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 NCSD 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, NCSD2013, a summary is included and the presentations are on the NCSD website at http://ncsd.ans.org/site/papers_Wilmington_2013.html. Mark your calendars for international topical meeting, ICNC 2015, to be hosted by NCSD September 14-18, 2015 at the OMNI Hotel in Charlotte NC. The NCSD 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 NCSD, 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, NCSD Chair

Nuclear Criticality Safety Standards, ANSI/ANI-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 Fissile Materials Outside Reactors,
Work Group Chairs: Doug Bowen/Nick Brown

This standard is applicable to operations with fissile 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 fissile materials.

ANS-8.3 (Revision), Criticality Accident Alarm System,
Work Group Chair: Shean Monahan

This standard is applicable to all operations involving fissile 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-% \( ^{235}\text{U} \), for \( ^{233}\text{U} \), 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 \( ^{235}\text{U} \), \( ^{233}\text{U} \), \( ^{239}\text{Pu} \), 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% \( ^{235}\text{U} \). 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 um (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: $^{232}\text{U}$, $^{234}\text{U}$, $^{237}\text{NP}$, $^{238}\text{Pu}$, $^{240}\text{Pu}$, $^{242}\text{Pu}$, $^{241}\text{Am}$, $^{242m}\text{Am}$, $^{243}\text{Am}$, $^{242}\text{Cm}$, $^{243}\text{Cm}$, $^{244}\text{Cm}$, $^{245}\text{Cm}$, $^{246}\text{Cm}$, $^{247}\text{Cm}$, $^{249}\text{Cm}$, and $^{251}\text{Cm}$. 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.


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 UO$_2$ 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-8.16  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 Mormon  
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

<table>
<thead>
<tr>
<th>Dates</th>
<th>Meeting</th>
<th>Location</th>
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<tbody>
<tr>
<td>June 15-19, 2014</td>
<td>ANS Annual Meeting</td>
<td>Reno, NV</td>
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<tr>
<td>November 9-13, 2014</td>
<td>ANS Winter Meeting</td>
<td>Anaheim, CA</td>
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<tr>
<td>June 7-11, 2015</td>
<td>ANS Annual Meeting</td>
<td>San Antonio, TX</td>
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<tr>
<td>September 14-18, 2015</td>
<td>ICNC 2015</td>
<td>Charlotte, North Carolina</td>
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<tr>
<td>November 8-12, 2015</td>
<td>ANS Winter Meeting</td>
<td>Washington, DC</td>
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**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](http://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.

<table>
<thead>
<tr>
<th>Sunday 9/29</th>
<th>Monday 9/30</th>
<th>Tuesday 10/1</th>
<th>Wednesday 10/2</th>
<th>Thursday 10/3</th>
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<tr>
<td>8:00</td>
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<td>Programs / Training / Risk Assessment / Post-Fukushima</td>
<td>Methods III</td>
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<td>AM Break</td>
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<td>9:00</td>
<td>Methods I</td>
<td>Methods II</td>
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<td>10:00</td>
<td>AM Break*</td>
<td>AM Break</td>
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<td>Methods III</td>
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<td>10:30</td>
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<td>Programs / Training / Risk Assessment / Post-Fukushima</td>
<td>AM Break</td>
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<tr>
<td>11:00</td>
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<td>Methods II</td>
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<td>Methods III</td>
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<td>13:00</td>
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<td>Analysis &amp; Experiments I</td>
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<td>Analysis &amp; Experiments II</td>
<td>Criticality Accidents and Response</td>
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<td>Buses Leave</td>
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<td>GEH/GNF Tour</td>
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<td>17:30</td>
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<td>NCSD Exec. Committee Mtg.</td>
<td>Cocktail Hour at Wilmington Convention Center</td>
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<td>19:00</td>
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<td>Banquet at Wilmington Convention Center with Keynote Speaker (GEH/GNF sponsors)</td>
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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,
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%), WALS (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 Schreiber following the fatal accident of May 21, 1946. Schreiber 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

NCSD Spring 2014 Newsletter
**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

- **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

- **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

**Through June 2014:**

- 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

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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](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 NCSD Website.

**NCSD Website**

**Webmaster: Larry Wetzel**

The NCSD website is a resource for NCSD members. Presentations from the November 2008 through the NCSD 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 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](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 233U solutions (Joe lost a pull and tug with Admiral Rickover’s staff regarding the 233U 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 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.”