

ATTACHMENT 1

S-02-01-LV

FINAL

**2002 WESTERN MULTI CONFERENCE  
INTERNATIONAL CONFERENCE  
ON  
SIMULATION TECHNOLOGY FOR NUCLEAR POWER PLANTS AND SYSTEMS**

**JANUARY 30, 2002**

**CHANGES TO 10 CFR PART 55 & RG 1.149**

**LAWRENCE VICK  
U.S. NUCLEAR REGULATORY COMMISSION**

**Introduction**

[**SLIDE NO. 1**] Thank you. Good morning, ladies and gentlemen. I am pleased to join you at this annual conference on "Simulation Technology for Nuclear Power Plants and Systems" sponsored by the Society for Modeling and Simulation International (SCS). [a.k.a. 2002 Western Multi Conference] I view this allotted time with you as an excellent opportunity to exchange information with you.

First, I want to bring you up to date on the NRC's amended regulations regarding 10 CFR Part 55, "Operators' Licenses."

**The Amended Regulations (10 CFR Part 55, Operators' Licenses)**

[**SLIDE NO. 2**] As you know, via the *Federal Register* [66 FR 52657], on November 16, 2001, the Nuclear Regulatory Commission (NRC) amended its regulations [10 CFR Part 55, Operators' Licenses] to permit applicants for operator and senior operator licenses to fulfill a portion of the required experience prerequisites by manipulating a plant-referenced simulator as an alternative to manipulation of the controls of the actual nuclear power plant. While the new rule allows use of the plant-referenced simulator for satisfying these experience requirements, use of the plant for this experience is still encouraged. The amended regulation (i.e., new rule) also removed requirements for facility licensee certification of their simulation facilities and routine submittal of reports to the NRC for review that identify any uncorrected performance test failures and a related schedule for correction. Also, the amended rule revised two definitions ["plant-referenced simulator" and "simulation facility"] and added clarity to the regulations by relocating requirements relating to the use of a simulation facility [from previous rule 55.45(b)] to a new section, designated 55.46, "Simulation Facilities."

Finally, the final rule facilitates voluntary licensee transition to an improved approach to simulator testing as described in an American National Standards Institute/American Nuclear Society (ANSI/ANS) standard, ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination." Revision 3 to Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," (RG 1.149) endorses this standard and was published in October 2001 in conjunction with this final rule.

I see my role today as one of (1) encouraging you to read the *Federal Register* notice to become familiar with the new rule and to read the revised R.G. 1.149, and (2) taking back any questions so that clear answers can be developed and promulgated to licensees.

[SLIDE NO. 3] With that background, today's presentation topic will be limited to three areas of interest:

- (1) Performance of Control Manipulations on the Plant-Referenced Simulator [i.e., 10CFR55.31(a)(5)].
- (2) Simulation facilities [i.e., 10 CFR 55.46], and
- (3) Revision 3 of R.G. 1.149, " Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations".

### **Performance of Control Manipulations on the Plant-Referenced Simulator**

[SLIDE NO. 4] Previously, the old rule [52FR9453, effective March 25, 1987] required that applicants for operator and senior operator licenses perform five significant control manipulations that affect reactivity or power level on the actual plant. Now, the new rule [66FR52657, effective November 16, 2001] allows applicants to perform the manipulations either on a plant-referenced simulator or on the actual plant at the facility licensee's discretion.

It is important to understand that when plant-referenced simulators are used to satisfy experience requirements for the performance of control manipulations [that affect reactivity or power level], the new rule requires that: (1) Simulator models replicate the nuclear and thermal-hydraulic characteristics of the most recent core load in the nuclear power reference plant for which a license is being sought; and (2) significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence. These requirements ensure that simulator experience replicates evolutions on the plant and that license applicants receive the same overall experience in safe plant operation as they would on the plant itself.

[SLIDE NO. 5] Control manipulations [which affect reactivity and power level, are identified in Sec 55.31(a)(5)] performed on the plant-referenced simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in Sec. 55.59(c)(3)(i)(A-F), (R), (T), (W), and (X), as applicable to the design of the plant for which the license application is submitted. [these 10 examples exclude major transients and accidents.]

## **New Section 55.46, Simulation facilities**

[SLIDE NO. 6] The new rule includes administrative changes to move the requirements for the use of simulation facilities from Sec. 55.45 [of the old rule] to a new Sec. 55.46, "Simulation Facilities." Parts of the old rule[in Secs. 55.45(b) (4) and (5)] dealing with simulators have been separated from Sec. 55.45 and consolidated in the new Sec. 55.46. This is simply an administrative change to improve clarify. [i.e., to clarify the old rule by separating requirements concerning simulation facilities from requirements in Sec. 55.45 concerning operating tests.]

In general, this section addresses the use of a simulation facility or the plant, if such use is approved by the NRC, for the administration of the operating test and plant-referenced simulators to meet experience requirements for applicants for operator and senior operator licenses.

[SLIDE NO. 6] The new section addresses three key implementation criteria/elements: They are: (1) Commission-approved simulation facilities and Commission approval of use of the plant in the administration of the operating test, (2) Plant-referenced simulators, and (3) Continued assurance of simulator fidelity.

Lets talk briefly about the first criteria/element.

[SLIDE NO. 7] *Commission approved simulation facilities and Commission approval of use of the plant in the administration of the operating test.*

Section 55.45(b) requires that the operating test for an operators license be administered on either a Commission-approved simulation facility, a plant-referenced simulator, or on the actual plant, if approved by the Commission. Facility licensees proposing to use a plant-referenced simulator [meeting the definition in Sec. 55.4] are not required to submit a request for Commission approval of that simulator. For cases when facility licensees propose to use a simulation facility not meeting the definition of a plant-referenced simulator, [i.e., other than a plant-referenced simulator] or the actual plant, the Commission will continue to require additional information to determine the acceptability of the simulator or use of the actual plant and thus, will require an application [request] for Commission approval.

[SLIDE NO. 8] Every request must include [as a minimum]: (i) A description of the components of the simulation facility intended to be used, or the way the plant would be used for each part of the operating test, unless previously approved; and (ii) A description of the performance tests for the simulation facility as part of the request, and the results of these tests; and (iii) A description of the procedures for maintaining examination and test integrity consistent with the requirements of Sec. 55.49.[Integrity of examination and tests]

The Commission will approve a simulation facility or use of the plant for administration of operating tests if it finds that the simulation facility and its proposed use, or the proposed use of the plant, are suitable for the conduct of operating tests for the facility licensee's reference plant

under Sec. 55.45(a).

Let's move our attention to the second criteria/element.

*Plant-referenced simulators.*

[SLIDE NO.9] First, the new rule [Section 55.46(c)] requires that a plant-referenced simulator used for the administration of the operator licensing operating test or to meet the experience requirements of Sec. 55.31(a)(5) demonstrate expected plant response to operator input and to normal, transient, and accident conditions to which the simulator has been designed to respond.

In other words, the plant-referenced simulator is designed and implemented so that it: (1) Is sufficient in scope and fidelity to allow conduct of the evolutions listed in Secs. 55.45(a)(1) through (13) and Secs. 55.59(c)(3)(i)(A) through (AA), as applicable to the design of the reference plant; and, (2) allows for the completion of control manipulations for licensed operator applicant eligibility [consistent with Sec. 55.46(c)(2).]

Second, in regard to control manipulations for licensed operator applicant eligibility, the new rule [in Section 55.46(c)(2)(i)] provides that 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. [the phrase "most recent" means the current core. If the plant is in a refueling outage, the core just previous to the outage is acceptable.] It also [in Section 55.46(c)(2)(ii)] provides that simulator fidelity has been demonstrated so that significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence.

Third, the new rule [in Section 55.46(c)(3)] provides criteria for the Commission to accept the plant-referenced simulator for conducting operating tests [as described in Sec. 55.45(a)], for requalification training [as described in Sec. 55.59(c)(3)], or for performing control manipulations that affect reactivity to establish eligibility for an operator's license [as described in Sec. 55.31(a)(5)]. The plant-referenced simulator must meet the requirements of 55.46(c)(1) [that we just talked about] and 55.46(d)(1) and (4) [that I will speak to next].

Let's move on to the third criteria/element.

*Continued Assurance of Simulator Fidelity*

[SLIDE NO.10] Although the new rule eliminates facility licensee certification of their simulation facilities [i.e., NRC Form 474], and routine submittal of reports to the NRC for review which identify any uncorrected performance test failures and a schedule for correction, continued assurance of simulator fidelity is provided in the new rule in new Sec. 55.46(d), by requiring licensees to: (1) Conduct performance testing and retain results for four years, (2) correct modeling and hardware discrepancies and discrepancies identified from scenario

validation and from performance testing, (3) make the results of any uncorrected performance test failures available for NRC review, and (4) maintain the provisions for license application, examination, and test integrity consistent with Section 55.49 [Integrity of examination and tests].

Continued assurance is checked by way of NRC reviews associated with operating tests for operator license applicants [NUREG-1021, Examiner Standards] or inspections completed using the Requalification Inspection Procedure [IP-71111.11] as part of the reactor oversight process [and use of the Requal SDP flowchart]. If these reviews find that a plant-referenced simulator is unsuitable because it does not demonstrate expected plant performance or meet the requirement specified in items (1) and (4) above, then the simulator may not be used to conduct operating tests for operator license applicants, requalification training, or control manipulations until the simulator is made suitable. In any case, simulation facilities, including plant-referenced simulators, must additionally meet (2) and (3) [above] of the requirements of Sec. 55.46(d) for continued assurance of simulator fidelity.

Let's now move to our third topic of interest.

### **Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Revision 3**

[SLIDE NO. 11] RG1.149, Revision 3, describes methods acceptable to the NRC for complying with those portions of the NRC's regulations associated with approval or acceptance of a simulation facility for use in reactor operator and senior operator training and NRC license examinations.

#### *The Role of simulators in operator training and licensing*

Everyone understands that facility licensees are responsible for ensuring that individuals who receive RO or SRO licenses possess the knowledge, skills, and abilities necessary to operate the facility in a safe manner. The use of a plant-referenced simulator for operator training and testing enables the trainer and/or examiner to evaluate a license applicant's performance in a manner that replicates conditions in the plant.

#### *Simulator Performance Testing*

[SLIDE NO. 12] Prior to the new rule, facility licensees trained licensed operators and applicants for operator and senior operator licenses on plant-referenced simulators that were certified by licensee to meet the standards set forth in accordance with the 1985 [or 1993] edition of ANSI/ANS-3.5, ["Nuclear Power Plant Simulators for Use in Operator Training and Examination."] This national industry standard specifies full-scope, stand-alone testing of system models and simulator training capabilities as part of initial simulator acceptance testing.

Since 1987, the industry's approach to computer software development and simulator testing has changed considerably. The new rule allows [facility licensees that adopt the 1998 revised

national standard] for a change in the type of performance testing from a prescriptive simulator testing program in the context of initial simulator procurement to a scenario-based and operability performance testing program. The new rule does not require facility licensees to adopt the 1998 version of ANSI/ANS-3.5 or to modify existing simulator support programs or practices.

Because the new rule continues to require performance testing, facility licensees that do not adopt the 1998 revised national standard will perform the same type of performance testing as before. The new rule allows facility licensees to adjust their performance test programs to their end-user needs, as defined by their accredited systems-approach-to-training (SAT) programs, or to conform their existing simulator programs to the new revision of ANSI/ANS-3.5.

#### *Endorsement of ANSI/ANS-3.5-1998*

[SLIDE NO. 13] RG 1.149, Revision 3, endorses ANSI/ANS-3.5-1998 without exceptions, because it sets forth provisions acceptable to the NRC for addressing minimum design, testing, performance, and configuration criteria for a plant-referenced simulator; for integrating simulator design and performance with an accredited training program; for comparing a simulator to its reference plant; for upgrading simulators to reflect changes to reference plant response or control room configuration; and for improving simulator fidelity. ANSI/ANS-3.5-1998 provides methods acceptable to the NRC staff for a facility licensee to demonstrate that, through meeting the criteria of ANSI/ANS-3.5-1998, the plant-referenced simulator will possess a sufficient degree of completeness and accuracy to meet the requirements of 10 CFR Part 55, "Operator's Licenses," for use in RO and SRO training and NRC license examinations.

[SLIDE NO.14] One important clarification applicable to this endorsement that you should be made aware of is that editions of ANSI/ANS-3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations. It is important to note that the new rule does not require facility licensees to adopt the 1998 version of ANSI/ANS-3.5 or to modify existing simulator support programs or practices. The new rule continues to require performance testing, whether or not facility licensees adopt the 1998 revised national standard.

Let me bring you up to-date on several related activities we are working on as a follow-up to the new rule.

#### **Update on Related Activities**

[SLIDE NO. 15] Currently, the NRC staff is developing revisions to NUREG-1021, Revision 8, [Operator Licensing Examination Standards for Power Reactors] and the "Licensed Operator Requalification Program Inspection Procedure," [IP-71111.11] of the reactor oversight process. These revisions will provide guidance to NRC examiners and inspectors for determining compliance with the rule. Training of examiners will be conducted as appropriate. As noticed in the *Federal Register* (66FR52657), the NRC staff expects that these revisions will be completed

one year from the date the final rule was published [i.e., October 17, 2002].

The staff is planning a public meeting/workshop concerning the new rule. Tentatively we are looking at early March -April, 2002, time frame. [several logistical factors remain to be resolved - such as final consensus on changes to NUREG-1021, IP-71111.11, SDP, and availability of meeting room, calendar conflicts, etc.]

## **Conclusion**

**[SLIDE NO. 16]** In conclusion, as we go down the road with the new rule let me point out that for the first time we are effectively synchronized in that we have [or will have] six (6) important documents that are tightly coupled in the topical area of "plant-referenced simulators."

They are: (1) 10 CFR Part 55; (2) R.G. 1.149, Revision 3; (3) NUREG-1021, Revision 8; (4) IP-71111.11; (5) REQUAL SDP; and (6) ANSI/ANS-3.5-1998

I think it is quite remarkable that we have all worked together to achieve this type of milestone. I believe it will become more appreciated as time and experience passes. Let us go forward in confidence that we are making a positive difference in the nuclear power plant simulation arena and operator licensing.

Thank you for your undivided attention. I will now entertain questions from the floor. [ensure that all questions from the floor are tracked and followed-up (indicate who ask question, the question, and topic area)]

**[SLIDE NO. 17] Available Key Information [display only]**

**[SLIDE NO. 17] Summary of What the Final Rule Does [display only]**

**ATTACHMENT 2 - SLIDES**

# **NRC Update**

**Lawrence Vick**

**U.S. Nuclear Regulatory Commission**

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**10 CFR Part 55, "Operator Licenses"**

**R.G. 1.149, "Nuclear Power Plant Simulation  
Facilities for Use in Operator Training and License  
Examinations"**

# 10 CFR Part 55, "Operators' Licenses," Amended To:

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- ❑ Permit applicants for RO & SRO licenses to fulfill a portion of the required experience prerequisites by manipulating a plant-referenced simulator as an alternative to manipulation of the controls of the actual nuclear power plant.
- ❑ Remove requirements for facility licensee certification of their simulation facilities and routine submittal of reports to the NRC for review that identify any uncorrected performance test failures and a related schedule for correction.
- ❑ Revise two definitions ["plant-referenced simulator" and "simulation facility"]
- ❑ Add clarity to the regulations by relocating requirements relating to the use of a simulation facility [from previous rule 55.45(b)] to a new section, designated 55.46, "Simulation Facilities."
- ❑ Facilitate voluntary licensee transition to an improved approach to simulator testing as described in an ANSI/ANS-3.5-1998.

# Areas of Interest:

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- Performance of control manipulations on the plant-referenced simulator.
- Simulation facilities.
- Revision 3 of R.G. 1.149, " Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations."

# Performance of Control Manipulations on the Plant-referenced Simulator

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- When plant-referenced simulators are used to satisfy experience requirements, the new rule requires that:
  - Simulator models replicate the nuclear and thermal-hydraulic characteristics of the most recent core load in the nuclear power reference plant; And.
  - Significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence.
- These requirements ensure that simulator experience replicates evolutions on the plant and that license applicants receive the same overall experience in safe plant operation as they would on the plant itself.

# Examples of Control Manipulations and Plant Evolutions

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- ❑ Plant or reactor startups.
- ❑ Plant shutdown.
- ❑ Manual control of steam generators or feedwater or both.
- ❑ Boration or dilution operations.
- ❑ Significant ( $\approx 10$  percent) power changes in manual rod control or recirculation flow.
- ❑ Reactor power change of 10 percent or greater.
- ❑ Mispositioned control rod or rods (or rod drops).
- ❑ Conditions requiring use of emergency boration or standby liquid control system.
- ❑ Malfunction of an automatic control system that affects reactivity.
- ❑ Malfunction of reactor coolant pressure/volume control system.

## New Section 55.46, “Simulation Facilities.”

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- Commission-approved simulation facilities and Commission approval of use of the plant in the administration of the operating test.
- Plant-referenced simulators.
- Continued assurance of simulator fidelity.

# and Commission Approval of Use of the Plant in the Administration of the Operating Test

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- ❑ Facility licensees proposing to use a plant-referenced simulator are not required to submit a request for commission approval of that simulator.
- ❑ For cases when facility licensees propose to use a simulation facility not meeting the definition of a plant-referenced simulator, [i.e., Other than a plant-referenced simulator] or the actual plant, the commission will continue to require additional information to determine the acceptability of the simulator or use of the actual plant and thus, will require an application for commission approval.

# and Commission Approval of Use of the Plant in the Administration of the Operating Test

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- Every request must include a description of the:
  - Components of the simulation facility intended to be used, or the way the plant would be used for each part of the operating test, unless previously approved; And
  - Performance tests for the simulation facility as part of the request, and the results of these tests; And
  - Procedures for maintaining examination and test integrity.
  
- Commission will approve a simulation facility or use of the plant for administration of operating tests if it finds that the simulation facility and its proposed use, or the proposed use of the plant, are suitable for the conduct of operating tests.

# Plant-referenced Simulators – the New Rule

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- Requires that a plant-referenced simulator demonstrate expected plant response to operator input and to normal, transient, and accident conditions to which the simulator has been designed to respond.
- Provides that the plant-referenced simulator utilizes models relating to nuclear and thermal-hydraulic characteristics that replicate the most recent core load.
- Provides that simulator fidelity has been demonstrated so that significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence.
- Provides criteria for the commission to accept the plant-referenced simulator for conducting operating tests, for requalification training, or for performing control manipulations that affect reactivity to establish eligibility for an operator's license.

# Continued Assurance of Simulator Fidelity

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- ❑ Conduct performance testing and retain results for four years.
- ❑ Correct modeling and hardware discrepancies and discrepancies identified from scenario validation and from performance testing.
- ❑ Make the results of any uncorrected performance test failures available for NRC review.
- ❑ Maintain the provisions for license application, examination, and test integrity.
- ❑ Continued assurance is checked by way of NRC reviews associated with operating tests for operator license applicants [NUREG-1021, Examiner Standards] or inspections completed using the Requalification Inspection Procedure [IP-71111.11 and use of the Requal SDP flowchart] as part of the reactor oversight process.

# Regulatory Guide 1.149, “Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations”

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- Rg1.149, revision 3, describes methods acceptable to the NRC for complying with those portions of the NRC's regulations associated with approval or acceptance of a simulation facility for use in RO & SRO training and NRC license examinations.
  
- *The role of simulators in operator training and licensing*
  - The use of a plant-referenced simulator for operator training and testing enables the trainer and/or examiner to evaluate a license applicant's performance in a manner that replicates conditions in the plant.

# Simulator Performance Testing – the New Rule Allows:

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- ❑ A change in the type of performance testing from a prescriptive simulator testing program in the context of initial simulator procurement to a scenario-based and operability performance testing program [facility licensees that adopt the 1998 revised national standard].
- ❑ Does not require facility licensees to adopt the 1998 version of ANSI/ANS-3.5 or to modify existing simulator support programs or practices.
- ❑ Continues to require performance testing [facility licensees that do not adopt the 1998 national standard will perform the same type of performance testing as before.]
- ❑ Allows facility licensees to adjust their performance test programs to their end-user needs, as defined by their accredited systems-approach-to-training (SAT) programs, or to conform their existing simulator programs to the new revision of ANSI/ANS-3.5.

# Endorsement of ANSI/ANS-3.5-1998

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- Rg1.149, revision 3, endorses ANSI/ANS-3.5-1998 without exceptions, because it:
  - Sets forth provisions acceptable to the NRC for addressing minimum design, testing, performance, and configuration criteria for a plant-referenced simulator.
  - Integrates simulator design and performance with an accredited training program.
  - Compares a simulator to its reference plant.
  - Requires upgrading simulators to reflect changes to reference plant response or control room configuration.
  - Provides for improving simulator fidelity.
  - Provides methods acceptable to the NRC staff for a facility licensee to demonstrate that, through meeting the criteria of the standard, the plant-referenced simulator will possess a sufficient degree of completeness and accuracy to meet the requirements of 10 CFR part 55, "operator's licenses," for use in RO and SRO training and NRC license examinations.

# Important Clarification Applicable to This Endorsement

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- Editions of ANSI/ANS-3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations.
- New rule does not require facility licensees to adopt the 1998 version of ANSI/ANS-3.5 or to modify existing simulator support programs or practices.
- New rule continues to require performance testing, whether or not facility licensees adopt the 1998 revised national standard.

# Update on Related NRC Activities

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- Updating NUREG-1021, Revision 8, [Operator Licensing Examination Standards for Power Reactors].
- Updating IP-71111.11, [Licensed Operator Requalification Program Inspection Procedure] of the reactor oversight process.
- Provide guidance to NRC examiners and inspectors for determining compliance with the rule.
- Training of examiners/inspectors as appropriate.
- Planning a public meeting/workshop concerning the new rule.

# Conclusion

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- Important documents that are tightly coupled in the topical area of “plant-referenced simulators” are:
  - 10 CFR Part 55.46
  - R.G. 1.149, Revision 3
  - NUREG-1021, Revision 8
  - IP-71111.11
  - REQUAL SDP
  - ANSI/ANS-3.5-1998

# Available Key Information

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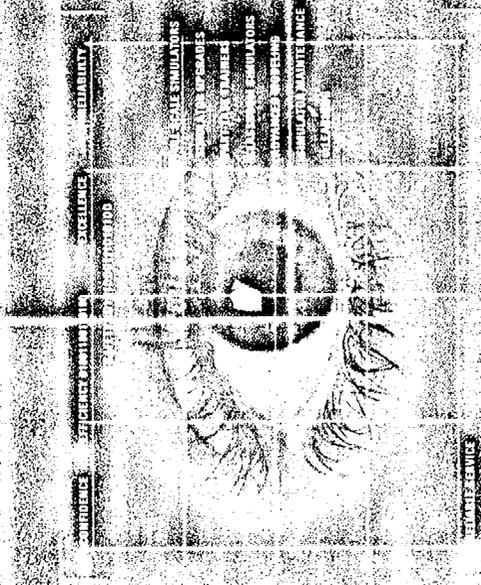
- March 25, 1987, (52 FR 9453) last amendment to 10 CFR Part 55.
- August 23, 1999, (64 FR 45985) Draft Regulatory Guide DG-1080 for Revision 3, RG 1.149.
- September 8, 1999, (SECY-99-225), rulemaking plan to amend 10 CFR 55.
- April 12, 2000, (SECY-00-0083), proposed rule to amend 10 CFR 55.
- July 3, 2000, (65 FR 41021), proposed rule published in Federal Register.
- July 10, 2001, (SECY-01-0125), Final rule to amend 10 CFR 55 and publish RG 1.149 concurrently.
- October 17, 2001, (66 FR 52657), Final rule published in Federal Register.
- October 17, 2001, Revision 3, R.G. 1.149, Nuclear Power Plant Simulation Facilities for Use in Operator Training and Licensing Examinations.

# Summary of What the Final Rule Does

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- Allows applicants for RO & SRO licenses to fulfill a portion of the required experience prerequisites by manipulating a plant-referenced simulator as an alternative to manipulation of the control of the actual nuclear power plant.
- Removes current requirements for facility licensee certification of their simulation facilities.
- Eliminates the necessity for routine submittal of reports to the NRC for review which identify any uncorrected performance test failures and a schedule for correction.
- Facilitates through RG 1.149, Rev 3, a voluntary licensee transition to an improved approach to simulator testing as described in ANSI/ANS 3.5-1998.

# UNLOCKING THE TRUE VALUE OF YOUR SIMULATOR



Serving customers in over 40 countries, CAE is the world's premier supplier of training simulators. With three decades of power plant simulation experience, CAE's innovative simulation know-how has resulted in what is undeniably the industry's front-running technology.

CAE has always provided unparalleled technologies and service to CAE simulator users and we'll continue to do so. But there are many simulators that were not originally supplied by CAE, which will not meet today's demanding and constantly evolving training and operations improvement needs. CAE has devised the solution to tackle this problem.

CAE's leading simulation technologies are now available to run seamlessly on third-party simulators. That's right! Powerful software like the ROSE® graphical model development and runtime environment and the dynamic HORUSM™ utility for loading, validating and monitoring cycle-specific reactor data are now available to run on third-party simulators.

When you need more from your simulator, you can trust CAE to unlock the true value for maximum performance and guaranteed results!



*Simulation and Beyond*

# WMC02



# 2002 WESTERN MULTI-CONFERENCE

FINAL PROGRAM



JANUARY 27-31, 2002

SHERATON FOUR POINTS HOTEL

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AND SIMULATION INTERNATIONAL  
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**Friday 9:20-10:10**  
**Room - Taos C**  
**Session 9: Collaborative Enterprise Security**  
 Chair: Stephen A. Miller

**Using the NuSMV Model Checker to Verify the Kerberos Protocol**  
 M. Panti, L. Spalazzi, S. Tacconi, *University of Ancona, Italy*

**Security As Collaborative Relationships**  
 Eugen Bacic, *Texar Corporation, Canada*

**Friday 10:30-11:20**  
**Room - Taos C**  
**Session 10: Coalition Work and Cooperative Services**  
 Chair: M. Panti

**Customized Transactional Support for Cooperative Work: An Experience Paper**  
 Heri Ramampiaro, Mads Nygard, *Norwegian University of Science and Technology, Norway*

**Collaboration in a Coalition Environment**  
 Donald E. Henager, Gary R. Shaffer, *SAIC, San Diego, California, USA*

**Friday 11:20-12:10**  
**Room - Taos C**  
**Session 11: Interfaces for Collaborative Enterprises**  
 Chair: Eugen Bacic

**An Analytical Review of Multiuser Interfaces: Design Criteria, Classification, and Case Studies**  
 Ashish Godbole, Waleed W. Smari, *University of Dayton, USA*

**Enhancing Collaborative Communication: Defining Three Dimensions Of Media Richness**  
 Kirk A. Weigand, *Air Force Research Laboratory, USA*  
 Deborah A. Mitta, *Georgia Tech Research Institute, USA*

**Friday 12:10-12:30**  
**Room - Taos C**  
**Conference Closing Remarks**  
 CTS Symposium General Chairs

**NUCLEAR POWER PLANTS AND SYSTEMS**

Co-Chair: Scott Halverson, *AmerenUE*  
 Co-Chair: Mac McDade, *Carolina Power and Light*

**Monday 10:30-12:00**  
**Room - Santa Fe**  
**Session 1: Classroom, PC and Specialty Simulation**  
 Chair: Jody Brodsky

**A New Design for Building Your Own Simulated GE Numac Drawer**  
 Tommy Albright, *Browns Ferry TVA*

**DDE Reflection of a ROSE Model - Expanding Full Scope Simulation**  
 Scott Halverson, *Callaway, AmerenUE*

**Operation Experience with the First PC-Based Full Scope Simulator KKG**  
 Heinz Lohmann, *STN ATLAS Elektronik GmbH*

**Monday 1:30-3:00**  
**Room - Santa Fe**  
**Session 2: Simulator Vendor Presentations**  
 Latest updates from CAE

**Monday 3:30-5:00**  
**Room - Santa Fe**  
**Session 3: Simulator Vendor Presentations**  
 Continued updates from DS&S

**Tuesday 8:00-9:30**  
**Room - Santa Fe**  
**Session 4: Thermal Hydraulic and Core Models**  
 Chair: Barney Panfil

**Simulating Fourth Generation Reactors**  
 Daniel Cote, George Salim, *CAE, Inc.*

**Implementation of a Relap5 RCS and Secondary Plant Model in a Nuclear Power Plant Training Simulator**  
 David W. Hiltbrand, Ken Williams, *TXU Electric/Data Systems and Solutions*

**Getting the Most Out of Your Third-Party Simulator**  
 Christian Paquette, *CAE, Inc.*

**Tuesday 10:00-11:30**  
**Room - Santa Fe**  
**Session 5: Tools, Tools, Enhancements and Models**  
**Motion Simulation: Earthquake and Main Turbine High Vibration**  
 Ronald D. Conaway and James B. Florence, *Cooper Nuclear Station*

**Nuclear Simulator Saves a Million. Yours can too!**  
 David Roberts, *Simulator Training Systems, Ratcliffe-on-Soar, Nottingham, UK*

**Windows 2000 Simulation: The Ling Ao Story**  
 Darness Helou, *CAE, Inc.*

**Tuesday 1:30-3:00**  
**Room - Santa Fe**  
**Session 6: System Upgrades**  
**Improved Balance of Plant Simulation with ROSE**  
 Roger Burelle, George Salim, *CAE, Inc.*

**Certification of the Laguna Verde Nuclear Power Plant Simulator**  
 Edgardo J. Roldán Villasana, *Mexico*

**Benefits of Emulation Technology**  
 Alan Brookes, *Powergen, UK*

**Tuesday 3:30-5:00**  
**Room - Santa Fe**  
**Session 7: Simulator Related Topics**  
**Woodward Governor Simulation - Browns Ferry**  
 Richard P. Potekhen

**System Dynamics a Powerful Tool for Simulation of Business Systems with an Application Model for Electric Utility**  
 Himadri Banerji

**Neuro-Fuzzy Control Simulation for Egypt Second Research Reactor, ETRR-2**  
 Mohamed A. Gaheen, Sayed M. Elaraby, M. Naguib Aly, *Atomic Energy Authority/Faculty of Engineering, Alexandria University, Egypt*

**Wednesday 8:00-9:30**  
**Room - Santa Fe**  
**Session 8: Panel Verification and Validation**  
 Chair: Carl Golightly

**Wednesday 10:00-11:30**  
**Room - Santa Fe**  
**Session 9: Panel ANS-3.5 and Regulation Changes**  
 Chair: Mac McDade  
**Jim Florence, ANSI-3.5 Committee Secretary**  
**Larry Vick, NRC 10CFR55.46, Reg Guide 1.149**  
**Scenario Based Testing**

**Wednesday 12:00-5:00**  
**Regional workshops in parallel breakout rooms**  
**Room - Suite 3020**  
**Session 10: MANTG Simulator Meeting Workshop**  
 Chair: Franco Pasquale  
**Topic: Open Agenda**

**Room - Guadalupe**  
**Session 11: MNTA Simulator Meeting/Workshop**  
 Chair: John Shriver  
**Topics: Open Agenda**

**Room - Suite 2020**  
**Session 12: SSNTA Meeting**  
 Chair: Tommy Albright (TVA)

**Room - Santa Fe**  
**Session 13: Westrain Simulator Meeting/Workshop**  
 Chair: Scott Halverson, *AmerenUE, Callaway Plant Simulator*  
**Topics: Scenario Testing – Pilot Program - Callaway**  
**Meeting ANSI/ANS-3.5-1998 Testing Requirements**

**Thursday 9:00-10:30**  
**Room - Coronado A&B**  
**Session 14: USUG Annual Meeting**  
 Chair: Scott Halverson, *AmerenUE, Callaway Plant Simulator*  
 Introductions and open discussions  
 Minutes from previous meeting - Jim Florence  
 Election Vice-Chairman  
 Elections Regions 2 and 4 (even year regions)  
 Region Reports, recent activities, workshops  
 Old Business  
 New Business – Web Page Adjustments

**Thursday 10:30-11:30**  
**Room - Coronado A&B**  
**Session 15: USUG Panel Discussion/Region Reports**  
 Chair: Region 1 & 2 Representatives  
**Panel Topic: To be provided by regions**

**Thursday 1:30-2:30**  
**Room - Coronado A&B**  
**Session 16: USUG Panel Discussion/Region Reports**  
 Chair: Region 3 & 4 Representatives  
**Panel Topic: Kevin Cox/Jody Brodsky**

**Thursday 2:45-3:45**  
**Room - Coronado A&B**  
**Session 17: USUG Panel Discussion – International**  
 Chair: Region 3 Representative  
**Panel Topic: Inputs from international members**

**Thursday 4:00-5:00**  
**Room - Coronado A&B**  
**Session 18: USUG Current topics from Conference**

**FOSSIL SIMULATION AND TRAINING**  
 General Chair: Richard Pennington, *EPRI Simulator and Training Center*

**Tuesday 8:00-10:00**  
**Room - Brazos A**  
**SeLearning: The Next Generation of Power Plant Simulation is Here Already!**  
 Daniel Rudich, *CAE, Inc.*

**Tuesday 10:30-12:00**  
**Room - Brazos A**  
**Raising the Bar for Combined-Cycle Gas Turbines Plant Simulators**  
 Robert Boire, *CAE, Inc.*

**Tuesday 1:30-2:30**  
**Room - Brazos A**  
**Power Plant Operator Virtual Reality Simulator**  
 Jack Hamrick, *EPRI*

**Tuesday 3:00-4:00**  
**Room - Brazos A**  
**Combustion Turbine Simulation**  
 Merrill Quintrell, *EPRI*

**Tuesday 4:00-5:00**  
**Room - Brazos A**  
**Digital Control Systems (DCS) Solutions for Fossil and Nuclear Power Plant Simulators**  
 M. Udbinac and O. Ashy, *Data Systems & Solutions, LLC*

**Wednesday 8:00-10:00**  
**Room - Brazos A**  
**Rapid Model Development Using SimSuite Power**  
 Garry Fotheringham, *PowerGen*

**Wednesday 10:30-12:00**  
**Room - Brazos A**  
**A Virtual Panel Training System for Space Station Experiments**  
 Dave Durand, *Ratheon Aerospace Eng. Service*

**WMC '02**

