



REGULATORY GUIDE 1.149 UPDATE –Larry Vick

- Office of Nuclear Reactor Regulation
- U.S. Nuclear Regulatory Commission

- SimTech 2010
- Riverside Hotel, Ft. Lauderdale, Florida
- March 23, 2010

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U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

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Topics

- Need for RG 1.149 Revision
- Revision Process
- Draft Regulatory Guide DG-1248
- Expected End Results
- Planned Schedule

Need for RG 1.149 Revision

- September 2009: ANSI/ANS-3.5-2009 was approved as an American National Standard replacing ANSI/ANS-3.5-1998
- December 2009: NEI-09-09 [Rev 1] was submitted to NRC for review and endorsement as a technical guidance and implementation document regarding simulator scenario based testing [SBT] methodology
- NRC must follow established protocols for public involvement to accept and endorse the new edition of ANSI/ANS-3.5-2009
- To facilitate the NRC's goal of having simulation facility licensees on the same standard

Revision Process

- Develop Draft Regulatory Guide
- Post DG-1248 in *Federal Register* to solicit public comments
- Consider public comments
- Finalize regulatory guide
- Post Final RG 1.149 Revision 4 in *Federal Register*



DG-1248

***“Nuclear Power Plant Simulation Facilities for
Use in Operator Training,
License Examinations, and
Applicant Experience Requirements”***

DG-1248

- Proposed Revision 4 of RG 1.149
- Will be published in the *Federal Register* to solicit public comments
- Has not received final staff review or approval
- Does not represent an official NRC final staff position

Purpose

- Describes methods acceptable to the NRC staff for complying with portions of the Commission's regulations associated with approval or acceptance of a nuclear power plant simulation facility for use in:
 - operator and senior operator training,
 - license examination operating test, and
 - meeting applicant experience requirements.

Highlights

- Use of Voluntary Consensus Standards
- Acceptance & Endorsement of NEI-09-09
[Rev 1]
- Acceptance & Endorsement of ANSI/ANS-
3.5-2009



Use of Voluntary Consensus Standards

- National Technology and Transfer and Advancement Act of 1995 (Public Law 104-113) requires that Federal agencies use technical standards developed or adopted by voluntary consensus standard bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical.
- NRC representatives participated in the development of ANSI/ANS-3.5-2009 in support of its mission and to encourage industry to develop a standard the NRC can endorse and industry can voluntarily adhere to.



NEI-09-09 [Rev 1]

“Nuclear Power Plant-Referenced Simulator Scenario Based Testing [SBT] Methodology”

- NEI Technical guidance and implementation document
- Establishes common method for conducting and documenting SBT
- Facilitates industry movement to a single standard
- Supports NRC review of SBT test results

Acceptance & Endorsement of NEI-09-09 [Rev 1]

- NEI-09-09 is an acceptable methodology for simulation facility licensees to demonstrate their compliance with the SBT performance test requirements of Section 3.4.3.2 and 4.4.3.2 of ANSI/ANS-3.5-2009
- NRC accepts and endorses NEI-09-09 [Rev 1] without exceptions

ANSI/ANS-3.5-2009

“Nuclear Power Plant Simulators for Use in Operator Training and Examination”

- Approved as an American National Standard
- Replaced ANSI/ANS-3.5-1998



Acceptance & Endorsement of ANSI/ANS-3.5-2009

- NRC accepts and endorses ANSI/ANS-3.5-2009 with the following clarifications:

Meeting Criteria

- ANSI/ANS-3.5-2009 provides methods acceptable for simulation facility licensees to demonstrate that (through meeting the criteria of the standard) the plant-referenced simulator will possess a degree of completeness and accuracy to meet the requirements of 10 CFR Part 55.46.

Historical Editions

- This guide does not endorse historical editions of the ANS-3.5 standard (e.g., '98, '93, and '85) previously endorsed by the NRC.

Section 3.1.4

- Licensees should demonstrate that they have conducted performance testing of the malfunctions listed in the standard at least once in the life of the simulator and that the associated test documentation includes the completed test results.

Section 3.4.1 & 3.4.2

- The NRC neither expects nor requires the standard's quality assurance methodology to be included in the facility licensee's quality assurance program as described in 10 CFR 50 Appendix B (which does not apply to simulation facilities as defined in 10 CFR 55).

Section 3.4.3.2

- Licensees should include the following types of SBTs for inclusion as performance tests:
 - NRC initial license examination (operating test) scenarios
 - Licensed operator requalification annual examination (operating test) scenarios
 - Scenarios used for performing applicant control manipulations that affect reactivity to establish eligibility for an operator's license

Section 4.4.3.1

- Footnote 6, as referenced to Appendix A, "Guideline for Documentation of Simulator Design and Test performance," of the standard applies only to this section.

Section 4.4.3.2

- Licensees should also adhere to NEI-09-09 [Rev 1] standardized approach for the conduct, performance, and documentation of SBT.
- Other required simulator performance tests are separate from and independent of SBT.

Section 4.4.3.3

- Licensees should meet the requirements with respect to real time and the conduct of core evolutions involved.
- Licensees should utilize models relating to nuclear and thermal-hydraulic characteristics that replicate a core load in the nuclear power reference plant
- If used for 10 CFR 55.31(a)(5) purposes, licensees must use most recent core load in the nuclear power reference plant for which a license is being sought.

Section 4.4.3.4

- Licensees should demonstrate the simulator's performance and response compares favorably to the reference plant's performance and response without significant deviation from the sequence of events for the reference plant event.

Section 4.4.3.4 - continued

- Licensees should demonstrate on the simulator those reference plant events that result in:
 - The automatic initiation of an engineered safety system
 - The manual or automatic trip of the nuclear reactor
 - A significant unplanned or unexpected reactivity change
 - The manual or automatic trip of the main turbine-generator while online with the electrical grid
 - Any other event deemed appropriate by the facility
- Licensees should demonstrate the plant event within 60 days following the event.



Expected End Results

- Final RG 1.149 Revision 4
- NRC acceptance and endorsement of ANSI/ANS-3.5-2009
- NRC acceptance and endorsement of NEI-09-09
- Simulation facility licensees adhere to one standard: ANSI/ANS-3.5-2009
- NRC inspects plant-referenced simulators for adherence to one standard: ANSI/ANS-3.5-2009

Planned Schedule

- Post DG-1248 in *Federal Register* by end of March, 2010
- 60 days later public comment period ends
- 60-90 days later NRC public comment review concludes
- 30-60 days later post Final Revision 4 of RG 1.1 49 in *Federal Register*
- 180 days later simulation facility licensees voluntary move to new standard: ANSI/ANS-3.5-2009



Questions and Comments?