ANS 3.5 Working Group Meeting Minutes
American Nuclear Society
Granbury Resort Conference Center
2012 March 13-16

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
William Fraser	2012mar13	Westinghouse Electric Company Nuclear Services I-70 Madison Exit 54, MB #20 Madison, PA 15663, USA	**Email**: fraserwa@westinghouse.com **Cell**: 717-304-6225 **Work**: 724-722-5777 **Work**: 724-722-5665
Vincent Gagnon	2012mar13	L-3 MAPPS 8565 Cote-de-Liesse Montreal, Quebec H4T1G5 Canada	Email: vincent.gagnon@l-3com.com Work: 514-787-4927 Cell: 760-638-3348
Roger Jones Proxy for Robert Goldman	2012mar13	Entergy Corp PO Box 31995 Jackson, MS 39213	Email: rjone16@entergy.com Work: 601-940-8923 Cell: 601-368-5619

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
Absent	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
Absent: Proxy	Robert Goldman	Entergy 1340 Echelon Parkway Jackson, MS 39213-8298	Proxy: Roger Jones	**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

Absent	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
Absent	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
41	42	43	44	45	46	47	48	49	50

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. Focus: Transients (AI-9 Closed Granbury Resort) Malfunctions (Closed AI-4 VC Summer) Configuration management DCS Appendix D Review (Limited Scope applications) McDade 2011jun10 – Info presented. Next meeting will propose the first of several anticipated standard changes. 2012Mar14 – Motion Rewrites Sections 3.4.3.1/4.4.3.1 and deleted Appendix B
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	2012Mar16: Closed	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 2012Mar16: Closed with three AI motions
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	Closed: 2012Mar14	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. 2012mar14 – team recommended closure. Standard is sufficient.
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	2012nov18: 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
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	2012mar13: Closed	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. 2012mar13: Closed by Motion

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

30	Closed: 2012Mar14	2011jun10	**Sale**	Review Appendix B Steady State section for deletion. 2012mar14 – AI-9 deleted Appendix. This AI is closed.
31	Closed: 2011nov18	2011jun10	**Petersen** Chang	Review list nomenclature for consistency 2011nov18: Closed by Motion Carried.
32		2011nov17	**McCullough**	Verify testing periodicity terminology consistency across section 4.
33		2011nov18	**Welchel**	Review use and consistency of term Fully Integrated, partially-integrated and Non-integrated, and Standalone with regards to Sections 3 and 4.
34	2012Mar16: Closed	2012Mar14	**Colby**	AI-9 deleted Appendix B, this AI is to review/cleanup remaining references to Appendix B 2012mar16: Closed Two Column Document Rev 4 updated.
35	2012Mar15: Closed	2012Mar15	**Felker** Colby	AI-5 Review the usage of "preference" and "shall" in Section 5.1.2 2012mar15: Closed - The working group reviewed the definitions of "preference" and "precedence". The list may be a precedence list but preference is adequate.
36		2012Mar15	**McCullough** Goodman	Consider replacing the opening paragraph in Section 5. With the following: A configuration management program shall be established to provide a means for demonstrating compliance with Sec. 3, "General Requirements." Section 5.1 is for initial simulator construction or for re-baselining the simulator design, else use Section 5.2.
37		2012Mar15	**Chang**	Consider definitions for "benchmark" and "baseline".

38		2012Mar15	**Rey** Goodman	With the new Section 5 (AI-11 2012mar15), Section 5.3 Assessment of Deviations, review the assessment parameters for adequacy as they apply to operational performance. Previously, the items only applied to physical fidelity.
39		2012Mar15	**Goodman** Chang	Consider revising Section 5.1 to include verification and validation as it applies to initial simulator construction.
40	2012Mar15: Closed	2012Mar15	**Goodman**	Section D.2 cleanup references to 3.2.1.4 and in Section D.3 cleanup references to 4.2.1.4. Closed by Motion
41			**Goodman** Welchel Dennis Felker	Additional review of Section 3.4.1/3.4.2/4.4.1/4.4.2 — Previous sections 3.4.1/3.4.2/4.4.1/4.4.2 use the word "Demonstrate". The new words in Section 5 do not include the word "Demonstrate" — The new Background section no longer refers to V&V, and includes no reference to CM — Review IEEE and ANS 3.5 for alignment of V&V requirements — Review the redefined intent of testing. Is the purpose of testing to "ensure no noticeable differences exist" or is it to "indentify noticeable differences that need to be resolved". (responsibility Dennis)
42			**Chang**	Review the use of "Because" in the first paragraph of section 5.1.2 Simulator Performance Benchmark. Consider "If" or "When". Multiple baseline data are not always available and sometimes no data is available.

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 2012 March 13 (0800)**

5.1 Introduction (0800)

Dave Goodman

5.2 Opening Statement:

5.3 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob
David Goodman
Mac McDade
Michael Petersen
Pablo Rey
Roger Jones (Robert Goldman Proxy)

5.4 Consensus Level

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

Proxy/Visitors:

Tim Dennis
Roger Jones: Goldman Proxy
Vincent Gagnon
William Fraser

5.5 Standard Completion Schedule:

Felker presented a schedule for discussion:

ID	Task Name	Start	Duration
131	ANS 3.5 Standard Draft Changes Complete	2013Feb01	1 Day
132	Outstanding Issues Meeting	2013Jun14	5 Days
133	Prepare/Submit proposed standard: • ANS-21 • NFSC • Public Review	2013Nov15	1 Day
134	Address/Resolution Comments Meeting	2014Mar10	1 Day
135	Outstanding Issues Meeting	2014Jun16	1 Day
136	5 Yr Maintenance Activities End	2014Sep04	1 Day

5.6 Motion (Carried): VC Summer Minutes Approve

Motion: **Carried** • 13 – For • 0 – Against • 0 – Abstained
Name 2012 Mar 13 **Motion**: Approve VC Summer Minutes Draft rev 12

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

Motion: **Carried** • 13 – For • 0 – Against • 0 – Abstained
Name 2012 mar 13 **Motion**: Agenda Rev 0 with changes

5.8 Business Rules

Roberts Rules of Order

5.9 Members reviewed Rules of the Chair (no change)

5.10 Officers reports

Florence	Reviewed the 2012 SCS conference Power Point Negative SCS conference feedback: Addition of Normal Evolutions testing periodicity. 2009 Transitions: 2011- 26 2012 – 22 2012 - 5 Total Simulators 72.
Welchel	No report
Colby	New two column document. Two column document shows 2009 against 201x.

	Three column document is the two column document plus additional text on what is changed between standards.
Chang	No report
Vick	**Parliamentarian Report** (Larry Vick) As a follow-up to AI-26, a review and evaluation of previous meeting minute's motions that were "Not Carried" was conducted to determine if the revised Rule of the Chair from the last meeting adversely affects the voting results. The following report shows only one motion that was "Not Carried." The motion is described in Section 7.7 of the June 7-10, 2011, meeting minutes (Westinghouse Headquarters, Cranberry Township, Pennsylvania). The vote outcome was: 11 "For"; 4 "Against"; 0 "Abstained." At the last meeting, based on RRO (Robert's Rules of Order), it was determined that amended motion should have been "Carried" based on a majority vote outcome instead of a consensus outcome. Section 5.5 of the minutes of the last meetings at the V.C. Summer Nuclear Station Training Center now records the amended motion vote outcome as "Carried." **Review and Evaluation of Previous Meeting Minutes Motions Report** Meeting Minutes on November 15-18, 2011, at VC Summer (South Carolina) 1. Section 5.5, Amended Motion (Carried) "AI-8 Appendix B Steady State [Parameter] List Removal," Vote count: 11 "For"; 4 "Against"; 0 "Abstained." 2. Section 5.6, Motion (Carried) "Westinghouse Cranberry Twp Minutes Approve," Vote count: 16 "For"; 0 "Against"; 0 "Abstained." 3. Section 5.7, Motion (Carried) "Summer Agenda Rev 0 Review and Approval," Vote count; 16 "For"; 0 "Against"; 0 "Abstained." 4. Section 5.14, Amended Motion (Carried) "Instructor Station Testing Periodicity," Vote count: 15 "For"; 1 "Against"; 0 "Abstained." 5. Section 6.6, Amended Motion (Carried) "Section 3.1.4 Malfunctions," Vote count: 12 "For"; 2 "Against"; 2 "Abstained." 6. Section 6.9, Amended Motion (Carried) "Real Time and Repeatability," Vote count: 13 "For"; 1 "Against"; 1 "Abstained." 7. Section 7.5, Amended Motion (Carried) "Normal Evolutions Periodicity," Vote count: 12 "For"; 2 "Against"; 0 "Abstained." 8. Section 8.7, Amended Motion (Carried) "List Consistency," Vote count: [14 "For"; 0 "Against"; 1 "Abstained."

	Meeting Minutes on June 7-10, 2011, at Westinghouse Headquarters, Cranberry Twp, (Pennsylvania) 9. Section 5.4, Motion (Carried) "Crystal River Minutes Approve," Vote count: 15 "For"; 0 "Against"; 0 "Abstained." 10. Section 5.5, Motion (Carried) "Agenda Review and Approval," Vote count: 15 "For"; 0 "Against"; 0 "Abstained." 11. Section 6.9, Motion (Carried) "AI-4 Section 3.1.4 Adding Cause Requirement," Vote count: 14 "For"; 1 "Against"; 0 "Abstained." 12. Section 7.4, Motion (Carried) "Section 4.1.3.1.1 T-average Editorial change," Vote count: 12 "For"; 2 "Against"; 1 "Abstained." 13. Section 7.7, Amended Motion (Not Carried) "AI-8 Appendix B Steady State List," Vote count: 11 "For"; 4 "Against"; 0 "Abstained." 14. Section 7.10, Motion (Carried) "AI-5 Normal Evolutions," Vote count: 14 "For"; 1 "Against"; 0 "Abstained." 15. Section 7.12, Motion (Carried) "AI-5 Malfunction Testing Periodicity," Vote count: 14 "For"; 1 "Against"; 0 "Abstained." 16. Section 8.3, Motion (Carried) "AI-5 Physical Fidelity and Human Factors Periodicity," Vote count: 13 "For"; 2 "Against"; 0 "Abstained." 17. Section 8.4, Motion (Carried) "AI-5 Instructor Station Testing Periodicity," Vote count: 13 "For"; 2 "Against"; 0 "Abstained." 18. Section 8.5, Motion (Carried) "AI-5 Limits of Simulation Notification Testing Periodicity," Vote count: 14 "For"; 1 "Against"; 0 "Abstained." Meeting Minutes on January 25-27, 2011, at Crystal River (Florida) 19. Section 6.3, Motion (Carried) "wording in scope statement," Vote count: 16 "For"; 0 "Against"; 0 "Abstained." 20. Section 6.3, Amended Motion (Carried) "wording in scope statement," Vote count: 13 "For"; 2 "Against"; 1 "Abstained." Meeting Minutes on October 5-6, 2010, at ANS Headquarters (Illinois) No Motions brought forward by any member in attendance.

INPO	No report
USUG (Florence)	No report

5.11 NRC (Vick)

On February 15, 2012, NRC's Larry Vick and Peter Presby presented "U.S. Nuclear Power Plant Simulation Facility Perspective" at the 2012 International Conference on Simulation Technology for Power Plants in San Diego, CA. The slide presentation is available in NRC's ADAMS. Also, Jim Kellum of the Office of New Reactors gave an update on new reactors, etc.

5.12 AI-25 Appendix B parameters (Chang)

AI 25 Team Chang, Tarselli **03/10/2012**

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.

Another reason for action: Westrain comments on the 2009 draft Standard and WG resolution.

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Westrain comment #36 Applicable Section: 4.1.3.1.2 (PWR 2% parameters)

Reason for Comment: Add the following parameters from appendix B to the 2% list.

Suggested Wording: Containment Pressure, Pressurizer Temperature,

Westrain comment #37 Applicable Section: 4.1.3.1.4 (BWR 2% parameters)

Reason for Comment: Add the following parameter from appendix B to the 2% list.

Suggested Wording: Control rod drive hydraulic system flow and temperature

WG resolution on both comments:

Comment not accepted by WG.

The consensus of the working group is that the appendix is for information only and the list included in 4.1.3.1 is providing direction for parameter analysis. During the next standard revision the working group has created an action item to review with due diligence the list in the body and appendix.

Refer to Minutes Section 10.22.

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Method of Analysis includes:

- **Importance to simulator fidelity,**
- **Covered elsewhere in the Standard, explicitly or implicitly,**
- **Impact on reactivities,**
- **Consistency between BWR's and PWR's,**
- **Operator training and examination support.**

Analysis and Recommendations to WG:

1. **BWR control rod drive (CRD) hydraulic system flow and temperature**

   These two parameters are contributors to reactor core thermal power calculations. Magnitudes are compatible to charging and letdown flows in PWR's (2% parameters).

   Recommendation: add CRD flow and temperature to the 2% parameter list.

2. **BWR secondary plant heat balance data**

   2% accuracy not needed to support operator training and examinations. Parameter has no direct impact on reactivities. It is not a contributor to core thermal power determination; and it has no or little impact on any other 1% or 2% parameters.

   Sec. 3.1.3 Normal Evolutions item (9) *Unit performance testing such as heat balance…… through the use of permanently installed instrumentation;* of the 1998 Standard has been removed from the 2009 Standard. Secondary plant heat balance testing, such as extraction steam flows and temperatures, is not a requirement of the Standard. The Standard does require the reactor core thermal power be within1% of the reference unit data.

   Recommendation: Not add to the steady state parameter list.

3. **PWR containment pressure**

   2% accuracy not needed to support operator training and examinations. Parameter has no direct impact on reactivities. It is not a contributor to reactor core thermal power determination; and it has no or little impact on any other 1% or 2% parameters. BWR containment pressure is neither a 1% nor2% parameter.

   Recommendation: Not add to the steady state parameter list.

4. **PWR boron concentration**

   It is reactivity!

a) HZP

Table A-1 of *ANSI/ANS-19.6.1 reload startup physics tests for pressurized water reactors* provides a typical test criterion of ±50 PPM for HZP all rods out critical boron.

An example of the acceptance criterion of a reference unit: a review criterion of ±50 ppm and an acceptance criterion of ±1000 pcm.

b) Intermediate Power

No ANSI/ANS guidelines were found. It is difficult, if not impossible, to establish an acceptance criterion for intermediate power levels. The power history of the reference unit and that of the simulator may be quite different. Xenon and Samarium worths depend on power history. Therefore the xenon and samarium concentrations can be very different. The boron concentrations at an intermediate power level with non-equilibrium Xe or Sm can vary substantially. Matching the boron concentrations of the simulator to those of the reference unit has little or no benefits.

c) HFP

No ANSI/ANS guidelines were found. An example of how HFP boron concentrations are tested in a reference unit:

HFP boron concentrations are measured monthly as part of core follows. If the difference between the measured and the predicted boron concentrations is greater than 300 pcm, the core design group is notified but no other action is required. If the difference is greater than 400 pcm, a condition report is generated. If the difference is greater than 600 pcm, re-evaluation of shutdown margin is required.

Section 4.4.3.3 Simulator reactor core performance testing, 2nd paragraph:

It shall be demonstrated that the simulator response during conduct of simulator reactor core performance testing meets the reference unit procedures' acceptance criteria.

Boron concentration is part of reactor core performance testing. The acceptance criteria are described in respective reference unit's core design report or plant procedures.

Recommendation: Not add to the steady state parameter list.

5. **PWR pressurizer temperature**

   2% accuracy not needed to support operator training and examinations. Parameter has no direct impact on reactivities. It is not a contributor to core thermal power determination; and it has no impact on any other 1% or 2% parameters.

   Discrepancies in pressurizer temperature would show up in manual reactor trip transient test and possibly other transient tests as well.

   Recommendation: Not add to the steady state parameter list.

6. **PWR control rod positions**

   Same as item 4, *PWR boron concentration. Also* BWR control rod positions is neither a 1% nor a 2% parameter.

   Recommendation: Not add to the steady state parameter list.

7. **PWR secondary plant heat balance**

   Same as item 2, *BWR secondary plant heat balance data*.

   Recommendation: Not add to the steady state parameter list.

Motion

Add "**• control rod drive system flow and temperature;"** to the list of parameters in Section 4.1.3.1.4 (before ***main generator gross electrical power***).

5.13 AI-25 Motion(Carried) Section 4.1.3.1.4 with Appendix B parameter

Motion: **Carried**

- 12 – For
- 1 – Against
- 0 – Abstained

Name
2012 Mar 13

Motion:

Add "• control rod drive system flow and temperature;" to the list of parameters in Section 4.1.3.1.4 (before *main generator gross electrical power*)

Section 4.1.3.1.4 will read:

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;**
- **control rod drive system flow and temperature;**
- **main generator gross electrical power.**

Reason: New parameter is required for heat balance and for consistency.

Reasons Against: The second paragraph in Section 4.1.3.1 regarding Steady State operation computed values is sufficient. Therefore, add a new parameter is unnecessary.

AI-25 is Closed by Motion

5.14 AI-9 New Builds (Felker)

AI-9 discussion continued for the remainder of the afternoon.

The following was presented for discussion. Discussions were lengthy and the WG developed alternate wordings.

NO CHANGE to 3.4.3.1 and the lead in to 4.4.3.1:

3.4.3.1 Simulator operability testing

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.

Section 4.4.3.1

4.4.3.1 Simulator operability testing

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.

START OF MOTION – Add the following to Section 4.4.3.1:

Acceptable simulator steady-state performance shall be demonstrated through the comparison of parameters between the simulator and the reference unit. The comparison shall be done for three distinct power levels spanning at least 50% of the operating range for which heat balance data is available. The set of parameters to be monitored as acceptance criteria are identified in Sects. 4.1.3.1.1, 4.1.3.1.2, 4.1.3.1.3 and 4.1.3.1.4.

The intent of simulator transient performance testing is to verify integrated simulator response and not to test individual or combinations of malfunctions. The simulator transient performance test shall demonstrate acceptable transient performance response through comparison of parameters between the simulator and the simulator design baseline. A representative set of simulator transient performance tests shall be selected to demonstrate integrated model performance of the simulator. Selection of such tests shall consider the reference unit design, Operational Transients, Anticipated Operational Occurrences, Faults of Moderate Frequency, Loss-of-Coolant Accidents, Anticipated Transient without Scram, Design Basis Events, and Station Blackout. Preference should be given to those transients reasonably expected to occur during the life of the reference unit. The transients shall be initiated from an appropriate initial condition with steady state xenon and decay heat and no operator follow-up actions unless specifically noted.

The set of parameters to be monitored for each selected simulator transient performance test shall be those parameters at a minimum that require direct and continuous monitoring to diagnose and mitigate the consequences of the transient and any additional data as maybe useful to evaluate the integrated simulator performance. Section 4.1.4 defines acceptance criteria for the simulator transient performance tests.

Each transient shall run to a stable operating condition. Monitored parameters shall be recorded with a resolution of one second or less. The recorded data shall be compared to simulator data in accordance with Section 5.1.1 Utilization of baseline data. A record of the conduct of this test and its evaluation shall be retained until superseded.

Replace Appendix "B" with the following:

Guidelines for the Conduct of Simulator Transient Testing

The purpose of this appendix is to provide examples of simulator transient tests for demonstration of simulator operability. The example tests documented herein will clarify the scope and intent of simulator transient testing required

by Sec. 4.4.3.1 of the standard.

B.1 Introduction

Formal test procedures should be generated for simulator transient tests and acceptance criteria should be established for validation commensurate with the requirements of Sec. 4.4 of the standard.

B.2 Transient performance tests

A representative set of simulator transient performance tests shall be selected to demonstrate integrated model performance of the simulator. It is not required that all tests within a particular reactor type be conducted.

B.2.1 BWR simulator transient test suggestions

1. manual scram;
2. simultaneous trip of all feedwater pumps;
3. simultaneous closure of all main steam isolation valves;
4. simultaneous trip of all recirculation pumps;
5. single recirculation pump trip;
6. main turbine trip from maximum power level that does not result in an immediate reactor scram;
7. maximum rate power ramp (master recirculation flow controller in "manual") down to ~75% and back up to 100%;
8. maximum size reactor coolant system rupture combined with loss of all offsite power;
9. maximum size unisolable main steam line rupture;
10. simultaneous closure of all main steam isolation valves combined with single stuck open safety or relief valve (inhibit activation of high pressure emergency core cooling systems);
11. trip of all reactor internal pumps;
12. closure of one turbine control valve;
13. closure of one main steam isolation valve;
14. runout of one feedwater pump;
15. runout of all feedwater pumps;
16. inadvertent safety relief valve opening;
17. inadvertent relief valve opening;
18. stuck open safety relief valve;

19. abnormal startup of idle reactor internal pump;
20. recirculation flow control failure – runout of all reactor internal pumps;
21. recirculation flow control failure – runback of all reactor internal pumps;
22. reactor internal pump seizure;
23. reactor shutdown from outside main control room;
24. reactor shutdown without control rods;
25. loss of feedwater heating;
26. generator load rejection with total turbine bypass failure;
27. turbine trip with total turbine bypass failure;
28. loss of condenser vacuum;
29. loss of shutdown cooling capability;
30. inadvertent shutdown cooling activation;
31. loss of grid connection;
32. pressure regulator failure – opening all turbine control and bypass valves; and
33. pressure regulator failure – closing all turbine control and bypass valves

B.2.2 PWR simulator transient test suggestions

1. manual reactor trip;
2. simultaneous trip of all feedwater pumps;
3. simultaneous closure of all main steam isolation valves;
4. simultaneous trip of all reactor coolant pumps;
5. trip of any single reactor coolant pump;
6. main turbine trip from maximum power level that does not result in immediate reactor trip;
7. maximum rate power ramp from 100% down to ~75% and back up to 100%;
8. maximum size reactor coolant system rupture combined with loss of all offsite power;
9. maximum size unisolable main steam line rupture;
10. slow primary system depressurization to saturated condition with pressurizer relief or safety valve stuck open (inhibit activation of high pressure emergency core cooling system);
11. maximum design load rejection;
12. closure of one turbine control valve;
13. closure of one main steam isolation valve;
14. runout of one feedwater pump;
15. runout of all feedwater pumps;

16. inadvertent safety relief valve opening;
17. inadvertent relief valve opening;
18. stuck open safety relief valve;
19. loss of feedwater heating;
20. pressure regulator failure resulting in decreasing steam flow;
21. loss of condenser vacuum;
22. reactor coolant pump shaft seizure;
23. CVCS system failure resulting in a decreasing boron concentration;
24. CVCS system failure resulting in an increase in reactor coolant inventory;
25. reactor shutdown from outside main control room;
26. reactor shutdown without control rods;
27. loss of feedwater heating;
28. generator load rejection with total turbine bypass failure;
29. turbine trip with total turbine bypass failure;
30. loss of shutdown cooling capability;
31. inadvertent shutdown cooling activation;
32. loss of grid connection;
33. pressure regulator failure – opening all turbine control and bypass valves; and
34. pressure regulator failure – closing all turbine control and bypass valves.

END OF MOTION

Based on the Summer meeting the full committee offered the AI-9 Tiger Team the following feedback. My responses are in bold, italics:

Working Group Comments:

- Repeating statements between sections – **Agree, this is not good standards' practice**
- Add USAR to example list – **Did not include, addressed various Rx vendors categorization and not documents;**
- Get rid of specific count of 10 transients – **Agree, an appropriate number of transients**
- Establish different set of acceptance criteria (do not use Malf Acceptance Criteria) (SK to supply language) – Provided

- Delete Appendix B – B **remains but it's purpose is changed**
- Retain List in Appendix B – **B remains but it's purpose is changed**
- Add benchmark selection criteria- Provided
- Appendix B should supply Transient Selection Guidance for new builds – **Standard provides guidance and appendix "B" provides lists**
- No change is necessary. Refer to Reg Guide 1.149 rev4 discussion section – **Changes have been made**
- Delete duplication between standard body and Appendix - **Agree**
- Appendix B could be for New Builds Only - **B remains but it's purpose is changed**
- New Definitions - New Builds e.g. in above text

5.15 AI-9 Motion(Postponed) Section 4.4.3.1 and Appendix B

Motion: **Postponed**

- x – For
- x – Against
- x – Abstained

Name
2012 mar 13

Motion:

Replace the last paragraph in Section 4.4.3.1 with the following:

Acceptable simulator steady-state performance shall be demonstrated through the comparison of parameters between the simulator and the reference unit. The comparison shall be done for three distinct power levels spanning at least 50% of the operating range for which heat balance data is available. The set of parameters to be monitored as acceptance criteria are identified in Sects. 4.1.3.1.1, 4.1.3.1.2, 4.1.3.1.3 and 4.1.3.1.4.

The intent of simulator transient performance testing is to verify integrated simulator response and not to test individual or combinations of malfunctions. The simulator transient performance test shall demonstrate acceptable transient performance response through comparison of parameters between the simulator and the simulator design baseline. A representative set of simulator transient performance tests shall be selected to demonstrate integrated model performance of the simulator. Selection of such tests shall consider the reference unit design, Operational Transients, Anticipated Operational Occurrences, Faults of Moderate Frequency, Loss-of-Coolant Accidents, Anticipated Transient without Scram, Design Basis Events, and Station Blackout. Preference should be given to those transients reasonably expected to occur during the life of the reference unit. The transients shall be initiated from an appropriate initial condition with steady state xenon and decay heat and no operator follow-up actions unless specifically noted.

The set of parameters to be monitored for each selected simulator transient performance test shall be those parameters at a minimum that require direct and continuous monitoring to diagnose and mitigate the consequences of the transient and any additional data as maybe useful to evaluate the integrated simulator

performance. Section 4.1.4 defines acceptance criteria for the simulator transient performance tests.

Each transient shall run to a stable operating condition. Monitored parameters shall be recorded with a resolution of one second or less. The recorded data shall be compared to simulator data in accordance with Section 5.1.1 Utilization of baseline data. A record of the conduct of this test and its evaluation shall be retained until superseded.

Replace Appendix "B" with the following:

Guidelines for the Conduct of Simulator Transient Testing

The purpose of this appendix is to provide examples of simulator transient tests for demonstration of simulator operability. The example tests documented herein will clarify the scope and intent of simulator transient testing required by Sec. 4.4.3.1 of the standard.

B.1 Introduction

Formal test procedures should be generated for simulator transient tests and acceptance criteria should be established for validation commensurate with the requirements of Sec. 4.4 of the standard.

B.2 Transient performance tests

A representative set of simulator transient performance tests shall be selected to demonstrate integrated model performance of the simulator. It is not required that all tests within a particular reactor type be conducted.

B.2.1 BWR simulator transient test suggestions

34. manual scram;
35. simultaneous trip of all feedwater pumps;
36. simultaneous closure of all main steam isolation valves;
37. simultaneous trip of all recirculation pumps;
38. single recirculation pump trip;
39. main turbine trip from maximum power level that does not result in an immediate reactor scram;
40. maximum rate power ramp (master recirculation flow controller in "manual") down to ~75% and back up

to 100%;

41. maximum size reactor coolant system rupture combined with loss of all offsite power;
42. maximum size unisolable main steam line rupture;
43. simultaneous closure of all main steam isolation valves combined with single stuck open safety or relief valve (inhibit activation of high pressure emergency core cooling systems);
44. trip of all reactor internal pumps;
45. closure of one turbine control valve;
46. closure of one main steam isolation valve;
47. runout of one feedwater pump;
48. runout of all feedwater pumps;
49. inadvertent safety relief valve opening;
50. inadvertent relief valve opening;
51. stuck open safety relief valve;
52. abnormal startup of idle reactor internal pump;
53. recirculation flow control failure – runout of all reactor internal pumps;
54. recirculation flow control failure – runback of all reactor internal pumps;
55. reactor internal pump seizure;
56. reactor shutdown from outside main control room;
57. reactor shutdown without control rods;
58. loss of feedwater heating;
59. generator load rejection with total turbine bypass failure;
60. turbine trip with total turbine bypass failure;
61. loss of condenser vacuum;
62. loss of shutdown cooling capability;
63. inadvertent shutdown cooling activation;
64. loss of grid connection;
65. pressure regulator failure – opening all turbine control and bypass valves; and
66. pressure regulator failure – closing all turbine control and bypass valves

B.2.2 PWR simulator transient test suggestions

35. manual reactor trip;
36. simultaneous trip of all feedwater pumps;
37. simultaneous closure of all main steam isolation valves;

38. simultaneous trip of all reactor coolant pumps;
39. trip of any single reactor coolant pump;
40. main turbine trip from maximum power level that does not result in immediate reactor trip;
41. maximum rate power ramp from 100% down to ~75% and back up to 100%;
42. maximum size reactor coolant system rupture combined with loss of all offsite power;
43. maximum size unisolable main steam line rupture;
44. slow primary system depressurization to saturated condition with pressurizer relief or safety valve stuck open (inhibit activation of high pressure emergency core cooling system);
45. maximum design load rejection;
46. closure of one turbine control valve;
47. closure of one main steam isolation valve;
48. runout of one feedwater pump;
49. runout of all feedwater pumps;
50. inadvertent safety relief valve opening;
51. inadvertent relief valve opening;
52. stuck open safety relief valve;
53. loss of feedwater heating;
54. pressure regulator failure resulting in decreasing steam flow;
55. loss of condenser vacuum;
56. reactor coolant pump shaft seizure;
57. CVCS system failure resulting in a decreasing boron concentration;
58. CVCS system failure resulting in an increase in reactor coolant inventory;
59. reactor shutdown from outside main control room;
60. reactor shutdown without control rods;
61. loss of feedwater heating;
62. generator load rejection with total turbine bypass failure;
63. turbine trip with total turbine bypass failure;
64. loss of shutdown cooling capability;
65. inadvertent shutdown cooling activation;
66. loss of grid connection;
67. pressure regulator failure – opening all turbine control and bypass valves; and
68. pressure regulator failure – closing all turbine control and bypass valves.

5.16 AI-9 Motion(Carried) to Postpone AI-9 Discussion

Motion: **Carried** • 13 – For • 0 – Against • 0 – Abstained
Name 2012Mar13 **Motion**: Postpone AI-9 discussion until Wednesday.

5.17 Recessed: 1740

6. **Wednesday 2012 March 14 (0800)**

6.1 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob
David Goodman
Mac McDade
Pablo Rey
Roger Jones (Robert Goldman Proxy)

6.2 Consensus Level

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

6.3 AI-9 new Builds Continued

The following wording was crafted by the WG that updates Section's 3.4.3.1 and 4.4.3.1

CHANGE to 3.4.3.1, 4.4.3.1, Appendix B:

3.4.3.1 Simulator operability testing

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.

The determination of the type and number of transient performance tests shall demonstrate integrated model performance within the scope of simulation. Preference should be given to those transients expected to occur during the life of the reference unit. The transient selection process should utilize the following references:

(1) reference unit design;
(2) operational transients;
(3) anticipated operational occurrences;
(4) faults of moderate frequency;
(5) loss-of-coolant accidents;
(6) design basis events.

Section 4.4.3.1

4.4.3.1 Simulator operability testing

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.

Simulator steady-state performance shall be demonstrated through the comparison of steady-state response to reference unit performance. The comparison shall be done for three distinct power levels spanning at least 50% of the operating range for which heat balance data is available. The minimum set of parameters to be monitored and

acceptance criteria are identified in Sec. 4.1.3.1.

Simulator transient performance shall be demonstrated through the comparison of transient performance response to actual or predicted reference unit performance. The intent of simulator transient performance testing is to verify integrated simulator response and not to test malfunctions. Sec. 4.1.4, items (2) through (4) define acceptance criteria for the simulator transient performance tests. The minimum set of parameters to be monitored for each selected transient performance test shall be those parameters required to evaluate integrated simulator performance.

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

6.4 AI-9 Motion(Amended-Carried) Section 4.4.3.1 and Appendix B

Motion: **Carried**

- 12 – For
- 0 – Against
- 0 – Abstained

Name
2012 Mar 14

Motion:

Replace Section 3.4.3.1 with the following:

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.

The type and the number of transient performance tests selected shall be sufficient to demonstrate integrated model performance within the scope of simulation. Preference should be given to those transients expected to occur during the life of the reference unit. The transient selection process should utilize the following references:

(1) reference unit design;
(2) operational transients;
(3) anticipated operational occurrences;
(4) faults of moderate frequency;
(5) loss-of-coolant accidents;
(6) design basis events.

Replace Section 4.4.3.1 with the following:

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.

Simulator steady-state performance shall be demonstrated through the comparison of steady-state response to reference unit performance. The comparison shall be done for three distinct power levels spanning at least 50% of the operating range for which heat balance data is available. The minimum set of parameters to be monitored and acceptance criteria are identified in Sec. 4.1.3.1.

Simulator transient performance shall be demonstrated through the comparison of transient performance response to actual or predicted reference unit performance. The intent of simulator transient performance testing is to verify integrated simulator response and not to test malfunctions. Sec. 4.1.4, items (2) through (4) define the acceptance criteria for the simulator transient performance tests. The minimum set of parameters to be monitored for each selected transient performance test shall be those parameters required to evaluate integrated simulator performance.

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

Delete Appendix B

Reason:

Accommodate new reactor design transient selection

AI-30 Closed: With the deletion of Appendix B, AI-30 (Review Appendix B Steady State section for deletion) is also closed.

6.5 New AI-34 Review/cleanup remaining Appendix B references

AI-9 deleted Appendix B, this AI is to review/cleanup remaining references to Appendix B

6.6 AI-17 Discussion (Mcdade) Section 1.2 Clarification

Recommendation is that Section 1.2 is sufficient. Reactivity requirements are presently covered with the standard as written.

The working group decided to not address experience requirements in the scope statement and therefore the need to address experience in the background is not needed. The regulations addressed in the scope address reactivity manipulations sufficiently.

The working group agreed to AI-17 closure.

6.7 AI-11 Goodman Configuration Management

The working group reviewed the following presentation.

Three motions are presented to the working group:

1. New Section 5 wording
2. Remove Sections 3.2.1.4/4.2.1.4 Assessment of deviations
3. Remove Section 3 and 4 references to Verification and Validation

Key Points:

- Move some requirements from section 4 to 5 (e.g. Assessment of deviations)
- Replace “Design Database” with “Design Baseline”
- Delete the definition of “Design Database”
- Replace Section 5
- The word “Baseline” is not fully understood
- Post RFT, only the Performance Baseline is updated.
- Some discussion centered on the single 24 month timeline regarding reference unit modifications and that the previous standard included several clocks.
-

6.8 AI-11 Motion(Postponed) Section 5

Motion: **Postponed**

- x – For
- x – Against
- x – Abstained

Name
2012 Mar 14

Motion:

Delete the definition "design database"

Replace the definition of "reference unit" with:

The specific nuclear power plant unit, identified by a unique docket number, from which the simulator control room configuration, system control arrangement, and simulator design baseline **(data)** are derived.

Replace the last paragraph in Section 4.1.2 with the following:

It shall be demonstrated that the limits of simulation are identified as part of the simulator design baseline and that automatic or administrative means are in place for notification to the instructor that the limits of simulation have been reached or exceeded.

Replace Section 5 with the following:

A configuration management program shall be established to provide a means for demonstrating compliance with Sec. 3, "General Requirements."

5.1 Initial Construction Program Requirements
A configuration management program shall be established to document the adequacy of initial design and performance of the simulator. The configuration management program for initial simulator construction shall include:

1. a means for establishing a simulator design baseline;
2. a means for establishing a simulator performance baseline; and
3. a means for identifying acceptable differences between the simulator and the reference unit .

5.1.1 Simulator design baseline. The simulator design baseline comprises the simulator design data, hardware configuration, and software configuration at the time the simulator is approved for use. The simulator design baseline includes the following, as each applies to the defined scope of simulation:

1. reference unit design drawings and specifications;
2. reference unit operating procedures;
3. simulator supporting calculations and analyses;
4. simulator model assumptions and simplifications;
5. simulator software requirements; and
6. equipment vendor documentation.

Design baseline documentation shall provide for relating the final simulator design to the source of the design requirement. The documentation shall be of sufficient detail to permit verification of the simulator configuration by personnel who are experienced in the subject activity.

5.1.2 Simulator performance baseline. The simulator performance baseline comprises the reference data necessary for the completion of operability testing defined in Sec. 4.4.3.1 at the time the simulator is approved for use. Because multiple sources of baseline data may be available, the order of preference to ensure simulator fidelity shall be as follows:

1. data collected directly from the reference unit;
2. data generated through engineering analysis with a sound theoretical basis;
3. data collected from a plant which is similar in design and operation to the reference unit;
4. data from subject matter expert estimates;
5. other data sources.

Simulator performance baseline documentation shall provide the expected response of key parameters for each test. For those instances where data are collected from sources other than the reference unit, the data source shall be specifically identified and demonstrated to be applicable to the simulator. The documentation shall be of sufficient detail to permit verification of the simulator performance by personnel who are experienced in the

subject activity.

5.1.3 Acceptable simulator differences. Noticeable differences in hardware, software, and physical configuration between the simulator and its reference unit shall be identified at the time the simulator is approved for use. A training needs assessment shall be performed for each noticeable difference to determine if a change to the simulator is required. Noticeable differences that do not impact the actions to be taken by the operator or do not detract from training are acceptable and are not required to be corrected. Unacceptable differences are considered simulator discrepancies. Documentation of acceptable simulator differences, including the associated training needs assessment, shall be maintained as long as the noticeable difference exists.

5.2 Change control program requirements
A configuration management program shall be established to verify the adequacy of changes to the design and performance of the simulator. Simulator changes shall be performed within the context of a structured process for design and testing using written instructions established for control of the simulator hardware and software configuration. The configuration management program for simulator changes shall include:

1. a means for identifying acceptable differences between the simulator and the reference unit;
2. a means for assessing and correcting simulator discrepancies;
3. a means for verifying and validating simulator changes; and
4. a means for maintaining a simulator performance baseline.

5.2.1 Acceptable simulator differences. A process shall be established to identify noticeable differences in hardware, software, and physical configuration between the simulator and its reference unit. A training needs assessment shall be performed for each noticeable difference to determine if a change to the simulator is required. Noticeable differences that do not impact the actions to be taken by the operator or do not detract from training are acceptable and are not required to be corrected. Unacceptable differences are considered simulator discrepancies and shall be assessed in accordance with Sec. 5.2.2. Documentation of acceptable simulator differences, including the associated training needs assessment, shall be maintained as long as the noticeable difference exists.

5.2.2 Assessment of simulator discrepancies. Written instructions shall be established for resolving simulator discrepancies identified during simulator use, simulator testing, and review of reference unit modifications. Documentation of each simulator discrepancy shall include:

1. a description of the discrepancy;
2. a description of the change made to the simulator configuration; and

3. a description of the testing performed to validate the change.

Documentation of the change and the testing shall be of sufficient detail to permit verification of the simulator performance by personnel who are experienced in the subject activity.

Simulator performance discrepancies that are not intended to be corrected or relevant reference unit modifications that are not intended to be implemented on the simulator shall be evaluated as an acceptable simulator difference in accordance with Sec. 5.2.1. The following parameters should be evaluated to determine if the discrepancy has an impact on the actions to be taken by the operators:

1. the human-system interface required for normal, abnormal, or emergency procedures;

2. the differences in performing the task on the simulator versus performing the task in the reference unit control room;

3. the differences in operator cues, auditory and visual information presented to the operator, and the critical decisions and actions required of the operator;

4. the function of the equipment and the potential for impacting reference unit safety, tripping the reference unit, or damaging reference unit equipment;

5. the differences required by the team response to normal, abnormal, or emergency actions; and

6. review of operational experience to identify the potential for operator error or the necessity for reinforcement of the skills required for the task.

5.2.3 Simulator change verification and validation. Simulator change verification and validation is part of a structured design and development process for proposed changes to the simulator configuration. Verification and validation shall be performed whenever simulation models, facilities, or computer systems are modified in a way that potentially affects simulator fidelity. Simulator changes shall be evaluated against the applicable criteria provided in Sec. 3, "General Requirements."

5.2.3.1 Simulator change verification. Change verification shall be performed by comparing the design of simulated components or systems to design requirements. The extent and nature of the verification shall be based on the importance of the change under consideration, the complexity of the modification, and potential impact on simulator fidelity.

5.2.3.2 Simulator change validation. Change validation shall be performed by comparing the performance of modified simulated components or systems to actual or predicted behavior. Validation shall be completed prior to using the proposed change in the conduct of operator training or examination. Simulator validation may be performed in a fully integrated, partially integrated, or stand-alone mode of system operation.

5.2.4 Maintenance of the simulator performance baseline. The simulator performance baseline comprises the reference data necessary for the completion of operability testing defined in Sec. 4.4.3.1. The simulator performance baseline shall be maintained current with the expected response of key parameters identified for each test.

Modifications made to the reference unit may result in a change in the expected nuclear and thermal hydraulic characteristics of the reference unit. An evaluation of the simulator performance baseline shall be performed following relevant significant modifications to the reference unit in order to identify and implement required changes to the baseline. The results of the evaluation shall be documented and the source of the data for the revised baseline shall be identified.

Replace Section D.4 with the following:

The configuration management requirements described in Section 5 should be adapted to the part-task and limited-scope simulator based on the part-task and limited-scope analysis

Reason: This motion addresses Section 5 industry comment received during the 2009 standard approval process. The proposed motion will remove all references to “database”, therefore a definition for “design database is no longer needed. Proposed Section 5 wording provides performance based configuration management requirements for initial simulator construction and post RFT change control. Proposed change control program requirements include assessment of deviations, and change verification and validation.

6.9 New Consensus Level

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

6.10 AI-11 Motion(Carried) to Postpone AI-11 Discussion

Motion: **Carried** • 13 – For • 0 – Against • 0 – Abstained
Name 2012Mar13 **Motion**: Postpone AI-11 discussion until Thursday. **Reason**:

6.11 Recessed: 1735

7. Thursday 2012 March 15 (0800)

7.1 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
McCullough, George
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob
David Goodman
Mac McDade
Michael Petersen
Pablo Rey
Roger Jones (Robert Goldman Proxy)

7.2 Consensus Level

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

7.3 AI-11 Discussion continued

There was discussion concerning the use of shall for a preference when defining a list to consider (i.e section 5.1.2). A new AI-35 is created to review the use of "preference" and "shall" in Section 5. Possibly change "preference" to "precedence"

7.4 AI-11 Motion(Amended-Carried) Section 5

Motion: **Carried**

- 12 – For
- 0 – Against
- 1 – Abstained

Name
2013mar15

Motion:

Delete the definition "design database":

design database: The design documents, performance data, records, assumptions, simplifications, derivations, and other definable data that form the basis of the design of the simulator hardware and software.

Replace the definition of "reference unit" with:

The specific nuclear power plant unit, identified by a unique docket number, from which the simulator control room configuration, system control arrangement, and simulator design data are derived.

Delete the last paragraph in Section 4.1.2:

It shall be demonstrated that the limits of simulation are identified as part of the simulator design database and that automatic or administrative means are in place for notification to the instructor that the limits of simulation have been reached or exceeded.

Replace Section 5 with the following:

A configuration management program shall be established to provide a means for demonstrating compliance with Sec. 3, "General Requirements."

5.1 Initial construction program requirements
A configuration management program shall be established to document the adequacy of initial design and performance of the simulator. The configuration management program for initial simulator construction shall include:

1. a means for establishing a simulator design baseline;
2. a means for establishing a simulator performance benchmark;
3. a means for identifying acceptable differences between the simulator and the reference unit.

5.1.1 Simulator design baseline. The simulator design baseline comprises the simulator design data, hardware configuration, and software configuration at the time the simulator is approved for use in operator training and examination. The simulator design baseline includes the following, as each applies to the defined scope of simulation:

1. reference unit design drawings and specifications;
2. reference unit operating procedures;
3. simulator supporting calculations and analyses;
4. simulator model assumptions and simplifications;
5. simulator software requirements;
6. equipment vendor documentation.

Design baseline documentation shall provide for relating the final simulator design to the source of the design requirement. The documentation shall be of sufficient detail to permit verification of the simulator configuration by a subject matter expert.

5.1.2 Simulator performance benchmark. The simulator performance benchmark comprises the reference data necessary for the completion of operability testing defined in Sec. 4.4.3.1 at the time the simulator is approved for use in operator training and examination. Because multiple sources of baseline data are available, the order of preference to ensure simulator fidelity shall be as follows:

1. data collected directly from the reference unit;
2. data generated through engineering analysis with a sound theoretical basis;
3. data collected from a plant which is similar in design and operation to the reference unit;
4. data from subject matter expert estimates;

5. other data sources.

Simulator performance benchmark documentation shall provide the expected response of key parameters for each test. For those instances where data are collected from sources other than the reference unit, the data source shall be specifically identified and demonstrated to be applicable to the simulator. The documentation shall be of sufficient detail to permit verification of the simulator performance by a subject matter expert.

5.1.3 Noticeable differences. Noticeable differences shall be identified at the time the simulator is approved for use in operator training and examination and shall be evaluated in accordance with Sec. 5.3

5.2 Change control program requirements
A configuration management program shall be established to verify the adequacy of changes to the design and performance of the simulator. Simulator changes shall be performed within the context of a structured process for design, development and testing using written instructions established for control of the simulator hardware and software configuration. The configuration management program for simulator changes shall include:

1. a means for identifying acceptable differences between the simulator and the reference unit;
2. a means for resolving simulator discrepancies;
3. a means for verifying and validating simulator changes;
4. a means for maintaining a simulator performance benchmark.

5.2.1 Noticeable differences. A process shall be established to identify noticeable differences. Noticeable differences shall be evaluated in accordance with Sec. 5.3.

5.2.2 Resolution of simulator discrepancies. Written instructions shall be established for resolving simulator discrepancies identified during simulator use, simulator testing, and review of reference unit modifications. Documentation of each simulator discrepancy shall include:

1. a description of the discrepancy;
2. a description of the change made to the simulator configuration;
3. a description of the testing performed to validate the change.

Documentation of the change and the testing shall be of sufficient detail to permit verification of the simulator performance by a subject matter expert.

5.2.3 Simulator change verification and validation. Simulator change verification and validation is part of a

structured design and development process for proposed changes to the simulator configuration. Verification and validation shall be performed whenever simulation models, facilities, or computer systems are modified in a way that potentially affects simulator fidelity. Simulator changes shall be evaluated against the applicable criteria provided in Sec. 3, "General Requirements."

5.2.3.1 Simulator change verification. Change verification shall be performed by comparing the design of simulated components or systems to design requirements. The extent and nature of the verification shall be based on the importance of the change under consideration, the complexity of the modification, and potential impact on simulator fidelity.

5.2.3.2 Simulator change validation. Change validation shall be performed by comparing the performance of modified simulated components or systems to actual or predicted behavior. Validation shall be completed prior to using the proposed change in the conduct of operator training or examination. Simulator validation may be performed in a fully integrated, partially integrated, or stand-alone mode of system operation.

5.2.4 Maintenance of the simulator performance benchmark. The simulator performance benchmark comprises the reference data necessary for the completion of operability testing described in Sec. 4.4.3.1. The simulator performance benchmark shall be maintained current with the expected response of key parameters identified for each test.

Modifications made to the reference unit could result in a change in the expected operating characteristics of the reference unit. An evaluation of the simulator performance benchmark shall be performed following significant modifications to the reference unit in order to identify and implement required changes to the benchmark. The results of the evaluation shall be documented and the source of the data for the revised benchmark shall be identified.

5.3 Acceptable simulator differences. A training needs assessment shall be performed for each noticeable difference to determine if a change to the simulator is required. Noticeable differences that do not impact the actions to be taken by the operator or do not detract from training are acceptable and are not required to be corrected. The following parameters should be evaluated to determine if the difference has an impact on the actions to be taken by the operators:

1. the human-system interface required for normal, abnormal, or emergency procedures;

2. the differences in performing the task on the simulator versus performing the task in the reference unit control room;

3. the differences in operator cues, auditory and visual information presented to the operator, and the critical decisions and actions required of the operator;

4. the function of the equipment and the potential for impacting reference unit safety, tripping the reference unit, or damaging reference unit equipment;

5. the differences required by the team response to normal, abnormal, or emergency actions;

6. review of operational experience to identify the potential for operator error or the necessity for reinforcement of the skills required for the task.

Documentation of acceptable simulator differences, including the associated training needs assessment, shall be maintained as long as the noticeable difference exists.

Replace Section D.4 with the following:

The configuration management requirements described in Section 5 should be adapted to the part-task and limited-scope simulator based on the part-task and limited-scope analysis

Reason:
This motion addresses Section 5 industry comment received during the 2009 standard approval process. The proposed motion will remove all references to "database", therefore a definition for "design database is no longer needed. The last paragraph of Section 4.1.2 is deleted to be consistent with the format of Section 4.1.1. Detailed testing requirements for the Limits of Simulation notification are not required. The function of the Limits of Simulation notification is clearly defined in Section 3.1.2.

Proposed Section 5 wording provides performance based configuration management requirements for initial simulator construction and post RFT change control. Proposed change control program requirements include assessment of deviations, and change verification and validation. Because a means for identifying acceptable differences between the simulator and the reference unit are similar for both the initial construction and change control program, common requirements for assessing

noticeable differences are included in Section 5.3.

The timeline for implementing unit design modifications in the simulator was removed. Based on group discussion, design modifications are no more important than performance based deviations. All deviations should be implemented in a timely fashion that supports the needs of the training program.

The term “simulator performance baseline” was changed to “simulator performance benchmark” to eliminate confusion with the “design baseline”. The performance benchmark is the data (or curves) that best represent “truth” which is used during transient testing for comparison of simulator performance.

Reason Abstained: Uncomfortable with a structural change at this time and the expectation of moving Verification/Validation testing to Section 5.

7.5 AI-36 – Enhance Section 5.

Consider replacing the opening paragraph 5. With the following:

A configuration management program shall be established to provide a means for demonstrating compliance with Sec. 3, “General Requirements.” Section 5.1 is for initial simulator construction or for re-baselining the simulator design, else use Section 5.2.

7.6 AI-37 Definition for benchmark and baseline

Consider definitions for “benchmark” and “baseline”.

7.7 AI-38 Section 5 Assessment of deviations review

With the new Section 5 (AI-11 2012mar15), Section 5.3 Assessment of Deviations, review the assessment parameters for adequacy as they apply to operational performance. Previously, the items only applied to physical fidelity.

7.8 AI-39

Consider revising Section 5.1 to include verification and validation as it applies to initial simulator construction.

7.9 Motion(Carried) – Delete Sections 3.2.1.4 and 4.2.1.4 and update Sec. 4.2.1.4 references

Motion: **Carried**
- 13 – For
- 0 – Against
- 0 – Abstained

Name
2012 Mar 15

Motion:

Delete Sections 3.2.1.4 and 4.2.1.4 and change all references to Sec. 4.2.1.4 to Sec. 5 in the body of the standard.

Sections:
Table of contents
4.2.1.1
4.2.1.2
4.2.1.3
4.2.2.1
4.2.2.2
4.3.3

3.2.1.4 Simulator control room deviations: Where physical fidelity and human factors deviations exist between the reference unit and the simulator, such deviations may remain if a training needs assessment is performed in accordance with Sec. 4.2.1.4.

4.2.1.4 Assessment of deviations: A training needs assessment shall be performed for each identified deviation or noticeable difference. Deviations and noticeable differences that do not impact the actions to be taken by the operator or do not detract from training are acceptable.
The following parameters should be evaluated to determine if the deviation or noticeable difference has an impact on the actions to be taken by the operators:

(1) the human-system interface required for normal, abnormal, or emergency procedures
(2) the differences in performing the task on the simulator versus performing the task in the reference unit control room;
(3) the differences in operator cues, auditory and visual information presented to the operator, and the critical decisions and actions required of the operator;
(4) the function of the equipment and the potential for impacting reference unit safety, tripping the reference unit, or damaging reference unit equipment;
(5) the differences required by the team response to normal, abnormal, or emergency actions;
(6) review of operational experience to identify the potential for operator error or the necessity for reinforcement of the skills required for the task.

Reason: AI-11 Motion 1 added assessment of deviations to Section 5. This motion (2) removes duplicate requirements from section 3 and section 4.

7.10 AI-40 Cleanup Appendix D.2

Section D.2 cleanup references to 3.2.1.4 and in Section D.3 cleanup references to 4.2.1.4.

7.11 Motion(Carried) – AI-40

Motion: **Carried** • 13 – For • 0 – Against • 0 – Abstained
Name 2012 Mar 15 **Motion**: In Section D.2 delete item: 3.2.1.4 Simulator control room deviations; In Section D.3 delete item: 4.2.1.4 Assessment of deviations; **Reason**: Appendix cleanup. Sections 3.2.1.4 and 4.2.1.4 were deleted with the previous motion.

7.12 AI-35 Discussion

The working group reviewed the definitions of "preference" and "precedence". The list may be a precedence list but preference is adequate.

AI-35 is closed.

7.13 Recessed: 1745

8. **Friday 2012 March 16 (0800)**

8.1 Roll Call

Members Present:
Chang, SK
Colby, Butch
Florence, Jim
Tarselli, Frank
Vick, Larry
Welchel, Keith
Felker, Bob
David Goodman
Mac McDade
Michael Petersen
Pablo Rey
Roger Jones (Robert Goldman Proxy)

8.2 Consensus Level

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

8.3 AI-11 Continued

The morning's discussion centered on the recommendation on deleting V&V in section 3 and section 4.

8.4 Consensus Level

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

8.5 AI-11 Motion(Carried) Deletion of Sections 3.4.1/3.4.2/4.4.1/4.4.2

Motion: **Carried**

- 9 – For
- 2 – Against
- 0 – Abstained

Name
2012 Mar 16

Motion:

Replace the last paragraph in Background with the following:

The organization of the standard is such that simulator functional and physical requirements described in Sec. 3 correspond to testing requirements described in Sec. 4. The sub-numbering of Sec.. 3 and Sec. 4 is consistent so that corresponding section paragraphs address the same subject matter from a requirements and testing standpoint. Configuration management, including verification and validation, is described in Sec. 5.

Replace Section 3.1 with the following:

The response of the simulator resulting from operator action, no operator action, improper operator action, automatic reference unit controls, and inherent operating characteristics shall be realistic and shall not violate the physical laws of nature, such as conservation of mass, momentum, and energy,

within the limits of the testing criteria of Sec. 4, “Testing Requirements.”

Replace Section 3.4 and Title with the following:

3.4 Simulator performance testing

Simulator performance testing shall be conducted to identify noticeable differences between the simulator control room or simulated systems when evaluated against the control room or systems of the reference unit. Noticeable differences shall be assessed in accordance with Sec. 5.

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.

Delete Section 3.4.1:

3.4.1 Simulator verification testing

Simulator verification testing is a form of software development testing. Simulator verification testing shall be conducted by comparison of simulated component or system software design to the original requirements to ensure that each step in the software development process completely incorporates all requirements of the previous step.

Delete Section 3.4.2:

3.4.2 Simulator validation testing

Simulator validation testing is a form of software development testing. Simulator validation testing shall be conducted by comparison of simulated component or system test results against actual or predicted

reference unit performance data in a stand-alone or integrated fashion.

Renumber the following sections:

3.4.3.1 Simulator operability testing
3.4.3.2 Simulator scenario-based testing
3.4.3.3 Simulator reactor core performance testing
3.4.3.4 Post-event simulator testing

to

3.4.1 Simulator operability testing
3.4.2 Simulator scenario-based testing
3.4.3 Simulator reactor core performance testing
3.4.4 Post-event simulator testing

Replace Section 4 with the following:

The intent of the following testing criteria is to identify noticeable differences between the simulator control room or simulated systems and the control room or systems of the reference unit. The requirements for the evaluation of each of the major elements of a simulator are set forth in Sec. 4.1 through 4.4.

Replace Section 4.4 and Title with the following:

4.4 Simulator performance testing

It shall be demonstrated that performance testing is conducted to identify noticeable differences between the simulator control room or simulated systems when evaluated against the control room or systems of the reference unit. Noticeable differences shall be assessed in accordance with Sec. 5.

It shall be demonstrated that simulator performance testing is conducted as specified below. A record of the conduct of these tests, and data comparison that the results meet reference unit data, shall be

maintained.

Delete Section 4.4.1:

4.4.1 Simulator verification testing

It shall be demonstrated that simulator verification testing is performed prior to initially integrating new or modified software with the remainder of the software used for operator training and examination. The extent and nature of the testing performed shall be based on the design of the software and its effects on simulator fidelity. Modifications to software may be tested in a nonintegrated environment on a computer system other than the simulator.

It shall be demonstrated that simulator verification testing is performed as part of the initial structured software design and development process and when changes or modifications are made to any of the following:

- computer platforms;
- operating systems and run-time utilities;
- interface systems;
- instructor stations;
- models.

Each simulation support organization should ensure that the necessary software design documentation is generated and updated.

Delete Section 4.4.2:

4.4.2 Simulator validation testing

It shall be demonstrated that simulator validation testing is performed by comparison of simulator model results to actual or predicted reference unit data as defined by Sec. 3, “General Requirements.” Sec. 4, “Testing Requirements,” provides the criteria to ensure these requirements are met. Simulator validation testing may be conducted in a fully integrated, partially integrated, or stand-alone mode of system operation. Each simulation support organization shall ensure that the validation test documentation is generated. The order of preference for data comparison shall be as stated in Sec. 5.1.1. A record of the conduct of this test, the test's results, and the test's evaluation shall be maintained.

Validation tests shall be conducted prior to the simulator's use in training and examination for the following situations:

(1) completion of simulator initial construction;
(2) whenever models are changed or modified in a way that potentially affects fidelity relative to the reference unit;
(3) whenever there are changes that have the potential to affect simulator capabilities or repeatability, including changes to computer platforms, operating systems and run-time utilities, interface systems, or instructor stations.

Renumber the following Sections:

4.4.3.1 Simulator operability testing
4.4.3.2 Simulator scenario-based testing
4.4.3.3 Simulator reactor core performance testing
4.4.3.4 Post-event simulator testing

to

4.4.1 Simulator operability testing
4.4.2 Simulator scenario-based testing
4.4.3 Simulator reactor core performance testing

4.4.4 Post-event simulator testing

Appendix D.2 delete the following items:

3.4.1 Simulator verification testing;
3.4.2 Simulator validation testing.

Appendix D.3 delete the following items:

4.4.1 Simulator verification testing;
4.4.2 Simulator validation testing.

Reason:
This motion removes duplicate verification and validation requirements from sections 3 and 4 because these requirements now exist in Section 5. The purpose of testing was changed from "ensuring that no noticeable differences exist" to "identifying noticeable differences". Testing cannot, by itself, ensure that no differences exist. Testing can only identify if noticeable differences are present. Simulator discrepancies are resolved using the requirements found in Section 5.

Reasons Against:

- Removing requirements from Section 3 & 4
- V&V belong in the testing section
- Does not support new builds

8.6 AI-41 additional review of Section 3.4.1/3.4.2/4.4.1/4.4.2

Following the acceptance of the motions for changes to Configuration Management, the group expressed concerns with regard to the removal of Sections 3.4.1/3.4.2/4.4.1/4.4.2. A careful review should be performed to ensure the intent of the previous wording has been fully preserved in Section 5. For example:

- Previous sections 3.4.1/3.4.2/4.4.1/4.4.2 use the word “Demonstrate”. The new words in Section 5 do not include the word “Demonstrate”
- The new Background section no longer refers to V&V, and includes no reference to CM
- Review IEEE and ANS 3.5 for alignment of V&V requirements
- Review the redefined intent of testing. Is the purpose of testing to “ensure no noticeable differences exist” or is it to “indentify noticeable differences that need to be resolved”. (responsibility Dennis)

8.7 Next meeting:

Host: Millstone or Diablo Canyon

Tentative Date: Late July 2012

8.8 Adjourned: 1150

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…