

American Nuclear Society
Nuclear Criticality Safety Division Newsletter
Summer 2013



Editor: Madison E. Martin

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

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Message from the Chair

This will be another busy year for NCS D. The Division's topical meeting, NCS D2013, is coming up September 29 to October 3. The Wilmington Local NCS Section is sponsoring the meeting and the organizing committee, led by Conference Chair Kevin Walsh, has done an excellent job planning the meeting, both from a technical and a networking standpoint. The technical program will include approximately 70 presentations backed by full papers in the proceedings. The Technical Program Committee, led by Lon Paulson, put in many hours reviewing all of those papers! I was glad to see strong international participation in the paper submittal process, no doubt building on the success of ICNC 2011 in Edinburgh. A SCALE 6 Tutorial is available free of charge on Sunday afternoon and technical tours of the GNFA Fuel Manufacturing Operation and Brunswick Nuclear Power Plant are planned for Thursday afternoon. Networking opportunities include a welcome reception, banquet and optional trips to the beach and Battleship North Carolina.

Speaking of ICNC, it is the United States' turn to host ICNC in 2015. The conference will be held September 14-18, 2015 at the OMNI Hotel in Charlotte NC. Charlotte is a hub for the nuclear resurgence and several nuclear companies are headquartered in Charlotte making it an ideal location for this conference. The meeting will be cosponsored by ANS Headquarters and NCS D. I am excited to have Dr. Bob Busch of the University of New Mexico as General Chair of this conference as Bob is not only a key player in the NCS D community, but has experience in ANS National meetings. I also want to thank Dr. Michael Brady-Raap of Pacific Northwest National Laboratory and Dr. Cecil Parks of Oak Ridge National Laboratory for their leadership and guidance on the organizing committee. Look for the Call for Papers next fall.

The NCS D 2013 and ICNC 2015 conferences are in addition to our ANS Summer and Winter Meetings. Attendance at the NCS D sessions remains strong. In fact, we often fill the rooms! The presentations from these meetings are posted on the NCS D website at <http://ncsd.ans.org>. As a practitioner myself, 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. I encourage you to write such papers as these topics have been underrepresented but provide useful data and references for other practitioners.

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 could use your help. Check out the list of committee chairs at <http://ncsd.ans.org>.

Sandi Larson, *NCS D Chair*

NCS D Pioneer Scholarship

Chair: Ron Knief

Each year, our division supports students pursuing college education with an emphasis in a criticality safety related subject. This scholarship was first proposed following the passing of Libby Johnson, and is awarded today to honor the contributions of the early criticality safety "pioneers" such as Ms. Johnson, and NCS mentors and colleagues. It is hoped that NCS D can raise the funds to create an endowed scholarship that will be awarded every year.

This year's recipient of the scholarship was Madison E. Martin. University of Florida.



I am honored and am extremely thankful to the Nuclear Criticality Safety Division for selecting me as the 2013 recipient of the NCS D's Pioneer Scholarship. Their investment and support will reflect well on the continuing development of nuclear criticality studies at the University of Florida. My first introduction to criticality science began when I started working with Dr. Sedat Goluoglu. We have studied adjoint monte carlo simulation and its application to perturbation studies related to nuclear criticality analysis. In addition, I have been fortunate enough to participate in UF's first "Introduction to Nuclear Criticality" course which was a great way to learn about what it is like to be criticality safety engineer at a facility. We explored various hand calculations and computational tools that are commonly used by criticality safety engineers to ensure that processes including fissionable material remain subcritical during the entire process. In addition to academic knowledge, the scholarship will also assist in the development a professional network of talented nuclear criticality scientists. I will be attending the NCS D Topical "Criticality Safety in the Modern Era: Raising the Bar" in late September. At this conference, I hope to learn more about the specific tools available for criticality analyses in addition to meeting criticality professionals from a variety of different backgrounds. I have enjoyed my time interacting with the NCS D, as they are supportive and knowledgeable group. I look forward to continuing my involvement in ANS and the NCS D as I learn more about the many facets associated with nuclear criticality science.

Madison E. Martin, *2013 NCS D Pioneer Scholarship Recipient*

You can read about the past recipients on the Scholarship page of the NCS D website (<http://ncsd.ans.org/site/scholarship.html>).

Endowed Scholarship Donation

Chair: Deborah Hill

NCS D is making progress towards raising \$60,000 to create an endowed scholarship that will be awarded every year. With over 900 members in the division, if everyone would donate just \$75, the goal would be met. Contributing is easy, and can be done online from the ANS donation page. Please consider donating

to the scholarship fund. There is an option to make your contribution in honor or memory of someone who inspired or mentored you. And of course, the donations are tax deductible.

The current donor list is available on the website (<http://ncsd.ans.org/site/scholarship.html>).

ANS Mentorship Program

Did you know the American Nuclear Society offers a mentorship program? The program matches students or young, early career ANS members with established nuclear professionals. Participating in this program as a mentor is a great way to encourage young people to consider pursuing a career in nuclear criticality safety, and to invite the next stars of the nuclear industry to participate with the division. The NCS division has some of the best participation in the society; help keep this momentum for the division's next generation by reaching out to the division's future leaders. If you are a student or young member, this is a great program to network with leaders of the industry. Take advantage of this program for your own career excellence! For information on how to participate as either a mentor or protégé, check out the ANS mentorship webpage (<https://ssl.ans.org/meetings/mentoring/>).

Program Committee

Chair: Allison Miller

Highlights of the Atlanta Meeting

There were three sessions at the Atlanta meeting: Data Analysis in Nuclear Criticality Safety-I, Data Analysis in Nuclear Criticality Safety-II, and Nuclear Criticality Safety Standards-Forum. There were 14 papers in the Data Analysis in Nuclear Criticality Safety sessions. The presentations given in Atlanta are available in the NCSD website at http://ncsd.ans.org/site/papers_Atlanta_Summer2013.html.



Governance Meeting on Sunday

Larry Wetzel receiving a plaque as outgoing chair from the incoming chair, Sandi Larson



Networking at the President's Reception



Univ. of Florida Reception

Upcoming Events

At a Glance

Dates

September 30 - Oct 3, 2013
 November 10-14, 2013
 June 15-19, 2014
 November 9-13, 2014
 June 7-11, 2015
 September 14-18, 2015
 November 8-12, 2015

Meeting

NCSD Topical
 ANS Winter Meeting
 ANS Annual Meeting
 ANS Winter Meeting
 ANS Annual Meeting
 ICNC 2015
 ANS Winter Meeting

Location

Wilmington, NC
 Washington, DC
 Reno, NV
 Anaheim, CA
 San Antonio, TX
 Charlotte, North Carolina
 Washington, DC

Upcoming Sessions

The general NCSD Data Analysis in Nuclear Criticality Safety sessions offer a venue for professionals to present their work that does not fall within a specified session. The topics range for this session include criticality safety evaluations (accomplishments and challenges), updates to computational tools, measurement techniques, and anything that you find interesting and relevant to the community. The ANS 8 Standards forum are a sessions that discussions the updates to the standards, changes to working group and allows for members of the community to voice suggestions and concerns with current and purposed standards. Also this is a great session to get involved in the working groups.

Winter 2013 Meeting – Washington D.C. Nuclear Criticality Safety (NCSD) November 10-14 2013

ANS 8 Standards Forum

Session Organizer – Tom McLaughlin

Data and Analysis in Nuclear Criticality Safety

Session Organizer – Allison Miller

FY2012 Recent Nuclear Criticality Safety Program Technical Accomplishments

Session Organizer – Nichole Ellis

Nuclear Criticality Safety (NCSD) June 15-19 2014

Data, Analysis, and Operations for Nuclear Criticality Safety

Session Organizer – Allison Miller

Criticality Accident Assessments by Students and Young Professionals

Students and Young Professionals interested in the discipline of Nuclear Criticality Safety should understand the background and history in accidents that have occurred in the field of Criticality Safety. LA-13638 “A Review of Criticality Accidents 200 Revision” provides an overview of the accidents.

Papers should investigate the causes and actions that could have avoided the accidents. Session

Organizer: Allison Miller and Katherin Goluoglu

Session Chair: Nichole Ellis or Gladys Udentia

Fundamentals of Uranium and Plutonium Chemistry–Tutorial

This tutorial will focus on uranium and plutonium chemistry, in order to better understand and correctly model systems with solutions or slurry mixtures. It will cover the basic materials and reactions that are encountered in fuel fabrication or proposed reprocessing facilities, as well as some of those that may be seen when dealing with unique legacy materials. The information covered will include methods for calculation of atomic number densities from solution information, and understanding what factors affect the settling or collection of material from a solution.

Session Organizer: Katherin Goluoglu

ANS 8 Standards Forum

Session Organizer – Tom McLaughlin

The NCSD Executive Committee approved the assignment of Vefa Kucukboyaci (Westinghouse) as the Vice-Program Chair. This role will allow Vefa to see the interworkings of the program committee and soon become the Program Chair.

If you have any suggestions for session ideas please contact me or if you would like to get involved in the program committee.

Thanks and see you in Wilmington or in DC.

Allison Miller, *Program Committee Chair*

NCSD 2013

Organizer: Lon Paulson

NCS Colleagues:

The ANS Wilmington Area Local Section is very pleased to announce the upcoming once-every-four-year, Class I, Stand Alone Topical event held by the ANS Nuclear Criticality Safety Division. Our chosen theme is entitled, “Criticality Safety in the Modern Era: Raising the Bar”. Registration information is available via www.ncsd2013.org.

The NCSD2013 organizing, technical program and technical review committee members are making final preparations for an outstanding conference to promote and advance the field of nuclear criticality safety. In addition to a SCALE Tutorial Sunday afternoon, over 70 papers are planned to be presented in 7 single track sessions as shown in Figure 1.

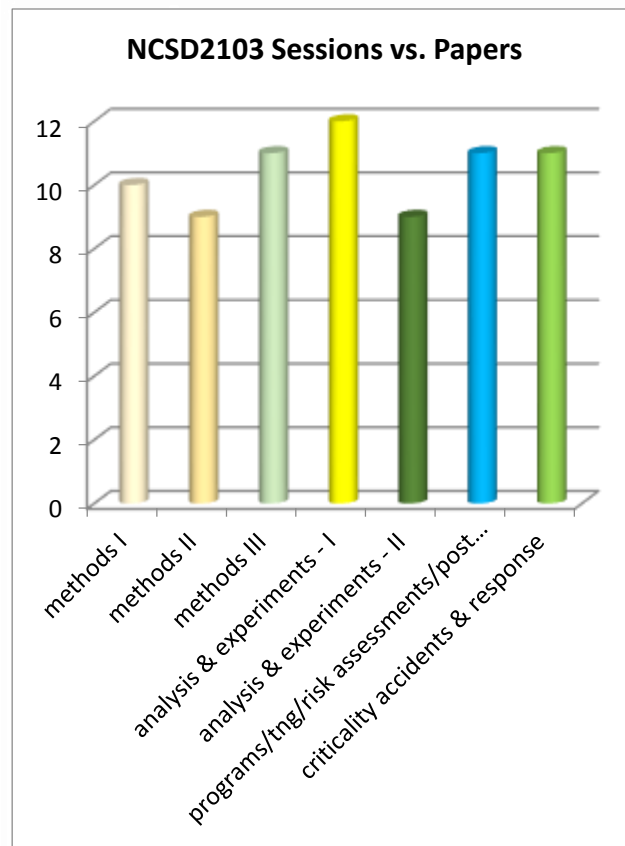


Figure 1. NCSD2103 Topical Track Summary

Our plenary speakers include:

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

In addition to the DOE national laboratory/complex attendees, we are anticipating significant domestic NRC licensee and international participation from both government and private industry. Private industry participants from GE Hitachi, AREVA, Westinghouse, Nuclear Safety Associates, EDF, Nuclear Consultants, Transport Logistics International, Babcock and Wilcox, and others plan to attend. Current international participants represent organizations from France, China, Canada, Sweden, the United Kingdom, and others. Academic institutions are also represented.

If you need T&L justification, please recall ANSI/ANS-8.26 (section 6.3) which advocates *maintaining qualification* as a criticality safety engineer visa vie: (4) continued professional development through

participation at professional meetings or societies (e.g., technical sessions, technical papers, committees, development of consensus standards, workshops, or tutorials).

Take this opportunity to be exposed to novel ideas and thinking in our field of nuclear criticality safety. We hope you can attend and look forward to your active participation.

Lon E. Paulson, *NCSD 2013 Technical Program Chair*



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 June meeting in Atlanta. 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.

Sharing lessons learned continues to be an often-requested topic at NCSD meetings. It was proposed that a session led by the younger generation of criticality safety professionals during the 2014 meeting be organized considering historic criticality events and how they might be addressed today. This session would serve as a lessons learned example and provide a forum for ideas on how to improve.

During the 2012 Winter Meeting, it was decided that the annual recipient of the NCSD Pioneer Scholarship was now routinely nominated as a student member on the Education Committee; Madison Martin has now assumed that role. The scholarship recipient will also take an active role in preparing the NCSD newsletter.

During the committee meeting, it was also decided that a division survey would be useful to identify those practices and services that might best serve the NCSD educational mission. The survey was distributed during the NCSD sessions of the meeting, with many returned. The survey results are currently being compiled for delivery to the executive committee. If you would like to participate in this survey, please contact Katherin Goluoglu (klgoluoglu@mse.ufl.edu) for a copy.

Finally, the term for education chair Katherin Goluoglu has passed, and the committee is working to have a new chair approved.

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 jhicks@doeal.gov Phone: 505-845-6287 US DOE/NNSA	<ul style="list-style-type: none">• Treasurer/Finance: Deb Hill dah29@nml.co.uk Phone: (+44) 1772-764359 National Nuclear Laboratory• Secretary: John A. Miller jmille2@sandia.gov Phone: 505-284-0875 Sigma Science, Inc.

Executive Committee

Through June 2014:	Through June 2015:	Through June 2016:
<ul style="list-style-type: none"> • Allison Miller amillerone@gmail.com Phone: 505-301-7426 Sandia National Lab. Inc. • Michael Corum michael.corum@nuclearassociates.com Phone: 803-873-9591 Nuclear Safety Associates • Chris Haught haughtcf@y12.doe.gov Phone: 865-576-5522 BWXT T-12, LLC 	<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 	<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)

Hyatt Regency – Hanover E
Atlanta, GA
ANS Summer Meeting
Sunday 16th June, 2013

1. Call to Order

The Executive Committee Chair, Larry Wetzel, convened the meeting at approximately 3pm.

2. Chair's Report

The Chair provided an update on activities relating to the Professional Divisions Committee:

- a) Training material is available to new ANS members to provide guidance on the accessing of various reference material via the main ANS website;
- b) The 75th anniversary of Fission will be celebrated at the upcoming 2013 Winter Meeting, although the Chair noted that no special NCSD sessions were planned. The Chair reported that a four minute video had been produced by LANL; members were encouraged to contact Hans Gougar (the current Chair of the Professional Divisions Committee) for a copy on DVD;

- c) Queries had recently been raised regarding the electronic documentation of the interactions of the Divisions, with it quickly becoming evident that different practices were adopted across the Divisions. The Chair noted that the NCSD rarely has the need for additional meetings outside of the main ANS meetings;
- d) Another query had recently been raised regarding the location of the “official” Bylaws for each of the Divisions. Some Divisions believed it was the copy held on their Division website, whereas others had been advised that it was the copy held centrally by ANS HQ (although those versions were found to be out-of-date in some instances);
- e) The new NCSD budget is scheduled to be submitted around August / September this year; the Chair noted that a telecom or email meeting may therefore be required to approve the proposed budget.

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

- a) In the Spring, the Executive Committee launched a study of all the products and services that ANS provides to its members. Their objective was to make sure that what ANS do on an annual basis is properly aligned with the ANS Strategic Plan, and that it was financially sound and sustainable. In order to get the input of members and the committee and professional development leadership, a survey was sent out to all ANS members. Almost twenty percent of the ANS members responded. The Executive Committee has analyzed these responses and identified 41 products that needed to be reviewed. These have initially been assigned into one of four categories, depending upon the importance of the work: (i) No Change Required – e.g. Nuclear News and National Meetings, (ii) Modification Required – e.g. Scholarships and the Nuclear Engineering Education for the Disadvantaged (NEED) program, (iii) Cut Out – e.g. Group Insurance, and (iv) Defer – e.g. Outreach Activities.
- b) In the case of the NEED Scholarship and the Congressional Fellowship, there was an intention to remove the designated funding from the Board but replace it as far as possible with (i) direct Division contributions, and (ii) Patron donations;
- c) ANS Globe (the e-newsletter from the ANS International Committee) will be made available via the ANS Website. The Radwaste Solutions magazine may be scrapped;
- d) In response to a query at the 2012 Winter Meeting, the Chair had queried whether both the presentations and the video materials associated with the NCSD Tutorials / Workshops could be made available via the NCSD website. However, he has not received an answer. The need still remains to ensure that training materials are made available to the wider NCSD membership, although it was important to not make this option so easy that it would severely weaken the business case for people to attend the meeting itself;

The Chair also reported that there was to be a streamlining of ANS staff input to the Honors and Awards process (noting that this is not currently applied to Endowed Scholarships). It is hoped this change would make more money available to the Divisions.

3. Vice Chair's Report

The Vice Chair noted that she had been tasked with producing a list of Division Committee Chairs / Vice Chairs as part of her duties; this list will shortly be emailed to the Executive Committee for approval. *{Secretary's Post-Meeting Note: This was issued to the Executive Committee for approval on 13th July 2013 and was accepted by a quorum via email voting.}*

The Vice Chair also requested that all outgoing Division Officers produce a one page summary of their duties to pass onto their successors; such summaries were considered an extremely useful tool in enabling the incoming people to quickly familiarize themselves with their new roles.

4. Treasurer's Report

The Treasurer noted that the NCSO Division was in good financial shape with an "Excess Over Budget Funds" figure of \$21,163. The main expenses this year are \$4,450 for student support (with \$2,500 being provided for student support for the NCSO Topical Meeting). Unfortunately the 2012 NCSO Awards Dinner made a loss of \$914 due to a misinterpretation of some terminology within the contract.

Jerry Hicks noted that support has traditionally been provided to the Student Conference. The Treasurer agreed, but noted that this would be covered under the budget for the coming year.

5. NCSO 2013 Topical Meeting

Lon Paulson announced that the next NCSO Topical Meeting on "Nuclear Criticality Safety in the Modern Era: Raising the Bar" is scheduled to be held in Wilmington, NC from September 29th – October 3rd, 2013. Full details are available on the dedicated NCSO 2013 website (www.ncsd2013.org), and the early-bird registration was now open. A full technical program with technical tours was being planned, with the technical program due to be finalized in the next couple of months. Lon noted that they were planning three sessions on "Methods", two sessions on "Analysis and Experiments", one session on "Programs / Training / Risk Assessment / Post-Fukushima", and one session on "Criticality Accidents and Response"; presentations are likely to be limited to fifteen minutes in length. A tutorial on SCALE was being planned, plus a banquet would be held at the Wilmington Convention Centre.

Lon indicated that the Topical Meeting Finance Committee had budgeted based on 190 participants at the meeting. He was personally hopeful that the meeting would generate approximately \$8,500 for the NCSO funds; worse-case, he believed this figure would be halved.

6. ICNC 2015 Meeting

It was announced that ICNC 2015 was scheduled to be held at the Omni Hotel in Charlotte, NC from September 14th – September 18th, 2015. The Vice Chair reported that a small organizing group of herself, Cecil Parks and Mikey Brady-Raap were continuing to liaise with ANS HQ to coordinate the event. Bob Busch had taken up an invite to be the General Chairman, and Elliott Whitesides has been approached about becoming the Honorary Chairman. Budgets were currently being worked-up, with it being hoped that the event would attract 300 people. A key meeting theme would be "35 years of International Cooperation in Nuclear Criticality Safety", and Charlotte was noted as being a key hub for the US nuclear

industry. The next stage was to look for volunteers from the US and international community to participate on the various technical committees.

7. ANS Student Conference Presentation

Representatives from the ANS 2013 Student Conference Organizing Committee attended to give a debrief on the student conference held in Boston, MA from April 4th – April 6th, 2013. The meeting was hosted by the ANS Massachusetts Institute of Technology Student Section, and was attended by a total of 637 students and professionals; the 536 attending students (from 54 different universities) set a new record for an ANS Student Conference, and 88 of them came from outside of the US. A total of 171 podium presentations and 65 poster presentations were made by student attendees. The organizers also noted that 11% of the funding for the conference was provided by the ANS Divisions.

The conference had been titled “Public Image of the Nuclear Engineer”, and one of the highlights during the week had been filming for the “I’m a Nuke !” campaign, which is designed to reshape the public image of the nuclear engineer. More than 20 students were filmed for the campaign, and a few of the videos can be viewed online at www.youtube.com/user/imanukecampaign; when all of the videos have been edited, they will be released simultaneously in a launch event. Another highlight was the “pitch” contest at the embedded Nuclear Energy Innovation Summit which challenged students to present a novel application of nuclear science and technology in 90 seconds using a single slide, and then face 90 seconds of questions from a panel of judges. Four technical workshops were also offered during the meeting, including (i) a nuclear fuel management workshop offered by Studsvik, (ii) fast reactors, (iii) irradiation testing, and (iv) MIT’s in-house Monte Carlo code called OpenMC.

The 2014 ANS Student Conference will be hosted by the ANS Pennsylvania State University Student Section. It is scheduled to be held from April 3rd – April 6th 2014, with a conference theme of “iNuc: Innovations in Nuclear Technology”; the intention is to focus on the industry in twenty years time. The conference organizers indicated that they were hoping to arrange technical tours to various parts of the Three Mile Island facility. A request was also made to the NCSD membership to supply judges for the conference.

8. Old Business

Andy Prichard provided an update on the EFCOG (Energy Facility Contractors Group) sub-committee on “Criticality Safety” that he currently chairs. This group had been set-up to facilitate interaction between nuclear safety and criticality safety practitioners. Andy has been running monthly telecom meetings and then issuing minutes / related emails; the meetings to date have included some detailed presentations on issues raised at various sites. Andy reiterated that his key interest was to improve the sharing of information throughout industry; in particular, he was keen to emphasize that the criticality safety challenges between DoE and NRC-regulated sites are generally the same, and that sharing information may help to resolve issues in each other’s areas. Anyone interested in ringing into the EFCOG meeting should contact Andy direct on andrew.prichard@pnl.gov, plus Andy was keen to hear from anyone interested in volunteering an operational issue from their own site (either verbally or through presentation slides).

9. New Business

It was announced that the new Division Officers for the 2013 / 14 term would be Sandi L. Larson (Chair), Jerry E. Hicks (Vice Chair), John A. Miller (Secretary) and Deborah A. Hill (Treasurer). The new Executive Committee members for the 2013 / 14 / 15 / 16 term would be James S. Baker, Catherine M. Percher and Ellen M. Saylor.

Nominations were currently being sought for the Service and Technical Excellence Awards which will be presented as part of the 2013 Winter Meeting (in Washington, D.C.).

10. Adjourn

The Executive Committee Meeting was adjourned on time at approximately 4:30pm.

For full meeting minutes please see <http://ncsd.ans.org/site/newsletter.html>

NCSD Website

Webmaster: Larry Wetzel

The NCSD website is a resource for NCSD members. Presentations from the November 2008 through the Atlanta meeting this year are available. I know there is more information and links that would be useful, so as always, I'm 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).