughout the US nuclear industry. He also performed unique experiments to demonstrate the subcriticality and safety of nuclear weapon components during their fabrication, assembly, storage, and transportation. Much of his generalized experimental work was delivered to international audiences abroad during the Eisenhower "Atoms for Peace" information exchanges.

By the time of the closure of the ORCEF in 1974, Joe had consolidated the results of his life's work of experimentation with arrays of fissile material units into an analytical methodology that he referred to as the NBN^2 Limiting Surface Density Method and Generic Array Criticality. Joe's insights regarding single unit and array criticality, in collaboration with G. Elliott Whitesides, spurred and assisted the developments of the KENO Monte Carlo criticality code and its array capabilities that was developed by Elliott and that provided the seminal safety analysis software that is used throughout the world for nuclear criticality design and safety analyses. As Elliot once stated, Joe ". . . was truly a treasure and it was my great fortune to have worked so closely with Joe."