

# MINUTES

## AMERICAN NUCLEAR SOCIETY STANDARDS SUBCOMMITTEE 8, "Fissionable Materials Outside Reactors"

Hyatt Regency Hotel, Atlanta, GA  
June 20, 2013

| Subcommittee 8 Members Present | Subcommittee 8 Members Absent |
|--------------------------------|-------------------------------|
|                                | S. Monahan                    |
| D. Erickson                    | J. S. Baker                   |
| J. Morman                      | B. O. Kidd                    |
| T. P. McLaughlin               | T. A. Reilly                  |
| E. Elliott                     | H. Toffer                     |
|                                | C. Tripp                      |
|                                | D. Kupferer                   |
|                                | A. S. Garcia                  |
|                                | D. Winstanley                 |
|                                | K. Kimball                    |

The meeting was attended by a total of approximately 30 individuals.

1. **Welcome and Discussion of Agenda:**

Tom McLaughlin called the meeting to order at 8:30 am. Members and meeting participants were welcomed. Copies of the agenda were handed out and reviewed. [A copy of the as-issued agenda is attached. Refer to **Attachment 1**]

A quorum of the ANS-8 members was not present. It was apparent that attendance in general was down for the Society and for the Division. Tom noted that, as he had done prior to this meeting, he would suggest to Lon, the incoming ANS-8 chair, that all members be polled via email to obtain approval of the Atlanta minutes prior to the DC meeting in November as meeting attendance becomes more difficult.

2. **International Standards Activities Report:**

Lon provided a report out, on behalf of Calvin Hopper, on the ISO TC85/SC5 WG8 activities from the past year, highlighting the prior week's ISO TC85/SC5 meetings held at Georgia Tech campus. He is assuming the ISO TC85/SC5 NTAG Overall

Advisor to ANSI from Calvin Hopper. Calvin Hopper (US) plans to remain *Convener* of WG8 on Nuclear Criticality Safety. Sylvie Tarle (FR) is the WG8 *Co-Convener*. Refer to **Attachment 2** for the ISO TC85/SC5/WG8 report out summary presentation. The final slide contains a list of active WG8 ISO standards.

Mike Westfall provided similar comments on the SC 6 (reactors) meetings also held at that time.

There was a brief discussion of IAEA standards, which are not consensus standards as we in ANSI and ISO know them, as they are the result of consensus balloting of a single representative from each member country and not subject matter experts in each field. It was also mentioned that an IAEA glossary of terms was being revised.

3. **N16 Standards Activities Report:**

Bob Busch reported that the activities of the N16 Consensus Committee were proceeding smoothly with no unusual happenings since the reorganization of the Consensus Committees by the ANS Standards Board last year - that left N 16 and ANS-8 unchanged.

4. **ANS-8 Meeting Minutes for San Diego, 2012:**

Draft meeting minutes for the San Diego meeting in November 2012 had been provided to the ANS-8 members prior to the current meeting. Minor editorial corrections were provided and incorporated and approved via email ballot in expectation of a lack of a quorum in Atlanta.

5. **Reports from Working Groups (WGs):**

- a. ANSI/ANS-8.1-1998; R2007 (R=Reaffirmed) **Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors**, Nicholas Brown/Doug Bowen

Doug reported that the WG was now resolving N16 ballot comments with no foreseen difficulties. Now that the editorial revision is coming to an end, the ANS-8.1 working group will now turn to address the remaining scope of the revision with respect to a formal verification of the subcritical limits in the standard and the addition of new subcritical limits for uranium metal, compounds, and solutions up to 10 wt. % enrichment. At some future time it was noted that an effort to extend the subcritical limit evaluations into the 10-20% enrichment range would be desirable as more research and new, small/modular reactors are/may be using fuel enriched in this range. Tom expressed much thanks for to Nick and Doug and all WG members for their

sustained efforts over the past few years.

- b. ANSI/ANS-8.3-1997; R2003; R2012 (R=Reaffirmed) **Criticality Accident Alarm System**, Shean Monahan

A written report was submitted by Shean. The standard is being reaffirmed to provide additional time for the revisions currently underway to be deliberated. While the formal progress has been slow, the scope and direction of the revision has become clearer over the last year due to discussions and the inquiries themselves. The working group is considering developing a compendium to the upcoming revision that will describe the rationale behind the revisions and the "intent" of the statements. Significant issues have to do with making the standard both self-consistent and consistent with other ANS-8 standards, particularly ANS-8.23 as they have evolved.

The working group has been actively involved in several inquiry responses over the last two years. Each inquiry response has illustrated additional topics that need to be addressed by the working group in the ongoing revision.

- c. ANSI/ANS-8.5-1996; R2002; R2007; R2012 (R=Reaffirmed) **Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Material**, Jerry Hicks

Jerry noted that ANS-8.5 is being incorporated into ANS-8.21. To preclude ANS-8.5 from lapsing as an approved standard prior to ANS-8.21 revision, ANS-8.5 was recently reaffirmed.

- d. ANSI/ANS-8.6-1983; R1988; R1995; R2001; R2010 (R=Reaffirmed) **Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ**, Bill Myers

Bill submitted a written report. He is currently contacting folks who were helping with ANS 8.6 to address comments from the last revision and get thru the mechanisms to get an updated approved document. A meeting is planned for November.

- e. ANSI/ANS-8.7-1998; R2007 (R=Reaffirmed) **Nuclear Criticality Safety in the Storage of Fissile Materials**, Kevin Kimball

The ANSI/ANS-8.7 standard is in maintenance, with no activity during this reporting period. Activities will begin to start a general revision that updates the standards and incorporates ANS-8 comments received during the past re-affirmation process.

- f. ANSI/ANS-8.10-1983; R1988; R1999; R2005 (R=Reaffirmed): **Criteria for Nuclear Criticality Safety Controls in Operations With Shielding and Confinement**, Linda Farrell

The last time the WG met was in Reno, NV; PINS re-affirmed last in 2005 and is now approaching the 10-year time limit. Andrew Pritchard and Lon Paulson agreed to reach out to Linda and revisit current revision status.

- g. ANSI/ANS-8.12-1987; R1993; R2002; R2011 (R=Reaffirmed): **Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors**, Debdas Biswas

Progress is slow. Members have time constraints due to DOE budget cuts. Effort is continuing to prepare and check the input files for the selected critical experiments for determining the bias and bias uncertainty.

- h. ANSI/ANS-8.14-2004; R2011 (R=Reaffirmed): **Use of Soluble Neutron Absorbers in Nuclear Facilities Outside Reactors**, Larry Berg

No report.

- i. ANSI/ANS-8.15-1981; R1987; R1995; R2005 (R=Reaffirmed): **Nuclear Criticality Control of Special Actinide Elements**, Charlie Rombough

Charlie reported that the WG had addressed all negative comments from the prior ballot and had submitted a revised draft to ANS-8 for ballot.

- j. ANSI/ANS-8.17-2004; R2009 (R=Reaffirmed): **Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors**, Brian Kidd

Brian provided a written report noting that the standard is in maintenance and not needing any attention nor demanding any from its users.

- k. ANSI/ANS-8.19-2005: **Administrative Practices for Nuclear Criticality Safety**, R. W. (Bill) Carson

"There are two current items related to 8.19.

The first is the ballot sent to ANS-8 last year. On Sunday, October 14, 2012 Davis Reed recommended the ANS-8 chair send the 8.19 standard to N16. I do not believe that the ballot from last year been sent to N16 for ballot. The second is the 8.19 Pete Angelo inquiry from January 2013. On Thursday, February 21, 2013, Tom McLaughlin sent an email to Pat Schroeder indicating

agreement for the 8.19 working group to respond to the inquiry.”

Re: those two items:

1. On March 5, 2013 Michael Crouse stated the following in an email: “Tom gave concurrence to send the 8.19 draft standard on to N16 via email late yesterday.” The WG nor chairman have heard anything since.
2. The response to Angelo’s inquiry was sent to ANS-8 from Michael Crouse on April 22, 2013. The WG nor chairman have heard anything since.

To summarize, we in a holding pattern awaiting N16 comments.

- l. ANSI/ANS-8.20-1991; R1999; R2005 (R=Reaffirmed): **Nuclear Criticality Safety Training**, Ron Knief

The working group completed a draft standard at the Chicago meeting and submitted it for review and ballot by ANS-8. The ballot was sent out 9/5 with substantive comments returned 10/18. Comment resolution began here in San Diego and will continue into 2013.

- m. ANSI/ANS-8.21-1995; R2001; R2011 (R=Reaffirmed): **Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors**, David Erickson

Progress has been slow, however, we are still working on comments and to get the standard back to ANS-8 this year, preferably this summer.

- n. ANSI/ANS-8.22-1997; R2006; R2011 (R=Reaffirmed): [Maintenance] **Nuclear Criticality Safety Based on Limiting and Controlling Moderators**, Michael Crouse

A written report was submitted. There has been no recent activity with ANS-8.22. The last reaffirmation of the standard was in November 2011.

- o. ANSI/ANS-8.23-2007; R2012 (R=Reaffirmed): [Maintenance] **Nuclear Criticality Accident Emergency Planning and Response**, Jim Baker

"ANSI/ANS-8.23 (R2012) was reaffirmed in May, 2012. A few comments were received from three ANS-8 members during the recent reaffirmation process. No other comments or requests for clarification have been received since Revision 1 of ANSI/ANS-8.23 was issued in 2007. The primary issue for the 8.23 standard is the lack of a current reference for criticality accident dosimetry. The previous criticality accident dosimetry standard, N13.3, is withdrawn due to lack of maintenance/revision. But with our encouragement, the HP Society has recently revived that effort. Mr. Dann Ward (of Sandia National Laboratory) is the new chair of the N13.3 WG. The N13.3 WG is making good

progress, and has a new draft standard that should be sent out for review later this year. James Baker is the liaison between the 8.23 and N13.3 WGs. The ANSI/ANS-8.23 WG intends to begin a revision upon completion of the new N13.3. Other suggestions and comments on ANSI/ANS-8.23 that the WG has received will be addressed at that time. The 8.23 WG does not need new members at this time."

- p. ANSI/ANS-8.24-2007; R2012 (R=Reaffirmed): **Validation of Neutron Transport Methods for Nuclear Criticality Safety Calculations**, Larry Wetzel

Larry reported that a new PINS form has recently been submitted but that no major action is needed at this time.

- q. ANSI/ANS-8.26-2007; R2012 (R=Reaffirmed): [Maintenance] **Criticality Safety Engineer Training and Qualification Program**, Jim Morman

Jim reported that the 8.26 WG did not meet at this ANS meeting, but has incorporated the resolutions to the ANS-8 and N16 comments that were generated during the PINS revision ballots. A proposed draft that incorporates edits that address most of the suggestions was provided along with a comment resolution table to the ANS standards representative. It has been rumored that the DOE standards on criticality safety engineer training might be archived, and in order to not lose some of the useful details about training program content an appendix is being drafted for WG consideration that will attempt to capture some of the details in that standard but in a way that is not DOE-specific.

- r. ANSI/ANS-8.27-2008, [Maintenance] **Burnup Credit for LWR Fuel**, Dale Lancaster

Charlie Rombough, WG member, reported for Dale that the standard is in maintenance and not currently undergoing any major efforts. The WG is planning to meet at the NCSD 2013 Topical in Wilmington, NC in September 2013.

- s. ANS-8.28, [proposed standard, PINS approved] ***Administrative Practices for the Use of Non-Destructive Assay Measurements for Nuclear Criticality Safety***, Ernie Elliott

Ernie reported that he has an active WG with NRC/DOE representation, and the standard is being developed at a good pace. The PINS statement was recently revised.

- t. ANS-8.29, [proposed standard, PINS balloted by ANS-8 but not yet submitted to N16] ***standard for reprocessing*** (no formal title at this time), Adolpf Garcia

In Adolf's absence Tom asked Bob Busch (N16 chair) for a comment on the PINS form. Bob noted that the negative ballots from N16 had more to do with the content of the form and not the "need for the standard" as Adolf had thought was the case. Tom stated that he would share that comment with Adolf and perhaps Adolf and Bob should chat.

## 5. **Old Business**

- a. ANS-8 membership update. Tom McLaughlin

Tom announced that Francis Alcorn and Davis Reed had tendered their resignations from ANS-8 after many years of very strong support for ANS-8 and the industry in general. Tom spoke with Francis and Davis personally recently, thanked them for all their past service and wished them the best. He encouraged others who knew them well to reach out with a kind word also.

Tom also announced four new ANS-8 members: three current WG chairs, Shean Monahan (ANS-8.3), Kevin Kimball (ANS-8.7) and Jim Morman (ANS-8.26) as well as Dave Kupferer, a member of the Defense Nuclear Facilities Safety Board staff.

## 6. **New Business**

- a. Welcome of Lon Paulson as the new ANS-8 Chairman

Tom introduced Lon as the new ANS-8 chair and thanked him for volunteering for this position and wished him well.

- b. Next ANS-8 Meeting.

Tom noted that the next ANS-8 meeting would be November 14, 2013 at the Omni Shoreham hotel in Washington, DC during the ANS Conference.

## 7. **Adjourn**

The meeting was adjourned at approximately 11:00 a.m.

**Attachment 1**  
**AMERICAN NUCLEAR SOCIETY STANDARDS COMMITTEE**  
**SUBCOMMITTEE 8 AGENDA**

Hyatt Regency Hotel, Atlanta, GA  
Hanover E, 8:30 – 11:30 a.m.  
June 20, 2013

1. Welcome and discussion of agenda
2. ISO Standards Activity Report – C. M. Hopper
3. N 16 Committee Activity Report – R. D. Busch
4. Approval of ANS-8 meeting minutes (San Diego, November 2012)
5. Reports from Working Groups:
  - a. ANS-8.1 (Revision), *Generic Criticality*, D. Bowen/N. W. Brown
  - b. ANS-8.3 (Revision), *Criticality Accident Alarm System*, S. Monahan
  - c. ANS-8.5 (Maintenance), *Borosilicate-Glass Raschig Rings*, J. Hicks
  - d. ANS-8.6 (Maintenance), *In Situ Measurements*, B. Myers
  - e. ANS-8.7 (Maintenance), *Storage of Fissile Materials*, K. D. Kimball
  - f. ANS-8.10 (Revision), *Shielded Facilities*, L. Farrell
  - g. ANS-8.12 (Revision), *Mixed Oxides*, D. Biswas
  - h. ANS-8.14 (Maintenance), *Use of Soluble Neutron Absorbers*, L. J. Berg
  - i. ANS-8.15 (Revision), *Actinides*, C. Rombough
  - j. ANS-8.17 (Maintenance), *LWR Fuel Element Safety*, B. O. Kidd
  - k. ANS-8.19 (Revision), *Administrative Practices*, R. W. Carson
  - l. ANS-8.20 (Revision), *Training*, R. A. Knief
  - m. ANS-8.21 (Revision), *Use of Fixed Neutron Absorbers*, D. Erickson
  - n. ANS-8.22 (Maintenance), *Moderators*, M. J. Crouse
  - o. ANS-8.23 (Maintenance), *Emergency Response*, J. S. Baker
  - p. ANS-8.24, (Maintenance) *Validation*, L. L. Wetzel
  - q. ANS-8.26, (Maintenance) *NCSE Training*, J. A. Morman
  - r. ANS-8.27, (Maintenance) *Burn-up Credit*, D. Lancaster
  - s. Proposed ANS-8.28, *Non-Destructive Assay Measurements for NCS*, E. Elliott
  - t. Proposed ANS-8.29, *Reprocessing*, A. Garcia
6. Old Business:
  - a. ANS-8 Membership Update
7. New Business:
  - a. Welcome Lon Paulson as the incoming ANS-8 chair
  - b. Next ANS-8 Standards Forum: Omni Shoreham Hotel, Washington, DC, Nov. 14, 2013
8. Adjourn



## Attachment 2



### **ISO TC85/SC5/WG8** ***Nuclear criticality safety*** ***report to ISO TC85/SC5 Plenary*** **(previous meeting – 7 June 2012)**

**Conveners: C. M. Hopper**  
**S. Tarle**

**13 June 2013**  
**Atlanta, Georgia US**

1. Managed by UT-Ramoth  
for the U.S. Department of Energy

US DOE NCSF Criticality Safety Support Group (CSSG) Functions & Activities



### **ISO/TC 85/SC5 /WG8 Attendance**

- 15 participating members
- Representing CA, FR, IN, KR, UK, US

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US DOE NCSF Criticality Safety Support Group (CSSG) Functions & Activities



## Documents distributed

- Draft preliminary proposal for Nuclear criticality safety dimensions
- Draft WG8 glossary for consideration by ISO/WD4 12749-4
- ISO/WD4 12749-4
- Draft preliminary proposal for *Nuclear criticality safety – Waste*
- Proposed concept for *Nuclear criticality safety – Training of fissile material handlers*
- Proposed concept for *Nuclear criticality safety - Soluble Boron Credit for PWR fuel pools*

<sup>2</sup> Managed by UT-Kimberly  
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U.S. DOE NCSF Criticality Safety Support Group (CSSG) Functions & Activities



## Documents Discussed

- ISO 1709
- ISO/FDIS 16117
- ISO/WD4 12749-4
- Proposed standards concepts and preliminary proposals

<sup>4</sup> Managed by UT-Kimberly  
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U.S. DOE NCSF Criticality Safety Support Group (CSSG) Functions & Activities





## Work In Progress since the 6 June 2012 St. Denis, FR meeting

- Prepared third preliminary draft for a NWIP for ISO 1709 revision following the receipt and resolution of comments (Neil HARRIS – UK)
- ISO/DIS 16117, *Estimation of the number of fissions of a postulated criticality accident* ballot comments resolved and submitted to ISO for progression as a FDIS (Matthieu DULUC – FR)
- Prepared a preliminary draft for an NWIP ISO standard on *Nuclear criticality safety dimensions*
- Prepared a preliminary draft for an NWIP ISO standard on *Nuclear criticality safety – waste* (Duncan ELLIS – UK)
- A draft purpose and scope statement was developed for the initiation of a NWIP ISO standard on *Nuclear criticality safety- Soluble boron credit for PWR fuels* (Hae Seuk WOO – KR)
- Further drafting of a WG8 nuclear criticality safety guidance for WG8 drafting consistency.



## Work In Progress at the Georgia Tech, Atlanta 11 – 12 June 2013 Meeting

- National standards having potential value to ISO standards development were reviewed (Sylvie TARLE – FR, Duncan ELLIS – UK, Calvin HOPPER – US)
- Briefly reviewed the status of ISO FDIS 16117 which is to close August 2013 (Matthieu DULUC)
- Reviewed preliminary draft for an NWIP ISO standard on *Nuclear criticality safety dimensions* (Sylvie TARLE, BARDELAY, NÉRON DE SURGY – FR)
- Reviewed and concurred with the development of a preliminary NWIP for process operator nuclear criticality safety training
- Review and discussions regarding ISO/WD4 12749-4 *Nuclear energy – Vocabulary – Part 3: Nuclear fuel cycle* (Calvin HOPPER – US)



## Work In Progress at the Georgia Tech, Atlanta 11 – 12 June 2013 Meeting (cont.)

- Reviewed, discussed and suggested content changes to be considered in the third preliminary draft of a NWIP for ISO 1709 revision
- Developed and approved a scope statement for the work of ISO TC85/SC5/ WG8
- WG8 concurred that ISO 1709 should remain an active ISO standard until otherwise revised as the result of WG8 development of a draft preliminary NWIP submittal.
- WG8 systematic review of ISO 14943; 2004 concurs that the standard should remain.

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U.S. DOE NCSF Criticality Safety Support Group (CSSG) Functions & Activities



## Work In Progress at the Georgia Tech, Atlanta 11 – 12 June 2013 Meeting (cont.)

- Reviewed the use of ISO LiveLink tools for WG8 work.
- Discussed organizing WG8 into topical areas for standards development.
- Identification of potentially needed ISO standards including:
  - Nuclear criticality risk assessment methodology (e.g., accident frequencies and credible initiating event thresholds)
  - Nuclear criticality safety- Soluble boron credit for PWR fuel pools

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U.S. DOE NCSF Criticality Safety Support Group (CSSG) Functions & Activities





## Difficulties Met

- Identifying ISO LiveLink
  - Transition for WG8
  - Problems requiring resolution (discussed with ISO TC85/SC5 Secretary)
- Disappointment for no OECD or IAEA liaison representation at meeting



## Resolutions

1. Neil HARRIS (UK) is to initiate a New Work Item Proposal (ISO Form 4) for the revision of ISO 1709 provided August 2013.
2. Duncan ELLIS (UK) is to progress the preliminary draft for a New Work Item Proposal for an ISO standard on Nuclear criticality safety–Waste, provided to WG8 for review by October 2013.
3. Sylvie TARLE (FR) is to draft, and Calvin HOPPER (US) is to assist, in the development of a proposal for organizing WG8 into standard topical areas identified in ISO 1709 by December 2013.
4. Susan JOHNSTON (CA) and Lon Paulson (US) is to draft a proposal scope for the initiation of a standard on nuclear criticality risk assessment methodology (e.g., accident frequencies and credible initiating event thresholds) by December 2013.

## Resolutions (cont.)

5. **Matthieu DULUC (FR)** will provide the name(s) of OECD spent fuel pool criticality safety task force members to **HaeSeuk WOO (KR)** and **WG8** for consideration in the development of a preliminary draft NWIP on PWR fuel pool storage by June 2013.
6. **HaeSeuk WOO** will develop a draft NWIP proposal for Nuclear criticality safety of soluble boron credit for PWR fuel pools by the next ISO TC85 joint meeting in Moscow, RU.
7. **Lon PAULSON** is (US) to share the OECD single unit critical study with **Neil HARRIS (UK)** and **WG8** for consideration for inclusion in ISO 1709.
8. **WG8** is to review the “two column guidance” for completeness (e.g., relationships and accuracy of translations) by December 2013.

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U.S. DOE NRCSP Criticality Safety Support Group (CSCSG) Functions & Activities



## Resolutions (cont.)

9. **WG8** is to provide comments on Version 2 of current draft NWIP proposal for criticality safety dimensions to **Aurelie BARDELAY (FR)** by October 2013 and to judge the readiness of the draft for NWIP submittal.
10. The UK (**Neil HARRIS/Duncan ELLIS**) will produce a rough preliminary draft of a NWIP for process operator nuclear criticality safety training.
11. **ISO TC85/SC5/WG8** offers thanks to **ANSI** and the Georgia Institute of Technology **W. Woodruff School of Nuclear & Radiological Engineering/Medical Physics Programs** for hosting the 2013 ISO TC85/SC5 meeting.

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U.S. DOE NRCSP Criticality Safety Support Group (CSCSG) Functions & Activities



## Current WG8 Standards

|                        |   |                     |
|------------------------|---|---------------------|
| ISO 11311:2011 (Ed. 1) | Nuclear criticality safety -- Critical values for homogeneous plutonium-uranium oxide fuel mixtures outside of reactors | ISO/TC 85/SC 5/WG 8 |
| ISO 11320:2011 (Ed. 1) | Nuclear criticality safety -- Emergency preparedness and response   | ISO/TC 85/SC 5/WG 8 |
| ISO 14943:2004 (Ed. 1) | Nuclear fuel technology -- Administrative criteria related to nuclear criticality safety                                | ISO/TC 85/SC 5/WG 8 |
| ISO 1709:1995 (Ed. 2)  | Nuclear energy -- Fissile materials -- Principles of criticality safety in storing, handling and processing             | ISO/TC 85/SC 5/WG 8 |
| ISO 27467:2009 (Ed. 1) | Nuclear criticality safety -- Analysis of a postulated criticality accident   | ISO/TC 85/SC 5/WG 8 |
| ISO 27468:2011 (Ed. 1) | Nuclear criticality safety -- Evaluation of systems containing PWR UOX fuels -- Bounding burnup credit approach         | ISO/TC 85/SC 5/WG 8 |
| ISO 7753:1987 (Ed. 1)  | Nuclear energy -- Performance and testing requirements for criticality detection and alarm systems                      | ISO/TC 85/SC 5/WG 8 |