ANS 3.5 Working Group Meeting Minutes
American Nuclear Society
V.C. Summer Nuclear Station
2011 November 15-18

ANS 3.5 Working Group Meeting Minutes
V. C. Summer Nuclear Station
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1. Visitors

Visitor	**Date**	**Affiliation**	**Email, Phone Fax**
Mr. Tim Dennis Observer	2011nov15	645 Lehigh Gap St. P. O. Box 119 Walnutport, PA 18088-0119	**Email**: a243@yahoo.com **Phone**:610-767-0979 **Fax**: 610-767-7095
Terrence (Terry) Byron INPO	2011nov15	308 Valley Green Ct	**Email**: byrontr@inpo.org **Phone**: 770-644-8627 **Fax**: 770-644-8120
Wayne Marquino GE-Hitachi	2011nov17	M/C A 65 3901 Castle Hagne Rd Wilmington, NC 28409	**Email**: wayne.marquino@ge.com **Phone**: 910-819-6444 **Cell:** 910-228-2982 **Fax**: 910-362-6444

2. Membership and Attendance

Present	Member	Address	Notes-Proxy	Email-Phone-Fax
Present	Jim Florence **Chair**	Nebraska Public Power District P. O. Box 98 Brownville, Nebraska 68321		**Email**: jbflore@nppd.com **Phone**: 402-825-5700 **Fax**: 402-825-5584
Present	Robert Felker **Vice Chair**	Western Services Corporation 7340 Executive Way, Suite A Frederick, MD 21704		**Email**: felker@ws-corp.com **Phone**: 301-644-2520 **Fax**: 301-682-8104 **Cell**: 240-344-5889
Present	Keith Welchel **Secretary**	Duke Power Company Oconee Training Center- MC:ON04OT 7800 Rochester Hwy Seneca, SC 29672		**Email**: kwelchel@duke-energy.com **Phone**: 864-885-3349 **Fax**: 864-885-3432
Present	F.J. (Butch) Colby **Editor**	L-3 MAPPS 8565 Cote-de-Liesse Quebec, Canada H4T 1G5		**Email**: butchcolby@comcast.net **Email**: butch.colby@l-3com.com **Phone**: (410) 961-7535 **Fax**: (410) 756-1954
Present	Lawrence (Larry) Vick **Parliamentarian**	US NRC, Office of Nuclear Reactor Regulation 07-G13 Washington, DC 20555		**Email**: lawrence.vick@nrc.gov **Phone**: 301-415-3181 **Fax**: 301-415-3061
Present	George McCullough	GSE Systems, Inc. 2300 St. Marys Road Suite D St. Marys, GA 31558		**Email**: gsmccullough@gses.com **Phone**: 912-576-6730 **Cell**: 410-707-6946
Present	Dennis Koutouzis	INPO 700 Galleria Parkway, NW Atlanta, GA 30339-5957		**Email**: koutouzisjd@inpo.org **Phone**: 770-644-8838 **Fax**: 770-644-8120
Present	Frank Tarselli	129 Abbey Rd Sugarloaf, PA 18249		**Email**: frankt64@epix.net **Phone**: 570.542.3717 **Cell**: 570-956-0303 **Fax**: 570.542.3855
Present	SK Chang	Dominion Nuclear Connecticut, Inc. Millstone Power Station L. F. Sillin, Jr. Nuclear Training Ctr. Rope Ferry Road Waterford, CT 06385		**Email**: Shih-Kao.Chang@dom.com **Phone**: 860-437-2521 **Fax**: 860-437-2671
Present	Robert Goldman	Entergy 1340 Echelon Parkway Jackson, MS 39213-8298		**Email**: rgoldma@entergy.com **Phone**: 601-368-5582 **Fax**:
Present	David Goodman	Luminant PO Box 1003 Glen Rose, TX 76043		**Email**: david.goodman@luminant.com **Phone**: 254-897-5636 **Fax**: 254-897-5714

Present	Jody Lawter	VC Summer Nuclear Station PO Box 88 Jenkinsville, SC 29065		**Email**: jody.lawter@scana.com **Phone**: 803-345-4854 **Fax**: 803-931-5616
Present	Mac McDade	Progress Energy – Harris Nuclear Plant 3932 New Hill–Holleman Rd New Hill, NC 27562		**Email**: mac.mcdade@pgnmail.com **Phone**: 919-362-3319 **Fax**: 919-362-3346
Present	Michael Petersen	Xcel Energy – Prairie island – Monticello 1660 Wakonade Drive West Welch, MN 55089		**Email**: Michael.petersen@xenuclear.com **Phone**: 651-388-1121 x 7253 **Fax**: 651-330-6282
Present	Pablo Rey	Tecnatom, s.a. Avda. Montes de Oca, 1 San Sebastian de los Reyes, 28703 - Madrid		**Email**: prey@tecnatom.es **Phone**: +346-079-99218 **Fax**: +349-165-98677
Present	James Sale	North Anna Power Station 11022 Haley Drive, PO Box 402 Mineral, Virginia 23117-0402		**Email**: jim.sale@dom.com **Phone**: 540-894-2464 **Fax**: 540-894-2931

3. Action Items

3.1 Action Item Quick-look Table

Open	Complete	Carried to Next Standard

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

3.2 Action Items

No.	Status	**Date**	**Assigned To:**	**Work Assignment**
1		2010oct05	**Florence** **Lawter** **Sale**	Appoint new members for officer development (job shadow for position development). Parliamentarian Assist Lawter, Sale
2	2011nov17: Closed	2010oct06	**Koutouzis** McCullough	2009 AI-60 Define the Term **Training Needs Assessment** in such a manner that it is clear in intent to both Training and Simulator staff 2011nov17: The WG agreed the definition of "Training Needs Assessment" is adequate
3		2010oct06	**Vick** Tarselli (BWR) Petersen (BWR) Rey (BWR) Goodman (PWR) McDade (PWR) Sale (PWR)	2009 AI-126 Consider adding Performance Test Program in next standard. New Appendix that gives example Performance Testing Program.

4	2011jun08: Closed items - 1, 3, 4 2011nov16: Closed Item 2	2010oct06	**Tarselli** Vick Chang Fraser Felker	2009 AI-132 ~~1. Review Malfunction Testing~~. 2011jun08 Closed 2. Are all list required? ~~3. What constitutes Malfunction testing is unclear~~ 2011jun08 Closed ~~4. Better define Malfunction causes~~. 2011jun08 Closed 2011jun08 2. AI-4 remains open pending review of Section 3.1.4 List. The remaining issue is relevance of the Malfunction list in Section 3.1.4 to the 201x standard. Additional consideration is if the malfunction list in section 3.1.4 should remain, be deleted or moved. 2011nov16 Closed by Motion
5	2011jun08: Closed 2011nov16: Wording change.	2010oct06	**McCullough** Florence Tarselli Colby	2009 AI-134 Minimum testing Periodicity Build Periodicity into the standard 2011jun09 Closed with Motions Realtime/Repeatability testing periodicity moved to AI-10 2011nov16: Added the word capability: An instructor station capability test shall be conducted

6		2010oct06	**Welchel** Lawter Petersen	2009 AI-147 2009 AI-180 Non-fully integrated mode performance testing Where applicable run performance test off-line 2011jun08 Discussion 2011nov18 Welchel New Definition and Sec. 3.4.3 change proposed for consideration. Discussion tabled
7		2010oct06	**Vick** Goldman	2009 AI-150 Review the term Power Range for consistency Confusion about the term Power Range.
8	2011jun09: Closed	2010oct06	**Chang** Tarselli Felker	2009 AI-162 Review Appendix B parameters against the standard body MANTG comments App. B parameters and std body are not consistent. 2011jun09 – A parliamentary issue regarding motion results. See AI-26 2011nov16: AI-8 was reviewed and changed to “Carried”. See Summer minutes Section 5.4.

9		2010oct06	**Felker** Lawter McCullough Fraser Colby Goodman McDade Koutouzis Rey Sale	2009 AI-163 Next generation simulators New builds. Public review comments that the WG did not considered new builds. Examine unique issues with new builds. Review will ask if 3.5-2009 provides sufficient guidance for new builds. 2011jun10 – Info presented. Next meeting will propose the first of several anticipated standard changes.
10	2011nov16: Closed	2010oct06	**McCullough** Felker McDade Goldman	2009 AI-179 Real-time and Repeatability testing Periodicity 2009 Public review comments. Methodology to demonstrate real-time. 2011jun10 Carried from AI-5 Realtime/Repeatability -Establish Realtime/Repeatability Periodicity Testing Requirement 2011nov16 Closed by Motion.

11		2010oct06	**Goodman** Vick Petersen Chang	2009 AI-181 Section 5 rewrite 2009 Westrain Comment #60 Configuration Management expectations needs strengthening Performance based. V&V is part of configuration mgt. (Section 4) possible a better fit in Section 5 2011nov15 – Section 5.4 references Section 4.4 and should reference 4.2
12	2010oct22: Closed	2010oct06	**Florence**	Invite ANS-21 Chair to WG meeting ANS-21 Chair Gene Carpenter Two White Flint North Washington, DC 20555-0001 **Mobile Ph**: 202-579-5155 **Work Ph**: 301-415-7333 **Email**: gene.carpenter@nrc.gov
13	2011jan28: Closed	2010oct06	**Florence**	Send letters of appointment to new working group members and their respective facility management Letter to new working group member and manager.
14	2011jan28: Closed	2010oct06	**Florence**	Coordinate next ANS-3.5 Meeting at the Crystal River Nuclear Power Plant in January 2011
15	2011jan28: Closed	2010oct06	**Florence**	2009 AI-185 Send a letter to the NEI in an effort to promote NEI participation in the ANS-3.5 Working Group and to develop a more collaborative relationship.

16		2011jan28	**Sale** Rey McCullough Tarselli Chang Koutouzis	Consider the option to include other uses of the simulator in footnote 1 on Page 1 of the Standard (e.g. - technical support). This was a consideration during the development of the scope statement in lieu of explicitly mentioning other uses of the simulator in the scope statement.
17		2011jan28	**McDade** Tarselli Koutouzis Petersen	Consider placing language in Section 1.2 Background to insert "experience requirements": `It is intended that in meeting the criteria of this standard, the simulator will be sufficiently complete and accurate to meet the training needs of the industry as well as the requirements of the NRC, as described in *Code of Federal Regulations*, Title 10, "Energy," Part 55, "Operators' Licenses" (10CFR55) **and station mandated experience requirements** Consider language in Section 1.2 Background to add clarification regarding control manipulations allowed by 10CFR55.46 and how this standard supports it.
18		2011jan28	**Florence** Rey Holl Fraser	1) Contact ANS to determine international opportunities in Standard development. 2) Consider language in Section 1.2 Background to mention use of this standard by the international community. 3) Additional consideration in the Standard body for the international community. Acknowledge international regulatory authorities.

19	2011nov18; Closed	2011jan28	**Tarselli** McCullough Goodman Chang Rey	Review the list below for inclusion into ANS 3.5 or other standards and basis for the recommendation: • Engineering Assist • Simulation Assisted Engineering • EP • DCS Logic Control Validation • HFE – Human Factors Engineering • Tech Training – I&C / Mechanical • PR Tours • Process Flow Diagrams • Spec. Operating Parameters • PRA • SAMG 2011nov18 Afetr discussion WG agreed to close AI-19
20		2011jan28	**McCullough** Colby Tarselli Lawter Fraser	Identify areas in the standard that can be improved to address DCS
21	2011jun10: Closed	2011jan28	**McCullough** Felker Koutouzis Lawter Goodman	Evaluate the need for inclusion into the standard other simulation devices derived directly from the full scope control room simulator. 2011jun10 – Presentation and discussion. No additional discussion and action will be taken. This AI is closed.

22		2011jan28	**Lawter** Sale Welchel Vick Felker	Review the recent regulatory cyber security guidance and OE to determine if cyber security should be included in the standard.
23		2011jan28	**Vick** Tarselli Rey Sale Florence Chang	Evaluate the need for including into Section 3.3.1 a set of IC criteria for ICs that are to be used when conducting the performance tests required by this standard. 2011jun10 – Proposal made. Additional consideration required.
24	2011feb01: Closed	2011jan28	**Florence**	Submit PINS Form to ANS Administrator 2011feb01 PINS has been submitted.
25		2011jun10	**Chang**	The following Appendix B Steady State parameters were considered in AI-8. BWR - control rod drive hydraulic system flow and temperature - secondary plant heat balance data PWR - containment pressure - boron concentration - pressurizer temperature - control rod positions - secondary plant heat balance These parameters should be reviewed for inclusion into the standard body Steady State parameter list.

26		2011jun10	**Florence**	Review and recommend modifications to the Rule of the Chair related to quorum in session. Interim Voting (Motions – Substantive Changes) shall be by Consensus (75% [rounded up] of quorum in session); Rule of the Chair for the remainder of the meeting: Interim Voting (Motions – Substantive Changes) shall be by Consensus (75% [rounded up] of voting membership present); 2011nov15: Additional consideration is needed to determine if previously "Not-carried" Motions are affected by the revised Rule of the Chair.
27	Closed: 2011nov15	2011jun10	**Florence**	Define Substantive Change with regards to Motion "Carried" threshold. 2011nov15: Closed with AI-26 discussion.
28		2011jun10	**Felker** Chang Sale	Review and report to the WG the usage of the terms: **If available** versus **As applicable**.
29	Closed: 2011nov17	2011jun10	**Rey** Tarselli	Review Normal Operating procedures Surveillance testing with regards to periodicity testing. It should be clarified what Normal Evolutions defined in 3.1.2.2 shall be tested with the frequency established in 4.1.3.2 2011nov17: Closed by Motion: Carried Text substitution in section 4.1.3.2 Normal evolutions

 Approved

30		2011jun10	**Sale**	Review Appendix B Steady State section for deletion.
31	Closed: 2011nov18	2011jun10	**Petersen** Chang	Review list nomenclature for consistency 2011nov18: Closed by Motion Carried.
32		2011nov17	Not assigned	Verify testing periodicity terminology consistency across section 4.
33		2011nov18	Not assigned	Review use and consistency of term Fully Integrated, partially-integrated and Non-integrated, and Standalone with regards to Sections 3 and 4.

4. **Working Group Procedural Rules**

4.1 Rules of the Chair

- Interim Voting (Motions – Substantive Changes) shall be by Consensus (75% [rounded up] of quorum in session);
- The Chair rules that no Motions will be accepted when not in session;
- Administrative issues by simple majority (quorum in session);
- The Chair shall be informed of absences;
- The absent member is encouraged to send a proxy.
- A Proxy shall have voting privileges
- Members shall attend the full length of the meeting;
- Word 7.0 shall be the document format;
- The Host shall collect and send all handout material for absent members without proxy;
- Robert's Rules of Order shall be used as a general guide;
- Guest Individual Contributors may receive working copy of the draft standard based on need;
- Chair approval shall be required for distribution of working copies of the draft standard;
- Members shall not Vote against their own non-amended Motion;
- The WG will through the course of normal business, generate confidential documentation applicable to the WG charter. As a result of this business, documentation could be released to the public through approved minutes posted on the ANS 3.5 WEB site. Other information may be released to the public as deemed appropriate by the WG Chair or Vice-Chair. In addition, information may be supplied to non-working group members on a need-to-know basis for the purpose of review and comment.
- When Abstention Votes are present the Majority (> 50%), Super Majority (2/3), Consensus (75%) levels are recalculated by subtracting the Abstention Votes count from the Members Present count
- Non-substantive change requires Majority Vote
- Appendices changes are non-substantives
- Substantive requires Consensus Vote
- Substantive Change: A substantive change in a proposed American National Standard is one that directly and materially affects the use of the standard. Examples of substantive changes are below:
  - — "shall" to "should" or "should" to "shall";
  - — addition, deletion or revision of requirements, regardless of the number of changes;
  - — Addition of mandatory compliance with referenced standards

4.2 Rules Enacted by the Working Group

Missing two consecutive meetings in a row without representation could result in loss of membership on the committee.

5. Tuesday 2011 November 15 (0800)

5.1 Introduction (0800)

Andy Barber

Welcome to the Summer Plant facility.

Summer will transition to ANS 3.5 2009 for both the present simulator and for the AP-1000

5.2 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob
Robert Goldman
David Goodman
Jody Lawter
Mac McDade
Michael Petersen
Pablo Rey
James Sale
Koutouzis, Dennis

5.3 Consensus Level

16 - Voting members
16 - Voting members Present
9 - Quorum (Majority Total Membership)
12 - Consensus (≥ 75% votes)
11 – Super Majority (≥ 2/3 Votes)
9 – Majority (> 50% votes)

5.4 AI-26 Discussion regarding vote counting (Rule of the Chair)

This discussion is a continuation (Westinghouse meeting) of the parliamentary inquiry regarding voting.

Sale - Robert's Rules of Order (RRO) state Abstentions are not counted. Majority level is recalculated by: Present-Abstain

Chair recommends following RRO.

Jim Sale reviewed the six RRO conditions regarding vote counting.

A discussion regarding whether Appendices changes are to be considered "substantive change." Changes to the Appendices are not considered substantive.

Additional Rules of the Chair:

- When Abstention Votes are present the Majority (> 50%), Super Majority (2/3), Consensus (75%) levels are recalculated by subtracting the Abstention Votes count from the Members Present count
- Non-substantive change – Majority Vote
- Appendices changes are non-substantives
- Substantive – Consensus Vote

Reason for adopting rule change: To better align with RRO and to create a more fair voting environment for the minority.

Past 201x Minutes will be reviewed (Vick) for possible votes that are affected by this change

Based on Point of Order, Past Motions were reviewed and it was determined that AI-8 (Westinghouse, Cranberry) was incorrectly considered a Consensus vote and should have been considered Majority vote. Based on the review, AI-8 is now "Carried."

AI-26 was discussed by the WG at large. Additional consideration is needed to determine if previously "Not-carried" Motions are affected by the revised Rule of the Chair.

5.5 Amended Motion (Carried): AI- 8 Appendix B Steady State List Removal

This Motion is brought forward from the Westinghouse Cranberry Txp meeting as Carried becuse the Motion is subject to Majority not Consensus vote total.

Brought forward from the Westinghouse Cranberry meeting. See 5.4 above. Additionally "Sections" is changed to "Secs." 2011 June 09 **Amended Motion**: In Appendix B.2.1 replace the list of parameters with "Refer to Secs. 4.1.3.1.3 and 4.1.3.1.4 for the set of parameters to be monitored." In Appendix B.3.1 replace the list of parameters with "Refer to Secs. 4.1.3.1.1 and 4.1.3.1.2 for the set of parameters to be monitored." In Appendix B.1.1 delete the sentence "The set of parameters to be monitored is identified in Secs B.2 and B.3." **Reason:** To make Appendix B more consistent with the standard body	Motion: **Carried** • 11 – For • 4 – Against • 0 – Abstained

regarding the Steady State parameters list. Response to public comment (MANTG, WESTRAIN) on the 2009 draft Standard. The WG agreed to consider their comments during the next revision. This Motion deletes two BWR parameters and five PWR parameters that are in Appendix B Steady State lists that will be considered at a later time for inclusion into the standard body list. New AI-25 BWR: • control rod drive hydraulic system flow and temperature • secondary plant heat balance data PWR: • containment pressure • boron concentration • pressurizer temperature • control rod positions • secondary plant heat balance data	

5.6 Motion (Carried): Westinghouse Cranberry, Twp Minutes Approve

Motion: **Carried** • 16 – For • 0 – Against

• 0 – Abstained
Name 2011 Nov 15 **Motion**: Approve Westinghouse Cranberry, Twp Minutes Draft rev 16

5.7 Motion (Carried): Summer Agenda Rev 0 Review and Approval

Motion: **Carried** • 16 – For • 0 – Against • 0 – Abstained
Name 2011 Nov 15 **Motion**: Agenda Rev 0 as discussed

5.8 Business Rules

Roberts Rules of Order

5.9 Members reviewed Rules of the Chair (no change)

5.10 Officers reports

Florence	No report
Welchel	No report
Colby	No report
Chang	No report
Vick	No report
INPO (Byron)	Power Point presentation – Operator Fundamentals and Training Evaluation Improvement Project
USUG (Florence)	No report

5.11 NRC (Vick)

IP Inspection Update

- Several utilities indicate future transition to the ANS-3.5 2009
- Future IP 71111.11 module update
- No future simulator rule changes planned

5.12 AI-30 Delete Appendix B (Sale)

- AI 30 resulted from analysis of the Appendix-B and standard body. The appendix-B is somewhat redundant with the standard body.
- Recommends removing Appendix B
- Power Point outlining the differences in the Standard body list and the Appendix B list.
- The working group agreed to continue with AI-30
- Koutouzis – parameters defined in the Appendix should be placed in the standard body.

5.13 AI-5 Motion() Instructor Station Testing Periodicity (McCullough)

Instructor Station testing discussion:

Name 2011 Nov 15 **Motion**: Change Section 4.3 from: **An instructor station test shall be conducted:** To: **An instructor station capabilities test shall be conducted:**	Motion: **N/A**

:

5.14 AI-5 Amended Motion(Carried) Instructor Station Testing Periodicity (McCullough)

Name 2011 Nov 15 **Amended Motion**: Change Section 4.3 from: **An instructor station test shall be conducted:** To: **An instructor station capability test shall be conducted:** **Reason:** Consistency with other capabilities test sections.	Motion: **Carried** • 15 – For • 1 – Against

Reasons Against: May imply a larger scope of Instructor Station testing upon addition of a new feature or single feature modification.

5.15 AI-9 Next generation Simulators "New Builds" (Felker)

Felker - Presentation and discussion. Reviewed New Build best estimate transient list.

One topic discussion topic for old builds is how would the transient list develop if none were available?

Several discussions/concerns centered on sufficiently bounding a non-list bounded transient definition.

Section 3.4.3.1 wording was proposed and the afternoon time was devoted to discussing several updates.

This discussion was tabled and will continue on Wednesday.

5.16 Recessed: 1730

6. Wednesday 2011 November 16 (0800)

6.1 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob
Robert Goldman
David Goodman
Jody Lawter
Mac McDade
Michael Petersen
Pablo Rey
James Sale
Koutouzis, Dennis

6.2 Consensus Level

16 - Voting members
16 - Voting members Present
9 - Quorum (Majority Total Membership)
12 - Consensus (≥ 75% votes)
11 – Super Majority (≥ 2/3 Votes)
9 – Majority (> 50% votes)

6.3 AI-9 Next generation Simulators "New Builds" (Felker) – Continued

Felker – proposed new Section 3.4.3.1/4.4.3.1 wording starting point for discussion.

Transient selection is not a risk based decision.

The WG may want to consider developing a background document to assist the reader in implementing the standard.

There was limited working group consensus regarding the proposed language below. Members were requested to comment on the proposed language for AI-9 team consideration. The comments are appended to the proposed language for consideration by the AI-9 team.

Section 3.4.3.1

Simulator operability testing shall be conducted to confirm overall simulator model completeness and integration by testing the following:

(1) simulator steady-state performance;

(2) simulator transient performance for a benchmark set of transients.

Acceptable simulator steady-state performance shall be demonstrated through comparison of parameters between the simulator and the reference unit. The comparison shall (should) be done for three distinct power levels spanning at least 50% of the operating range for which heat balance data is available.

A minimum set of ten simulator transient performance tests shall be selected to demonstrate integrated simulator response. Many of these events may be introduced through the use of malfunctions; however, the intent of transient performance testing is to verify simulator response and not to test the malfunction. Selection of such tests shall be based on the reference unit design and the scope of simulation to which the simulator has been designed to respond. Consideration for selection of the transients should include actual reference unit events, design basis transients, transients of similar reactor designs, and industry experience. The transients shall be initiated from an appropriate initial condition with no operator follow-up actions unless specifically noted in the test.

The set of transient performance tests shall consist of a representative sample of transients taken from the reference unit design; e.g. Anticipated Operational Occurrences (AOO), Loss-of-Coolant Accidents (LOCA), Anticipated Transient Without Scram (ATWS), Design Basis Events (DBEs), and Station Blackout (SBO).

A ~~The~~ set of parameters shall be ~~to be~~ monitored and recorded with a resolution of one second or less for each selected simulator transient performance test. Monitored parameter selection shall be based on the reference unit design to which the simulator has been designed to respond.~~.~~

Section 4.4.3.1

A simulator operability test shall be conducted once per reference unit fuel cycle by testing the following:

(1) simulator steady-state performance;

(2) simulator transient performance for a benchmark set of transients.

It shall be demonstrated that simulator response during the conduct of the transients required by Section 3.4.3.1 meet the following acceptance criteria:

(1) Any observable change in simulated parameters corresponds in direction to the change expected from actual or best estimate response of the reference unit to the transient;

(2) The simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic action under identical circumstances;

(3) The simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances.

A record of the conduct of this test and its evaluation shall be maintained.

Working Group Comments:

- Repeating statements between sections
- Add USAR to example list
- Get rid of specific count of 10 transients
- Establish different set of acceptance criteria (do not use Malf Acceptance Criteria) (SK to supply language)
- Delete Appendix B
- Retain List in Appendix B
- Add benchmark selection criteria
- Appendix B should supply Transient Selection Guidance for new builds
- No change is necessary. Refer to Reg Guide 1.149 rev4 discussion section
- Delete duplication between standard body and Appendix
- Appendix B could be for New Builds Only
- New Definitions - New Builds e.g. in above text

(Delete Appendix "B")

6.4 AI-4 Section 3 Malfunction List Item 2 (Tarselli)

Possible directions:

- Leave as is
- Remove the list because we have enough words in the section to cover everything needed already
- Add some more words to say more clearly that the simulator shall have sufficient malfunctions to conduct an Approved Initial License, and Requalification License program as defined in 10 CFR and using the approved SAT process.

Discussion centered on removal of the malfunction list from the standard body.

Comments were expressed to keep the malfunction list based on Reg Guide 1.149 Rev 4 malfunction guidance. Removing the malf list may divorce the standard from the required malfunction testing as prescribed in regulation.

Present wording ties the malf list to regulation based on requirements to support the accredited operator training programs.

6.5 AI-4 Motion(Withdrawn) – Section 3.1.4 Malfunctions (Tarselli)

Replace Section 3.1.4 Malfunction 2011 Nov 16 **Motion**: Replace Section 3.1.4 with the following: The determination of the type and number of malfunctions simulated shall be part of a systematic approach to training process for the design of performance-based operator training programs. Each malfunction shall have a valid cause based upon a sound technical basis. The malfunction selection process should utilize the following	Motion: **Not Carried Amended Withdrawn** • x – For • x – Against • x – Abstained

references: (1) Licensee Event Reports (LERs), Significant Event Reports, and Significant Operating Experience Reports; (2) Probabilistic Risk Assessment (PRA) studies; (3) nuclear steam supply system and balance-of-plant manufacturer equipment availability and reliability data, as well as technical information service bulletins; (4) local site considerations and reference unit-specific operating experiences; (5) NRC bulletins, circulars, and generic letters; (6) reference unit Safety Analysis Report. The specific malfunction capability required of the simulator shall meet the requirements specified in the reference unit's accredited licensed operator training programs. The simulator shall support the conduct of abnormal, off-normal, and emergency events, including simultaneous or sequential malfunctions, to demonstrate inherent reference unit response and automatic control functions. Where operator actions vary based on severity of the event, the simulator shall have adjustable malfunction severity of a sufficient range to represent the potential reference unit conditions. The simulator shall support consequential failures of systems and equipment due to operator action or malfunction of supporting systems where supported by a training needs assessment. The response of the simulator shall be compared to actual reference unit response or best estimate unit response, as required by Sec. 4, "Testing Requirements." The simulator shall support operator actions to recover from or mitigate the consequences of malfunctions. The scope of simulation shall be such that a stable, controllable, and safe	

 Approved

condition is attained, which can be continued either to cold shutdown conditions or until the limits of simulation are reached (see Sec. 3.1.2). **Reason:** The list of 25 is not sufficient to meet this standard's scope: **This standard establishes the functional requirements for full-scope nuclear power plant control room simulators for use in operator training and examination.[1)] The standard also establishes criteria for the scope of simulation, performance, and functional capabilities of simulators. This standard does not address simulators for test, mobile, and research reactors, or for reactors not subject to U.S. Nuclear Regulatory Commission (NRC) licensing.**	

6.6 AI-4 Amended Motion(Carried) – Section 3.1.4 Malfunctions (Tarselli)

Replace Section 3.1.4 Malfunction 2011 Nov 16 **Motion**: Replace Section 3.1.4 with the following: **The determination of the type and number of malfunctions simulated shall be part of a systematic approach to training process for the design of performance-based operator training programs. Each malfunction shall have a valid cause based upon a sound technical basis. The malfunction selection**	Motion: **Carried (Consensus)** • 12 – For • 2 – Against • 2 – Abstained

[1)] Guidance is provided in Appendix D to adapt this standard to part-task and limited-scope simulators to ensure fidelity appropriate to the intended use for operator training and examination.

process should utilize the following references: **(1) Licensee Event Reports (LERs), Significant Event Reports, and Significant Operating Experience Reports;** **(2) Probabilistic Risk Assessment (PRA) studies;** **(3) nuclear steam supply system and balance-of-plant manufacturer equipment availability and reliability data, as well as technical information service bulletins;** **(4) local site considerations and reference unit-specific operating experiences;** **(5) NRC bulletins, circulars, and generic letters;** **(6) reference unit Safety Analysis Report.** **The specific malfunction capability required of the simulator shall meet the requirements specified in the reference unit's accredited licensed operator training programs.** **The simulator shall support the conduct of abnormal, off-normal, and emergency events, including simultaneous or sequential malfunctions, to demonstrate inherent reference unit response and automatic control functions. Where operator actions vary based on severity of the event, the simulator shall have adjustable malfunction severity of a sufficient range to represent the potential reference unit conditions. The simulator shall support consequential failures of systems and equipment due to operator action or malfunction of supporting systems where supported by a training needs assessment.** **The response of the simulator shall be compared to actual reference unit response or best estimate unit response, as required by Sec. 4, “Testing Requirements.” The simulator shall support operator actions to recover from or mitigate the consequences of malfunctions. The scope of simulation shall be**	

such that a stable, controllable, and safe condition is attained, which can be continued either to cold shutdown conditions or until the limits of simulation are reached (see Sec. 3.1.2). In Appendix D D.2 remove the reference to (list of malfunctions): **3.1.4 Malfunctions (list of malfunctions);** Replace with the following: **3.1.4 Malfunctions;** **Reason:** The list of 25 is not sufficient to meet this standard's scope: **This standard establishes the functional requirements for full-scope nuclear power plant control room simulators for use in operator training and examination.[2)] The standard also establishes criteria for the scope of simulation, performance, and functional capabilities of simulators. This standard does not address simulators for test, mobile, and research reactors, or for reactors not subject to U.S. Nuclear Regulatory Commission (NRC) licensing.**	

Reasons Against:
New builds with no training programs would use a pre-defined list.
Reg Guide 1.149 rev 4 endorses the standard with the list included.

Reason Abstained:
Both for and against arguments are good. No opinion.
The list has served the industry well. No opinion.

[2)] Guidance is provided in Appendix D to adapt this standard to part-task and limited-scope simulators to ensure fidelity appropriate to the intended use for operator training and examination.

AI-4 is Closed.

6.7 Consensus Level

15 - Voting members
15 - Voting members Present
8 - Quorum (Majority Total Membership)
11 - Consensus (≥ 75% votes)
10 – Super Majority (≥ 2/3 Votes)
8 – Majority (> 50% votes)

6.8 AI-10 Motion() Real time and repeatability Testing (McCullough)

Name 2011 Nov 16 **Motion**: As the lead in to section 4.1.1 delete the existing paragraph and insert the following wording: **Real Time and Repeatability testing shall be conducted upon completion of simulator initial construction and once per reference unit fuel cycle.** **It shall be demonstrated that the simulator completes execution within the designed time interval, that the simulator is repeatable and that between successive simulator tests, no noticeable differences exist with respect to time base relationships, sequences,**	Motion: **Not Carried Amended Withdrawn** • x – For • x – Against • x – Abstained

 Approved

durations, rates, and accelerations. **Reason:** Testing periodicity industry comment in the 2009 brought forward to this standard. Additionally this item was an identified item during the development of the 2009 standard.	

6.9 AI-10 Amended Motion(Carried) – Real time and Repeatability (McCullough)

Real time and periodicity testing 2011 Nov 16 **Motion**: Replace Section 4.1.1 with the following: Real time and repeatability testing shall be conducted: (1) upon completion of simulator initial construction; (2) once per reference unit fuel cycle. **Reason:**	Motion: **Carried** • 13 – For • 1 – Against • 1 – Abstained

Testing periodicity industry comment in the 2009 brought forward to this standard. Additionally this item was an identified item during the development of the 2009 standard. The original 4.1.1 text was redundant to the definition of real time and repeatability definitions. Noticeable difference as used in the original 4.1.1 text, was not in alignment with the definition of "noticeable difference"	

Reasons Against:
Text is sufficient as written.

Reason Abstained:
Insufficient time to evaluate the change.

Additional member comment:
A member voted for the Motion because the new wording is an improvement, however real time and repeatability should not require specific testing.

AI-10 is closed.

6.10 Recessed: 1730

7. **Thursday 2011 November 17 (0800)**

7.1 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob (Absent)
Robert Goldman
David Goodman
Jody Lawter
Mac McDade (Absent)
Michael Petersen
Pablo Rey
James Sale
Koutouzis, Dennis

7.2 Consensus Level

14 - Voting members
14 - Voting members Present
8 - Quorum (Majority Total Membership)
11 - Consensus (≥ 75% votes)
9 – Super Majority (≥ 2/3 Votes)
8 – Majority (> 50% votes)

7.3 AI-29 Normal evolution Periodicity (Rey)

Plant systems change over time. Surveillance testing is designed to catch this degradation for inclusion into the simulator database.

Alternate method for incorporating plant data is to reference ISI data.

SBT does not adequately test simulator response.

Periodic testing surveillance testing can be considered similar to periodic malfunction testing.

What is gained by testing surveillance test on the simulator. Accuracy?

Surveillance testing is possibly a shotgun approach in hopes of catching plant response changes.

Surveillance testing may be better handled by SBT and only being concerned with those relevant to the training program.

Presently, surveillance testing schedule is not defined.

Presently, which surveillance procedure to test is not defined.

7.4 AI-29 Motion(Withdrawn) Normal Evolutions Periodicity (Rey)

Motion: **Not Carried Amended Withdrawn** • x – For • x – Against • x – Abstained
Name 2011 Nov 17 **Motion**:

 Approved

Replace the following text in section **4.1.3.2 Normal evolutions:** ***Normal evolutions shall be conducted upon completion of simulator initial construction and once per reference unit fuel cycle.*** With the text ***A normal evolution test shall be conducted:*** ***(1) upon completion of simulator initial construction;*** ***(2) once per reference unit fuel cycle for items (1) through (3) listed in Sec. 3.1.3.2.*** **Reason**: To clarify the normal evolutions periodicity for surveillance testing.

7.5 AI-29 Amended Motion(Carried) Normal Evolutions Periodicity (Rey)

Motion: **Carried** • 12 – For • 2 – Against
Name 2011 Nov 17 **Motion**: Replace the following text in section **4.1.3.2 Normal evolutions:** ***Normal evolutions shall be conducted upon completion of simulator initial construction and once per reference unit fuel cycle.***

With the text

Normal evolutions shall be conducted:

(1) upon completion of simulator initial construction;

(2) once per reference unit fuel cycle for items (1) through (3) listed in Sec. 3.1.3.2.

Reasons:

- To clarify the normal evolutions periodicity for surveillance testing.
- Testing periodicity industry comment in the 2009 brought forward to this standard.
- Additionally this item was an identified item during the development of the 2009 standard.

Reasons Against:

- Surveillance testing should have periodicity
- Standard is sufficient as written; the motion should not exclude surveillance testing.

New Action Item 32: Verify testing periodicity terminology consistency across section 4

7.6 AI-11 Section 5 Configuration management (Goodman)

Goodman led a reading of Section 5

Observations:

- Items listed in 5.0 do not align with the 5.0 body text.
- Section 5 timetables:
  - 5.1.2.1 - 18 months
  - 5.1.2.2 - 12 months
  - 5.3.1.1 - 30 months

- 5.3.1.2 - 24 months
- 5.3.2 – TNA
- 5.4 – Sec 4.4

Goodman proposed a Section 5 draft rewrite.

Draft Section 5 will be sent to members for comment. A Section 5 update motion is expected at the next meeting.

7.7 AI-23 IC Criteria (Vick)

The AI-23 presentation reviewed at the Westinghouse meeting was presented for discussion.

The discussion was tabled.

7.8 AI-2 Define Training Needs Assessment (Koutouzis)

Presentation

Reference AI-60 in the 2009 standard's development.

The discussion centered on the Term Training need Assessment.

The WG reviewed the history of AI-2 i.e. 2009 standard development action items AI-60, AI-48 and AI-49. Additional information is available in the **05_Approved_ANS 3.5 Meeting Minutes_DC Cook_2000oct25.doc** minutes.

The WG agreed the definition of "Training Needs Assessment" is adequate.

No additional action is required.

AI-2 is closed.

7.9 Recessed: 1730

8. **Friday 2011 November 18 (0800)**

8.1 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob (Absent)
Robert Goldman
David Goodman
Jody Lawter
Mac McDade
Michael Petersen
Pablo Rey
James Sale
Koutouzis, Dennis

8.2 Consensus Level

15 - Voting members
15 - Voting members Present
8 - Quorum (Majority Total Membership)
11 - Consensus (≥ 75% votes)
10 – Super Majority (≥ 2/3 Votes)
8 – Majority (> 50% votes)

8.3 AI-6 Non-integrated mode testing (Welchel)

6		2010oct06	**Welchel** Lawter Petersen	2009 AI-147 2009 AI-180 Non-fully integrated mode performance testing Where applicable run performance test off-line 2011jun08 Discussion

3.4.3 Simulator performance testing

Simulator performance testing comprises operability testing, scenario-based testing, reactor core performance testing, and post-event simulator testing. Simulator performance testing shall be performed in a fully integrated mode of operation.

Usage

- Fully Integrated
- Non-Integrated
- Partially integrated

Sections
3.4.2 Validation testing - **stand-alone or integrated fashion**
3.4.3 Performance testing - **fully integrated mode of operation**
4.4.1 Verification testing - **nonintegrated environment on a computer system other than the simulator**
4.4.2 Validation Testing - **fully integrated, partially integrated, or stand-alone mode of system operation**

Non-integrated Mode testing:
Testing credit may be taken for non-integrated mode testing when non-integrated mode testing results and fully-integrated mode testing baseline comparative analysis result in no comparative difference.

Definition:
Baseline Comparative Analysis: Analysis performed comparing the fully integrated mode test baseline and the results achieved through a non-integrated mode of testing for the purpose of determining any differences.

Proposed:

> **3.4.3 Simulator performance testing**
> Simulator performance testing comprises operability testing, scenario-based testing, reactor core performance testing, and post-event simulator testing. Simulator performance testing shall be performed in a fully integrated mode of operation. Non-integrated mode operability testing credit may be taken when a baseline comparative analysis results in no comparative difference.

Some members expressed that PEST is candidate for non-integrated mode testing

For new builds the difference with panels or without panels is small.

Present regulator language may not allow for non-integrated mode testing. Additional consideration is required.

The WG agreed to continue non-integrated mode testing discussion.

The discussion is tabled. AI-6 will be carried forward.

AI-33 – Review use and consistency of term Fully Integrated, partially-integrated and Non-integrated, and Standalone with regards to Sections 3 and 4. Example usage:

> 3.4.2 Validation testing - stand-alone or integrated fashion
>
> 4.4.2 Validation Testing - fully integrated, partially integrated, or stand-alone mode of system operation

8.4 AI-19 Other Simulator uses (Tarselli)

Discussion and conclusion ANS 3.5

When simulation technology is to be applied to other uses, the correct approach is to consider a separate standard and assemble a team that includes the end users of the technology.

WG agreed to close AI-19.

8.5 AI-31 Motion() List Consistency (Petersen)

Motion: N/A

Name
2011 Nov 18

Motion:

Replace the following sections with the Proposed Wording:

- 4.1.3.1.1
- 4.1.3.1.2
- 4.1.3.1.3
- 4.1.3.1.4
- B.2.2.2
- B.2.2.3
- B.2.2.4
- B.3.2.2
- B.3.2.3
- B.3.2.5

Current Wording	Proposed Wording
4.1.3.1.1 **It shall be demonstrated that the following PWR**	4.1.3.1.1

 Approved

parameters match reference unit data within 1% of the reference unit instrument loop range: • temperature (T)-average; • T-hot; • T-cold; • core MWt; • power range nuclear instrumentation readings; • reactor coolant system pressure; • steam generator pressure; • pressurizer level.	**It shall be demonstrated that the following PWR parameters match reference unit data within 1% of the reference unit instrument loop range:** • average reactor coolant system temperature; • reactor coolant system hot leg temperature; • reactor coolant system cold leg temperature; • reactor core thermal power; • nuclear instrumentation power indication; • pressurizer pressure; • steam generator pressure; • pressurizer level.
4.1.3.1.2 **It shall be demonstrated that the following PWR parameters match reference unit data within 2% of the reference unit instrument loop range:** • steam generator feed flow; • reactor coolant system flow; • steam generator level; • letdown flow; • charging flow; • steam flow; • turbine first stage pressure; • MWe.	4.1.3.1.2 **It shall be demonstrated that the following PWR parameters match reference unit data within 2% of the reference unit instrument loop range:** • steam generator feed flow; • reactor coolant system flow; • steam generator level; • letdown flow; • charging flow; • main steam flow; • main turbine first stage pressure; • main generator gross electrical power.
4.1.3.1.3	4.1.3.1.3

It shall be demonstrated that the following BWR parameters match reference unit data within 1% of the reference unit instrument loop range: • core MWt; • reactor narrow range pressure; • reactor wide range pressure; • total core flow.	**It shall be demonstrated that the following BWR parameters match reference unit data within 1% of the reference unit instrument loop range:** • reactor core thermal power; • reactor narrow range pressure; • reactor wide range pressure; • total core flow.
4.1.3.1.4 **It shall be demonstrated that the following BWR parameters match reference unit data within 2% of the reference unit instrument loop range:** • average power range monitor readings; • feedwater temperature (after last feedwater heating stage); • total steam flow; • individual recirculation loop flows; • total feedwater flow; • turbine steam flow; • condenser vacuum; • individual calibrated jet pump flow; • narrow range reactor water level; • MWe.	4.1.3.1.4 **It shall be demonstrated that the following BWR parameters match reference unit data within 2% of the reference unit instrument loop range:** • average power range monitor readings; • feedwater temperature (after last feedwater heating stage); • total main steam flow; • individual recirculation loop flows; • total feedwater flow; • main turbine steam flow; • main condenser vacuum; • individual calibrated jet pump flow; • narrow range reactor water level; • main generator gross electrical power.
B.2.2.2 For transients (1), (2), (3), (6), and (7) in Sec. B.2.2.1, record	**B.2.2.2** For transients (1), (2), (3), (6), and (7) in Sec. B.2.2.1,

the following set of test parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • total steam flow; • total feedwater flow; • wide range reactor pressure; • narrow range reactor pressure; • wide range reactor water level; • narrow range reactor water level (feedwater control); • generator gross electrical power; • turbine steam flow; • total core flow; • total recirculation loop flow.	record the following set of test parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • total main steam flow; • total feedwater flow; • wide range reactor pressure; • narrow range reactor pressure; • wide range reactor water level; • narrow range reactor water level (feedwater level control input); • main generator gross electrical power; • main turbine steam flow; • total core flow; • total recirculation loop flow.
B.2.2.3 For transients (4) and (5) in Sec. B.2.2.1, record the following set of parameters simultaneously with a resolution of one second or less: • reactor power (percent neutron flux); • total steam flow; • total feedwater flow; • narrow range reactor pressure; • narrow range reactor water level (feedwater control); • total core flow; • individual recirculation loop flows; • individual calibrated jet pump flows.	**B.2.2.3** For transients (4) and (5) in Sec. B.2.2.1, record the following set of parameters simultaneously with a resolution of one second or less: • reactor power (percent neutron flux); • total main steam flow; • total feedwater flow; • narrow range reactor pressure; • narrow range reactor water level (feedwater level control input); • total core flow; • individual recirculation loop flows; • individual calibrated jet pump flows.

B.2.2.4 For transients (8), (9), and (10) in Sec. B.2.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • wide range pressure; • wide range water level; • fuel zone water level; • total steam flow; • total feedwater flow; • containment temperature; • suppression pool temperature; • containment pressure; • drywell temperature; • drywell pressure; • total low pressure injection flow; • total low pressure core spray flow; • total high pressure injection flow.	**B.2.2.4** For transients (8), (9), and (10) in Sec. B.2.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • wide range reactor pressure; • wide range reactor water level; • fuel zone water level; • total main steam flow; • total feedwater flow; • average containment temperature; • average suppression pool temperature; • containment pressure; • average drywell temperature; • drywell pressure; • total low pressure injection flow; • total low pressure core spray flow; • total high pressure injection flow.
B.3.2.2 For transients (1), (2), (3), (4), (6), (7), and (11) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • neutron flux (percent); • average temperature; • pressurizer pressure; • pressurizer level; • pressurizer temperature;	**B.3.2.2** For transients (1), (2), (3), (4), (6), (7), and (11) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • core neutron flux (percent); • average reactor coolant system temperature; • pressurizer pressure; • pressurizer level; • pressurizer temperature;

• total steam flow (if available); • total feedwater flow (if available); • hot leg temperature (any single loop) ; • cold leg temperature (same loop as hot leg temperature); • steam generator secondary pressure (same loop as hot leg temperature); • steam generator level (same loop as hot leg temperature).	• total main steam flow (if available); • total feedwater flow (if available); • reactor coolant system hot leg temperature (any single loop) ; • reactor coolant system cold leg temperature (same loop as hot leg temperature); • steam generator secondary pressure (same loop as hot leg temperature); • steam generator level (same loop as hot leg temperature).
B.3.2.3 For transient (5) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • neutron flux (percent); • hot leg temperature; • cold leg temperature; • steam generator secondary pressure; • steam generator level; • steam generator steam flow (if available); • steam generator feedwater flow; • loop flows.	**B.3.2.3** For transient (5) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • core neutron flux (percent); • reactor coolant system hot leg temperature; • reactor coolant system cold leg temperature; • steam generator secondary pressure; • steam generator level; • steam generator steam flow; • steam generator feedwater flow; • reactor coolant system loop flows.
B.3.2.5 For transient (10) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of	**B.3.2.5** For transient (10) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution

one second or less: • relief valve flow (if available); • pressurizer pressure; • pressurizer temperature; • pressurizer level; • loop flows; • surge line temperature; • hot leg temperature (surge line leg); • source range monitor output; • reactor vessel level (if available); • saturation margin monitor output (if available).	of one second or less: • pressurizer relief valve flow (if available); • pressurizer pressure; • pressurizer temperature; • pressurizer level; • reactor coolant system loop flows; • pressurizer surge line temperature; • reactor coolant system hot leg temperature (surge line leg); • source range monitor output; • reactor vessel level (if available); • saturation or subcooled margin monitor output (if available).

Reason:

8.6 AI-31 Amended Motion(Carried) List Consistency (Petersen)

Motion: **Carried**

- 14 – For
- 0 – Against
- 1 – Abstained

Name
2011 Nov 18

Motion:

Replace the following sections with the Proposed Wording:

- 4.1.3.1.1
- 4.1.3.1.2
- 4.1.3.1.3
- 4.1.3.1.4
- B.2.2.2
- B.2.2.3
- B.2.2.4
- B.3.2.2
- B.3.2.3
- B.3.2.5

Current Wording	Proposed Wording
4.1.3.1.1 **It shall be demonstrated that the following PWR parameters match reference unit data within 1% of the reference unit instrument loop range:** • temperature (T)-average; • T-hot; • T-cold; • core MWt; • power range nuclear instrumentation readings; • reactor coolant system pressure; • steam generator pressure; • pressurizer level.	4.1.3.1.1 **It shall be demonstrated that the following PWR parameters match reference unit data within 1% of the reference unit instrument loop range:** • average reactor coolant system temperature; • reactor coolant system hot leg temperature; • reactor coolant system cold leg temperature; • reactor core thermal power; • nuclear instrumentation power indication; • pressurizer pressure; • steam generator pressure; • pressurizer level.
4.1.3.1.2 **It shall be demonstrated that the following PWR**	4.1.3.1.2 **It shall be demonstrated that the following PWR**

parameters match reference unit data within 2% of the reference unit instrument loop range: • steam generator feed flow; • reactor coolant system flow; • steam generator level; • letdown flow; • charging flow; • steam flow; • turbine first stage pressure; • MWe.	**parameters match reference unit data within 2% of the reference unit instrument loop range:** • steam generator feed flow; • reactor coolant system flow; • steam generator level; • letdown flow; • charging flow; • main steam flow; • main turbine first stage pressure; • main generator gross electrical power.
4.1.3.1.3 **It shall be demonstrated that the following BWR parameters match reference unit data within 1% of the reference unit instrument loop range:** • core MWt; • reactor narrow range pressure; • reactor wide range pressure; • total core flow.	4.1.3.1.3 **It shall be demonstrated that the following BWR parameters match reference unit data within 1% of the reference unit instrument loop range:** • reactor core thermal power; • reactor narrow range pressure; • reactor wide range pressure; • total core flow.
4.1.3.1.4 **It shall be demonstrated that the following BWR parameters match reference unit data within 2% of the reference unit instrument loop range:** • average power range monitor readings;	4.1.3.1.4 **It shall be demonstrated that the following BWR parameters match reference unit data within 2% of the reference unit instrument loop range:**

• feedwater temperature (after last feedwater heating stage); • total steam flow; • individual recirculation loop flows; • total feedwater flow; • turbine steam flow; • condenser vacuum; • individual calibrated jet pump flow; • narrow range reactor water level; • MWe.	• average power range monitor readings; • feedwater temperature (after last feedwater heating stage); • total main steam flow; • individual recirculation loop flows; • total feedwater flow; • main turbine steam flow; • main condenser vacuum; • individual calibrated jet pump flow; • narrow range reactor water level; • main generator gross electrical power.
B.2.2.2 For transients (1), (2), (3), (6), and (7) in Sec. B.2.2.1, record the following set of test parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • total steam flow; • total feedwater flow; • wide range reactor pressure; • narrow range reactor pressure; • wide range reactor water level; • narrow range reactor water level (feedwater control); • generator gross electrical power; • turbine steam flow; • total core flow; • total recirculation loop flow.	**B.2.2.2** For transients (1), (2), (3), (6), and (7) in Sec. B.2.2.1, record the following set of test parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • total main steam flow; • total feedwater flow; • wide range reactor pressure; • narrow range reactor pressure; • wide range reactor water level; • narrow range reactor water level (feedwater level control input); • main generator gross electrical power; • main turbine steam flow; • total core flow; • total recirculation loop flow.

B.2.2.3 For transients (4) and (5) in Sec. B.2.2.1, record the following set of parameters simultaneously with a resolution of one second or less: • reactor power (percent neutron flux); • total steam flow; • total feedwater flow; • narrow range reactor pressure; • narrow range reactor water level (feedwater control); • total core flow; • individual recirculation loop flows; • individual calibrated jet pump flows.	**B.2.2.3** For transients (4) and (5) in Sec. B.2.2.1, record the following set of parameters simultaneously with a resolution of one second or less: • reactor power (percent neutron flux); • total main steam flow; • total feedwater flow; • narrow range reactor pressure; • narrow range reactor water level (feedwater level control input); • total core flow; • individual recirculation loop flows; • individual calibrated jet pump flows.
B.2.2.4 For transients (8), (9), and (10) in Sec. B.2.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • wide range pressure; • wide range water level; • fuel zone water level; • total steam flow; • total feedwater flow; • containment temperature; • suppression pool temperature; • containment pressure; • drywell temperature;	**B.2.2.4** For transients (8), (9), and (10) in Sec. B.2.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • reactor power (percent neutron flux); • wide range reactor pressure; • wide range reactor water level; • fuel zone water level; • total main steam flow; • total feedwater flow; • average containment temperature; • average suppression pool temperature; • containment pressure; • average drywell temperature;

• drywell pressure; • total low pressure injection flow; • total low pressure core spray flow; • total high pressure injection flow.	• drywell pressure; • total low pressure injection flow; • total low pressure core spray flow; • total high pressure injection flow.
B.3.2.2 For transients (1), (2), (3), (4), (6), (7), and (11) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • neutron flux (percent); • average temperature; • pressurizer pressure; • pressurizer level; • pressurizer temperature; • total steam flow (if available); • total feedwater flow (if available); • hot leg temperature (any single loop) ; • cold leg temperature (same loop as hot leg temperature); • steam generator secondary pressure (same loop as hot leg temperature); • steam generator level (same loop as hot leg temperature).	**B.3.2.2** For transients (1), (2), (3), (4), (6), (7), and (11) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • core neutron flux (percent); • average reactor coolant system temperature; • pressurizer pressure; • pressurizer level; • pressurizer temperature; • total main steam flow; • total feedwater flow; • reactor coolant system hot leg temperature (any single loop) ; • reactor coolant system cold leg temperature (same loop as hot leg temperature); • steam generator secondary pressure (same loop as hot leg temperature); • steam generator level (same loop as hot leg temperature).
B.3.2.3 For transient (5) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of	**B.3.2.3** For transient (5) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution

one second or less: • neutron flux (percent); • hot leg temperature; • cold leg temperature; • steam generator secondary pressure; • steam generator level; • steam generator steam flow (if available); • steam generator feedwater flow; • loop flows.	of one second or less: • core neutron flux (percent); • reactor coolant system hot leg temperature; • reactor coolant system cold leg temperature; • steam generator secondary pressure; • steam generator level; • steam generator steam flow; • steam generator feedwater flow; • reactor coolant system loop flows.
B.3.2.5 For transient (10) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • relief valve flow (if available); • pressurizer pressure; • pressurizer temperature; • pressurizer level; • loop flows; • surge line temperature; • hot leg temperature (surge line leg); • source range monitor output; • reactor vessel level (if available); • saturation margin monitor output (if available).	**B.3.2.5** For transient (10) in Sec. B.3.2.1, record the following parameters simultaneously versus time with a resolution of one second or less: • pressurizer relief valve flow; • pressurizer pressure; • pressurizer temperature; • pressurizer level; • reactor coolant system loop flows; • pressurizer surge line temperature; • reactor coolant system hot leg temperature (surge line leg); • source range monitor output; • reactor vessel level; • saturation or subcooled margin monitor output.

Reason: Editorial Parameter Clarification

Reason Abstained: Concerns that removing "If Available" will require the utility to take exception and thus invite regulatory scrutiny

AI-31 is Closed.

8.7 Next meeting:

Host: Comanche Peak (Dave Goodman)

Tentative Date: Mar 5 Week

8.8 Adjourned: 1045

9. Attachment 1 - Style Guide Review (SK Change)

201x Standard - Style Guide

1. **ANSI Style Guide-sheet – 2003**

   Available at http://www.ansi.org/

   A. General guide-lines
   - **Heavy emphasis on technical integrity (accurate, complete, consistent), a spelling error would only be a minor issue.**
   - **Consistency throughout the document: format, capitalization, etc..**

   B. Strong recommendations:
   - **No requirements in foreword, scope, background, definitions, footnotes.**
   - **Use of "shall" to indicate a requirement; use "should" to indicate a recommendation. Avoid use of "must".**
   - **References: full and complete. Annex is a preferred term to Appendix.**
   - **Number the footnotes sequentially.**

   C. Completeness and consistency of document:
   Pagination, indentation, punctuation, numbering of sections, footnotes, etc.: follow 2009 Standard.

2. **ANSI Style manual, 8th edition, version 1.0, 3/1/91. [historical]**

   http://www.new.ans.org/standards/resources/downloads/docs/ansi-stylemanual.pdf

   This has been replaced by the 2003 guide, but ANS keeps it for reference.

3. ANS NFSC Policy and Procedures Manual

http://www.ans.org/standards/resources/downloads/docs/nfscpolicies.pdf
Section 7.3 Specifying Requirements in a Standard (Shall, Should, and May) (approved Jan 2010).
Directions given in the standard shall use "shall", "should", and "may":
Shall, to designate a mandatory action.
Should, to delineate a recommended action. "Should also indicates that the issue must be addressed and that either the recommended action shall be taken or an equivalent action shall be taken and a basis given for equivalency. "
May, to designate a permissive action.
Avoid "shall consider", "shall, if possible" and equivalent phrases
Note: Three occurrences of "shall consider" or equivalent are found in the 2009 Standard. These may deviate from NFSC rules.

Section 3.2.1.2, end of 1st paragraph: "The following items shall be considered:"

Section 3.2.1.3, end of 1st paragraph: "The following items shall be considered:"

Section 4.4.3.2, end of 4th paragraph: "Evaluation of the test data shall consider:"

Section 7.4 Use of units SI units shall be used either parenthetically with English units or SI units exclusively (approved Nov 2004).

It refers to the NBS publication concerning SI units:

NBS Special Publication 330, "The International System of Units (SI)," U.S. Department of Commerce, 1977. The current version is "NIST Special Publication 330. 2008 Edition; U.S. Department of Commerce, National

Institute of Standards and Technology" available at

http://physics.nist.gov/Pubs/SP330/sp330.pdf

The 2008 edition has no impact on the SI units used in Appendix C of the Standard:
MPa and °C

4. **Other References:**

Google dictionary: http://www.google.com/dictionary
Merriam-Webster: http://www.merriam-webster.com/

The Chicago Manual of Style. Chicago: University of Chicago.

Webster's New International Dictionary of the English Language (Unabridged). Springfield, MA: Merriam-Webster, Inc.

10. Attachment 2 – Motion template

Motion: **Not Carried Amended Withdrawn** • x – For • x – Against • x – Abstained
Name 2011 Nov 17 **Motion**: **Reason**:

Reasons Against: Text goes here…

Reason Abstained: Text goes here…