# ANS 3.5 Working Group Meeting Minutes
# GSE – Columbia, MD

# 2003 Mar 10-13

ANS 3.5 Working Group Approved Meeting Minutes
Columbia, MD

# 1      Index

ANS 3.5 Working Group Approved Meeting Minutes
Columbia, MD

2        **<u>Next Meeting</u>**

**Location**:  Exitech – Maryville, TN
**Airport**: McGee-Tyson Airport (Knoxville)
**Date**: July 21, 2003
- Monday  1pm-5pm
- Tuesday  8:30am-5pm
- Wednesday 8:30am-5pm
- Thursday 8:30am-5pm
- Friday 8:30am – 12pm

## 3 __Motions__

| | |
|---|---|
| Welchel<br>Accept 2002Oct Meeting Minutes Rev 12 | Motion: **Carried (Unanimous)** |
| Colby<br>Align all Appendix Headers with the appropriate published standard date and title. | Motion: **Unanimous**<br> • 11 – For<br> • 0 – Against<br> • 0 – Abstention<br><br>Additional Comments: None |
| Dennis<br>Accept Jane Neis as voting member | Motion: **Carried** |
| McCullough<br>AI-95<br>Modify Paragraph Numbered Item (2) Section 4.4.3.2<br><br>(2) the simulator is capable of producing the expected reference unit response without procedural exception, significant performance discrepancies, or deviation from an approved scenario sequence;<br><br>Modify paragraph after "Scenario Lesson Plan Title:" in Appendix E<br><br>This test verifies that the simulator may be used to satisfy predetermined learning or examination objectives without procedural exception, significant performance discrepancies or deviation from the approved scenario sequence, including the appropriate instructor interfaces, operator actions, and operator cues. | Motion: **Carried (Unanimous)** |
| Colby<br>AI-68<br>Delete Malfunction List Table in Section 3.1.4 and move to Appendix A | Motion: **Not Carried**<br> • 6 – For<br> • 5 – Against<br> • 1 – Abstained |

| | Additional Comments: None |
|---|---|
| Colby<br>AI-90<br>Defer AI-90 to 2008 Standard<br><br>AI-90 is concerned with reporting to the committee; This is complete.<br>AI-90 was closed and AI-102 was opened.  AI-102 will deal with making the necessary changes. | Motion:  **Withdrawn**<br>• 0 – For<br>• 0 – Against<br>• 0 – Abstained<br><br>Additional Comments: Motion Withdrawn |
| Colby<br>Revised Scope:<br><br>1.1 Scope.  This standard establishes the functional requirements for full-scope nuclear power plant control room simulators for use in operator training and examination.  Criteria are established for the scope of simulation, performance, and functional capabilities of simulators.  This standard does not address simulators for test, mobile, and research reactors, nor for reactors not subject to U.S. Nuclear Regulatory Commission licensing.<br><br>This standard does not establish criteria for application of simulators in training programs | Motion:  **Carried**<br>• 9 – For<br>• 3 – Against<br>• 0 – Abstained<br><br>Additional Comments: None |
| Colby<br><br>   1.  Delete the Definition "Simulation Facility"<br>   2.  Change "Simulation Facility" to "Simulator" in the definitions of "freeze" and "performance testing"<br>       Revised Wording:<br>       **freeze.**  The controlled cessation of the simulator.<br><br>       **performance testing.**  Testing characterized by a comparison of the results of integrated operation of the simulator to actual or predicted reference unit data. | Motion:  **Carried**<br>• 11 – For<br>• 0 – Against<br>• 1 – Abstained<br><br>Additional Comments:<br><br>Discussion on why Simulation facility was originally placed in the Standard:<br>• Certification was the law of the land and "Simulation Facility" was the term used |

| | |
|---|---|
| Performance testing encompasses testing other than software development testing. | by the NRC.<br>• The Working Group was trying to align the Standard language with regulation<br>• Align the Standard to capture other devices that are used in training and examination that were captured by the regulations use of the term "Simulation Facility"<br>• The Standard body did not capture the other devices and Appendix D was created to capture these.<br><br>Reasons for this change:<br>• Align the use of Simulator in the Scope and Standard Body<br>• Simulator will refer to "The Simulator" |
| Colby<br><br>1. In Section 4.3 "Simulator Instructor Station Capabilities" second paragraph<br><br>First sentence, replace "replicate" with "initiate"<br><br>Revised Wording<br>    It shall be demonstrated that the capability exists to initiate the malfunctions required in 3.1.4 and required by the accredited licensed operator training program.<br><br>2. Second sentence, replace "introduction of the malfunction" with "initiation of malfunctions"<br><br>Revised Wording | Motion: **Carried**<br>• 12 – For<br>• 0 – Against<br>• 0 – Abstained |

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|---|---|
| The initiation of malfunctions shall not alert the operators to pending events other than by indications that would occur in the reference unit. | |
| Neis<br><br>In Section 3.2.1.4 "Simulator Control Room Deviations" replace "reference plant" with "reference unit"<br><br>Revised Wording:<br><br>**3.2.1.4 Simulator Control Room Deviations**.  Where deviations exist among the simulator control panels, the reference unit panels in instrumentation, and audio-visual cues provided to the operator, such deviations may remain if a training needs assessment is performed in accordance with 4.2.1.4. | Motion:  **Carried**<br>• 11 – For<br>• 0 – Against<br>• 1 – Abstained |

4    **Action Item Activity**

| | | |
|---|---|---|
| **99** | Have Standard reviewed by Technical Editor<br>Reference AI-88 | Vick<br>Koutouzis |
| **100** | Create two subcommittee's (PWR and BWR) that will investigate Core Performance testing inclusion into the Standard.<br><br>&bull; Review Section 3.1.3 "Normal Evolutions" Item 9 ANS 3.5 1998 with regard to Core Performance testing for PWR and BWR types.<br>&bull; Should Core Performance be in Section 3.1.3<br>&bull; Is Unit Performance Testing the correct term or did the committee mean Core Performance Testing. | **PWR**<br>**McCullough - Lead**<br>Neis<br>Chang<br>Welchel<br>Kozak<br><br>**BWR**<br>**Havens - Lead**<br>Felker<br>Florence<br>Panfil<br>Tarselli<br><br>Vick - Coordinator |
| **101** | Review 3.2.1.4 for language clarification | Neis<br>Felker<br>Kozak |
| **102** | Review Sections 3, 4, 5 and 6 for alignment and consistency and possible merge.<br><br>Inform Tim Cassidy that Sections are under review.<br><br>Options:<br>&bull; This Standard<br>&bull; Next Standard<br><br>Formatting<br>&bull; Keep the Sections separate but aligned | **Colby**<br>Paris<br>Dennis<br>Koutouzis<br>Shelly<br>Cox<br>Vick - Coordinator |

| | | |
|---|---|---|
| | • Merge the Sections | |
| **103** | Colby<br><br>Will create two Revised Standards Versions<br>Version 1<br>1998 versus 2003 No History<br><br>Version 2<br>1998 versus 2003 with Revision History | Colby |

5     **Visitors**

| Visitor | Date | Affiliation | Email, Phone Fax |
|---|---|---|---|
| Jane Neis | 2003Mar10 | R.E. Ginna Nuclear Power Plant Training Center 1517 Lake Rd Ontario, NY 14519 | Email: jane_neis@rge.com Phone:  (585) 771-6646 Fax: (585) 524-8278 |
| Barney Panfil Proxy for Jim Florence | 2003Mar10,11 | First Energy 10 Center Rd Perry, OH  44081 | Email: bjpanfil@firstenergycorp.com Phone: 440.280.5818 Fax: 440.280.8027 |
| Frank Tarselli | 2003Mar10,11 | PO Box 467 Berwick,  PA  18603 | Email: fatarselli@pplweb.com Phone: 570.542.3551 Fax: |

## 6      Roll Call

| Present | Member | Address | Notes-Proxy | Email-Phone-Fax |
|---|---|---|---|---|
| Present | Timothy Dennis **Chairman** | P. O. Box 119<br>645 Lehigh Gap St.<br>Walnutport, PA  18088-0119 | | Email: a243@yahoo.com<br>Phone:610-767-0979<br>Fax: 610-767-7095 |
| Present (Proxy) | Jim Florence **Vice Chairman** | Nebraska Public Power District<br>P. O. Box 98<br>Brownville, Nebraska  68321 | | Email: jbflore@nppd.com<br>Phone: 402-825-5700<br>Fax: 402-825-5584 |
| Present | Keith Welchel **Secretary** | Duke Power Company<br>Oconee Training Center- MC:ON04OT<br>7800 Rochester Hwy<br>Seneca, SC 29672 | | Email: kwelchel@duke-energy.com<br>Phone: 864-885-3349<br>Fax: 864-885-3432 |
| Present | F.J. (Butch) Colby **Editor** | CAE Inc.<br>8585 Cote-de-Liesse<br>P.O, Box 1800 Saint-Laurent<br>Quebec, Canada<br>H4L 4X4 | | Email: butchcolby@cs.com<br>Email: butch.colby@cae.com<br>Phone: (410) 381-3557<br>Fax: (410) 381-2017 |
| Absent(1) | William M. (Mike) Shelly **Style Editor** | Entergy Services, Inc.<br>1340 Echelon Parkway<br>Jackson, MS 39213-8298 | | Email: wshelly@entergy.com<br>Phone: 601-368-5861<br>Fax: 601-368-5816 |
| Present | Larry Vick **Parliamentarian** | US NRC, Office of Nuclear Reactor Regulation<br>09-D24<br>Washington, DC  20555 | | Email: Lxv@nrc.gov<br>Phone: 301-415-3181<br>Fax: 301-415-2222 |
| Preset | George McCullough | American Electric Power<br>620 Sixth Ave.<br>St. Albans, WV 25177-2964 | | Email: gsmccullough@aep.com<br>Email: rifreyberg@aep.com<br>Phone: 304-556-4043<br>Fax: 304-556-4049<br>Cell: 304-549-8761 |
| Present | Hal Paris | GSE Systems<br>8930 Stanford Blvd.<br>Columbia, MD. 21004 | | Email: hal.paris@gses.com<br>Phone: 410-772-3559<br>Fax: 410-772-3595 |
| Present | Robert Felker | EXITECH Corporation<br>102 E. Broadway<br>Maryville,TN 37804 | | Email: rfelker@EXITECH.com<br>Phone: 410-461-4295<br>Fax: 410-730-4008 |
| Present | Allan A. Kozak | Dominion Generation<br>North Anna power Station<br>P.O. Box 402<br>Mineral, VA 23117-0402 | | Email: allan_kozak@dom.com<br>Phone: 540-894-2400<br>Fax:540-894-2441 |
| Present | Dennis Koutouzis | INPO<br>700 Galleria Parkway, NW<br>Atlanta, GA  30339-5957 | | Email: koutouzisjd@inpo.org<br>Phone: 770-644-8838<br>Fax: 770-644-8120 |

| Present | Oliver Havens, Jr | PSEG Power<br>Hope Creek Generating Station, NTC<br>244 Chestnut St.<br>Salem, NJ 08079 | | Email: Oliver.Havens@pseg.com<br>Phone: 856-339-3797<br>Fax: 856-339-3997 |
|---|---|---|---|---|
| Absent(1) | Kevin Cox | Exelon Generation<br>Dresden Nuclear Power Station<br>6500 North Dresden Rd.<br>Morris, IL 60450 | | Email: kevin.cox@exeloncorp.com<br>Phone: 815-942-2920 x-2109<br>Fax: 815-941-7121 |
| Present | SK Chang | Dominion Nuclear Connecticut, Inc.<br>Millstone Power Station<br>L. F. Sillin, Jr. Nuclear Training Ctr.<br>Rope Ferry Road<br>Waterford, CT 06385 | | Email: Shih-Kao_Chang@dom.com<br>Phone: 860-437-2521<br>Fax: 860-437-2671 |
| Present | Jane Neis | R.E. Ginna Nuclear Power Plant Training Center<br>1517 Lake Rd<br>Ontario, NY 14519 | | Email: jane_neis@rge.com<br>Phone: (585) 771-6646<br>Fax: (585) 524-8278 |
| NA | Suriya Ahmad | Standards  Administrator<br>American Nuclear Society<br>555 North Kensington avenue<br>La Grange Park, IL 60526-5592 | | Email:  sahmad@ans.org<br>Phone: 708-579-8269<br>Fax: 708 352 6464 |

## 7     **Action Item List**

7.1     Action Item Quick-look Table

| Open | Complete | Carried to 2008 |
|------|----------|-----------------|

| 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 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
| 101 | 102 | 103 | | | | | | | |

## 7.2      Action Items

| No. | Status | Date | Assigned To: | Work Assignment |
|-----|--------|------|--------------|-----------------|
| 1 | **Dennis** contacted Mike Wright. No Input from Mike. The Scope change should be approved soon.<br><br>2001Apr05<br>Scope statement will be revised based on SubCommittee-1 comments that ANS 3.1 is not Training Criteria | Priority 1 – PINS form will be completed by next meeting (15min) | **Dennis** | DOE Nuclear Facility vs. Power Plant Simulators – Check with ANS 3. Inquire as to whether other simulator issues are addressed/referenced in other ANS 3 standards<br>Dennis will contact Mike Wright (ANS-3 chair).<br>Are DOE issues referencing simulators?<br><br>2001Apr05<br>Dennis<br>Dennis attended the SubCommittee-1 meeting and was informed the PINS form needs to be completed.<br>Additionally, the scope statement states ANS 3.1 establishes Training Criteria, but does not.<br>Accepted 3.5 Scope change and Appendix D<br><br>**2000mar09**<br>Chandler Comments (NUPPSCO) relating to DOE simulators. We need to resolve Open NUPPSCO comments from the 1998 standards approval process. |
| 8 | | Priority 1 – PINS form will be completed by next meeting (15min) | **Dennis** | Contact Mike Wright about the scope change<br>Scope and Background submitted to Shawn and Mike. No schedule at present for ANS-3 to review scope change.<br><br>2002Oct29<br>PINs form completed and ready to send to ANS.<br><br>2001Apr05 |

| | | | | | Contacted Sub-Committee-1 and Dennis needs to complete PINS forms; |
|---|---|---|---|---|---|
| 97 | | | | Dennis | Determine reference usage within ANS Standards. Can the 3.5 Standard reference an INPO document?<br><br>**2003Mar11**<br>**Dennis**<br>**Researching using documents not available to general public.** |
| 99 | | | | Vick<br>Koutouzis | Vick and Koutouzis will have Standard reviewed by Technical Editors for consistency<br><br>**2003Mar10**<br>**Initial Action Item.** |
| 100 | | | | **PWR**<br>**McCullough - Lead**<br>**Neis**<br>**Chang**<br>**Kozak**<br>**Welchel**<br><br>**BWR**<br>**Havens - Lead**<br>**Felker**<br>**Florence**<br>**Panfil**<br>**Tarselli**<br><br>**Vick - Coordinator** | Create two subcommittee's (PWR and BWR) that will investigate Core Performance testing inclusion into the Standard.<br><br>• Review Section 3.1.3 "Normal Evolutions" Item 9 ANS 3.5 1998 with regard to Core Performance testing for PWR and BWR types.<br>• Should Core Performance be in Section 3.1.3<br>Is Unit Performance Testing the correct term or did the committee mean Core Performance Testing.<br><br>**2003Mar10**<br>**Initial Action Item.** |
| 101 | | | | Neis | Review 3.2.1.4 for language clarification |

| | | | | |
|---|---|---|---|---|
| | | | **Felker** **Kozak** | **2003Mar10** **Initial Action Item.** |
| **102** | | | **Colby** **Paris** **Dennis** **Koutouzis** **Shelly** **Cox** **Vick -** **Coordinator** | Review Sections 3, 4, 5 and 6 for alignment and consistency and possible merge. Inform Tim Cassidy that Sections are under review. Options: <br>• This Standard<br>• Next Standard<br><br>Formatting<br>• Keep the Sections separate but aligned<br>• Merge the Sections<br><br>**2003Mar10** **Initial Action Item.** |
| **103** | | | **Colby** | Colby<br><br>Will create two Revised Standards Versions<br>Version 1<br>1998 versus 2003 No History<br><br>Version 2<br>1998 versus 2003 with Revision History<br><br>**2003Mar10** **Initial Action Item.** |
| | | | | |

## 8    **Working Group Procedural Rules**

8.1    Rules of the Chair

- Interim Voting (Motions) shall be by Consensus
- The Chairman rules that no Motions will be accepted when not in session
- Administrative issues by simple majority;
- The Chair shall be informed of absences;
- The absent member is encouraged to send a proxy;
- A Proxy shall not have voting privileges;
- Members attend the full length of the meeting;
- The two absent policy will be enforced;
- Word 7.0 will be the document format;
- The Host will collect and send all handout material for absent members without proxy;
- Robert's Rules of Order will used a general guide;
- Guest Individual Contributors may receive working copy based on need;
- Chair approval required for distribution of working copies;

8.2    Rules Enacted by the Working Group

Missing two consecutive meetings in a row with out representation could result in loss of membership on the committee

## 9      **Monday 2003mar10 (Day 1)**

### 9.1    Introduction to GSE (Paris)

Paris – Introduction and opened the meeting.

### 9.2    Opening Comments (Dennis):

- Called Meeting to order

- Welcomed Visitors

### 9.3    Roll Call

Absent Members (3):

Cox (1)
Shelly (1)
Florence (1) Proxy Barney Panfil

Voting: 75% of 11 members present requires 9 for consensus.

Discussion on simple majority versus consensus voting:  Larry will review and advise at future meetings.

### 9.4    Review of Meeting minutes Dated 2002Apr22

Motion to Accept Minutes as Written
Minutes Accepted

9.5     Officers:

Officer Reports:
- Dennis
  - DOE wants to get involved but no funding
  - NSFC – methodology "Performance Based and Risk Based Standards"
- Welchel:
  - Asked members to respond to Emails that the Email was received.
  - Minutes: Asked members to respond even with "No Comment."
- Koutouzis:
  - Supplied INPO Academy Document CD (May be used by non-INPO 3.5 WG members.)

9.6     Review of Mission Statement: (Dennis)

Action Item Screening Criteria:

Committee agreed to use the screening criteria for considering standard language changes.

**If the action facilitates clarification of the existing document**

*THEN*
**If Clarification results in minimal impact to the 1998 standard**

*THEN*
**If work is doable by July 31, 2003**

*THEN*
**ACCEPT Action Item for 2003**

*ELSE*
**TABLE Item until 2008**

9.7      AI-94 and 98 (Colby)

Colby (See Appendix for additional Info)

Motion: Align all Appendix Headers with the appropriate published standard date and title.

Vote: Unanimous

9.8      Consider Jane Neis as voting member (Dennis)

- Neis presented Resume

Motion: Accept Jane Neis as voting member

Vote: Unanimous

9.9      AI-36 (Koutouzis)

- SAT (Systematic Approach to Training) process should drive simulator modification timelines.

- Delayed simulator modification implementation should have no impact on operator performance.

- Panfil – Any feedback on two year limit being too long.
  Koutouzis – Question was not asked.  Two years is not creating problems.

- Neis – What was original basis for 24 month implementation?
  Dennis – Not sure but maybe related to simulator procurement and large number of outstanding modifications after original delivery.

- Paris – Simulator is becoming critical path for referenced Unit modifications.

- Discussion on the basis for the different requirements in Sections 5.3.1.1, 5.3.1.2 and 5.3.2.

- Koutouzis - INPO has guidance for Instructor Qualifications.  Improvement needed for Instructor performance (Scenario development, Scenario Validation).

- Koutouzis - Evidence that instructor performance may impact the ability to effectively implement Scenario Based Testing.

- Deferred until 2008

## 9.10    AI-88 (Vick)

Vick – Reviewed fidelity using Thesaurus

Vick – Fidelity implies tolerance.

Vick took quick pole of members view on Fidelity

Kozak – Hardware and Software are basically the same

Chang – Hardware implies sameness

Havens

- HW – One can see likeness

- SW implies tolerance, error

Panfil

- Fidelity as written in standard applies to HW

- SW - Trueness to plant

Tarselli

- How different can HW be and still have fidelity.

McCullough

- Fidelity implies HW

Felker

- Likeness of unit/simulator response as defined by the standard

Koutouzis

- Differences are indistinguishable

Colby

- Examples use of Fidelity in Standard

    o 4.4.1

    o 4.4.2

    o Appendix D

Vick – Recommends having standard reviewed by Technical Editor.

## 9.11 AI-68 (Colby)

Reviewed Malfunction List survey results

- Recommends moving malfunctions to an Appendix

- Felker – Why keep it.
  Colby – Historical value.

- Panfil – Consider putting malfunctions in Appendix A and present malfunction list as a guideline for malfunction inclusion.

- 2001Apr - a Motion was Not carried to delete the Malfunction list.

- Felker – Initial malfunction list began with the Denton letter, pre SAT process.

- Colby - 40-70% of survey respondents recommend removing or deleting malfunction list (partial or in totality)… no longer doing business this way.  List outdated.  The survey questioned whether to delete or remove each malfunction.  For any malfunction, the survey returned 40-70% to delete that malfunction.

9.12    Adjourned 2003Mar10 at 1700

## 10     Tuesday 2003Mar11 (Day 2 8:30am)

### 10.1     AI-68 (Colby) – Continued

Colby distributed table contrasting:

- DENTON Letter

- CFR Part 55.59 Requalification

- ANS 3.5 Malfunctions

- Survey Section 3.1.4

Neis – Questioned if the committee has reviewed generic Task List (SAT).

Koutouzis –

- No generic Task List (utility specific)

- All US programs are accredited and SAT based since 1991

Colby Summary

- Standard already references Regulation, no need to

- No loss by moving Malfunction list to the appendix

Motion (Colby):

- Delete Malfunction List Table in Section 3.1.4 and move to Appendix A

Vote:
- For: 6
- Against: 5
- Abstained: 1

## 10.2 AI-95 (Felker)

No Changes necessary

McCullough

Motion

Modify Paragraph Numbered Item (2) Section 4.4.3.2

<mark>(2) the simulator is capable of producing the expected reference unit response without procedural exception, significant performance discrepancies, or deviation from an approved scenario sequence;</mark>

Modify paragraph after "<mark>Scenario Lesson Plan Title:</mark>" in Appendix E

_____

<mark>This test verifies that the simulator may be used to satisfy predetermined learning or examination objectives without procedural exception, significant performance discrepancies or deviation from the approved scenario sequence, including the appropriate instructor interfaces, operator actions, and operator cues.</mark>

Vote:
- For: 12
- Against: 0
- Abstained: 0

## 10.3 AI-97 (Dennis)

Researching using documents not available to general public.

**10.4    AI-91 (Dennis)**

No further change from NFSC Nov 2002 meeting

AI Complete

**10.5    AI-90 (Colby)**

Section Alignment

Felker –

- Section 3 - Requirements

- Section 4 - Testing

- Section 5 - Documentation

- Section 6 - Configuration Management

Tarselli – If required by the Standard, should have corresponding testing Section.

Panfil – All Standard's requirements must be met, so whether the sections align… was not critical to implementation.

Colby – Recommends AI-90 be moved

Motion:

Defer AI-90 to 2008 Standard

Motion Withdrawn for later discussion.

10.6     AI-92 (Colby)

Colby distributed table showing 98 wording and Revised recommended wording.  (See Appendix)

McCullough

**Motion** – Remove from 2003 proposed Scope: "The replication may encompass full-scope, part-task, or limited scope."

Revised Scope:

1.1 Scope. This standard establishes the functional requirements for Simulation Facilities used in the Training and Examination of Nuclear Power Plant Operators. Criteria are established for the degree of simulation, performance, and functional capabilities of the replicated systems and components. This standard does not address simulators for test, mobile, research reactors, or reactors not subject to U.S. Nuclear Regulatory Commission licensing.

This standard does not establish criteria for application of simulators in training programs.

Motion withdrawn

Kozak

**Motion** – Reinstate McCullough Motion

Motion – Withdrawn

**Motion** – Revert back to 1998 first paragraph Scope Statement and keep second paragraph of approved draft revision regarding ANS 3.1.

Revised Scope:

1.1 Scope.  This standard establishes the functional requirements for full-scope nuclear power plant control room simulators used for operator training and examination.  Criteria are established for the degree of simulation, performance, and functional capability of the simulated control room instrumentation and controls.  This standard does not address simulators for test, mobile, and research reactors, nor for reactors not subject to U.S. Nuclear Regulatory Commission licensing.

This standard does not establish criteria for application of simulators in training programs.

> **Comment [zz1]:** Approved Scope and Background from March 02-03, 1999. Accepted 1999sep14.

> **Comment [BC2]:** Remove last sentence and reference number [1].  Approved change of removing all reference to ANS-3.1 within the Standard.  From April 22-25, 2002 meeting.  Action item #57.  This change is due to the fact that ANS-3.1 does not establish training criteria for use of simulators.  This change was supported by the chairman for ANS-3.1.

Motion – Withdrawn

**Amended Motion** (McCullough):

Revised Scope:

1.1 Scope.  This standard establishes the functional requirements for full-scope nuclear power plant control room simulators for use in operator training and examination.  Criteria are established for the scope of simulation, performance, and functional capabilities of simulators.  This standard does not address simulators for test, mobile, and research reactors, nor for reactors not subject to U.S. Nuclear Regulatory Commission licensing.

This standard does not establish criteria for application of simulators in training programs.

> **Comment [zz3]:** Approved Scope and Background from March 02-03, 1999. Accepted 1999sep14.

> **Comment [BC4]:** Remove last sentence and reference number [1].  Approved change of removing all reference to ANS-3.1 within the Standard.  From April 22-25, 2002 meeting.  Action item #57.  This change is due to the fact that ANS-3.1 does not establish training criteria for use of simulators.  This change was supported by the chairman for ANS-3.1.

Vote:
- For: 9
- Against: 3
- Abstained: 0

Change:
Removed:

The replication may encompass full-scope, part-task, or limited scope.

Changed:

<mark>replicated systems and components</mark>

to

Simulators

## 10.7    NRC Workshop Update

Vick presented two Power Point Presentations

- Workshop Update

- Workshop Question and Answer

## 10.8    Adjourned 2003Mar11 at 1715

## 11     **Wednesday 2003Mar12 (Day 3 8:45am)**

11.1     Operator Control Manipulations (Colby)

Colby
- Colby lead discussion on core fuel load and criteria for validation.
- Industry feedback all over the board from "We test very little" to "We test a lot"
- Standard should not address requiring current core load issues.
- Standard should address validating current core model.
- Industry has expressed interest in having core validation in the next standard.

Vick
- Criteria set forth by NRC
- Left methods to utility to implement
- NRC will not be prescriptive in core validation testing

Felker
- Reactivity manipulations and Core validation testing is an NRC staff creation and not developed by the Working Group.
- Criteria should be measured using the same instrumentation that would be used in the plant
- Core validation is not the same as Operator Surveillance
- Has WG decided to take up this issue.

Havens
- Industry petitioned NRC to allow use of Simulator for Experience.

Dennis
- Regulation has evolved all the way from all Experience requirements completed on the plant to now the simulator may be used.

Panfil
- Licenses are given for operating all core loads (present and future) not just present core cycle

- Core cycle characteristics change significantly in short periods of time
- Is it acceptable to base core performance on predicted core performance versus actual plant data?

Kozak
- Working Group should consider adding Core testing to an Appendix.
- Possible problem is Section 3 and word-crafting core validation test
- Does not want the WG to set a precedence wrt to regulators dictating future direction, but for this issue the industry has expressed significant interest in the ANS 3.5 WG taking up this issue.


11.2    Unit Performance Test Presentation (Panfil)

- July 2000 performance test conducted

- Utilized PhD for core parameter selection

- Conducted site acceptance core validation (various test similar to annual performance testing and others)

- Normal Evolution tests result supplied to NRC

- CORE FAT test were not provided to NRC

- Examiner wanted to review how core Nuclear and Thermal-Hydraulic characteristics matched the plant

- Results – NRC states insufficient documentation to demonstrate that the simulator met the requirements of 10 CFR 55.46

- NRC has linked 10 CFR 55.46 to Section 3.1.3

- Section 3.1.3 is insufficient to support using the simulator for experience requirements

- Standard concerns:

    o Phrase "Such as" really means "as Example"

- ▪ Interpretation left for uses which may result in differences in interpretation

  - o Does not take into consideration PWR and BWR differences

  - o Virtually no Core performance test… handled in "Normal Evolutions"

- Standard Recommended changes:

  - o Eliminate evolutions listed in 3.1.3 except Heat balance

  - o Add BWR and PWR specific testing and performance criteria to Section 4 or to an Appendix.

  - o Do not use the word "Replicate" or "for the most recent core load" even though these words are used in 10 CFR 55.46.

- Perry core testing matrix "Startup and Physics testing following an Outage"

- Examiner asked for additional core performance data and Perry communicated they had not completed specific core parameter validation. Perry did not supply the Core installation validation data.

Vick

- Utility should be pro-active in deciding core validation

- Looking for Core Performance tests results

## 11.3    Use of Replicate in FAA Advisories

Colby – Presented the results of a search of the word replicate in FAA Standards documents.

## 11.4    Operator Control Manipulations (Colby) -Continued

Review of 10CFR 55.46 and the Use of the word replicate survey results.

Colby lead discussion on survey results.  See document in Appendix.

Reviewed the use of "Simulation Facility".

Welchel – Consider replacing the term "Simulation Facility" with "Simulator".

Simulation Facility is used in:

- Freeze Definition

- Performance Testing Definition

- Section 4 – Used as "Simulation facility organization"  This usage does not refer to "The Simulator" as does the definition's usage.

Motion (Colby):

1. Delete the Definition "Simulation Facility"

2. Change "Simulation Facility" to "Simulator" in the definitions of "freeze" and "performance testing"

    Revised Wording:

    **freeze.**  The controlled cessation of the simulator.

    **performance testing.**  Testing characterized by a comparison of the results of integrated operation of the simulator to actual or predicted reference unit data.  Performance testing encompasses testing other than software development testing.

Discussion on why Simulation facility was originally placed in the Standard:

- Certification was the law of the land and "Simulation Facility" was the term used by the NRC.
- The Working Group was trying to align the Standard language with regulation
- Align the Standard to capture other devices that are used in training and examination that were captured by the regulations use of the term "Simulation Facility"
- The Standard body did not capture the other devices and Appendix D was created to capture these.

Reasons for this change:
- Align the use of Simulator in the Scope and Standard Body
- Simulator will refer to the full scope simulator. Simulation Facility refers to other simulators, not just the full scope simulator, and the Standard as written today refers to "The Full Scope Simulator"

Vote:
- For: 11
- Against: 0
- Abstained: 1

## 11.5 Use of the Term Replicate (Colby)

Survey comments from NEI/NRC Workshop

Colby

- Where "Replicate" refers to HW leave as is.

- Other uses of "Replicate"

  o Section 4.3

    ▪ Replace the word replicate in Section 4.3. Initiate better describes the event. While there, the committee modified the second sentence in the second paragraph to better align with sentence one in the second paragraph.

Motion:

In Section 4.3 "Simulator Instructor Station Capabilities" second paragraph

1.  First sentence, replace "replicate" with "initiate"

    Revised Wording

    > It shall be demonstrated that the capability exists to initiate the
    > malfunctions required in 3.1.4 and required by the accredited
    > licensed operator training program.

2.  Second sentence, replace "introduction of the malfunction" with "initiation of malfunctions"

    Revised Wording

    > The initiation of malfunctions shall not alert the operators to pending
    > events other than by indications that would occur in the reference
    > unit.

Vote:
- For: 12
- Against: 0
- Abstained: 0

## 11.6 Core Performance testing (Colby)

Survey comments from NEI/NRC Workshop

Action Item 100

- Two subcommittee's (PWR and BWR) that will investigate Core Performance testing inclusion into the Standard.

- Review Section 3.1.3 "Normal Evolutions" Item 9 ANS 3.5 1998 with regard to Core Performance testing for PWR and BWR types.

- Should Core Performance be in Section 3.1.3

- Is Unit Performance Testing the correct term or did the committee mean Core Performance Testing.

Sub-Committees:

| PWR | BWR |
|---|---|
| **McCullough - Lead** | **Havens - Lead** |
| Neis | Felker |
| Chang | Florence |
| Welchel | Panfil |
| Kozak | Tarselli |
| Vick - Coordinator ||

## 11.7    Simulator Control Room Deviations (Felker)

Reference Unit language consistency

Motion (Felker):

In Section 3.2.1.4 "Simulator Control Room Deviations" replace "reference plant" with "reference unit"

Amended Motion:

Revised Wording

**3.2.1.4 Simulator Control Room Deviations.** Where control panel, instrumentation and audio-visual cue deviations exist between the simulator and the reference unit, such deviations may remain if a training needs assessment is performed in accordance with 4.2.1.4.

Motion Withdrawn

Motion (Neis):

In Section 3.2.1.4 "Simulator Control Room Deviations" replace "reference plant" with "reference unit"

Revised Wording:

**3.2.1.4 Simulator Control Room Deviations**.  Where deviations exist among the simulator control panels, the reference unit panels in instrumentation, and audio-visual cues provided to the operator, such deviations may remain if a training needs assessment is performed in accordance with 4.2.1.4.

Vote:
- For: 11
- Against: 0
- Abstained: 1

Action Item 101

Review 3.2.1.4 for language clarification

## 11.8    Tim Cassidy Email (Colby)

Reviewed Tim Cassidy comments from Survey

AI 102

Review Sections 3, 4, 5 and 6 for alignment and consistency and possible merge.

Inform Tim Cassidy that Sections are under review.

11.9    Section 3 and 4 Merge/Alignment Discussion

Panfil – Present standard is sufficient

Colby
- Should we defer or review for this standard
- This topic needs to be reviewed now due to significant inconsistencies.
- First cut is complete, but additional review for each section to determine that the Section body agrees with the title and testing.
- Value is gained by aligning sections.

Vick

- Postpone due to magnitude.

- Timing of the 1998 Standard sync'd well with the change in the Rule.

Paris

- What value is added by creating Sections to align Sections 3 and 4

- New numbers and Sections will appear to add new requirements.

- Concerns as to how the NRC will view changes

Kozak

- Recommends each member look at this and be ready next meeting to discuss and recommend changes.

Chang

- Recommends these two sections be revised and edited by outside technical writers/editors.

11.10    Adjourned 2003Mar12 at 1845

12      **Thursday 2003Mar13 (Day 4 8:30am)**

12.1    Presented SCS ANS 3.5 Power Point Presentation (Dennis)

ANS 3.5 Working Group members present at the SCS

- Dennis
- Welchel
- Colby
- Paris
- Kozak

12.2    Reviewed SCS ANS 3.5 Questions (Paris)

See Appendix for Presentation

Discussion on what documentation is sufficient for SBT.

Koutouzis – Results should be the basis for success, but this does not answer the question: "What is sufficient for inspection."

12.3    USUG (Panfil)

Presented list of USUG Officers

Presented Overview of Region Reports

Decline in Region 8 (International) attendance

Halverson – Develop a task List and University level program for Simulator Engineer.

## 12.4    MANTG (Tarselli)

Preparing PWR/BWR Core performance testing Whitepaper for distribution

Next big topic for discussion – Exam Security

Topic de jour - SBT

Quarterly Meetings – next meeting at Millstone (next week); May meeting Fitzpatrick

## 12.5    NFSC (Dennis)

Met with ANS-21 Chair

New emphasis to reorganize/reform standards approval

Next NSFC meeting 2004 June in San Diego

## 12.6    DOE (Dennis)

Nothing to report

Yoder retired

## 12.7    NEI (Dennis)

Nothing to report

12.8    ANS-21 (Dennis)

      Nothing to report

12.9    Meeting Critique

      Staying on agenda

      Who ever has the floor needs to keep the group on focus

      Good – NRC and INPO creates balance

      Being prepared

      Individuals being prepared to discuss Action Items

      Survey is good source of Feedback for the Working Group

      Try to stay on schedule with proposed meeting dates

      Stay focused

      Collegiality

      Improve off-meeting communication

12.10    Adjourned 2003Mar13 at 1115

## 13 **Appendix**

### 13.1 **AI-68 (Colby)**

<table>
<tr><td colspan="4" align="center"><strong>Action Item 68</strong></td></tr>
<tr>
<td>Denton Letter<br>GL80-028 &amp; NUREG 0737<br>Appendix "C</td>
<td>CFR Part 55.59 -<br>Requalification</td>
<td>ANS 3.5 section - 3.1.4<br>Malfunctions</td>
<td>Survey<br>Section 3.1.4<br>67 inputs</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td><mark>Range 40 to 70% for deleting malfunction list</mark></td>
</tr>
<tr>
<td></td>
<td>(A) Plant or reactor startups to include a range that reactivity feedback from nuclear heat addition is noticeable and heatup rate is established.</td>
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<tr>
<td></td>
<td>(B) Plant shutdown</td>
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<td></td>
<td>(C) Manual control of steam generators or feedwater or both during startup and shutdown.</td>
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<td></td>
<td>(D) Boration or dilution during power operation</td>
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<td></td>
<td>(E) Significant (¬10 percent) power changes in manual rod control or recirculation flow.</td>
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<tr>
<td></td>
<td>(F) Reactor power change of 10 percent or greater where load change is performed with load limit control or where flux, temperature, or speed control is on manual (for HTGR).</td>
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</tr>
<tr>
<td>Loss of Reactor Coolant (small and DBA); (2) Steam Generator Tube Rupture</td>
<td>(G) Loss of coolant, including Significant PWR steam generator leaks</td>
<td>(1) Loss of coolant: significant Pressurized Water Reactor (PWR)</td>
<td><mark>Delete or move list</mark></td>
</tr>
</table>

| | | | |
|---|---|---|---|
| (small and large) | Inside and outside primary containment Large and small, including lead-rate determination Saturated reactor coolant response (PWR). | steam generator tube leaks; inside and outside primary containment; large and small Loss of Coolant Accidents (LOCA) demonstrating multiphase flow; and failure of safety and relief valves | |
| | (H) Loss of instrument air (if simulated plant specific). | (2) Loss of instrument air to the extent that the whole system or isolable portions can lose pressure and affect the reference unit's static or dynamic performance | Delete or move list |
| (1) Loss of Offsite Electrical Power; (2) Loss of One Train of Onsite Electrical Power | (I) Loss of electrical power (or degraded power sources). | (3) Degraded electrical power to the station, including loss of offsite power, loss of emergency power, loss of emergency generators, loss of power to the unit's electrical distribution buses, and loss of power to the individual instrumentation buses (including AC as well as DC) that provide power to control room instrumentation or unit control functions affecting the unit's response | Delete or move list Clarify degrade |
| Loss of Reactor Coolant Pumps at Full Power and Demonstration of Natural Circulation (PWR); Inadvertent trip of Recirculation Pump (BWR) | (J) Loss of core coolant flow/natural circulation. | Part of (1) above? | |
| Loss of All Feedwater (normal and emergency) (PWR) & (BWR) | (K) Loss of feedwater (normal and emergency). | (10) Loss of all feedwater, both normal and emergency | Delete or move list Define emergency FW |

| | (L) Loss of service water, if required for safety. | (6) Loss of service water or cooling to individual components | Delete or move lis Safety systems t |
|---|---|---|---|
| Loss of RHR Shutdown Cooling with the RCS Temperature 200 Deg F to 300 Deg F (PWR) & (BWR) | (M) Loss of shutdown cooling. | (7) Loss of shutdown cooling | Delete or move list |
| | (N) Loss of component cooling system or cooling to an individual component. | (8) Loss of component cooling system or cooling to individual components | Delete or move list Safety systems |
| Loss of Normal Feedwater at Full Power | (O) Loss of normal feedwater or normal feedwater system failure. | (9) Loss of normal feedwater, or normal feed-water system failure | Delete or move list |
| | (P) Loss of condenser vacuum. | (5) Loss of condenser vacuum, including loss of condenser level control | Delete or move list Delete level |
| | (Q) Loss of protective system channel. | (11) Loss of a protective system channel | Delete or move list |
| Dropped Control Rod While at Power (BWR) | (R) Mispositioned control rod or rods (or rod drops). | (12) Control rod failure, including stuck rods, uncoupled rods, drifting rods, rod drops, and misaligned rods | Delete or move list Drifting uncoupled |
| Failure of Rod Control System | (S) Inability to drive control rods. | (13) Inability to drive control rods | Delete or move list |
| | (T) Conditions requiring use of emergency boration or standby liquid control system. | Part of (?) above/below? | |
| | (U) Fuel cladding failure or high activity in reactor coolant or offgas. | (14) Fuel cladding failure resulting in high activity in reactor coolant or off-gas, and the associated high radiation alarms | Delete or move list |
| Turbine Trip from Full Power | (V) Turbine or generator trip. | (15) Turbine trip (16) Generator trip | Delete or move list |
| | (W) Malfunction of an automatic control system that affects reactivity. | (17) Failure in automatic control systems that affect reactivity and core heat removal | Delete or move list |
| Failure Open of One or | (X) Malfunction of reactor | (25) Reactor pressure | Delete or move list |

| | | | |
|---|---|---|---|
| More Turbine Bypass Valves While at (a) Full Power, (b) Hot Standby (PWR); Turbine Bypass Valve Failure to Open Following Trip (BWR) | coolant pressure/volume control system. | control system failure, including turbine bypass failure for Boiling Water Reactors (BWRs). | |
| Reactor Trip from Full Power (PWR) & (BWR) | (Y) Reactor trip. | (19) Reactor trip | Delete or move list |
| Steam Line Break (inside-outside containment) (BWR) | (Z) Main steam line break (inside or outside containment). | (20) Main steam line break, as well as main feed line break, both inside and outside containment | Delete or move list |
| | (AA) A nuclear instrumentation failure. | (21) Nuclear instrumentation failures | Delete or move list |
| Failure of Pressurizer Level and Pressure Automatic Controls; (2) Failure of Automatic Steam Generator Level Controls | | (18) Failure of reactor coolant pressure and volume control systems for PWRs | Delete or move list BWR should have pressure control |
| | | (22) Process instrumentation, alarms, and control system failures | Delete or move list |
| | | (23) Passive failures of components in systems, such as engineered safety features or emergency feedwater systems | Delete or move list |
| | | (24) Failure of the automatic reactor trip system; and | Delete or move list |
| Load Rejection of Greater than 10% (PWR) & (BWR); | | | |
| Failure Open of Power Operated Relief Valve (PWR); Inadvertent Opening of Relief Valve (BWR) | | | |
| Stuck Open Pressurizer Safety Valve (PWR); Reactor Pressure Control | | | |

| | | | |
|---|---|---|---|
| Failure (BWR) | | | |
| Inadvertent Safety Injection While at Power (PWR) | | | |
| Inadvertent Isolation of MSIV's while at Power (BWR) | | | |
| Cold Water Transient at Power (BWR) | | | |
| Inadvertent Start of Idle Recirculation Pump (BWR) | | | |
| Malfunction of Reactor Water Level Automatic Controls (BWR) | | | |
| | | | My recommendation is to move the entire list to the appendix. |

## 13.2 AI-94 and 98 Colby

**Action Item 94 and 98**

AI - 94 - Align Appendix Header dates to Appropriate Published Standard Date

AI-98 - Insert correct standard Title in appendices headers

| | | |
|---|---|---|
| Appendix A<br><br>(This Appendix is not a part of American National Standard for Nuclear Power Plant Simulators for Use in Operator Training, ANSI/ANS-3.5-1998, but is included for information purposes only.) | Appendix A<br><br>(This Appendix is not a part of American National Standard for Nuclear Power Plant Simulators for Use in Operator Training and Examination,, ANSI/ANS-3.5-2003, but is included for information purposes only.) | Approved change from October 2002 meeting. Action item #97. Add the words "and Examination" to be consistent with the approved title for the ANS 3.5 Standard.<br><br>Approved change from October, 2002 meeting. Action item #94. Change the Standard date from 1998 to 2003 to be consistent with the current Standard revision |

13.3  **AI-90 (Colby)**

| **Action Item 90** |
|---|
| Hi fellow task members – Jim F, Kevin C, SK and Butch.<br><br>My thoughts on approaching this task – compare section 3 in the standard to section 4 of the standard.<br><br>Assume the information in section 3 is our guide. In other words use it as the requirement and compare the words to the associated section number in 4. I.e. Section 3.1 should be compared to section 4.1. Section 4 should contain the testing requirements for section 3 or at least give you a method to accomplish the requirement in section 3<br>I caution you that I have found some methods to accomplish a requirement of section 3 in a different location of section 4. They are not always lined up by the associated section number<br>Please hi light items in section 3 if you do not find a testing method in section 4<br>Identify items in section 4 which exceeds the requirements from section 3 |

**Make a recommendation to section 4 what should be added in order to meet the requirements of section 3**
**Please try to identify any areas of redundancy in either section.  If you can recommend an approach to**
**eliminate the redundancy, please identify those areas.**
**If you have a table in your section, please look at need for the table and should it be moved to the appendix**
**or deleted.  Be prepared to discuss this.**

Reference – NOTE:  Section

**1.2 Background**
This standard is organized so that simulator functional and physical requirements are described in
Section 3, while the corresponding testing and validation requirements are described in Section 4.  The
sub-numbering of Sections 3 and 4 is consistent so that corresponding section paragraphs address the
same subject matter from a requirements and testing standpoint.

| 3. General Requirements | 4. Testing Requirements |
|---|---|
| A nuclear power plant simulator is intended to be used as a training device in support of initial and requalification training, as well as a device for the examination of operators.  The simulator shall be referenced to a specific unit.  The scope of simulation shall be such that the operator is required to take the same action on the simulator to conduct an evolution as on the reference unit, using the reference unit operating procedures.  The scope of simulation shall permit conduct of all of the evolutions required in this section until a stable condition is obtained. | The intent of the following verification, validation, and performance testing criteria is to ensure that no noticeable differences exist between the simulator control room or simulated systems when evaluated against 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 4.1 through 4.4. |
| | Note:  There are no requirements to ensure overall simulator design incorporates provisions for examination security. |
| A process incorporating structured software design and testing concepts shall be provided to control simulator modifications.  The overall simulator design shall incorporate provisions for examination security.  Simulator verification and validation | Subpart E--Written Examinations and Operating Tests **Sec. 55.**40  **Implementation** (2) Pursuant to Sec. 55.49, power reactor facility licensees shall establish, implement, and maintain procedures to control examination security and |

| | |
|---|---|
| testing, performance testing, and configuration management capabilities shall also be provided.<br><br>Simulation of the control room equipment, systems, and operation shall be as described in paragraphs 3.1 through 3.4. | integrity;<br><br>It shall be demonstrated that the overall simulator design incorporate provisions for examination security. |
| **3.1 Simulator Capabilities.**  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 verification, validation, and performance testing criteria of Section 4, Testing Requirements. | **4.1 Simulator Capabilities Criteria**<br><br>It shall be demonstrated that the simulator performs the capabilities defined in 3.1. |
| **3.1.1 Real Time and Repeatability.**  The simulator shall, in a repeatable manner, operate in real time while conducting any of the evolutions required by this section. | **4.1.1 Real Time and Repeatability.**  It shall be demonstrated that the simulator performs the capabilities defined in 3.1, completes execution within the designed time interval, and is repeatable.  In addition, it shall be demonstrated that between successive simulator tests no noticeable differences exist with respect to time base relationships, sequences, durations, rates, and accelerations. |
| **3.1.2 Limits of Simulation.**  Mathematical models of physical phenomena are sometimes simplified to meet real-time simulation requirements.  Such simplification can limit the conduct of certain evolutions on the simulator.  In addition, it is sometimes possible to create events on a simulator that progress beyond reference unit design limits. Simulation could be inaccurate beyond these limits. Examples of such events include primary | **4.1.2 Limits of Simulation.**  It shall be demonstrated that the limits of simulation are identified as part of the simulator design data base, and that automatic or administrative means are in place for notification to the instructor that the limits of simulation have been exceeded. |

| | |
|---|---|
| containment failure and gross core degradation. To reduce the potential for negative training, automatic or administrative controls shall be provided to alert the instructor when model parameters exceed values indicative of events beyond the implemented simulation scope or expected reference unit behavior. | |
| **3.1.3 Steady State and Normal Evolutions.** | **4.1.3 Steady-State and Normal Evolutions** |
| **3.1.3.1 Steady-State Operation.** The simulator shall support steady-state operation in a continuous manner at three different power levels spanning at least 50% of the operating range. | **4.1.3.1 Steady-State Operation.** It shall be demonstrated that the simulator correctly represents the response of the reference unit at three different power levels spanning at least 50% of the operating range for which reference unit data is available. The simulator power levels at which the comparison is performed shall have been attained through continuous operation over the power range. |
| The simulator shall support the conduct of the reference unit evolutions listed in this section in a continuous manner, without any mathematical model or initial condition changes.<br><br>The simulator shall calculate system parameters corresponding to particular operating conditions, display these parameters on the appropriate instrumentation, and provide proper alarms and protective system actions. The minimum evolutions that shall be supported by the simulator, using only operator action normal to the reference unit, are as follows: | The recorded computed values of the parameters shall be compared with the reference unit data and shall be demonstrated to be within the tolerances noted below. The computed values of parameters not itemized below, and considered to be relevant to steady-state operation, shall be demonstrated to match reference unit data within 10% of the reference unit instrument loop range. In making comparisons between the simulator computed values and the reference unit data, an additional deviation may be allowed up to the documented value of the reference unit instrument error.[1] The simulator instrument error shall be no greater than that of the comparable meter, recorder, and |

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[1] Appendix C provides several example steady-state tolerance calculations.

| | related instrument system of the reference unit. |
|---|---|
| (1) Unit startup from cold shutdown to rated power conditions;<br>(2) Unit shutdown from rated power to cold shutdown conditions;<br>(3) Load changes;<br>(4) Operator-conducted surveillance testing on safety related equipment or systems; and<br>(5) Unit performance testing such as heat balance, determination of shutdown margin, and measurement of reactivity coefficients and control rod worth through the use of permanently installed instrumentation<br><br>For evolutions not listed above, such as reactor core end-of-cycle coastdown, mid-loop operations, refueling operations, or evolutions where the reactor vessel head is removed, conditions may be achieved in a non-continuous manner and mathematical model or initial condition changes are permitted. | **4.1.3.1.1.** It shall be demonstrated that the following PWR parameters match reference unit data within 1% of the reference unit instrument loop range:<br><br>• Temperature (T)-average<br>• T-hot<br>• T-cold<br>•<br>• Core MWt<br>• Power range nuclear instrumentation readings<br>• Reactor coolant system pressure<br>• Steam generator pressure<br>• Pressurizer level.<br><br>**4.1.3.1.2.** It shall be demonstrated that the following PWR parameters match reference unit data within 2% of the reference unit instrument loop range:<br><br>• Steam generator feed flow<br>• Reactor coolant system flow<br>• Steam generator level<br>• Letdown flow<br>• Charging flow<br>• Steam flow<br>• Turbine first stage pressure.<br>MWe<br><br>**4.1.3.1.3.** It shall be demonstrated that the following BWR parameters match reference unit data within 1% of the reference unit instrument:<br><br>• Core MWt |

- Reactor pressure
- 
- Reactor wide range pressure
- Total core flow.

**4.1.3.1.4.** It shall be demonstrated that the following BWR parameters match reference unit data within 2% of the reference unit instrument loop range:

- Average power range monitor readings
- Feedwater temperature (after last feedwater heating stage)
- Total steam flow
- Individual recirculation loop flows
- Total feedwater flow
- Turbine steam flow
- Condenser vacuum
- Individual calibrated jet pump flow
- Narrow range reactor water level.

MWe

**3.1.3.2 Normal Evolutions**

The simulator shall support the conduct of the reference unit evolutions listed in this section in a continuous manner, without any mathematical model or initial condition changes.

The simulator shall calculate system parameters corresponding to particular operating conditions, display these parameters on the appropriate instrumentation, and provide proper alarms and protective system actions. The minimum evolutions that shall be supported by the simulator, using only operator action normal to the reference unit, are as follows:

**4.1.3.2 Normal Evolutions.** The performance of procedures on the simulator, such as heat balance and determination of shutdown margin, shall be compared and demonstrated to represent correctly the response of the reference unit at the same power level consistent with reference unit procedures and data availability.

It shall be demonstrated that simulator response during conduct of the normal evolutions identified in 3.1.3.2 meet the following acceptance criteria:

| | |
|---|---|
| (1) Unit startup from cold shutdown to rated power conditions;<br>(2) Unit shutdown from rated power to cold shutdown conditions;<br>(3) Load changes;<br>(4) Operator-conducted surveillance testing on safety related equipment or systems; and<br>(5) Unit performance testing such as heat balance, determination of shutdown margin, and measurement of reactivity coefficients and control rod worth through the use of permanently installed instrumentation<br><br>For evolutions not listed above, such as reactor core end-of-cycle coastdown, mid-loop operations, refueling operations, or evolutions where the reactor vessel head is removed, conditions may be achieved in a non-continuous manner and mathematical model or initial condition changes are permitted. | (1) Be the same as the reference unit startup and shutdown test procedures acceptance criteria.<br>(2) Be the same as the reference unit surveillance procedure acceptance criteria.<br>(3) Be the same as the reference unit normal operating procedure acceptance criteria.<br>(4) Require that the observable change in the parameters correspond in direction to those expected for a best estimate of normal unit operation.<br>(5) Require that the simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic action under identical circumstances.<br>(6) Require that the simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances. |
| 3.1.4 Malfunctions.  The determination of the type and number of malfunctions to be simulated shall be part of a Systematic Approach to Training process for the design of performance-based operator training programs.  The malfunction selection process should utilize the following references:<br><br>(1) Licensee Event Reports (LERs), Significant Event Reports, and Significant Operating Experience Reports;<br>(2) Probabilistic risk assessment (PRA) studies;<br>(3) Nuclear steam supply system and balance of | **4.1.4 Malfunctions.**  It shall be demonstrated that simulator response during the conduct of the malfunctions required by 3.1.4 meets the following acceptance criteria:<br><br>(1) The simulator allows the use of applicable reference unit procedures.<br>(2) Any observable change in simulated parameters corresponds in direction to those expected from actual or best estimate response of the reference unit to the malfunction.<br>(3) The simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused |

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| plant manufacturer equipment availability and reliability data, as well as technical information service bulletins; <br><br>(4) Local site considerations and reference unit-specific operating experiences; <br>(5) U.S. Nuclear Regulatory Commission bulletins, circulars, and generic letters; and <br>(6) Reference unit Safety Analysis Report. <br><br>The specific malfunction capability required of the simulator shall meet the requirements specified in the reference unit's accredited licensed operator training programs. <br><br>The malfunctions listed below shall be included: <br><br>(1) Loss of coolant: significant Pressurized Water Reactor (PWR) steam generator tube leaks; inside and outside primary containment; large and small Loss of Coolant Accidents (LOCA) demonstrating multiphase flow; and failure of safety and relief valves; <br>(2) Loss of instrument air to the extent that the whole system or isolable portions can lose pressure and affect the reference unit's static or dynamic performance; <br>(3) Degraded electrical power to the station, including loss of offsite power, loss of emergency power, loss of emergency generators, loss of power to the unit's electrical distribution buses, and loss of power to the individual instrumentation buses (including AC as well as DC) that provide power to control room instrumentation or unit control | an alarm or automatic action under identical circumstances. <br>(4) The simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances. |

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| functions affecting the unit's response; <br> (4) Loss of forced core coolant flow due to single or multiple pump failure; <br> (5) Loss of condenser vacuum, including loss of condenser level control; <br> (6) Loss of service water or cooling to individual components; <br> (7) Loss of shutdown cooling; <br> (8) Loss of component cooling system or cooling to individual components; <br> (9) Loss of normal feedwater, or normal feed-water system failure; <br> (10) Loss of all feedwater, both normal and emergency; <br> (11) Loss of a protective system channel; <br> (12) Control rod failure, including stuck rods, uncoupled rods, drifting rods, rod drops, and misaligned rods; <br> (13) Inability to drive control rods; <br> (14) Fuel cladding failure resulting in high activity in reactor coolant or off-gas, and the associated high radiation alarms; <br> (15) Turbine trip; <br> (16) Generator trip; <br> (17) Failure in automatic control systems that affect reactivity and core heat removal; <br> (18) Failure of reactor coolant pressure and volume control systems for PWRs; <br> (19) Reactor trip; <br> (20) Main steam line break, as well as main feed line break, both inside and outside containment; <br> (21) Nuclear instrumentation failures; <br> (22) Process instrumentation, alarms, and control | |

system failures;

(23) Passive failures of components in systems, such as engineered safety features or emergency feedwater systems;

(24) Failure of the automatic reactor trip system; and

(25) Reactor pressure control system failure, including turbine bypass failure for Boiling Water Reactors (BWRs).

The simulator shall support the conduct of abnormal, off-normal, and emergency events, including simultaneous or sequential malfunctions, to demonstrate inherent reference unit response and automatic control functions. Where operator actions are a function of the degree of severity of the event, the simulator shall have adjustable malfunction severity of a sufficient range to represent the potential reference unit conditions. Consequential failures of systems and equipment due to operator action or malfunction of supporting systems shall be simulated where supported by a training needs assessment.

The response of the simulator shall be compared to actual reference unit response or best estimate unit response, as required by Section 4, Testing Requirements. The simulator shall support operator actions to recover from, or mitigate the consequences of, malfunctions. The scope of simulation shall be such that a stable, controllable, and safe condition is attained, which can be continued either to cold shutdown conditions, or

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| until the limits of simulation are reached (see 3.1.2). | |
| **3.2 Scope of Simulation** | **4.2 Scope of Simulation** |
| **3.2.1 Physical Fidelity and Human Factors**<br><br>**3.2.1.1 Scope of Panel Simulation.** The simulator shall include those operational panels, consoles, and operating stations required to provide the controls, instrumentation, alarms, and other human-system interfaces used by operators in the reference unit to conduct the normal evolutions of 3.1.3 and respond to the malfunctions of 3.1.4. | **4.2.1 Physical Fidelity and Human Factors**<br><br>**4.2.1.1 Scope of Panel Simulation.** A comparison shall be performed to demonstrate that operational panels, consoles, and operating stations which are simulated (stimulated) replicate the size, shape, color, and configuration of those of the reference unit; that noticeable differences are documented; and that a training needs assessment has been conducted in accordance with the criteria provided by 4.2.1.4. |
| **3.2.1.2 Instrumentation, Controls, Markings, and Operator Aids.** Meters, recorders, switches, annunciators, controllers, plant computer interface hardware, and other components or displays on the panels, consoles, and operating stations, that are used during normal, abnormal, off-normal, and emergency evolutions shall be included in the simulator. Stimulated hardware devices may be used. | **4.2.1.2 Instrumentation, Controls, Markings, and Operator Aids.** A comparison shall be performed to demonstrate that instrumentation, controls, markings, stimulated components, and operator aids that are on panels, consoles, and operating stations, which are simulated in accordance with 3.2.1.2, replicate the size, shape, color, configuration, feel, and dynamic functioning of those of the reference unit. Components located on simulated panels but not used by the operator during training may be visually simulated hardware. It shall be demonstrated that information is displayed to the operator in the same format and engineering units as in the reference unit control room. It shall be demonstrated that noticeable differences are documented and that a training needs assessment has been conducted in accordance with the criteria provided by 4.2.1.4. Items to be reviewed include the following:<br><br>• Switches |

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| | •      Controllers<br>•      Meters<br>•      Recorders<br>•      Mimics<br>•      Demarcation lines<br>•      Engravings<br>•      Color<br>•      Panel layout<br>•      General appearances<br>•      Plant computer capabilities<br>•      Lights<br>•      Annunciators<br>•      Labels<br>•      Tactile cues<br>•      Display systems. |
| **3.2.1.3 Control Room Environment.** The reference unit control room environmental features that support normal, abnormal, off-normal, and emergency evolutions shall be simulated. Communication systems that an operator would use to direct remote reference unit activities shall be operational at least to the extent that the instructor, when performing these activities, is able to communicate over the appropriate operator's communication system. | **4.2.1.3 Control Room Environment.** A comparison shall be performed to demonstrate that the simulator control room environment replicates the reference unit control room in accordance with 3.2.1.3. It shall be demonstrated that noticeable differences are corrected or that a training needs assessment has been conducted in accordance with the criteria provided by 4.2.1.4. Items to be included are the following:<br><br>•      Floor plan<br>•      Lighting characteristics<br>•      Communications<br>•      Furnishings<br>•      General appearance<br>•      Audible cues<br>•      Obstructions. |
| **3.2.1.4 Simulator Control Room Deviations.** Where deviations exist among the simulator control | **4.2.1.4 Simulator Control Room Deviations.** The training needs assessment performed for each deviation |

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| panels, the reference plant panels in instrumentation, and audio-visual cues provided to the operator, such deviations may remain if a training needs assessment is performed in accordance with 4.2.1.4. | identified in 4.2.1.1, 4.2.1.2, and 4.2.1.3 Shall be evaluated. Deviations that do not impact the actions to be taken by the operator or do not detract from training are acceptable.<br><br>The following parameters should be evaluated to determine if the deviation has an impact on the actions to be taken by the operators:<br><br>(1) The human-system interface required for normal, abnormal, or emergency procedures;<br>(2) The differences in performing the task on the simulator versus performing the task in the reference unit control room;<br>(3) The differences in operator cues, auditory and visual information presented to the operator, and the critical decisions and actions required of the operator;<br>(4) The function of the equipment and the potential for impacting reference unit safety, tripping the reference unit, or damaging reference unit equipment;<br>(5) The differences required by the team response to normal, abnormal, or emergency actions;<br>(6) Review of operational experience to identify the potential for operator error or the necessity for reinforcement of the skills required for the task. |
| **3.2.2 Systems to be Simulated and the Degree of Completeness** | **4.2.2 Systems to be Simulated and the Degree of Completeness** |
| **3.2.2.1 Systems Controlled or Monitored from the Control Room.** The inclusion of systems of the reference unit in the scope of simulation shall be to the extent necessary to allow the operator to perform the evolutions described in 3.1.3 and respond to the malfunctions described in 3.1.4. | **4.2.2.1 Systems Controlled or Monitored from the Control Room.** It shall be demonstrated that the systems of the reference unit that are within the scope of simulation are adequate to perform the evolutions required by 3.2.2.1. It shall be demonstrated that the scope of simulation includes system interactions with |

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| These systems shall be complete to the extent that the operator can perform these control manipulations and observe simulated unit response as in the reference unit.  The scope of simulation shall include system interactions with other simulated systems, so as to provide a total integrated unit response. | other simulated systems so as to provide a total integrated unit response.  A training needs assessment shall be performed for each deviation identified in accordance with criteria provided in 4.2.1.4.  Deviations that do not impact the actions to be taken by the operator or do not detract from training are acceptable. |
| **3.2.2.2 Systems Controlled or Monitored External to the Control Room.**  The systems that are operated or monitored external to the control room, and are necessary to perform the evolutions described in 3.1.3 and to respond to malfunctions described in 3.1.4, shall be simulated.  The operator shall be able to interface with the remote activity in a manner similar to the reference unit. | **4.2.2.2 Systems Controlled or Monitored External to the Control Room.**  It shall be demonstrated that systems operated or monitored external to the control room, and necessary to perform the evolutions required by 3.2.2.2, are simulated.  It shall be demonstrated that the operator is able to interface with the remote activity in a similar manner as in the reference unit.  A training needs assessment shall be performed for each deviation identified in accordance with criteria provided in 4.2.1.4. |
| **3.3 Simulator Instructor Station Capabilities** | **4.3 Simulator Instructor Station Capabilities.** |
| **3.3.1 Initial Conditions.**  The simulator shall include storage capacity for a sufficient number of initial conditions to support the evolutions identified in 3.1.3.  A set of initial conditions that support the operator training and examination program shall be identified and administratively controlled.  This set shall provide a variety of the reference unit operating conditions that encompass various power operating conditions, major evolutions during startup and shutdown, effects of different times during the core life cycle, and fission product poison concentrations. | **.3.1 Initial Conditions**It shall be demonstrated that initial conditions specified will support the operator training and examination program as required in 3.3.1, are administratively controlled and are representative of reference unit conditions |
| **3.3.2 Malfunctions.**  The simulator shall replicate the malfunctions required in 3.1.4 and as required by the accredited license operator training program. | 4.3.2 Malfunctions<br><br>It shall be demonstrated that the malfunctions and |

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| The simulator shall include the capability for insertion of simultaneous or sequential malfunctions.  Capabilities shall be provided to insert and, as appropriate, terminate malfunctions. Event-triggered, as well as time-triggered, malfunction initiation should be included. Provision shall be made for incorporating additional malfunctions. | capability exists as required in 3.3.2.  The introduction of the malfunction shall not alert the operators to pending events other than by indications that would occur in the reference unit. |
| **3.3.3 Other Features.**  The simulator shall include freeze, run, snapshot, backtrack, control room panel hardware override, and initial condition reset. Other features, such as replay, slow time, fast time, component failure capabilities, operator performance monitoring, monitoring of parameters, and plotting capabilities, should be included. For stimulated hardware which stores historical data or whose performance is dependent on history, requirements for freeze, run, initial condition reset, snapshot, and backtrack shall be included. | 4.3.3 Other Features  (move to 4.3.4)<br><br>It shall be demonstrated that the simulator includes features, capabilities and controls as specified in 3.3.3, and that implementation of simulator control features does not alert the operator to pending events other than those features that cause departure from real-time execution of the models or notification of reaching a limit of simulation. For stimulated components it shall be documented that noticeable differences have been defined and that training needs assessments have been performed in accordance with 4.2.1.4. |
| **3.3.4 Local Operator Actions.**  The simulator shall permit the instructor to act in the capacity of an individual performing local actions external to the control room in support of 3.1.3 and 3.1.4. Examples of local actions to be supported include changing the position of valves, circuit breakers, or other locally operated equipment.  In addition, other features to enhance the instructor's control over the simulation of the reference unit external environment may be implemented; e.g., air temperature and circulating water temperature.  For multi-unit plants, and where not otherwise provided, the instructor shall have the ability to | 4.3.4 Local Operator Actions<br><br>It shall be demonstrated that the capability exists to reproduce the local operator actions required in 3.3.4 and by the accredited licensed operator training program. The introduction of the local operator action does not alert the operators to pending events other than by indications that would occur in the reference unit.<br><br>It shall be demonstrated that the simulator permits the instructor to act in the capacity of the required individuals performing local operations external to the control room, as required by 3.3.4. |

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| control common resources, such as steam, air, and electrical power available from the other unit or units which impact operator response on the reference unit. | |
| **3.4 Simulator Testing.** The simulator shall have the capability to capture selected simulated parameters electronically, and to provide hard copy data of these parameters in the form of either plots or printouts for the required reference unit parameters during the evolutions specified in 3.1.3 and the malfunctions specified in 3.1.4.<br><br>A means to compare electronically the simulated parameters with reference unit data may be used. Test data collection capability shall provide sufficient parametric and time resolution to allow determination of compliance with the testing criteria of Section 4, Testing Requirements.<br><br>**3.4.1 Simulator Verification Testing.** Simulator verification testing is a form of software development testing performed 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.. | **4.4 Simulator Testing**<br><br>Verification, validation, and performance testing shall be performed to ensure that no noticeable differences exist between the simulator control room or simulated systems when evaluated against the control room or systems of the reference unit.<br><br>**4.4.1 Simulator Verification Testing.**<br><br>Simulator verification testing shall be 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 non-integrated environment on a computer system other than the simulator.<br><br>Simulator Verification testing shall be performed as part of the initial structured software design and development process, and when changes or modifications are made to any of the following:<br><br>•      Computer platforms<br>•      Operating systems and run-time utilities<br>•      Interface systems<br>•      Instructor stations |

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| | •     Models.<br><br>Each simulation facility organization should ensure that the necessary software design documentation is generated and updated. |
| **3.4.2 Simulator Validation Testing.** Simulator validation testing is a form of software development testing performed by comparison of simulated component or system results against actual or predicted reference unit performance data in either a stand-alone or integrated fashion. | **4.4.2 Simulator Validation Testing.**<br><br>Simulator validation testing shall be performed by comparison of simulator model results to actual or predicted reference unit data as defined by Section 3, General Requirements.  Section 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 standalone mode of system operation.  Each simulation facility organization shall ensure that the validation test documentation is generated.  The order of preference for data comparison shall be as stated in 5.1.1.  A record of the conduct of this test, the test's results, and the test's evaluation shall be maintained.<br><br>Validation tests shall be conducted prior to the simulator's use in training and examination for the following situations:<br><br>1) Completion of simulator initial construction.<br><br>(2) Whenever models are changed or modified in a way that potentially affects fidelity relative to the reference unit.<br>(3) Whenever there are changes which 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. |
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| **3.4.3 Simulator Performance Testing.** Simulator performance testing is characterized by a comparison of the results of integrated operation of the simulation facility to actual or predicted reference unit data. Performance testing encompasses testing other than software development testing.<br><br>Simulator performance testing comprises operability and scenario-based testing. | **4.4.3 Simulator Performance Testing.** Simulator performance testing shall be 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. Simulator performance testing shall be conducted in a fully integrated mode of operation. |
| **3.4.3.1 Simulator Operability Testing.**<br><br>The intent of simulator operability testing is to demonstrate the following:<br><br>(1) Overall simulator model completeness and integration;<br>(2) Simulator steady-state performance; and<br>(3) Simulator transient performance for a benchmark set of transients. | **4.4.3.1 Simulator Operability Testing.** A simulator operability test[2] shall be conducted once per year, on either a calendar or certification basis, to confirm overall simulator model completeness and integration<br><br>Simulator operability testing credit may be taken for having performed those normal evolutions, malfunctions, local operator actions, and other features exercised by the scenario during scenario-based testing or operator training, provided that both of the following conditions are satisfied:<br><br>(1) The evolutions are performed in accordance with reference unit procedures.<br>(2) The scenario-based testing results are evaluated and documented. |

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[2] Appendix B provides examples of acceptable simulator operability tests.

| 3.4.3.2 **Simulator Scenario-Based Testing.** | 4.4.3.2 **Simulator Scenario-Based Testing.** |
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| The intent of scenario-based testing is to ensure the simulator is capable of producing the expected reference unit response to satisfy predetermined learning or examination objectives by utilizing the existing training and examination scenario validation process. | . Scenario-based tests shall be conducted utilizing the existing training and examination scenario validation process prior to using scenarios for operator training and examination. Performance testing credit may be taken for a scenario developed for the simulator, provided that the following conditions are satisfied: (1) the scenario is tested prior to use for operator training and examination including the appropriate instructor interfaces, operator actions, and operator cues; (2) the simulator is capable of producing the expected reference unit response without procedural exceptions, significant performance discrepancies, or deviation from an approved scenario sequence; A record of the conduct of these tests, typically in the form of a completed scenario checklist, and the evaluation of the test results, shall be maintained.[2] . |

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[2] Footnote: Appendix E provides an example of an acceptable means of documenting scenario-based testing.

13.4  **AI-92 Colby**

<table>
<tr><td colspan="3" align="center">**Action Item 92**</td></tr>
<tr><td colspan="3">AI-92 - Improve Definition of Simulation facility to include Part-task and limited scope. (coordinate with Scope State)</td></tr>
<tr><td>Current 98 Standard wording</td><td>Revised wording **- 2003**</td><td>Reasons</td></tr>
<tr>
<td>1.1 Scope.  This standard establishes the functional requirements for full-scope nuclear power plant control room simulators used for operator training and examination.  Criteria are established for the degree of simulation, performance, and functional capability of the simulated control room instrumentation and controls.  This standard does not address simulators for test, mobile, and research reactors, nor for reactors not subject to U.S. Nuclear Regulatory Commission licensing.</td>
<td>**1.1 Scope.** This standard establishes the functional requirements for Simulation Facilities used in the Training and Examination of Nuclear Power Plant Operators. Criteria are established for the degree of simulation, performance, and functional capabilities of the replicated systems and components. The replication may encompass full-scope, part-task, or limited scope. This standard does not address simulators for test, mobile, research reactors, or reactors not subject to U.S. Nuclear Regulatory Commission licensing.</td>
<td>I would delete the sentence "The replication may encompass full-scope, part-task, or limited scope."

We have not addressed nor do we have time to fix the part task or limited scope type of simulation facilities in this Standard.  I would defer to the 2008

I would recommend changing this word to something like reproduce or represent, ??. The reason is this should refer to software as oppose to hardware items.</td>
</tr>
<tr>
<td>This standard does not establish criteria for application of simulators in training programs. Training criteria are established in</td>
<td>This standard does not establish criteria for application of simulators in training programs.</td>
<td>Page: 69
Remove last sentence and reference number [1].
Approved change of removing</td>
</tr>
</table>

Comment [zz5]: Approved Scope and Background from March 02-03, 1999. Accepted 1999sep14.

Comment [BC6]: Remove last sentence and reference number [1].  Approved change of removing all reference to ANS-3.1 within the Standard.  From April 22-25, 2002 meeting.  Action item #57.  This change is due to the fact that ANS-3.1 does not establish training criteria for use of simulators.  This change was supported by the chairman for ANS-3.1.

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| American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plants, ANSI/ANS-3.1-1993 [1].[3] | | all reference to ANS-3.1 within the Standard.  From April 22-25, 2002 meeting.  Action item #57.  This change is due to the fact that ANS-3.1 does not establish training criteria for use of simulators.  This change was supported by the chairman for ANS-3.1. |
| simulation facility.  Device-driven or computer-driven interactive equipment which represents a system or group of integrated systems, and which replicates the effects of the reference unit used for operator training and examination. | No Change | I would not change this wording. |

13.5    Unit Performance Test Presentation (Panfil)

Perry Unit IP 71111.11 Experience

"Startup and Physics testing following an Outage" Matrix…

MANTG papers…

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[3] Numbers in brackets refer to corresponding numbers in Section 6, References.

13.6     Operator Control Manipulations (Colby) [Survey Conclusio1-92.doc]

| Survey Conclusion |
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| **QUESTION 1 - How would you define the word "Replicate" as used in item (i) above?** |

| **Reference  In 10 CFR 55 46** - Simulation facilities, item (c) (2) (i)  The plant-referenced simulator utilizes models relating to nuclear and thermal-hydraulic characteristics that replicate the most recent core load in the nuclear power reference plant for which a license is being sought; and… | Discussion - word Replicate<br><br>is generally reserved for hardware<br>Produces (expected) results<br>Matches data from fuels group<br>Webster's – to copy or reproduce<br>to represent nuclear and thermal hydraulics characteristics<br>Within tolerances of 4.1.3<br>NOTE:  NRC's response to comment 3-3 in Attachment 1 of SECY-01-0125 dated 7-10-2001. Where alternate wording had been suggested by NEI, they say in part... 'It means that the plant-referenced simulator's nuclear and thermal-hydraulics models operate within the tolerances specified in section 4.1.3, "Steady-State and Normal Evolutions" of the industry standard.<br>Within the acceptance criteria of approved plant procedures<br>as far as the student/operator can determine<br>exhibits the same characteristics to an operator as would the reference plant<br>will exist after core model parameters are determined to match equivalent reference unit parameters within these defined tolerances | |

| | refers to the cycle characteristics/response rather than the cycle number itself<br> Refers to<br>To duplicate; to make an exact copy of<br>To duplicate, copy, reproduce, or repeat.<br>To copy or repeat (something).<br>One out of a set of identical observations in a given experiment under identical conditions.<br>Equivalent or Correspond |
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| Reference ANS-3.5 1998 | Reference ANS-3.5 2005 - Revision |
| **2.  Definitions**<br>**simulation facility**.  Device-driven or computer-driven interactive equipment which represents a system or group of integrated systems, and which replicates the effects of the reference unit used for operator training and examination. | **Hardware and maybe software**<br><br>**2.  Definitions**<br>**stimulated components.** Hardware/software components that are integrated to the simulator process via simulator inputs/outputs which perform their functions parallel to, and either independently of or synchronized with the simulation process |
| **4.2.1.1 Scope of Panel Simulation.**  A comparison shall be performed to demonstrate that control panels, consoles, and operating stations which are simulated as required by 3.2.1.1 replicate the size, shape, color, and configuration of those of the reference unit; that noticeable differences are documented; and that a training needs assessment has been conducted in accordance with the criteria provided by 4.2.1.4. | Hardware<br><br>This is dealing only with hardware so I think Replicate is OK in this use of the word.  It will work for most of the options listed above. |
| 4.2.1.2 Instrumentation, Controls, Markings, and Operator Aids.  A comparison shall be performed to demonstrate that instrumentation, | **Hardware**<br><br>This is dealing only with hardware so I think |

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| controls, markings, stimulated devices, and operator aids that are on panels, consoles, and operating stations, which are simulated in accordance with 3.2.1.2, replicate the size, shape, color, configuration, feel, and dynamic functioning of those of the reference unit. | Replicate is OK in this use of the word.  It will work for most of the options listed above. |
| 4.2.1.3 Control Room Environment.  A comparison shall be performed to demonstrate that the simulator control room environment replicates the reference unit control room in accordance with 3.2.1.3.  It shall be demonstrated that noticeable differences are corrected or that a training needs assessment has been conducted in accordance with the criteria provided by 4.2.1.4.  Items to be included are the following: | **Hardware**<br><br>This is dealing only with hardware so I think Replicate is OK in this use of the word.  It will work for most of the options listed above. |
| 4.3 Simulator Instructor Station Capabilities.  It shall be demonstrated that initial conditions specified in 3.3.1 are administratively controlled and are representative of reference unit conditions.<br><br>It shall be demonstrated that the capability exists to replicate the malfunctions required in 3.1.4 and required by the accredited licensed operator training program.  The introduction of the malfunction shall not alert the operators to pending events other than by indications that would occur in the reference unit. | Software<br><br>I think this word should be changed to duplicate |

QUESTION 2
The only guidance the current Standard provides is contained in item (9) above.  The Working Group needs your guidance on what tests you currently perform to meet the requirements of item (ii) of 10CFR 55.46.  Please

indicate type of unit, BWR, PWR (W, CE, B&W, other).

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| **Reference:**<br>In ANS-3.5 1998 section 3.1.3 Normal Evolutions, it states:<br><br>… The minimum evolutions that shall be supported by the simulator, using only operator action normal to the reference unit, are as follows:<br><br>(9) Unit performance testing such as <mark>heat balance, determination of shutdown margin, and measurement of reactivity coefficients and control rod worth, through the use of permanently installed instrumentation</mark>; and | Discussion<br><br>I think we need to come up with a list for BWR and one for PWR type plants.<br><br>NOTE:  On BWR limited core physics testing using simulator data points, however these tests could not be performed using permanently installed instrumentation<br><br>NOTE:  On PWR there are no permanently installed instrumentation for core testing |
| | BWR<br>heat balance test is the only test<br>Potential tests<br>Startup<br>ECP<br>heat balance comparison<br>local criticality tests<br>ECCS tests, RWM and RSCS tests<br>Nuclear Instrument checks IRM/APRM |
| | PWR<br>Potential tests<br>Startup<br>ECP<br>heat balance and shutdown margin |

| | measured data at HZP.<br>Boron concentration at initial startup<br>rod worth tests<br>ITC tests<br>boron worth<br>xenon and samarium<br>Axial Flux targets<br>predicted power operation tests | |
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## 13.7    Simulator Control Room Deviations (Felker)

Greetings All!

I look forward to seeing everyone in the frozen tundra of Columbia!

Regarding AI-95, I will propose at the meeting that this item be closed. The two items identified at the bottom of Section 4.4.3.1 define the conditions under which operability testing credit can be taken for evolutions conducted during training that satisfy any of the three "intents" of operability testing. I believe it is correct and can be deleted as an issue before the committee.

I do however believe there are much larger fish to fry at the upcoming meeting. I will talk to the group about my impressions of the NEI/NRC Workshop but in a nutshell, I don't believe we have ever looked closely at Section 3 almost as a CFR type document. At least I know that I have not! If one does that then there are several requirements "land mines" laying in the bushes waiting for some unsuspecting utility to step on. For instance note the following:

1)    3.1.3 (9) - this is the one that everyone is generally aware of thanks to Larry's efforts however, in addition to the low power physics testing are there other reference unit performance tests besides heat balance determination? I would guess so although I am not smart enough to know what they are. Are they different between BWR's and PWR's?

2)    3.1.4 1st paragraph after the table of "25", Consequential failures. The standard states that "Consequential failures of systems and equipment due to operator action or malfunction of supporting systems shall be simulated where supported by a

training needs assessment.". Considering loss of cooling water to a pump or motor or, loss of oil pressure to a turbine there are probably hundreds if not thousands of such unusual events on the books today. Has a TNA been performed for each event either at your site or at a site of a similar reactor design? My guess is the answer is no. Do you have the documentation to show why your simulator models such a consequential failure correctly or why it is not required for your specific site? This seems to be very fertile ground for a 7-11-11 interview question!

3)    3.3.3  The standard states "For stimulated hardware which stores historical data or  whose performance is dependent on history, requirements for ...{ simulator unique functions} '... shall be included. Note, there is no weasel phrase regarding TNA. Can every site demonstrate the correct operation of stimulated devices under simulator unique modes or is there some documentation in the file describing why training says this is not required?

4)    3.3.4 The standard states "For multiunit sites, and where not otherwise provided, the instructor shall have the ability to control common resources, such as steam, air, and electrical power available from the other unit or units which impact operator response on the reference unit." Can everyone do this? Same questions and comments as before.

As a very minor point Section 3.2.14 refers to "reference plant" which I believe should be "reference unit" to be consistent with the remainder of the standard.

I think we need to address all of these issues prior to release of the next version of the standard since it is now being used as a CFR document. A one year extension for the next update is almost a foregone conclusion in my mind.

I look forward to the discussions and the challenge of writing new law!

Bob Felker
410-461-2119

## 13.8    Tim Cassidy Email (Colby)

Butch, attached is Seabrook's feedback on the survey.  I also have the following overall comment on Section 4 of the 98 standard that you can pass along to the committee:

The inconsistencies in Section 4 must be addressed.  All of the 'requirements' of Section 4.1 are not addressed in the testing requirements defined in Section 4.4.  For example, Section 4.1.1 Real Time

and Repeatability implies by the phrase 'it shall be demonstrated' that some sort of computer system real time test must be performed but this is not a test required by Section 4.4.

How do the repeatability criteria of this section apply to the testing program outlined in Section 4.4? The criteria of Section 4.1.2, "Limits of Simulation" are also not listed in section 4.4 but the phrase 'it shall be demonstrated' again implies testing (and documentation?).

The testing program outlined in Section 4.4 replaces discreet malfunction testing with scenario-based testing. How do the 'requirements' of section 4.1.4 apply in this instance? Should they be moved to Section 4.4.3.2?

Tim

## 13.9    Flight Simulator "replicate" usage reference (Colby)

The word "replicate" (as well as its cousin word "replicated") are used in a few places in the FAA's Advisory Circular 120-40C Draft. However, neither are defined in the document.

Here are the occurrences we found:

APPENDIX 1. Simulator Standards - 2.General - paragraph a : "Additional required crewmember duty stations and those required bulkheads aft of the pilot seats are also considered part of the cockpit and must replicate the airplane."

APPENDIX 1. Simulator Standards - 2.General - paragraph j : "Control forces and control travel which correspond to that of the replicated airplane."

APPENDIX 1. Simulator Standards - 2.General - paragraph u : "Control feel dynamics which replicate the airplane simulated."

The same wording is found in ICAO's Manual of Criteria for the Qualification of Flight Simulators, Doc 9625, First Edition 1995, for example:

Appendix A Flight Simulator Criteria - 1.General - paragraph a :

"Additional required crew member duty stations and those required bulkheads aft of the pilot seats are also considered part of the cockpit and must replicate the airplane."

Appendix A Flight Simulator Criteria - 1.General - paragraph i : "Control forces and control travel which correspond to that of the replicated airplane."

Appendix A Flight Simulator Criteria - 1.General - paragraph t : "Control feel dynamics which replicate the airplane simulated." I hope that this will help you.

NOTE:  Not sure if you want the reference person I got the information from?
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13.10    SCS ANS  3.5 Questions (Paris)

**SCS Meeting Comments**

14        Orlando Florida

January, 2003

14.1    Part Task

Why is Appendix D in the standard?  If it is truly not part of the standard  get rid of it.  Management keeps asking the Question.

14.2     Reactivity

BWR Operators do not perform any special testing.  Shutdown Margin is done by RE.

PWR Nuclear Engineers do all the Core Verification

No Value added, Heat Balance is important

Permanently installed - clear majority suggests we remove it

14.3     MW

Discussion that 2% is too large. The survey indicated 80% wanted it narrowed.

14.4     V&V

Simulation V&V does not add meaning.  V&V is standard software language.

14.5     Scenario Based Testing

Without Exceptions – language is too strong – questions concerning exceptions – suggest dropping

Discussion – if operator training does not validate a scenario the simulator can not take credit for testing – then how much should we test – basically it is a function of your program

Appendix E

Learning Objectives without exceptions refers to learning objectives

The Appendix is more clear than the body of the document

## 14.6    Part Task Discussions

Should I also include whiteboards and projectors etc.

Possibility to create problems with management

## 14.7    Unit Performance Testing

"such as" implies we should do it – does it really add value – seems not

examples may be misinterpreted as requirements

4.4.3.2

Test results shall be maintained – why do we need additional paperwork – what are tests results?

## 14.8    Exceptions from NRC

NRC means procedural exceptions

14.9     Test Results -  NRC defines performance testing differently as than the standard

"show evidence of the test results' – NRC may have a different idea

scenarios-  basically have no data to compare to in requal

14.10     Inconsistencies in Section 4

4.1, 4.2, 4.3 – not consistent in regard to testing programs – specifically in the 1998 standard

4.4 – Real-time & repeatability are not addressed – should be addressed

### 15    Action Items Carried to 2008 Standard

| 20 | **Date: 2002oct29**<br>**Status: Deferred to 2008** | Priority 1 – | **Paris**<br>**Colby**<br>**Kozak** | Exploiting technology changes and future industry trends. What's coming around the corner;<br><br>2002oct29<br>Paris<br>Deferred to 2008.  Additional technologies will need to be considered (e.g. Virtual reality, DCS, WEB based training)<br><br>2001Apr05<br>Paris<br>Presentation: What is Around the Corner (See Attachments Section)<br><br>**2001Aug09**<br>Paris Presentation – Distributed Control Systems scope needs to be considered in the standard (Hal will e-mail his presentation to Butch). |
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| 25 | **Moved to 2008** | Priority 2 – | **Dennis** | Process Guidelines (Mods and Testing) ;Institutionalizing Procedures<br><br>2002apr24<br>Dennis<br>Gave presentation on Millstone experience<br>Defer AI-25 to 2008<br><br>2001Apr05<br>Dennis<br>Deferred |
| 36 | **Date: 2003Mar10**<br>**Status: Deferred until 2008** | Priority 2 | **Koutouzis**<br>**Havens** | Questions from Review of INPO Documents: |

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| | | | | • Timeline for incorporation of Plant design changes into the simulator<br>• Instructor Performance<br>• Long Term Open Simulator Fidelity Issues<br><br>This is an information AI<br><br>**2003Mar10**<br>**Koutouzis**<br>**No INPO statements on Simulator Fidelity.**<br>**INPO is concerned with performance based issues only.**<br><br><br>2002Apr24<br>Havens – Keep this AI open pending additional input and data.<br>Koutouzis is gathering additional data. Recommends to do nothing right now<br>No Update<br><br>2001Apr05<br>Koutouzis<br>No Update<br><br>Related AI: 34 |
| **60** | **Moved to 2008** | Priority 1 | **McCullough Shelly** | Define the Term **Training Needs Assessment** in such a manner that it is clear in intent to both Training and Simulator staffs<br><br>2002apr23<br>McCullough<br>History presentation of Training Need Assessment.<br>See Appendix<br><br>2001Apr05 |

| | | | | McCullough<br><br>Trainers and Simulator personel view Training Needs Assesments Differently;<br>Training Needs Analysis and Training Needs Assessment are npot used consistently.<br>McCullough will revisit this item in a future date;<br><br>Reference: ACAD-85-006 "A Suppliment to Principles of Training Systems Development" |
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| **80** | **Moved to 2008** | | **Florence** | 2008 Copy and Paste RG 1.149 Rev 3 Section 1.5 into the 2008 Standard. (Software V&V) |
| | | | | |

## 16    Closed Action Items

| No. | Status | Date | Assigned To: | Work Assignment |
|---|---|---|---|---|
| 2 | **Date: 2000oct25** **Status:** Additional Editorial Review Required  **Date: 2000mar09** **Status: Complete** | | **Colby Welchel** | Obtain a Master Copy of the ANS 3.5 standard in Dual Column (working/1998) format. The WordPerfect copy from Shawn does not port into WORD correctly Assigned to Butch Colby. |
| 3 | **Date: 1999sep14** **Status: Complete** | | **Welchel** | Get NUPPSCO comments to members |
| 4 | **Date: 1999sep14** **Status: Complete** | | **Welchel** | Send copy of meeting minutes 1998Nov04 and 1999Mar02-03 to Jim Florence |
| 5 | **Date: 1999sep14** **Status: Complete** | | **Florence** | Jim will look at creating a survey on the USUG WEB concerning the Action Items and for soliciting info from the industry |
| 6 | **Date: 1999sep14** **Status: Complete** | | **Dennis** | Jeff will contact ANS about ANSI Historical standards Cataudella-Spoke with ANS Standards Secretary, Shawn Coyne-Nalbach Historical Standards: Past standards are retired and are only available as historical standards. 1979, 1981, 1985, and 1993 are no longer endorsed by ANSI and ANS only the 1998 standard is endorsed. |
| 7 | **Date: 2001Aug9** **Status complete** | | **Shelly Vick Dennis** | Talk to ANS about use of footnotes, asterisks, etc in standards To review style guide.  2001Apr05 Shelly Shelly will call Shawn. |
| 9 | **Date: 2001Apr05** | | **Dennis** | Is ANS 3 considering that the standard may address other |

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| | **Status: Closed**<br>**Dennis** | | | simulators not specific to NRC Regulatory Commission licensing?<br><br>2001Apr05<br>Dennis - No - per SubCommittee-1 Tamp Meeting<br><br>Dennis will verify with Mike concerning additional scope (adding DOE facilities into 3.5).<br>2001Apr05<br>Dennis - No - per SubCommittee-1 Tamp Meeting<br><br><br>**2000mar09**<br>Dennis will check at the next ANS 3 meeting |
| 10 | **Date: 2001Apr04**<br>**Status:  Awaiting Kozak**<br>**conversation with Chandler**<br>**and Mallay**<br><br>**Date: 2001Aug09**<br>**Status: Closed Pending**<br>**input from Alan Kozak**<br><br>**Date: 2001Aug27**<br>**Status: Closed** | | **Kozak**<br>**Collins**<br>**(Vick)**<br>**McCullough** | Propose security criteria for Simulators operating in Exam Mode<br><br>2001aug27<br>Kozak<br>Contact was made with James Mallary (NUPPSCO) to clarify the comment concerning "non-prescriptive" His concern was the inclusion of further details within the body and stated that if this was not the case then he has no further comment.<br><br>Contact could not be made with Harish Chandler.<br><br>Information gathered via the ANS survey presents the fact that all of the responding sites are applying Exam Security measures that meet the requirements of their training programs and review from other agencies, i.e. NRC, INPO. It can be safely assumed that non responders are doing like wise.<br><br>Based on this information no further action should be needed for this AI.<br><br>2001Apr04 | |

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| | | | | Kozak<br>PPT Presentation outlining several Security concerns. The presentation is included in the AI-10 documentation dated 2001Apr04. Final conclusion was that the current wording is sufficient.<br><br>AI Originator: Parking Lot Issue<br><br>2001Apr05<br>Kozak<br>Two NUPPSCO comments:<br>NUPPSCO supporting comment: James: Mallay stated that this item should be non-prescriptive.<br>NUPPSCO supporting comment: Harish Chandler<br><br>Kozak will call Chandler and Mallay and discuss their NUPPSCO<br><br>**2000mar09**<br>Determine source of Exam Security comment |
| 11 | **Date: 2001Apr05<br>Status: Closed<br>Moved to AI 13** | | **Felker<br>Collins<br>(Vick)** | Standard Section 3.1.4 - Add information notices and any other information; establish threshold of documents to be reviewed. Correspondences change over time. Discuss at next meeting with Felker present.<br><br>Origin: Parking Lot List<br><br>2001Apr05<br>Deferred for later discussion pending more important issues |
| 12 | **Date: 2001Aug09<br>Status: Closed** | | | Intentionally Left Blank |
| 13 | **Date: 2002oct29<br>Status: Complete** | Priority 1 – Waiting input from Florence on | **Felker<br>Florence<br>Colby** | Standard Section 3.1.3(7) - Rated coolant Flow - are BWR's OK with this?  Review entire list in section 3.1.3 for applicability. Review present parameter list. |

| | | feedback from industry | | Colby has additional information for discussion at the next meeting. Consider instrument accuracy relating to different plant types. |
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| | | | | 2002OCT29<br>Florence<br>Approved change of 3.1.3 items 1 trough 5 from April 22-25, 2002:  Action item #13.  The new words in Item 1 includes the intent of old items #1, 2, 3, 5, 7, and 10 and as a result has replaced them.  Old  item # 8 wording changed in new item #2 to be consistent with wording in new #1.  Old item # 4, # 6 and #9 were not changed and are now new item #3, 4, and 5.  The main reason for the change is to eliminated unnecessary wording contained within various tables of the Standard and to make them a little more in tune with the industry as it exist in today's environment.  This was also the consensus of the industry peer group based on a survey conducted by the ANS Working Group. |
| | | | | Origin: Parking Lot List |
| | | | | Review all List;<br>Combined with the 3.1.3(7) item (Moved from 23); |
| | | | | Standard Section 3.1.4 - Add information notices and any other information; establish threshold of documents to be reviewed. Correspondences change over time. Discuss at next meeting with Felker present. |
| | | | | Note: Review associations between removal of List and Appendix. |
| | | | | 2001Apr05<br>Moved AI 11 to AI 13 |

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| | | | | Deferred for later discussion pending more important issues<br><br>Felker: The Simulator shall cause an alarm or automatic action only if the reference plant would have caused an alarm or automatic action.<br>Suggestion to replace Sections 4.1.3 and 4.1.4 with the language above.<br><br>2001Apr05<br>Felker – Tables that remain in the 2003 Std should updated or noted as Historical.<br><br>Florence – Recommendation for wording in Section 3.1.3. See Notes in Minutes Body.<br><br>2001Apr04<br>Colby<br>Presented the History of the Critical Parameters list.<br><br>2001 |
| 14 | **Closed:**<br>**2002apr23**<br>**Motion** | Priority 1 – | **Paris**<br>**Felker**<br>**Florence**<br>**Chang** | 2001Aug 09<br><br>SK Chang proposes including *synchronization* in the new definition for stimulated device.  Hal Paris and SK Chang to provide working group a revised document regarding stimulated devices in one month.  Members shall respond within 30 days.<br><br>Review guidance on stimulated devices. Combine stimulated hardware and stimulated devices. Issues relating to various stimulated device functions and compatibility with the simulator (e.g. Run/Freeze, History retention and Recalls/Backtracks, software revision control)<br><br>2002apr23 |

| | | | | Motion: |
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| | | | | Change Definition of Stimulated Hardware to Stimulated Components with the definition of Stimulated Components: <ul><li>**stimulated <span style="color:red">components</span>** Hardware/software components that are integrated to the simulator process via simulator inputs/outputs which perform their functions parallel to, and either independently of or synchronized with the simulation process</li><li>Replace Stimulated hardware and Stimulated Device with Stimulated Components</li></ul> 2001Apr04<br>Paris<br>Recommends new definition:<br><br>Old Definition:<br>"**Stimulated hardware.** Components or devices that perform their functions independently of and parallel to the simulation process"<br><br>2001Apr05<br>Paris<br>Considerations for new definitions for later review<br>New Definitions:<br>Suggested choices for new definitions:<br><br>**stimulated hardware.** Components or devices that are integrated to the simulator process via simulator inputs and/or outputs which perform their functions independently of and |

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|  |  |  |  | parallel to the simulation process".<br>**stimulated components.** Hardware or software components that are integrated to the simulator process via simulator inputs and/or outputs which perform their functions independently of and parallel to the simulation process".<br>**stimulated components.** Components or devices that are integrated to the simulator process via simulator inputs and/or outputs which perform their functions independently of and parallel to the simulation process".<br>**stimulated components.** Hardware or software components that perform their functions independently of and parallel to the simulation process"<br><br>and<br><br>Change Stimulated Hardware to Stimulated Device<br><br>Originator: NUPPSCO comments 1998 review process and in Butch's survey<br><br>**2000mar09**<br>Determine the source of this comment |
| 15 | Date: 2000mar09<br>Status: Complete<br>Presentation by Allan Kozak |  | **Collins (Vick)<br>Kozak<br>McCullough** | Numerous uses of Training Needs Assessment (TNA)<br>Collins - Add paragraph in Section 3.0 detailing TNA and then remove all other references to TNA.<br><br>Training Needs Assessment was changed to Training Impact Assessment<br><br>**2000mar09**<br>Determine Source of this comment |
| 16 | 2002apr24<br>Closed | Priority 1 – | **Welchel<br>Dennis** | Coordinate use of Discrepancy and Deviation. Consider Yoder #12. |

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| | **Motion No Carried** | | | NUPPSCO Comment<br><br>2002apr24<br>Welchel<br>Prepared and presented Deviation/Discrepancy and Differences replacement.<br>Closed – Motion Not Carried<br><br>**2001apr03**<br>Welchel<br>Discrepancy is used in sections 4.4.3.2 and 5.2.<br>Webster's definition:<br>Discrepancy-inconsistency<br>Deviation – diverge |
| 17 | **Date: 2001Aug09**<br>**Status: Closed** | | **Dennis Welchel** | Get feedback from industry on actually how the 1998 standard is actually used. Use USUG meetings.<br>Cataudella – Seabrook MANTG meeting (Aug-1999) comments:<br>    How to document Scenario Based Testing?<br>    Expand on what is V&V and what is necessary.<br>    Shelly – User feedback is not available for inclusion at this time.<br>    Develop Mission statement for working group.<br>    Cataudella – Problems implementing Scenario Based Testing.<br>    Benchmarking of various sites has shown use of V&V and scenario validation.<br><br>**2000mar09**<br>Welchel – Add relevant SSNTA meeting minutes to WG minutes.<br><br>Wait for industry experience<br><br>2001Apr05 |

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| | | | | Industry Feedback<br>Callaway has implement the 1998 Standard and presently reports no concerns.<br><br>**2001apr03**<br>Welchel<br>As of Jan 2001, Callaway (Scott Halverson) is the only simulator presently implementing the 1998 standard.<br>The industry consensus, as expressed at the 2001 USUG meeting, is that implementing Scenario based testing for License Class Simulator Scenarios is unworkable. It is generally agreed that the Regulatory carrot for using the simulator for License Candidate Reactivity Manipulations, is a significant positive for adopting the 1998 3.5 ANS standard.<br>Activity:<br>MANTG Mar 2001<br>SSNTA Jan 2001<br>SCS Jan 2001<br>USUG Jan 2001 |
| 18 | **Date: 2000mar09**<br>**Status:**<br><br>**Closed Statement** (Do we need to put some boundaries as to the limits simulator) | | **Kozak**<br>**Shelly**<br>**Cox**<br>**Havens**<br>**Florence** | Part-Task – Should Part-Task become part of the standard or remain as an appendix. Possibly look at tying the Standard body to the Appendix; Application of Full Scope Simulators. Outside interest are asking for uses of simulators that are not related to Operator Training. ~~Do we need to put some boundaries as to the limits simulator;~~(Closed 2001Apr05)<br><br>Origin: Scope Change at Oconee Meeting<br><br>2001Apr05<br>Florence<br>Moved from AI 22<br>Look at the use of Simulator, Simulation Facility; Definitions change Simulation Facility becomes Simulator; Simulation Facility is now defined as the collection of Simulators; |

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| | | | Coordinate use of Simulator and Simulation Facility.<br><br>2001Apr05<br>Kozak<br>Close the Boundry issue<br>*Do we need to put some boundaries as to the limits simulator;*<br><br>2001Apr05<br>Kozak<br>See Minutes Body<br><br>**2000mar09**<br>Presentation of Virginia Power Classroom/Part-task trainer at the 2000mar09 meeting<br><br>Related AI: 41 |
| 19 | **Date: 2001apr05**<br>**Status: Closed**<br>(This Item will be ask on Survey#2) | **Colby**<br>**Florence** | Using the simulator for other than Operator Training. Uses in predictive analysis and design mods, SAMGS procedures changes;<br><br>2001Apr05<br>Colby<br>Include this as part of Survey #2 and Closed<br><br>**2000mar09**<br>Scope change. This will require approval from ANS-3 |
| 21 | Date: 2000mar10<br>Status: Complete<br>Keith Welchel wanted to dismiss this item. The WG agreed. | **Collins**<br>**(Vick)**<br>**Welchel**<br>**Chang** | (JFC/KPW/JS) Hybrid Simulators. Hybrid Simulator refers to a simulator that implements many different technologies, source code vendors, different operating systems, integration vendors, etc. Maybe we need to have words that stipulate that testing needs to cover all the other changes we make to the simulator that may affect the operation of the simulator: Instructor Console, Operating Systems, New I/O, etc. (Voted to Dismiss-Consensus) Comments on regulation - The Working Group will not comment on regulations. The Standards Working Group is working in |

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| | | | | Working Group space.<br><br>**2000mar10**<br>Keith Welchel moved to dismiss this item. Jim Florence Seconded; |
| 22 | Date: 2001apr05<br>Status: Closed | | Florence Kozak | ~~Workshops on Testing Philosophy (what are the benefits? testing that provides results); USUG participation;~~<br>~~Schedule workshop during USUG at SCS in Jan. 1999. Develop materials for handout. Florence lead material development.~~<br>Closed 2001Apr05<br>Complete<br><br>Look at the use of Simulator, Simulation Facility; Definitions change Simulation Facility becomes Simulator; Simulation Facility is now defined as the collection of Simulators<br>Coordinate use of Simulator and Simulation Facility.<br>Closed<br>Moved to AI 18<br><br>Jim gave a presentation at the 2000 SCS conference during the USUG meeting. |
| 23 | | | | Intentionally Left Blank |
| 24 | Date: 2000mar09<br>Status: Complete<br>No Action.<br>Real-time at this time does not seem to be an industry concern at this time. Committee members had no issues with the definition or Section 4.1.1. Therefore, this | | Dennis DeLuca | Real Time - Dennis will give further consideration and he will look at industry standards; Measuring Real-Time; |

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| | AI was Closed. | | | |
| 26 | **Date: 2000mar10**<br>**Status: Complete**<br><br>Historical information was presented at the SCS conference.<br><br>Dennis checked with ANS Headquarters and this issue was discussed in detail | | **Dennis** | 1985 ANS 3.5 Standard is Historical Standard; Dennis will follow up with Shawn and Mike Wright about Historical/Active Standards and how the present process does not follow the five year; How should we handle or should we comment that the 1985 ANS/ANSI 3.5 standard is now an Historical standard and is no longer in the ANSI catalog.<br><br>Does the ANS 3.5 Working Group need to comment on this issue; Utilities would need to take exception by treating Certification as other; Mark up the Form 474 and state the other that you are going to do. Scenario Based testing (> 25%/yr.); Performance Based testing Plan<br><br>Dennis will call Mike Wright confirming ANS-3 understands the Historical Standard issue |
| 27 | **Date: 2001Aug09**<br>**Status: Closed** | | Collins(Vick)<br>Dennis<br>Koutouzis | (JFC/TD) Possible cross-pollination with other standards. Frank and Dennis will contact others<br><br>2001Apr05<br>Dennis<br>Reference: ANSI/ISA–77.20–1993<br>Fossil Fuel Power Plant Simulators – Functional Requirements<br><br>Reviewed FAA WEB Site: www.faa.gov/nsp<br>Simulator Qualifications: www.faa.gov/nsp/ac.htm<br><br>Colby –To research Navy Simulator Systems<br>Colby – To research Germany regulatory standards |
| 28 | **Date: 1999sep15**<br>**Status: Complete** | | **Florence** | Suggested a letter to Jim Stavely asking for a commitment to attend meetings along with 02Mar1999 meeting minutes; however, Jim Stavely resigned and submitted replacement resume Oliver Havens, Jr; |
| 29 | **Date: 2000mar10** | | **Florence** | Vice-chair prepare letter to Jim Davis asking for commitment to |

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| | **Status: Complete** | | **Dennis** | attend meetings along with 02Mar1999 meeting minutes; Chair to sign and send.<br>Chair to send letter to Jim Davis and Ken Rach thanking them for their past participation and asking them for substitute resumes. |
| 30 | **Date: 2001Apr05**<br>**Status: Complete** | | **Florence**<br>**Welchel** | Jim Florence suggested that the following information be placed on the USUG Web Page: ANSI-3.5 Membership List, approved meeting minutes, meeting schedules and meeting agendas. Florence/Welchel will ensure WEB page is updated<br><br>Florence:<br>    Check with Shawn (ANS) for WEB space.<br>    Check with USUG for WEB Space<br><br>2001Apr05<br>Florence<br>Membership List<br>Minutes<br>Meeting Schedules<br>Will not use ANS WEB Site<br><br>All future approved ANS WG minutes will be placed on the USUG WEB site. |
| 31 | **Date: 1999sep15**<br>**Status: Complete** | | **Dennis** | Mission statement for Working Group for the 2003 standard. AI #31 added 1999sep14<br><br>**1999sep15:**<br>Voted not to complete |
| 32 | **Date: 2001Apr04**<br>**Status: Closed by Motion** | **1999sep15** | **Colby**<br>**Collins**<br>**Koutouzis**<br>**Havens**<br>**Felker**<br>**McCulough** | Description: Multi-Units. Application of reference unit simulators to non-referenced units. Butch has offered to survey the industry. INPO will assist by supplying information from their databases;<br><br>Misc Info:<br>    Reg Guide 1.149 refers to Multi-Unit Plant, but 3.5 does not. |

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| | | | | Felker - Simulators other than the referenced unit are not covered by this standard;<br><br>2001Apr04<br>The WG, by Motion, closed AI 51 and 32. There was agreement that the 3.5 Standard does not cover simulator configured for Multi-Unit use. The Multi-Unit issues are basically training related and are not minimum reference unit Standard's space. Additional Survey questions will be directed by AI 50. The WG approved a motion to delete AI 32 and AI 51 and Colby will still ask survey questions concerning multi-unit plants.<br><br>**2000Oct26:**<br>**Butch will request bullets on Multi-Unit from the Group for next meeting** |
| 33 | **Date: 2001Apr04**<br>**Status: Closed** | | **Havens**<br>**Kozak**<br>**Shelly**<br>**Welchel** | Change 24-month design change limit to some shorter period.<br><br>**2001apr03**<br>Welchel<br>Proposed new wording:<br>*5.3.1.2 Subsequent Upgrade.  Following the initial upgrade, reference unit modifications determined to be relevant to the training program shall be implemented on the simulator within 24 months of their reference unit in-service dates, or earlier if warranted by a training needs assessment.*<br><br>Requiring that a determination of the relevance to training and that a training needs assessment be completed should be sufficient. Recommendation is that the "24 months" be removed and that section 5.3.1.2 should read:<br><br>*5.3.1.2 Subsequent Upgrade.  Following the initial upgrade, reference unit modifications determined to be relevant to the training program shall be implemented on the simulator based on* |

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| | | | | *training needs assessments in accordance with the criteria provided in 4.2.1.4.*<br><br>*5.1.2.2 Subsequent Update. Following the initial update, new data shall be reviewed, and the simulator design data base appropriately revised, once per calendar year. Modifications made to the reference unit shall be reviewed for determination of the need for simulator modification within 12 months.*<br><br>*5.1.2.2 Subsequent Update. Following the initial update, new data shall be reviewed, and the simulator design data base appropriately revised, once per calendar year. Modifications made to the reference unit shall be implemented on the simulator based on training needs assessments in accordance with the criteria provided in 4.2.1.4.*<br>.<br>WG agreed to close this AI with no further discussion. The 12 and 24 month timelines could be used to ensure the modifications. |
| 34 | Date: 2001Apr05<br>Status: Closed | 1999sep15 | Welchel<br>McCullough<br>DeLuca<br>Koutouzis | Present standard does not address software bugs, discrepancies, and enhancements. Time limits only relate to plant design changes, no time limits are associated for simulator fidelity and enhancements.<br><br>Origin: Welchel<br><br>2001Apr05<br>Closed – Other issues are handled with the Simulator Configuration Process<br><br>Related AI: 36 |
| 35 | Date: 2001Apr05 | 2000mar08 | McCullough | Review the double column Draft Working Document prepared by |

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| | **Status: Closed** | | **Collins(Vick)** | Butch Colby<br><br>2001Apr05<br>McCullough<br>Reviewed and recommend no changes at this time. Footnotes in the side-by-side format do not agree with the original document but this should clear up when the double format is deleted. Additional editorial work may be needed to ensure the footnotes align correctly. |
| 37 | **Date: 2001Apr05**<br>**Status: Closed**<br><br>**Group agreed to closed this item. No additional information required.** | 2000mar08 | **Koutouzis**<br>**Collins(Vick)** | Five Required Control Manipulations Clarification<br><br>2001Apr05<br>Koutouzis<br>No Update |
| 38 | **Date: 2001Apr05**<br>**Status: Closed** | 2000mar08 | **Dennis** | Discuss the ANS definitions and process of Clarification and Interpretation<br><br>2001Apr05<br>Refer to Meeting Minutes {find the meeting minutes and place here} |
| 39 | **Date: 2001Apr05**<br>**Status: Closed** | 2000mar08 | **McCullough**<br>**Florence**<br>**Felker** | Consider differentiating validation of Requal and Initial License Scenarios<br><br>2001Apr05<br>McCullough<br>{Add LTI Document Here} |
| 40 | **Date: 2002oct31**<br>**Status: Complete** | Priority 1 | **Cox**<br>**Vick**<br>**Florence** | Appendix Update for Scenario Based Testing Documentation.<br><br>2002oct31 |

| | | | Collins McCullough | Florence<br>New Appendix E Accepted<br>See Minutes Appendix<br><br>2001Apr05<br>Draft a Scenario Based Testing Guideline (new) Appendix |
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| 41 | **Date: 2000Oct26**<br>**Status**: **Complete** | 2000mar08 | **DeLuca**<br>**Colby** | Appendices consideration up-front and not as an after thought.<br>Tie documentation and Testing to the Standard Body<br><br>Related AI: 18<br><br>**Resolution (2000Oct26 – Colby)**:<br>    Continue using Appendices A and B as is<br>    Recommendation to revisit appendices content<br>    Consider moving Appendix D (Part-Task) into standard main body<br>    Related AI-18 |
| 42 | **Closed:**<br>**2002apr23**<br>**Motion** | Priority 1 - | **Chang**<br>**Felker**<br>**Cox** | Use of Verification and Validation<br>Origination: Colby Survey<br><br>**2002apr23**<br>**Closed by Motion**<br><br>**2000Oct26:**<br>**Chang to look at Survey and determine the issues with**<br>**Verification and Validation and bring to next meeting**<br><br>**Origin: ANS 3.5 WG Survey #1**<br><br>**2001Apr05**<br>**Felker**<br>**The use of V&V as espoused through the IEEE 7xxx** |

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| | | | | **standards for SW Validation. We have outside documentation regarding the use of the term SW Validation &Verification;**<br><br>**It is not V&V as defined in the Nuclear Industry.**<br><br>**2001Aug09**<br>**SK will put out a revised document on V&V in one week. Members shall respond within 30 days.** |
| 43 | Date: 2001Apr03<br>Status: Complete | 2000mar08 | **Welchel** | Send 1998 Standard NUPPSCO comments to:<br>Hal Paris<br>Bob Felker<br>Bud Havens<br><br>**2001apr03**<br>Welchel - Delivered 2001apr03 |
| 44 | Date: 2002oct29<br>Status: Complete | Priority 1 - | **Paris**<br>**Havens**<br>**Chang** | Clarify Simulator Repeatability wrt to Real-time and not Scenario Based Testing. Repeatability is not specified for Scenario Based Testing but is related to Real-time.<br><br>2002oct29<br>Paris<br>Closed<br>Refer to 2002apr motion to leave wording as is.  This item is closed (originated form 1998 NUPSCO comments TVA)<br><br>2001Apr05<br>Paris<br>Concern: What is Repeatability? Further review is needed.<br>See Attachment for AI 44<br><br>**2000Oct26:**<br>**Hal and Group will review the use of these terms and consistency** |

| 45 | Date: 2000Oct26<br>Status: Complete | 2000mar08 | **Shelly**<br>**Chang**<br>**Havens** | Clarify Overrides do not have to be tested like Malfunctions and are not Malfunctions. (Survey Comment 3.15 p20)<br><br>**2000Oct26:**<br>**Non-issue because it's related to CFR and not the standard**<br>　　Not all Overrides need to be tested<br>　　Only Overrides in Scenarios need to be tested<br>　　AI45 Originated from Colby survey<br>　　Confusion between the CFR about 25%/yr and the 98 standard linking Overrides to Malfunctions<br>　　Recommend that this is a non-issue and should be closed because its not an issue with the standard but is with the 10CFR Part 55 |
| 46 | Date: 2001Aug09<br>　　　Status: Closed | | **Committee** | Request members review the other parts of the survey and comment. Members are ask to review and submit two bullets that they consider important for further ANS3.5WG consideration |
| 47 | Date: 2000Oct26<br>Status: Complete | 2000mar09 | **Colby** | Send Thank You notes to all Survey Participants |
| 48 | Date: 2000Oct26<br>Status: Complete | 2000mar09 | **Colby** | Modify DCD Training Needs Assessment to Training Impact Assessment<br><br>**2000Oct26:**<br>**Deleted due to Motion by Felker being Carried**<br>**WG decided to revert back to Training Needs Assessment** |
| 49 | Date: 2000Oct26<br>Status: Complete | 2000mar09 | **Kozak** | Determine source of Training Needs Assessment<br>Related AI: 15<br><br>**2000Oct26:**<br>**Could not determine the Source of Training Needs Assessment** |
| 50 | Date: 2001Apr04<br>Status:  Closed<br>**Redundant to AI 10** | 2000mar09 | **Colby** | Additional survey concerning Exam Security Concerns<br><br>2001Apr05 |

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| | | | | Colby<br>Close redundant to AI 10. Closed<br><br>2001Apr04<br>Kozak presented a PPT presentation outlining and defining security issues<br><br>Closed based on better understanding of NUPPSCO. |
| 51 | **Date: 2001Apr04<br>    Status: Closed by Motion** | 2000mar09 | **Colby** | Send out another survey concerning Multi-unit questions and will try to target Simulator, Training, and OPS<br><br>2001Apr04<br>The WG, by Motion, closed this AI 51 and 32. There was agreement that the 3.5 Standard does not cover simulator configured for Multi-Unit use. The Multi-Unit issues are basically training related and are not minimum reference unit Standard's space.  Additional Survey questions will be directed by AI 50. The WG  approved a motion to delete AI 32 and AI 51 and Colby will still ask survey questions concerning multi-unit plants; |
| 52 | **Date: 2000Oct26<br>Status: Complete** | 2000mar09 | **Felker** | Locate previous Multi-Unit work completed by the 1993 WG. Bob will contact Bill Geiss<br><br>**Resolution**: 2000Oct26 Felker<br><br>Material does not exist. |
| 53 | **Date: 2001Aug09<br>    Status: Closed** | | **Colby** | Review the Appendix A – A(3) (BOM). Consider removal of the BOM list and replace with I&C list<br><br>2001Apr05<br>Colby<br>March 2000 meeting minutes Working Doc Editor to remove BOM from Appx A |
| 54 | Date: 2000Apr05 | 2000mar09 | **Vick** | Aquire US Government Style Guide |

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| | **Status: Complete** | | | 2001Apr05<br>Style manual given to Style Editor. |
| 55 | Date: 2000Oct25<br>**Status: Complete** | 2000oct25 | **Dennis** | Distribute Robert Boire work assignments<br><br>2001Oct25<br>Completed |
| 56 | Date: 2000Oct26<br>**Status: Complete** | 2000oct25 | **Colby** | Contact Mr. Cox (Com Ed) for 3.5 WG participation.<br><br>**2000Oct26**<br>**Colby called Mr Cox but Mr Cox is out until 2000Oct30.**<br>**Terrill Laughton attended on behalf of Mr Cox** |
| 57 | **Date: 2002Oct29**<br>**Status:** | Priority 1 - | **Dennis**<br>**Vick**<br>**Colby** | Remove all references to 3.1<br><br>2002oct29<br>Dennis - Closed<br>Verified by working group in Standard Draft Rev 6.<br><br>2002apr24<br>Dennis<br>Vick and Colby will determine the changes necessary and bring these to the committee for approval.<br><br>Revised wording presented to Working Group.<br>One negative comment resolved by personal review of ANS-3.1;<br>Motion passed to accept wording (see 14.11 2002apr22 minutes)<br><br>2002apr23<br>Dennis<br>Get Copy of 3.1 for review.<br><br><br>2001Apr05 |

| | | | | Dennis<br>Deferred for later discussion. |
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| 58 | **Date: 2002apr24**<br>**Status: Complete** | Priority 1 | **Dennis** | Send Robert Boire a note of thanks for his participation<br><br>2002apr24<br>Dennis<br>Closed<br>Letter reviewed by members.<br><br>2002apr23<br>Dennis<br>Letter sent.  Get copy of letter for members review.<br><br>2001Apr05<br>Dennis<br>Letterhead not available.<br>Florence will contact Shawn at ANS and request letterhead. |
| 59 | **Date: 2002apr23**<br>**Status: Complete** | Priority 1 | **Florence McCullough** | Develop a list of Action Items for 3.5-WG resulting from the 2000Oct26 USUG Ops Test Directors Meeting at DC Cook<br><br>2002apr23<br>Closed<br>Closed – Items were reviewed by WG in the Oct 2000 meeting and they were incorporated into the Working Groups public comment to the NRC's proposed rule change.<br><br>2001Apr05<br>Florence<br>Deferred until Florence communicates with McCullough |
| 61 | **Date: 2001apr03**<br>**Status: Complete** | 2000oct26 | Welchel<br>Dennis | Write letter to NRC concerning the WG comments on the proposed rule change<br><br>2001apr03<br>Welchel – Letter Written and mailed to NRC stating the three |

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| | | | | issues regarding the proposed rule change. |
| 62 | Date: 2001Aug09<br>Status: Closed | | Koutouzis | Send Meeting Materials to Absent members; |
| 63 | Date: 2001Aug09<br>Status: Closed | | Dennis | Address the problem of other standards placing requirements on the ANS 3.5 Standard without our knowledge. (NFSC Sub-Committee I); |
| 64 | Date: 2001Aug09<br>Status: Closed | | Florence<br>Dennis | Florence to prepare W. DeLuca letter for T. Dennis signature; |
| 65 | Date: 2001apr03<br>Status: Complete | | Welchel | NUPPSCO comment to Kevin Cox (Complete) |
| 66 | Date: 2001Aug09<br>Status: Closed | | Havens | Scan NRC Form 398 and Email to WG members |
| 67 | Date: 2001Aug09<br>Status: Closed | | Dennis | Contact Shawn concerning Clarification Statement<br><br>2001jul11<br><br>Ms. Shawn M. Coyne-Nalbach<br>NFSC Secretary<br>American Nuclear Society<br>555 North Kensington Avenue<br>La Grange Park, IL 60526-5592<br><br>Dear Ms. Coyne-Nalbach:<br><br>Subject: Request for Clarification<br><br>Reference: ANSI/ANS-3.5-1998 Standard Document, Section 4.4.3.2<br><br>I am a supervisor for the Nebraska Public Power District's Cooper Nuclear Station responsible for maintaining the functional requirements for our full-scope nuclear power plant control room simulator used for operator training and examination.<br><br>I am writing this letter to your organization to request a clarification to the reference document in regards to Simulator Scenario-Based Testing. |

Section 4.4.3.2 of the reference document states that scenarios developed for the simulator, including the appropriate instructor interfaces and cueing, shall be tested before use for operator training or examination. The simulator shall be capable of being used to satisfy predetermined learning or examination objectives without exceptions, significant performance discrepancies, or deviation from the approved scenario sequence.  A record of the conduct of these tests, typically in the form of a completed scenario or lesson plan checklist, and the evaluation of the test results, shall be maintained.

I am concerned that the Standard requires scenarios developed for the simulator shall be tested before use for operator training or examination. It appears that this requirement may not be achievable with all operator training programs, namely initial license candidate training programs.

Please clarify the preceding paragraph by addressing the following questions:

1.  What is the intent of scenario-based testing?  Does scenario-based testing impose additional training program requirements?

ANS-3.5 Working Group answer:

        Scenario Based Testing is intended to best utilize, to the extent possible, the existing training scenario development process without imposing additional training program requirements.

2.  How does scenario-based testing interface with simulator performance testing?

ANS-3.5 Working Group answer:

        Simulator performance testing comprises Operability and Scenario Based Testing and establishes a test program to ensure simulator
performance for the use in operator training and examination.

3.   Do simulator users have to test each scenario before every use, including those utilized to support initial license candidate training programs?  Can training programs that utilize simulators currently certified to previous editions of the standard take testing credit for

| | | | | simulator performance testing and simulator scenarios previously developed and approved for use in operator training or examination? |
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| | | | | ANS-3.5 Working Group answer: |
| | | | | Users of the standard are encouraged to take testing credit for simulator performance testing and simulator scenarios previously developed and approved for use in operator training or examination. This does not imply that a scenario shall be tested before every use, however the following items should be considered before subsequent use of the approved scenario developed for operator training or examination: |
| | | | | * If the training process requires revalidation of the scenario; <br> * Whenever models or simulator capabilities are changed or modified in a way that affects the scenario performance. |
| | | | | If any of the above items have occurred and impact the scenario, the scenarios shall be re-tested before use for operator training or examination. |
| | | | | I would appreciate a clarification statement from the ANS-3.5 Working Group. |
| | | | | Thank you for your attention to my request. |
| | | | | Sincerely, |
| | | | | James B. Florence <br> Simulator Supervisor <br> Nebraska Public Power District <br> Cooper Nuclear Station <br> Brownville, NE 68321 <br> Phone: 402-825-5700 <br> Pager: 402-977-3692 <br> Fax: 402-825-5584 <br> Email: jbflore@nppd.com |
| 68 | Date: 2003Mar11 <br> Status: Complete <br><br> Date: 2002oct30 | Priority 1 | Colby <br> Shelly <br> Felker | Survey #2 <br> Multi-Unit <br> Different OPS Procedures <br> Fuel Cycles |

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| | **Status: Re-Opened**<br><br>**Closed**<br>**2002apr24** | | | Time Delay loading Sim Fuel load<br>Unit Procedure Differences and Training<br><br>**2003Mar11**<br>**Colby**<br>**Presented list of survey results.**<br>**Motion:**<br>**Delete Malfunction List Table in Section 3.1.4 and move to Appendix A**<br><br>**2003Mar10**<br>**Colby**<br>**Presented list of survey results.**<br>**This item was originally discussed in AI-83.**<br><br>**2002oct30**<br>**Reopened to consider additional Survey data.**<br>**Consider AI-83 - Malfunctions List and Survey Results**<br><br>2002apr24<br>Colby<br>Recommend Closing due to information will be handled by future Action Items.<br><br>2002apr23<br>Colby<br>Nothing here that would be changed in the 2003 standard.<br><br>2001AUG7<br>All survey's have not been received, so the final results of the survey will be discussed at our next meeting in March. |
| 69 | **Closed**<br>**2002apr24** | | **Vick** | Check out and report information on SECY-01-0125<br><br>2002apr24 |

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| | | | | Vick<br>Simulator rule is in effect Nov 16,2001 and SECY reference is now background info only. |
| 70 | **Date: 2002oct29**<br>**Status: Complete** | | **Florence** | Come up with a set of rules for use and what will go on the web site.<br><br>**2002oct29**<br>Florence<br>Closed<br>WEB Site Changes:<br><ul><li>Only latest minutes will be posted</li><li>Contact Keith Welchel to request previous minutes</li><li>ANS 3.5 WEB will not be password protected</li><li>Remove membership contact info accessible by general public</li></ul><br>2002apr24<br>Florence<br>Handout presented to members for review.<br>AI-70 will be closed when the ANS 3.5 WEB site is password protected.<br><br>Password protect the ANS 3.5 WEB site and post amended ANS 3.5 WEB page use policy. |
| 71 | **Date: 2002apr24**<br>**Status: Complete** | | **Dennis** | Vary if ANS normally provide the minutes of group meetings<br><br>2002apr24<br>Dennis<br>Provided by request by ANS. |
| 72 | **Date: 2001Nov27**<br>**Status: Complete** | | **Shelly** | Check if we can add an appendix and still reaffirm<br><br>**2001Nov27** |

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| | | | | **Shelly**<br><br>I contacted Suriya with this question, and his response was that a standard<br>can be reaffirmed if the appendix/annex will be informative. If the additional appendix is informative, then you should supply a statement in<br>the foreword regarding this informative piece.  The statement in the forward<br>is NOT required  but highly recommended.<br><br>The standards can not be reaffirmed if the additional appendix will be<br>normative. In this case the standard will have to be considered under the<br>revision process through ANSI.<br><br>According to Webster's, NORMATIVE means "of, relating or conforming to, or<br>prescribing norms".  Based on this, we could add an appendix to the standard<br>and still reaffirm the current standard, but we must ensure the appendix<br>contains clarifying information and doesn't prescribe any new requirements<br>or parameter limits.<br><br>I consider this action closed unless someone knows of a need for further<br>`research on this issue.` |
| 73 | **Closed 2002apr24** | | **Dennis** | Send the clarification letter to ANS on the Scenario Based Testing<br><br>2002apr24<br>Dennis |

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| | | | | Published in the Nuclear Standards News, Vol. 33/No. 2 March-April 2002 |
| 74 | **Closed 2002apr24** | | **Dennis** | Contact ANS Standards Administer to determine if we can refer to documents other than ANS Standards<br><br>2002apr24<br>Dennis |
| 75 | **Closed 2002apr24** | | **Jim Florence** | Contact the industry<br><br>2002apr24<br>Florence does not know what this is about.<br>Recommend to close . |
| 76 | **Closed 2002apr24** | | **Butch & Hal** | To research Germany regulatory standards and navy standards<br><br>2002apr24<br>Colby<br>Most International simulator customers refer to ANS 3.5 in their purchase spec |
| 77 | **Closed: 2002apr22 Dennis** | | **Dennis** | Determine if the ANS 3.5 Working Group name will change due to the ANS 3 to ANS-21 name change.<br><br>Closed<br>2002apr22<br>Dennis contacted Suriya Ahmad at ANS headquarters and no change is planned for ANS 3.5. |
| 78 | **Closed 2002apr24** | | **Keith Welchel** | AI16 - Prepare a document for review by ANS members that shows the result of substituting Difference for Deviation/Discrepancy.<br><br>2002apr24 |

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| | | | | Colby<br>Prepared summary of all Deviation/Discrepancy and Difference replacements and reviewed with members. |
| 79 | **Date: 2002oct30**<br>**Status: Complete** | | **Vick**<br>**Cox**<br>**Kozak** | Bring to the committee recommendation for implementing Roberts Rules or Order.  (i.e. Revisiting Motions Not-carried)<br><br>**2002Oct30**<br>**Cox**<br>**Consensus that Robert's Rules of Order will used a general guide** |
| 81 | **Date: 2002Oct29**<br>**Status: Complete** | | **Dennis** | Get copy of ANS 3.1 for members review.<br><br>**2002oct29**<br>**ANS 3.1 is no longer referenced in ANS 3.5; No need for ANS 3.1.**<br><br>**2002Apr24 Closed**<br>**Dennis**<br>**Copy of ANS-3.1 obtained from ANS Standards Secretary.**<br>**Copy given to requesting Working Group member for review.** |
| 82 | **Closed**<br>**2002apr24** | | **Dennis** | Get copy of Letter of thanks to Robert Boire for members review<br><br>2002apr24<br>Dennis<br>Members reviewed letter |
| 83 | **Date: 2002oct30**<br>**Status: Complete** | | **Colby** | Compare 3.1.4 Malfunction List with 10 CFR Part 55.59<br><br>**2002oct30**<br>**Colby**<br>**Reviewed items that are in 10CFR55.59 but are not in the Standard.  This item was discussed before.** |

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| | | | | **This item may be discussed in AI-68.**<br><br>2002oct29<br>Colby<br>Reviewed 10CFR55.59 List (See Appendix AI-83) |
| 84 | Date: 2002oct29<br>Status: Complete | | Florence | Review 4.4.3.1 for clarity concerning SBT and to remove Certification reference<br><br>**2002oct29**<br>**Florence**<br>Complete Refer to AI-40<br>AI-84 was completed at Jackson meeting via AI-40. Cannot find reference in past minutes why this AI was created. AI-84 has been completed and is thus Closed. |
| 85 | Date: 2002Oct28<br>Status: Complete | | Welchel | Create another Bucket to place 2008 deferred AI's<br><br>**2002Oct28 Closed**<br>**Welchel**<br>**New Section and Table to Hold Deferred Action Items** |
| 86 | Date: 2002oct29<br>Status: Complete | | Colby<br>Florence | Create Frank Collins Plaque for review membership<br><br>2002oct29<br>Colby<br>Colby create a plaque for the group to consider. Plaque is mahogany base with Brass ANS Logo and wording. |
| 87 | Date: 2002oct29<br>Status: Complete | | Colby | Review MANTG Simulator Historical base-line data<br><br>2002oct29<br>Colby<br>Closed – Reference Section 5.1 "Current Simulator" |
| 88 | Date: 2003Mar10 | | Cox | Review simulator Fidelity. Standard does not define Software |

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| | **Status: Complete** | | | Fidelity, only HW Fidelity<br><br>**2003Mar10**<br>**Vick**<br>**New AI - Recommends having Document Edited by a Technical Editor**<br>**Complete – No need to define SW fidelity.**<br><br>2002oct30<br>Cox<br>Cox and Vick will recommend new definition. |
| 89 | **Date: 2002oct29**<br>**Status: Complete** | | **Shelly**<br>**Vick** | Review 4.4.3.1 "once per year on a calendar basis language"<br><br>**2002oct29**<br>**Shelly**<br>**Defeated on Motion** |
| 90 | **Date: 2003Mar12**<br>**Status: Complete** | | **Florence**<br>**Colby**<br>**Cox**<br>**Chang** | Review all Section for alignment specifically Sections 3.4 and 4.4 and report and recommend new Section alignments<br><br>**2003Mar12**<br>**Colby**<br>**Report to committee complete**<br>**AI-Closed**<br>**Refer to AI-102**<br><br>**2003Mar11**<br>**Colby**<br>**Motion: Defer AI-90 to 2008 Standard**<br>**Motion withdrawn pending further discussions**<br><br>2002oct30<br>Colby<br>Action deferred to next meeting.  See AI-90 meeting minutes |

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| | | | | 2002oct30. |
| 91 | Date: 2003<br>Status: Complete | | Dennis | Call Mike Wright and get a determination on standards organizational alignment and possible standards name change<br><br>**2003Mar11**<br>**Dennis**<br>**Refer to AI-77**<br>**No further change from NFSC Nov 2002 meeting**<br><br>2002oct28<br>Dennis |
| 92 | Date: 2003Mar11<br>Status: Complete | | Florence<br>Colby<br>Kozak | Improve Definition of Simulation facility to include Part-task and limited scope. (coordinate with Scope State)<br><br>**2003Mar11**<br>**Colby**<br>**Motion:**<br>**Revise Scope Statement** |
| 93 | Date: 2003Mar10<br>Status: Complete | | Shelly | Appendix and Standard Dates referencing<br>Are Appendices required to reference the standard's published date.<br><br>**2003mar10**<br>**Shelly**<br>**Contacted Suriya Ahmad of ANS.**<br>**Response: The appendix reference to the standard's published date is part of the ANSI's format when publishing a standard. Therefore, it can not be removed.** |
| 94 | Date: 2003Mar10<br>Status: Complete | | Colby | Align Appendix Header dates to Appropriate Published Standard Date<br><br>**2003Mar11** |

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| | | | | Colby:<br>**Presented New Appendix Wording** |
| **95** | **Date: 2003Mar11**<br>**Status: Complete** | | **Felker**<br>**Florence**<br>**Kozak** | Section 4.4.3.2<br>New 4.4.3.2 wording and/or integrate 4.4.3.1 and 4.4.3.2<br><br>**2003Mar11**<br>**McCullough**<br>**Motion to add procedural in Section 4.4.3.2 and Appendix E.**<br><br>**Modify Paragraph Numbered Item (2) Section 4.4.3.2**<br>(2) the simulator is capable of producing the expected reference unit response without procedural exception, significant performance discrepancies, or deviation from an approved scenario sequence;<br><br>**Modify paragraph after "Scenario Lesson Plan Title:" in Appendix E**<br><br>This test verifies that the simulator may be used to satisfy predetermined learning or examination objectives without procedural exception, significant performance discrepancies or deviation from the approved scenario sequence, including the appropriate instructor interfaces, operator actions, and operator cues. |
| **96** | **Date: 2002Oct30**<br>**Status: Complete** | | **Kozak**<br>**Chang** | Locate a copy of INPO document concerning pre-running Scenarios and determine what validation is required.<br><br>**2002Oct30**<br>**ACAD 90-022 – "Guidelines for Simulator Training"**<br>**The document uses the word "should" to validate scenarios before use in operator training.**<br>**This document is only a guide.** |
| **98** | **Date: 2003Mar10** | | **Colby** | Insert correct standard Title in appendices headers |

| | Status: Complete | | | 2003Mar11<br>See AI-94 |
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