

RULEMAKING ISSUE AFFIRMATION

July 10, 2001

SECY-01-0125

FOR: The Commissioners

FROM: William D. Travers
Executive Director for Operations

SUBJECT: FINAL RULEMAKING TO AMEND 10 CFR PART 55, "OPERATORS' LICENSES," REGARDING OPERATOR LICENSE ELIGIBILITY AND THE USE OF SIMULATION FACILITIES IN OPERATOR LICENSING; AND, REVISION 3 OF REGULATORY GUIDE 1.149, "NUCLEAR POWER PLANT SIMULATION FACILITIES FOR USE IN OPERATOR TRAINING AND LICENSE EXAMINATIONS"

PURPOSE:

To obtain the Commission's approval to publish the attached final rule (Attachment 1) to amend 10 CFR Part 55, "Operators' Licenses" regarding operator license eligibility and the use of simulation facilities in operator licensing, and to inform the Commission of the staff's intent to issue Revision 3 of Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations" (RG 1.149). The final rule permits 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 plant. In addition, this final rule also removes requirements for: (1) utilities to certify their simulation facilities (i.e., to state in formal communication, on NRC Form 474, "Simulation Facility Certification," to the Commission that the simulation facility meets the Commission's regulations); (2) routine submittal of reports to the NRC for review that identify any uncorrected performance test failures; and (3) if applicable, submission of a schedule for test failure correction.

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BACKGROUND:

At the proposed rulemaking stage, the subject amendment was provided to the Commission in SECY-00-0083, dated April 12, 2000. The Commission approved the proposed rule in a staff requirements memorandum (SRM) issued on May 15, 2000. The proposed rule was published in the *Federal Register* on July 3, 2000 (65 FR 41021), for a 90-day comment period that expired on September 18, 2000. Fifteen comment letters were received that represented comments from 3 individuals, 9 nuclear power plant licensees (utilities), 1 utility organization (Nuclear Energy Institute), 1 licensed operator organization (the Professional Reactor Operators Society), and 1 national consensus standards committee working group. Twelve of the 15 commenters expressed support for amending the rule. Two commenters did not support performance on the simulator of the reactivity control manipulations associated with operator license eligibility. One commenter implied the need to continue to perform control manipulations on the plant and believed that more explicit requirements for these control manipulations on the actual plant were necessary. Attachment 1 includes the analysis of the public comments on the proposed rule in the *Federal Register* notice.

In conjunction with this final rulemaking, the staff intends to issue Revision 3 of RG 1.149 (Attachment 2), which describes methods acceptable to the NRC staff for complying with those portions of 10 CFR Part 55 that relate to the use of simulation facilities in the licensing of reactor operators and senior reactor operators. RG 1.149, Revision 3 endorses 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," with minor clarifications and without exceptions. The proposed Revision 3 of the regulatory guide was published in the *Federal Register* on August 23, 1999 (64 FR 45985), for public comment as Draft Regulatory Guide DG-1080. Comments were received from 6 facility licensees and 1 facility training organization. All commenters expressed support for RG 1.149 and its endorsement of the revised ANSI/ANS-3.5-1998. Attachment 2 includes the staff's responses to the public comments on the draft regulatory guide.

DISCUSSION:

The final rule, that is provided in the attached *Federal Register* notice, amends 10 CFR Part 55 to take advantage of improvements in simulator technology and to reduce unnecessary regulatory burden on licensees by:

- (1) Allowing 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,
- (2) Removing current requirements for facility licensee certification of their simulation facilities, and
- (3) Eliminating the necessity for routine submittal of reports to the NRC for review that identify any uncorrected performance test failures and a schedule for correction.

In conjunction with supporting these objectives, the final rule also revises two definitions in 10 CFR Part 55 and adds clarity to the regulations by relocating language relating to the use of a simulation facility to a new Section 55.46 dedicated to "Simulation Facilities."

Continued assurance of simulator fidelity is provided since a facility licensee must: (1) conduct performance testing and retain the 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 on site; and (4) maintain the provisions for license application, examination, and test integrity consistent with Section 55.49. In addition, NRC reviews or inspections at simulation facilities to ensure compliance with final rule requirements will maintain safety without the unnecessary burden of certification and submittal of simulator performance test reports. If NRC reviews associated with operating tests for operator license applicants or inspections completed using the Requalification Inspection Procedure as part of the oversight process find that a plant-referenced simulator is unsuitable because it does not demonstrate expected plant response or meet the requirements specified in items (1) and (4) above, 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) of the requirements of §55.46(d) for continued assurance of simulator fidelity. Further, NUREG-1021, Revision 8, "Operator Licensing Examination Standards for Power Reactors," provides detailed policies, procedures, and practices for examining applicants for reactor operator and senior reactor operator licenses. NUREG-1021 essentially ensures that simulator scenarios for examinations are completed without procedure exceptions or simulator performance exceptions.

New technologies, involving multi-module facilities, in which there are multiple identical reactors (e.g. pebble bed reactors) may influence how a simulation facility is referenced to a specific nuclear power plant. The Commission did not consider these new technologies during preparation of this final rulemaking and believes it is best to defer regulatory decisions until it is clear whether the regulations will be affected.

The staff prepared a draft regulatory analysis for the proposed rule to examine the costs and benefits of the alternatives considered. Public comments on this analysis were requested in connection with the proposed rule. No significant comments were received. Minor changes have been made to the draft regulatory analysis, including, prorating the cost and benefit of the final rule over the average remaining years of operating life of the facility. The final regulatory analysis for the rule is provided as Attachment 3.

RELATED ACTIVITIES:

To implement this rule, the NRC staff is developing revisions to the process for initial licensing, requalification, and examination of reactor and senior operators, including updating NUREG-1021, Revision 8, and the "Licensed Operator Requalification Program Inspection Procedure," (IP-71111.11) of the reactor oversight process. Training of examiners will be conducted as appropriate. The NRC staff expects that these revisions will be completed within 1 year from the date the final rule is published. Since the proposed rulemaking notice, the staff has

determined that it is not necessary to revise and update NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operator's Licenses" and NUREG-1258, "Evaluation Procedure for Simulation Facilities Certified Under 10CFR 55." Instead of revising NUREG-1262, the staff will post on the Operator Licensing Program web page answers to any questions that may be generated from a public meeting/workshop concerning this final rulemaking. NUREG-1258 has become obsolete and will no longer be used or updated.

RESOURCES:

Resources to implement this final rule (1.0 full-time equivalent (FTE) position) are included in the Fiscal Year 2001 budget. It is expected that minimal savings to the NRC will occur under the revised reporting requirements.

COORDINATION:

The Office of the General Counsel has reviewed this Commission paper and the final rule and has no legal objections to their content. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections. The Committee To Review Generic Requirements (CRGR) was briefed on the final rule on May 21, 2001, and believes the final rule change and regulatory guide do not impose a backfit and should be approved (Letter dated May 25, 2001, Attachment 4). On May 15, 2001, the Advisory Committee on Reactor Safeguards (ACRS) issued a letter (Attachment 5) stating that it decided not to review these documents and has no objection to issuing the final rule and associated RG 1.149, Revision 3.

RECOMMENDATIONS:

That the Commission:

- (1) Approve the publication of the *Federal Register* notice that promulgates the final rule, Attachment 1.
- (2) Certify that this rule, if issued, would not have a significant economic impact on a substantial number of small entities to satisfy the requirements of the Regulatory Flexibility Act, 5 U.S.C. 605(b).
- (3) Note that
 - (a) This final rule eliminates all information collection requirements for the Office of Management and Budget (OMB) approval number 3150-0138.
 - (b) Regulatory Guide 1.149, Revision 3 (Attachment 2), will be published concurrently with publication of the final rule. The *Federal Register* notice that publishes the final rule will provide notice of the availability of the regulatory guidance. The staff's responses to the public comments will be made available in the NRC's Public Document Room (PDR).

- (c) The Regulatory Analysis (Attachment 3) will be made available in the NRC's PDR.
- (d) The Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification regarding economic impact on small entities and the reasons for it as required by the Regulatory Flexibility Act.
- (e) A press release will be issued.
- (f) The appropriate congressional committees will be informed.
- (g) The NRC has determined that this action is not a major rule under the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) and has confirmed this determination with OMB (Attachment 6).
- (h) Copies of the final rule will be distributed to all affected facility licensees and interested stakeholders.

/RA/

William D. Travers
Executive Director
for Operations

- Attachments:
- 1. *Federal Register* notice
 - 2. Regulatory Guide 1.149, Revision 3, with the staff's response to the public comments
 - 3. Regulatory Analysis
 - 4. CRGR memorandum
 - 5. ACRS memorandum
 - 6. SBREFA forms

Federal Register Notice
10 CFR Part 55
Operator License Eligibility and
Use of Simulation Facilities in Operator Licensing

NUCLEAR REGULATORY COMMISSION

10 CFR Part 55

RIN 3150-AG40

Operator License Eligibility and
Use of Simulation Facilities in Operator Licensing

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its regulations 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. This change, along with other amendments contained in this rule, takes advantage of improvements in simulator technology and reduces unnecessary regulatory burden on licensees.

EFFECTIVE DATE: The final rule is effective [INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: The final rule and any related documents are available on the NRC's rulemaking website at <http://ruleforum.llnl.gov>. For information about the interactive rulemaking website, contact Carol Gallagher, 301-415-5905 (electronic mail: cag@nrc.gov)

Copies of certain documents related to this rulemaking may be examined at the NRC Public Document Room, 11555 Rockville Pike, Rockville, MD. These same documents may be viewed and downloaded electronically via the rulemaking website. Documents created or received at the NRC after April 1, 2000, are also available electronically at the NRC's Public Electronic

Reading room on the internet at <http://www.nrc.gov/NRC/ADAMS/index.html>. From this site, the public can gain entry into the NRC's Agency Document Access and Management System (ADAMS) that provides text and image files of NRC's public documents. For more information, contact the NRC Public Document Room (PDR) Reference staff at 301-415-4737 or toll-free at 1-800-397-4209, or by e-mail at pdr@nrc.gov.

FOR FURTHER INFORMATION CONTACT: David Trimble, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, telephone 301-415-2942, or by electronic mail to dct@nrc.gov.

SUPPLEMENTARY INFORMATION: The Nuclear Regulatory Commission (NRC) is amending the regulations that govern operators' licenses to allow 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. This final rule also removes 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. Continued assurance of simulator fidelity is provided because a facility licensee must: (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 onsite; and (4) maintain the provisions for license application, examination, and test integrity consistent with Section 55.49. The final rule also revises two definitions and adds clarity to the regulations by relocating language relating to the use of a simulation facility to a new section dedicated to "Simulation Facilities." Lastly, 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 is being published in conjunction with this final rule.

Background

Prior to 1987, the Commission's position was that simulator experience was not necessarily equivalent to actual nuclear power plant operating experience. The industry and the public supported this position, citing inherent problems and uncertainties in simulator technology, and the few plant-specific simulators in existence at the time.

The Commission became increasingly aware of the need to update its operator licensing requirements, in particular the need to clarify the extent to which simulators may be used in the operator licensing process. In 1987, the Commission amended substantial portions of 10 CFR Part 55 to (1) formalize the requirement for license applicants to perform five significant manipulations to control reactivity or power level on the actual plant as a prerequisite for license eligibility; (2) require that every operating test be administered in a plant walk-through and a simulation facility that was either approved by the Commission or certified by the facility licensee as a plant-referenced simulator; and (3) require submittal of periodic performance tests on the simulation facility, and maintenance of records pertaining to the conduct of these tests and the results obtained. (See 52 FR 9453; March 25, 1987). Consequently, facility licensees began to develop simulators for operator licensing and training which were certified by licensees to be in accordance with national standard ANSI/ANS-3.5-1985, "Nuclear Power Plant Simulators for Use in Operator Training." Eventually, every facility with a current Part 50 license procured a plant-referenced simulator and submitted a certification for its use to the Commission.

After 1987, simulation technology has increased the simulators' computing capability, model complexity, and fidelity. Consequently, the Commission has fewer concerns regarding the equivalence of experience gained on simulation facilities and that obtained on the actual plant. Simulator testing has changed considerably since the current rule was published in 1987. Specifically, the ANS 3.5 Standard Committee Working Group (WG) initiated a new approach to simulator testing with the issuance of ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," that employs a scenario-based testing philosophy that is inconsistent with the testing assumptions and requirements of the current rule. The Commission has reviewed this new industry standard, found it acceptable, and determined that the existing regulatory requirements contain prescriptive aspects that are impediments to

industry adoption of the 1998 standard and are no longer necessary to support required training and examination programs. The Commission has also determined that the current requirements for facility licensee certification of plant referenced simulators and routine submittal of simulation facility performance test failures with a schedule for corrections are unnecessarily burdensome for licensees and can be replaced by NRC review of plant-referenced simulators for acceptability and of performance test results of simulation facilities before simulator facility use for operating tests.

Discussion

With this final rule, the Commission is updating its positions regarding the use, certification, and reporting requirements for performance testing of simulation facilities. The final rule amends 10 CFR Part 55 to take advantage of improvements in simulator technology and to reduce unnecessary regulatory burden on licensees by:

(1) Allowing 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,

(2) Removing current requirements for facility licensee certification of their simulation facilities, and

(3) Eliminating the necessity for routine submittal of reports to the NRC for review that identify any uncorrected performance test failures and a schedule for correction.

Finally, the final rule facilitates voluntary licensee transition to an improved approach to simulator testing as described in industry 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," endorses this standard and is being published in conjunction with this final rule.

Performance of Control Manipulations on the Plant-Referenced Simulator

The current rule requires that applicants for operator and senior operator licenses perform five significant control manipulations that affect reactivity or power level on the actual plant. This final rule will allow applicants to perform the manipulations either on a plant-referenced simulator or on the actual plant at the facility licensee's discretion. When simulators are used to provide for performance of control manipulations, the final 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.

The use of a plant-referenced simulator of appropriate fidelity for these manipulations is acceptable because of improvements in simulator technology and 13 years of successful experience in using simulators after the 1987 revision of Part 55. Plant-referenced simulators provide operator training and realistic examination scenarios on reactivity manipulations, other normal and abnormal procedure operations, complex plant operations, and emergency operating procedure evolutions, including the management of simultaneous tasks and faulted conditions. This final rule will allow license applicants to fulfill a portion of the required experience requirements in the facility's plant-referenced simulator without disrupting the operation of the actual plant.

During the public comment period, the Nuclear Energy Institute (NEI) and several additional commenters recommended changing proposed §55.45(b)(3)(i)(A), which would have required that the simulator model replicate the plant "at the time of the applicant's operating test." The commenters recommended that the words "at the time of the applicant's operating test" be deleted because this could unnecessarily restrict the candidate's opportunities to conduct reactivity manipulations to a short time just before the operating test. The commenters also stated that this would be a problem if a refueling outage occurs near the time the applicant was scheduled for the operating test or if the date of the operating test changed. The Commission

acknowledges NEI's concern that the proposed wording of §55.45(b)(3)(i)(A) (§55.46(c)(2)(i) of the final rule) would have restricted the candidates' opportunities to conduct the reactivity manipulations to a short time just before the operating test. The Commission does not intend to be unduly restrictive with regard to the timing for conduct of the five significant control manipulations on a plant-referenced simulator. Therefore, the Commission has revised §55.46(c)(2)(i) of the final rule to require the plant-referenced simulator to "replicate the most recent core load in the nuclear power reference plant for which a license is being sought," without the words "at the time of the applicant's operating test." It is the Commission's intent that the phrase "most recent" means the current core or if the plant is in a refueling outage, "most recent" means the core just previous to the outage.

Simulator Certification and Routine Submittal of Performance Test Reports

The current rule requires licensees who use plant-referenced simulators to certify on NRC Form 474, "Simulation Facility Certification," that their simulator meets Commission regulations. The current regulations also require that test documentation and test schedules be submitted quadrennially. There are licensee-certified, plant-referenced simulators now at all currently licensed power reactor facilities. The NRC staff's experience has shown that the submitted quadrennial reports are of minimal value.

The final rule eliminates current requirements in §55.45(b) for: (1) facility licensee certification of their simulation facilities, and (2) 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 final rule in new §55.46(d), by requirements for 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 onsite, and (4) maintain the provisions for license application, examination, and test integrity consistent with Section 55.49. In addition, NRC reviews or inspections to ensure compliance with final rule requirements at simulation facilities will maintain safety without the unnecessary burden of certification and submittal of simulator performance test reports. If NRC reviews associated with operating tests for operator license applicants or inspections

completed using the Requalification Inspection Procedure as part of the oversight process 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) of the requirements of §55.46(d) for continued assurance of simulator fidelity. Further, NUREG-1021, Revision 8, "Operator Licensing Examination Standards for Power Reactors," provides detailed policies, procedures, and practices for examining applicants for reactor operator and senior reactor operator licenses. NUREG-1021 essentially ensures that simulator scenarios for examinations are completed without procedure exceptions or simulator performance exceptions.

Facility licensees have trained licensed operators and applicants for operator and senior operator licenses on plant-referenced simulators that were certified in accordance with the 1985 edition of ANSI/ANS-3.5, "Nuclear Power Plant Simulators for Use in Operator Training and Examination." This national standard specifies full-scope, stand-alone testing of system models and simulator training capabilities as part of initial simulator acceptance testing. Facility licensees have continued to test their plant-referenced simulators as tested during initial development and to submit test schedules and reports on a quadrennial basis. The industry's approach to computer software development and simulator testing has changed considerably since 1987 through the issuance of the 1998 version of ANSI/ANS-3.5. The standard has moved away from continued full-scope, stand-alone testing of system models and simulator training capabilities toward a scenario-based testing and quality control philosophy.

For facility licensees that adopt the 1998 revised national standard, the final rule revision allows 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 final 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 final 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 final rule will allow 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. This rule and the associated Revision 3 of Regulatory Guide 1.149, "Nuclear Power Simulation Facilities for Use in Operator Training and License Examinations," that endorses ANSI/ANS-3.5-1998 without exceptions, reduces inconsistencies between the operational needs of facility licensee programs and the simulator testing requirements.

Clarification of Part 55 Definitions

In 10 CFR 55.4, "Definitions," the proposed rule would have defined performance testing as follows: "Performance testing means validation, scenario-based, or operability testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance." During the public comment period, the ANS 3.5 Standards Committee WG recommended that the proposed definition be changed to eliminate the word "validation." The Commission agrees with that suggestion and, further, the Commission has reconsidered the inclusion of the phrase ". . . scenario-based, or operability . . ." because it could be interpreted as limiting a facility licensee to the use of the ANSI/ANS-3.5-1998 standard. Therefore, the Commission has retained the original definition of performance testing in the final rule as "*Performance testing* means testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance."

The definition of "plant-referenced simulator" is revised to remove the last sentence and to relocate the provision of that sentence a "plant-referenced simulator demonstrates expected plant response to operator input, and to normal, transient, and accident conditions to which the simulator has been designed to respond" to new §55.46(c)(1). This is a conforming change that provides clarity to the regulation. The first sentence of the definition remains the same.

The term "reference plant" is defined in §55.4 as "the specific nuclear power plant from which a simulation facility's control room configuration, system control arrangement, and design data are derived." This definition remains the same in the final rule and continues to provide clarification that for a simulation facility, a specific plant (unit) at a multi-plant (unit) site is the "reference plant." The Commission realizes that the use of inconsistent terminology can be

confusing and has made clarifications where appropriate in preparing the final rule. However, the Commission intends to re-evaluate the use of the term "reference plant" in the future.

The term "simulation facility" is revised to include part-task and limited-scope simulator devices so that these devices can be used if a request were received and approved by the Commission for their use. The definition of "simulation facility" is also revised to remove "the plant" as a potential "simulation facility." Use of "the plant" is now addressed in the new §55.46 (b). This is a conforming change that provides clarity to the regulation. The intent remains to allow facility licensees to use the plant, if approved, for the administration of the operating test and to meet experience requirements for applicants for operator and senior operator licenses. This conforming change is intended to continue to provide the regulatory flexibility that facility licensees have had since 1987.

New Section 55.46

The final rule includes administrative changes to move the requirements for the use of simulation facilities from §55.45 to a new §55.46, "Simulation Facilities." Former §§55.45(b)(4) and (5) dealing with simulators have been separated from §55.45 and consolidated in the new §55.46. This is simply an administrative change to clarify the existing rule by separating requirements concerning simulation facilities from requirements in §55.45 concerning operating tests.

Related Activities

To implement this rule the NRC staff is also developing revisions to the process for initial licensing, requalification, and examination of reactor and senior operators, including updating NUREG-1021, Revision 8, and the "Licensed Operator Requalification Program Inspection Procedure," (IP-71111.11) of the reactor oversight process. Training of examiners will be conducted as appropriate. The NRC staff expects that these revisions will be completed one year from the date the final rule is published. Since the proposed rulemaking notice, the staff has determined that it is not necessary to revise and update NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal

Regulations, Part 55 on Operator's Licenses" and NUREG-1258, "Evaluation Procedure for Simulation Facilities Certified Under 10 CFR 55." Instead of revising the NUREG's listed above, answers to questions from a public meeting/workshop concerning this final rulemaking will be posted on the NRC's home page at <WWW.NRC.GOV> in the Nuclear Reactors icon under Principal Reactor Programs under Operator Licensing Program. Additionally, the answers to any questions will be available and may be viewed as discussed above under the heading ADDRESSES.

Revisions to Regulatory Guide REG 1.149, Revision 3

A draft version of the associated regulatory guide (DG-1080, Proposed Revision 3 of Regulatory Guide 1.149) that proposed endorsing ANSI/ANS-3.5-1998 was made available for public comment (64 FR 45985). The final Regulatory Guide 1.149 is being made available concurrently with this final amendment. The regulatory guide is available for inspection in the NRC Public Document Room or it may be viewed and downloaded electronically through the interactive rulemaking web site established by the NRC for this rulemaking, as discussed above under the heading ADDRESSES. Single copies may be obtained from David Trimble, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, telephone 301-415-2942, or by electronic mail to dct@nrc.gov.

Analysis of Public Comments

The proposed rule was published in the *Federal Register* on July 3, 2000 (65 FR 41021), and the public comment period ended on September 18, 2000. The Commission received 15 comment letters on the proposed rule: 3 comments from individuals, 9 from nuclear power plant licensees (utilities), 1 from a utility organization (Nuclear Energy Institute), 1 from a licensed operator organization (the Professional Reactor Operators Society (PROS)), and 1 from a national consensus standard working group (Standards Committee WG ANS-3.5). One letter with a request for an extension to the comment deadline was also received. No public comments were received from any State agency. No public meetings were held to discuss the proposed rule nor were any requested, however the general status of the proposed rule was discussed at NEI Initial Operator Licensing Focus Group Meetings open to the public. The

comment letters may be viewed on the NRC's Web site, <http://www.nrc.gov/NRC/rule.html>, Rulemaking Web Site, "News, Information and Contacts for Current Rulemaking."

Twelve of the 15 commenters expressed support for amending the rule. Several of the commenters provided specific recommendations for changes to the proposed rule. The comments and responses were grouped into five categories: (1) general support of the proposed rule, (2) general opposition to the proposed rule, (3) reactivity manipulations, (4) simulator issues, including certification of simulation facilities, and (5) definitions and wording.

General Support of the Proposed Rule

Comment 1-1: The majority of commenters supported the proposed changes to 10 CFR Part 55, "Operator's licenses" to allow licensed operator candidate reactivity manipulations on a plant-referenced simulator as an alternative to use of the actual plant.

Response: No response necessary.

Comment 1-2: The Professional Reactor Operator Society (PROS) commented that the proposed rule would allow initial license candidates to perform required reactivity changes on a plant-referenced simulator is a welcome and acceptable change. PROS stated that the rule does not specify that license candidates cannot or should not perform manipulations on the actual plant. The amended rule will simply allow the requirement for performing five significant control manipulations that affect reactivity to be performed on either the actual plant or on the simulation facility.

Response: No response necessary.

Comment 1-3: One commenter stated that hands-on individual demonstrations of a reactivity manipulation on a simulator would seem to be a significant benefit of the rule change.

Response: The Commission agrees.

General Opposition to the Proposed Rule

Comment 2-1: One commenter stated that plant owners should not be able to shirk their responsibility for adequately training new operators. The commenter noted that there may be an enormous cost involved with the current rule and although it may be inconvenient, it does not justify diluting the licensing requirements to the point where a licensed operator does not even have to operate the real plant. The current cold license exceptions should not be used as justification because there are many extra controls and safeguards in place on a new startup. Another commenter stated that the industry needs clear guidelines, minimum deviations, and appropriate penalties for any noncompliance. The commenter also stated that safety dictates that initial license candidates are given the opportunity to move the plant without regard to real or perceived costs and that it has always been hard to put a dollar value on training until past mistakes are examined. The opportunity for actual reactivity manipulations reduces the stress-induced error rate, notably during transient conditions when clear decision-making counts.

Response: The Commission believes that the level of reactor safety established under the regulations is adequate and that the rule does not need to be strengthened. The Commission believes that the proposed changes are justified based not on an extension of the cold license exceptions (cold license examinations are those administered before the unit completes pre-operational testing and the initial start up test program) in the existing regulation, but rather on significant improvements in simulation technology, including increases in computing capability, model complexity, and fidelity. In addition, the NRC staff has conducted and observed operator licensing and requalification examinations on plant-referenced simulators for approximately 15 years and has found that scenarios are performed on simulators in a very realistic manner.

Further, this final rule does not change any of the training requirements of §50.120 or the specific licensed operator training and requalification requirements in §55.45(a) or §55.59. The candidates are still required to spend a substantial amount of time actually performing the duties of their particular positions in an on-the-job training environment. In response to the concern that

the industry needs clear guidelines, minimum deviations, and appropriate penalties for any noncompliance, the Commission believes that the final rule in conjunction with the regulatory guide endorsing the ANSI/ANS standard provides clear guidance to the industry. Penalties for noncompliance are addressed by the Commission's enforcement program.

Although the NRC's primary mission is to maintain adequate levels of reactor safety, it must also give due consideration to the principle of regulatory efficiency. Because the Commission has concluded that the proposed regulatory change will not affect the existing level of reactor safety, it would be inappropriate not to take advantage of this opportunity to adopt a regulatory alternative that will minimize the burden on facility licensees. The Commission concludes that there is no measurable net benefit in requiring facility licensees to have license candidates perform reactivity control manipulations on the plant for experience purposes when doing so can entail significant expense for the facility licensee and a measure of risk to plant operations and safety. Therefore, no changes are warranted in response to this comment.

Reactivity Manipulations

Comment 3-1: The Nuclear Energy Institute (NEI) and several additional commenters recommended changing proposed §55.45(b)(3)(i)(A), which requires that the simulator model replicate the plant "at the time of the applicant's operating test." The commenters recommended that the words "at the time of the applicant's operating test" be deleted because this could unnecessarily restrict the candidate's opportunities to conduct reactivity manipulations to a short time just before the operating test. The commenters also stated that this would be a problem if a refueling outage occurs near the time the applicant was scheduled for the operating test or if the date of the operating test changed.

Response: The Commission agrees with this comment as discussed above in the "Discussion" section under "Performance of Control Manipulations on the Plant-Referenced Simulator." This change has been incorporated in the final rule.

Comment 3-2: The NEI and several additional commenters recommended that because plant-referenced simulators are modeled to one plant, the reference plant, the regulatory text

should be clarified to indicate that the simulator modeling is for the referenced plant.

Response: The Commission agrees with NEI's recommendation that the regulatory text be clarified to indicate that the simulator core model will replicate the reference plant for the simulation facility. This change has been incorporated in the final rule.

Comment 3-3: The NEI and several additional commenters recommended that training objectives could be met if the models reasonably represent the reference plant at the time of the manipulations. Therefore, they recommend that §55.45(b)(3)(i)(A) be changed to read: "The plant-referenced simulator uses models relating to nuclear and thermal-hydraulic characteristics that *reasonably represent* the core load that exists in the nuclear power reference plant for the facility at which a license is being sought; and ..." Another commenter stated that "replicate" could be misleading in a more legal application. Another commenter stated that in discussing the requirements of the simulator that will be used for control manipulations, the terms "replicate," "represent," and "reasonably represent" are used interchangeably.

Response: The Commission does not agree with NEI's recommendation that the simulator core model "reasonably represent" rather than "replicate" the core load that exists in the reference plant. The Commission believes that the terminology in the proposed rule is appropriate and consistent with ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," the current industry consensus standard. 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. The commenter did not explain and the Commission does not understand why "replicate could be misleading in a more legal application." On the contrary, the NRC staff believes that using different terminology in the regulation than in the industry standard would be more confusing and misleading.

Comment 3-4: One commenter thought that the five reactivity manipulations should be "evaluated" manipulations. The commenter also stated that perhaps three of the five reactivity manipulations should be required to be evaluated by senior management.

Response: The Commission agrees with the commenter's suggestion that the five

reactivity manipulations should be "evaluated" manipulations and believes that this expectation is already addressed in the Commission's regulations and guidance documents. Section 55.4, "Definitions" describes the five elements of a systems approach to training, including the requirement to evaluate the trainees' mastery of the objectives during training, that apply to all licensed operator training programs. Section 4.6 of NUREG-1220, "Training Review Criteria and Procedures," that provides direction to NRC staff for reviewing training programs to verify compliance with the regulations, clarifies the Commission's expectations regarding the evaluation of tasks performed to ensure that the trainees master the actual job performance requirements. The Commission believes that requiring senior management to evaluate the reactivity manipulations would be overly prescriptive while adding little value. In practice, whenever license applicants are engaged in on-the-job training (OJT) in the actual control room, they have to be closely supervised and evaluated by the on-shift licensed operators. Generally, the more safety-significant activities, including reactivity and power changes, are more closely supervised and evaluated than others, regardless of whether they are performed in the actual control room or the simulator.

The Commission encourages communication and cooperation between plant operations and training management when making determinations regarding the license applicants' mastery of the training objectives and job requirements and, ultimately, their readiness for the licensing examination. Under §55.31(a)(4), an authorized representative of the facility licensee, usually the plant manager or higher, must certify on the license application that the applicant has successfully completed the facility licensee's requirements to be licensed as an operator or senior operator. Based on the foregoing, no changes are warranted in response to this comment.

Comment 3-5: One commenter indicated that it would appear that there are so many required reactivity manipulations for each operator that the time constraint alone would preclude all manipulations from being currently performed on the reactor. The commenter stated that the simulator must already be used extensively in meeting reactivity manipulations requirements.

Response: Although it is true that simulators are already being used extensively for operator training and to practice reactivity manipulations, the control manipulations that are

required by the regulations cannot be performed on the simulator, though, a few exceptions to this rule have recently been granted. These five required significant control manipulations, which affect reactivity or power level, must be performed by applicants, as trainees at the controls of the facility for which a license is sought. The Commission believes that the proposed changes to the regulation will promote the original intent of the control manipulation requirement.

Comment 3-6: One commenter stated that "as a minimum, one 10 percent power change should be mandatory prior to an unconditional license. If plant conditions warrant, a conditional license is issued. The condition is that an observed manipulation is performed. For those plants not in compliance with 100 percent of the fidelity issues as delineated by the guideline, the candidates must perform three 10 percent changes, that would include startups and responses to reactor trips." The commenter also stated that they believed strictly requiring compliance with fidelity issues will ensure the identified fidelity issues are addressed.

Response: The commenter appears to address two different issues: (1) the need for an explicit requirement that the control manipulations involve at least a 10 percent change and (2) where the simulator is not "100 percent" compliant with fidelity requirements, then three 10 percent changes must be accomplished by the operator applicant. However, no basis was provided for these two proposals. The Commission does not believe that either proposal is necessary. With regard to the first issue, neither the current nor the final rule address how much of a percentage power change is required for the control manipulations. The first proposal indicates that the commenter believes that the magnitude of a power level change must be at least 10 percent if it is to be a meaningful experience for an operator. The Commission believes that the magnitude of a power level change is a secondary issue. It is more important that a license candidate understand the operation of the systems involved and that the experience reinforce that knowledge and be conducted in an atmosphere as conducive to training as possible. A simulator setting in many ways is a more optimum setting for gaining this experience. To address the commenters apparent concern, it is more likely that larger magnitude changes can be performed on the simulator than on the plant. The final rule does not alter the requirement for every license applicant to complete the control manipulations on the facility for which a license is sought, it simply gives facility licensees the flexibility to conduct some or all of the required manipulations on a plant-referenced simulator, but only if the

simulator satisfies the NRC's core modeling and fidelity requirements. With regard to the second issue, the final rule does address the continued assurance of simulator fidelity issues in §55.46(d) and also requires simulator fidelity to be demonstrated so that significant control manipulations can be completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence.

Comment 3-7: One commenter thought that in the past the Commission has allowed utilities to deviate from the intent of the reactivity manipulation requirements. This allowed the utilities to use a wide range of interpretations for the required reactivity manipulations. The commenter also thought that deviations had become the norm rather than the rule. The commenter stated that wholesale deviations from this rule cannot be made.

Response: NRC expects that the rule is uniformly applied to all facility licensees. The Commission agrees that deviations cannot be made. Contrary to the commenters belief, the Commission does not allow anyone to deviate from the requirements without an exemption. Therefore, no changes are warranted in response to this comment.

Simulator Issues

Comment 4-1: A few commenters stated that an operator's license should not be issued based on only operating a simulator.

Response: The Commission acknowledges that operating a plant-referenced simulator is not identical to operating the actual plant despite all efforts to maximize realism and fidelity. However, today's plant-referenced simulators are of sufficient quality and fidelity that significant control manipulations can be completed without procedural exceptions, simulator performance exceptions, or deviation from the approved scenario sequence. The Commission does not believe that the rule will dilute the operators' licensing requirements. The rule will not change the requirement for every initial license applicant to complete five significant (power or reactivity) control manipulations, nor will it allow all of an applicant's training to be "simulated" because it does not change the requirement for every applicant to complete an on-the-job-training (OJT) program. OJT programs include hands-on experience in shift operations under the direct

supervision of a licensed operator. Therefore, no changes are warranted in response to this comment.

Comment 4-2: One commenter stated that the difference between operating a real plant and a simulator is "stress" and further noted that the Commission did not mention the difference in operator stress while operating the real plant versus a simulator. Another commenter stated that the fidelity of the simulator is not proportional to the induced stressed from real plant operations.

Response: The level of stress experienced by licensed operators while performing the required significant control manipulations and other routine, controlled, and supervised evolutions are, in the Commission's opinion, insignificant when compared with the level of stress that they experience while responding to major plant transients (real or simulated as part of an examination scenario) that require the implementation of emergency operating procedures and response plans. Consequently, the Commission believes that there is little value in trying to distinguish between the levels of stress associated with routine control manipulations performed on a plant-referenced simulator and the actual plant. While undergoing OJT, the license applicants will still be given many opportunities to operate the real plant and experience "the stress of knowing that the impact of a mistake may be much more dramatic than a call to 'reset the simulator.'" The NRC staff has conducted and observed operator licensing and requalification examinations on plant-referenced simulators for approximately 15 years and has detected no discernable difference in the operators' and applicants' demeanor while performing control manipulations in simulators versus actual control rooms.

Comment 4-3: One commenter stated that the Commission should give very high priority to comments submitted by qualified operators and further stated that "if qualified operators do not believe that plant-referenced simulators are an adequate replication for this purpose, or indicate that this proposal is a step toward degrading operator training, or judge that safety in reactor operation is compromised, then the rule should not go forward without modifications that can gain the operators' support."

Response: The Commission agrees completely and has given high priority and serious consideration to comments submitted by qualified operators and to any concerns they have about this amendment. Only one formerly licensed senior operator and one instructor of licensed operators submitted comments in general opposition to the rule. PROS, who submitted comments on behalf of its members, portrayed the change to the rule as welcome and acceptable.

Comment 4-4: One commenter thought that with more reliance being placed on the plant-referenced simulator for operator qualification, it would seem logical that greater attention is paid to ensure that the simulator is the best possible replication of the plant. If removal of current requirements for certification of simulation facilities and routine submittal of simulator performance test reports to the Commission is not consistent with greater attention, then the proposal seems self-contradictory.

Response: The Commission agrees that, when a plant-referenced simulator is used for operator qualification, there must be assurance that the simulator is the best possible replication of the plant. The fact that this rule removes the current regulatory requirements for facility licensees to certify their simulator facilities and submit periodic performance test results to the Commission does not mean that the Commission is reducing the technical requirements for simulator fidelity. When simulators are used to provide control manipulation experience, the final rule requires the simulator to utilize 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. It also requires simulator fidelity to be demonstrated so that significant control manipulations can be completed without procedure exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence. These requirements should ensure that experience gained on the simulator essentially replicates that obtained from actual control manipulations on the plant. The final rule simply changes the nature of the reporting requirements for the performance test reports but does not eliminate the requirement for performance testing. No changes are warranted in response to this comment.

Comment 4-5: One commenter noted that there are licensed operators and senior licensed operators who have never seen or responded to an actual reactor trip. They should not experience an actual trip for the first time during real plant operations. The stress-induced error rate would be unacceptable.

Response: The Commission acknowledges that there may be licensed operators and senior operators who have never seen or responded to an actual reactor trip because many plants are experiencing record runs with unplanned reactor trip rates far below the levels seen several years ago. This simply highlights the importance of having high-quality, high-fidelity, plant-referenced simulators that enable operators to practice normal, abnormal, and emergency evolutions (most of which would never be possible to perform on the plant) without procedural or simulator performance exceptions. Although there is no regulatory requirement to do so, the Commission believes that facility licensees assign most new and inexperienced operators to crews containing other operators having greater levels of experience. Moreover, the Commission has encouraged teamwork between control room operators and, therefore, in 1987, significantly revised its requalification examination process to focus primarily on the crews' ability to successfully accomplish those activities deemed critical to safe plant operation.

Definitions and Other Rule Wording

Comment 5-1: The Standards Committee WG ANS-3.5 stated that the ANSI/ANS-3.5-1998 Standard defines performance testing as, "testing characterized by a comparison of the results of integrated operation of the simulation facility to actual or predicted reference plant data. Performance testing encompasses testing other than software development testing." Also Section 4.4.3 states, "Simulator performance testing comprises operability and scenario-based testing." In §55.4, "Definitions," the proposed rule would define performance testing as follows: "Performance testing means validation, scenario-based, or operability testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance." The Standards Committee WG ANS-3.5 recommends that the proposed definition be changed to read as follows: "Performance testing means scenario-based and operability testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance."

Response: The Commission agrees that the proposed wording of the definition of "performance testing" (i.e., "validation, scenario-based, or operability testing") may have caused some confusion. Further, the Commission has reconsidered the inclusion of the phrase ". . . scenario-based, or operability . . ." because it could be interpreted as limiting a facility licensee to the use of the ANSI/ANS-3.5-1998 standard. Therefore, the Commission has retained the original definition of performance testing in the final rule as "*Performance testing* means testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance."

Comment 5-2: One commenter stated that the terms "plant facility," "plant," and "nuclear power unit" are used interchangeably when discussing the requirement for control manipulations. For a multi-unit facility, the three phrases can have distinctly different meanings and ramifications on the actual number of manipulations that would be required. The use of "nuclear power unit" could be slightly different on each unit at the time of an operator license application due to staggered outages and design upgrade implementation schedules. The use of "plant" could be interpreted as one of the units of a multi-unit facility or as a "facility." A more appropriate term would be "reference unit."

Response: The Commission acknowledges the commenter's observation that the terms "plant facility," "plant," and "nuclear power unit" were used interchangeably when discussing the requirement for control manipulations. The Commission does not require that a plant-referenced simulator reflect multiple unit configurations or that the control manipulations would have to be completed on each configuration separately. The term "reference plant" is defined in §55.4 as "the specific nuclear power plant from which a simulation facility's control room configuration, system control arrangement, and design data are derived." This definition remains the same in the final rule and continues to clarify that for a simulation facility, a specific plant (unit) at a multi-plant (unit) site is the "reference plant." The Commission realizes that the use of inconsistent terminology can be confusing and has made clarifications where appropriate in preparing the final rule. However, the Commission intends to re-evaluate the use of the term "reference plant" in the future.

Comment 5-3: One commenter stated that in discussing the testing that would be required by the Commission to take credit for a manipulation performed as a plant-reference simulator in the Statements of Consideration, the scope of testing is described as (1) to encompass verification, validation, and documentation and (2) developmental and verification testing. On the other hand, the proposed wording in §55.45(b)(3)(i)(B) of the proposed rulemaking (65 FR 41021) describes the specific performance testing requirements as follows: "Simulator fidelity has been demonstrated so that significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviation from approved training scenarios sequence." It is important to note that certain words with specific definitions in ANSI/ANS-3.5-1998 (i.e., verification and validation) are not used in the rule itself. The commenter recommends that the Statements of Consideration use the same language as the rule itself.

Response: The Commission acknowledges the commenter's observation that certain words with specific definitions in ANSI/ANS-3.5-1998 (i.e., verification and validation) were not used in the proposed rule and the recommendation that the Statements of Consideration use the same language as the rule itself. The intent of §55.45(b)(3)(i)(B) of the proposed rule was not to establish specific performance testing requirements but to ensure that the significant control manipulations that are performed on the simulator are completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence. It is important to remember that while the Commission has endorsed ANSI/ANS-3.5-1998, it is not requiring facility licensees to upgrade their commitments and requirements with respect to simulator testing. Therefore, no changes are warranted in response to this comment.

Comment 5-4: One commenter noted that §55.45(b)(3)(i)(A) states in part that "the plant-referenced simulator uses models related to nuclear and thermal-hydraulic characteristics that replicate the core load that exist in the nuclear power unit." Engineering and real-time numerical models contain approximations. Generally, neither reproduces physical processes exactly. Therefore, guidance identifying the level of modeling detail required and a definition for the term "replicate" need to be developed. The level of modeling detail required has to coincide with actual plant's response as seen by the operators. Paragraphs 4.1.3.1.3 and 4.1.3.1.4 of the 1998 ANSI/ANS-3.5 Standard do not provide any assistance. Additionally, no guidance is

provided on rod worth, notch worth, SRM-IRM range performance, axial power distribution, radial power distribution, stored energy, fuel time constant, core coupling, etc., that are the actual plant responses that the operator sees. Also, older, coarser mesh models are less refined than the more recent wheel-up engineering look-alike models. Therefore, the commenter believes that guidance as to what level of modeling detail is acceptable to the Commission needs to be developed.

Response: When the Commission developed the proposed rule, it purposely excluded prescriptive guidance on the level of modeling detail for a plant-referenced simulator because the NRC staff believes that section 4.1, "Simulator Capabilities Criteria" of ANSI/ANS-3.5-1998, the latest industry consensus standard, provides adequate guidance in that area. The NRC staff believes that the concerns regarding paragraphs 4.1.3.1.3 and 4.1.3.1.4 of the standard and the specific parameters identified in the comment are unrelated to the proposed rule. Technical issues such as these should be brought to the attention of the Standards Committee WG ANS-3.5 for resolution. Therefore, no changes are warranted in response to this comment.

Comment 5-5: One commenter stated that clear guidance should be provided for multi-unit sites training on one simulator. In addition, the commenter stated that provisions have to be made that allow for training on a simulator that may not exactly replicate the reactor core in each reactor unit.

Response: The Commission acknowledges the commenter's concerns regarding training at multi-unit sites and has clarified the final rule language to indicate that the simulator core model will replicate the *reference* plant for the facility. The NRC does not expect that a plant-referenced simulator would reflect multiple unit configurations or that the control manipulations would have to be completed on each configuration separately. If a facility licensee wishes to use a simulation facility to simulate more than one nuclear power plant, it must be able to demonstrate to the NRC that the differences between the plants are not so significant that they have an impact on the ability of the simulation facility to meet the requirements and guidance of ANSI/ANS-3.5. Therefore, no additional changes are warranted in response to this comment.

Comment 5-6: One commenter noted that under the "Discussion of Proposed Rule Change," the statement is made that "absent certification, assurance of simulator suitability would be provided through Commission reviews and validation of operating test scenarios, with review of performance test results, and uncorrected modeling or hardware discrepancies, if needed." Objective guidance should be developed for Commission's review of "uncorrected modeling or hardware discrepancies" because such a review could render the simulator unsuitable for examination.

Response: As discussed in the proposed regulatory analysis attached to SECY-00-0083, the Commission is planning to revise and develop additional implementation guidance for use by the NRC staff in evaluating whether a plant-referenced simulator is suitable for use in conducting the required control manipulations and operating examinations. This effort is expected to include revisions of the appropriate sections of NUREG-1021, Revision 8, "Operator Licensing Examination Standards for Power Reactors," and the Licensed Operator Requalification Inspection Procedure (IP-71111.11) of the reactor oversight process.

Comment 5-7: One commenter notes that, as stated in SECY-00-0083, dated April 12, 2000, the current revision of the national standard, ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," employs a scenario-based testing and quality control philosophy that is inconsistent with the testing assumptions and requirements of the rule. With the elimination of the certification process and NRC Form 474, the commenter did not understand where the linkage between the proposed regulatory change, Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," and the ANSI/ANS-3.5-1998 Standard is maintained.

Response: The Commission believes that the rule will facilitate the voluntary implementation of ANSI/ANS-3.5-1998 because it deletes the prescriptive requirements for simulator test performance and scheduling that were implemented in connection with the industry standard that was in effect at the time of the 1987 rule change. If those requirements had not been deleted, facility licensees would have had little incentive to revise their programs to be compatible with the current industry standard. As with most other NRC regulations, the linkage between 10 CFR Part 55 and ANSI/ANS-3.5, the industry consensus standard for

nuclear power plant simulation facilities, is established by the associated regulatory guide, in this case RG 1.149. Eliminating NRC Form 474 does not affect that linkage.

Section-by-Section Summary of Final Amendments

Part 55 - Operator's Licenses, Table of contents

In 10 CFR Part 55, "Operators's Licenses," the Table of Contents regarding Subpart E- Written Examinations and Operating Tests, is amended by reference to new §55.46.

Section 55.4 Definitions.

The term "plant-referenced simulator" is revised to remove the provision that "a plant-referenced simulator demonstrates expected plant response to operator input, and to normal, transient, and accident conditions to which the simulator has been designed to respond" from the definition and move it to new §55.46(c)(1).

The term "simulation facility" is revised to include part-task and limited-scope simulator devices so that such devices can be used if a request were received and approved by the Commission for their use. The definition of "simulation facility" is also revised to relocate the "the plant" as a potential "simulation facility" to new §55.46 (b).

Section 55.8 Information collection requirements: OMB approval.

NRC Form 474, "Simulation Facility Certification" no longer needs to be filed. Accordingly §55.8(c)(3) is deleted.

Section 55.31 How to Apply.

Section 55.31(a)(5) is revised to allow that the required five significant control manipulations that affect reactivity or power level to be performed either on a plant-referenced simulator or on the plant itself, at the facility licensee's discretion.

By providing an option for facility licensees to use plant-referenced simulators for control manipulations, the final rule makes unnecessary the need for current provisions in §55.31(a)(5) addressing the use of simulators for performance of control manipulations for facilities that have not yet completed pre-operational testing and initial startup test programs and provisions addressing plants in extended shutdowns. Thus those provisions are removed.

Section 55.45 Operating Tests (b) Implementation -- Administration.

Former §§55.45(b)(4) and (5) dealing with simulators have been separated from the requirements for operating tests in §55.45 and consolidated in a new §55.46, "Simulation Facilities."

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 §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, the Commission will continue to require additional information to determine the acceptability of the simulator and thus, will require an application for Commission approval.

Section 55.46 Simulation Facilities.

The final rule implements administrative changes to former §55.45(b) to move the requirements to a new Section 55.46, "Simulation Facilities." The new section has one general and three implementation criteria as discussed below.

(a) General.

Section 55.46(a) explains that the purpose of this section is to set forth the requirements for the use of a simulation facility for the administration of the operating licensing operator test, and for the use of a plant-referenced simulator for fulfilling a portion of the experience requirements for applicants for operator and senior licenses.

(b) Commission-approved simulation facilities and Commission approval of use of the plant in the administration of the operating test.

Section 55.46(b)(1) provides that facility licensees who propose to use a simulation facility, other than a plant-referenced simulator, or the plant in the administration of the operating test under §55.45(b)(1) or §55.45(b)(3) shall request approval of the simulation facility from the Commission and that this request must include certain criteria as described below.

Section 55.46(b)(1)(i) provides that the request for approval of the simulation facility, other than solely a plant-referenced simulator, must describe the components of the simulation facility or the plant intended to be used for each part of the operating test, unless previously approved. Section 55.46(b)(1)(ii) provides that the request for approval of the simulation facility, other than solely a plant-referenced simulator, must describe the performance tests and the results of the tests. Section 55.46(b)(1)(iii) provides that the request for approval of the simulation facility, other than solely a plant-referenced simulator, must describe the procedures for maintaining examination and test integrity consistent with the requirements of §55.49. Section 55.46(b)(2) provides that the Commission will approve a simulation facility or use of the plant for administration of operating tests if it finds that the simulation facility or the plant and their proposed use are suitable for the conduct of operating tests for the facility licensee's reference plant under §55.45(a).

(c) Plant-referenced simulators.

Section 55.46(c) requires that a plant-referenced simulator used for the administration of the operator licensing operator test or to meet the experience requirements of §55.31(a)(5) to demonstrate expected plant response to operator input and to normal, transient, and accident conditions to which the simulator has been designed to respond. Sections 55.46(c)(1)(i) and (ii) are revised to include the provision that a 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 §§55.45(a)(1) through (13) and §§55.59(c)(3)(i)(A) through (AA), as applicable to the design of the reference plant; and, (2) allow for the completion of control manipulations for licensed operator applicant eligibility consistent with §55.46(c)(2).

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. 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. It is the Commission's intent that the phrase "most recent" means the current core or if the plant is in a refueling outage, "most recent" means the core just previous to the outage.

(d) Continued assurance of simulator fidelity.

Section 55.46(d) requires that facility licensees which maintain a simulation facility shall: (1) conduct performance testing throughout the life of the simulation facility in a manner sufficient to ensure that the criteria of §55.46(c)(1)(ii), as applicable, and §55.46(d)(3) are met, and retain the test results for four years after the completion of each performance test or until superseded by updated test results; (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 that may exist at the time of the operating test or requalification program inspection available for NRC review, prior to or concurrent with

preparations for each operating test or requalification program inspection; and, (4) maintain the provisions for license application, examination, and test integrity consistent with §55.49.

Section 55.59, Requalification.

As a result of the changes to §55.45(b) that eliminate the simulator certification requirement, a conforming change to §55.59(c)(4)(iv) deletes the terms "certified" when referring to a simulation facility in this section.

Electronic Reporting

The Commission is currently in the process of implementing an electronic document management and reporting program, known as the Agency Wide Documents Access and Management System (ADAMS) that will provide for electronic access of many types of reports. Accordingly, there is no separate rulemaking effort to provide for electronic access or submittal of reports.

State Input

Many States (Agreement States and Non-Agreement States) have agreements with power reactors to inform the States of plant issues. State reporting requirements are frequently triggered by Commission reporting requirements. Accordingly, the Commission sought State comment on issues related to the proposed amendment by letters to State Liaison Officers as well as by a specific request in the proposed rule. No comments on the proposed rule were received from any State agency.

Voluntary Consensus Standards

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards developed or adopted by voluntary consensus standards bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. This final rule sets forth requirements with respect to training of

operators, and removing current certification requirements for simulators, which are not addressed in any industry consensus standards. With respect to certification of a simulator, the Commission has determined that the industry consensus standard in this area, American National Standards Institute/American Nuclear Society (ANSI/ANS) 3.5, "Nuclear Power Plant Simulators for Use in Operator Training and Examination" is prescriptive rather than performance-based and is more appropriate for endorsement as one acceptable means for complying with requirements of the final rule. Accordingly, Regulatory Guide 1.149, Revision 3, as an acceptable method by which facility licensees might implement specific parts of this rule and endorses the ANSI/ANS-3.5-1998.

Finding of No Significant Environmental Impact and Categorical Exclusion

The Commission has determined under the National Environmental Policy Act (NEPA) of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51 that this rule falls within the categorical exclusions of sections 51.22(c)(1), (2), and (3)(i) and (iii). Therefore, neither an environmental impact statement nor an environmental assessment is required.

Paperwork Reduction Act Statement

This final rule eliminates all the information collection requirements for Office of Management and Budget approval number 3150-0138. Because the rule will eliminate information collection requirements, the public burden for these information collections is expected to be decreased by 120 hours per response. This reduction includes the time required for reviewing instructions, searching existing data sources, gathering and maintaining the data needed and completing and reviewing the information collection. Send comments on any aspect of these information collections, including suggestions for further reducing the burden, to the Records Management Branch (T-6E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet electronic mail at BJs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0138), Office of Management and Budget, Washington, DC 20503.

Public Protection Notification

If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

Regulatory Analysis

The Commission prepared a draft regulatory analysis for the proposed rule to examine the costs and benefits of the alternatives considered by the Commission. Public comments on this analysis were requested in connection with the proposed rule. No significant comments were received. Minor changes have been made to the draft regulatory analysis to prorate the cost and benefit of the final rule over the average remaining years of operating life of the facility. The final regulatory analysis is available for inspection in the Commission Public Document Room or it may be viewed and downloaded electronically via the interactive rulemaking web site established by NRC for this rulemaking, as discussed above under the heading ADDRESSES. Single copies may be obtained from the contact listed above under the heading, "For Further Information Contact."

Regulatory Flexibility Act Certification

In accordance with the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Commission certifies that this rule does not have a significant economic impact on a substantial number of small entities. This final rule affects only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act or the size standards established by the Commission (10 CFR 2.810).

Backfit Analysis

The Commission has determined that the backfit rule, 10 CFR 50.109, does not apply to this final rule because it does not impose new requirements as defined in 10 CFR 50.109(a)(1). The final rule changes constitute either permissible relaxations from current requirements or provide an alternative regulatory approach without changing substantive existing requirements. Therefore, a backfit analysis has not been prepared. Facility licensees would not be required by this final rule to change existing programs. The final rule permits the five significant control manipulations to be conducted at either the actual facility or a plant-referenced simulator. The final rule clarifies criteria on simulator fidelity assurance. The final rule also eliminates certification of simulation facilities and submittal of quadrennial test reports and schedule information.

The final rule entails costs on the part of both the NRC and the industry for one-time revision of existing programs. However, the regulatory analysis suggests that industry could recover these costs and the final rule would be an overall burden reduction.

As discussed below, the Commission has prepared a regulatory analysis for the proposed rule that examines the costs and benefits of the proposed requirements in this rule. The Commission regards the regulatory analysis as a disciplined process for assessing information collection and reporting requirements to determine that the burden imposed is justified in light of the potential safety significance of the information to be collected.

Small Business Regulatory Enforcement Fairness Act

In accordance with the Small Business Regulatory Enforcement Fairness Act of 1996, the Commission has determined that this action will have no adverse impact on small businesses and has verified this determination with the Office of Information and Regulatory Affairs of OMB.

List of Subjects in 10 CFR Part 55

Criminal penalties, manpower training programs, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553; the NRC is adopting the following amendments to 10 CFR Part 55.

PART 55—OPERATORS’ LICENSES

1. The authority citation for Part 55 continues to read as follows:

Authority: Secs. 107, 161, 182, 68 Stat. 939, 948, 953, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2137, 2201, 2232, 2282); secs. 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5841, 5842).

Sections 55.41, 55.43, 55.45, and 55.59 also issued under, Pub. L. 97 - 425, 96 Stat. 2262 (42 U.S.C. 10226). Section 55.61 also issued under secs. 186, 187, 68 Stat. 955 (42 U.S.C. 2236, 2237).

2. In §55.4, Definitions, the terms "Plant-referenced simulator," and "Simulation facility" are revised to read as follows:

§55.4 Definitions.

* * * * *

Plant-referenced simulator means a simulator modeling the systems of the reference plant with which the operator interfaces in the control room, including operating consoles, and which permits use of the reference plant's procedures.

* * * * *

Simulation facility means one or more of the following components, alone or in combination: used for either the partial conduct of operating tests for operators, senior operators, and license applicants, or to establish on-the-job training and experience prerequisites for operator license eligibility:

- (1) A plant-referenced simulator;
- (2) A Commission-approved simulator under §55.46(b); or
- (3) Another simulation device, including part-task and limited scope simulation devices, approved under §55.46(b).

* * * * *

3. In §55.8, paragraphs (c)(3) and (4) are deleted and (b) is revised to read as follows:

§ 55.8 Information collection requirements: OMB approval.

* * * * *

(b) The approved information collection requirements contained in this part appear in §§55.11, 55.25, 55.27, 55.31, 55.40, 55.41, 55.43, 55.45, 55.46, 55.47, 55.53, 55.57, and 55.59.

4. In §55.31, paragraph(a)(5) is revised to read as follows:

§55.31 How to apply

(a) * * *

(5) Provide evidence that the applicant, as a trainee, has successfully manipulated the controls of either the facility for which a license is sought or a plant-referenced simulator that meets the requirements of §55.46(c). At a minimum, five significant control manipulations must be performed that affect reactivity or power level. Control manipulations performed on the plant-referenced simulator may be chosen from a representative sampling of the control

manipulations and plant evolutions described in §55.59(c)(3)(i)(A-F), (R), (T), (W), and (X) of this part, as applicable to the design of the plant for which the license application is submitted. For licensed operators applying for a senior operator license, certification that the operator has successfully operated the controls of the facility as a licensed operator shall be accepted; and

* * * * *

5. In §55.45, paragraph (b) is revised to read as follows.

§55.45 Operating tests.

* * * * *

(b) *Implementation -- Administration.* The operating test will be administered in a plant walkthrough and in either —

- (1) A simulation facility that the Commission has approved for use after application has been made by the facility licensee under §55.46(b);
- (2) A plant-referenced simulator (§55.46(c)); or
- (3) The plant, if approved for use in the administration of the operating test by the Commission under §55.46(b).

6. Section 55.46 is added to read as follows:

§55.46 Simulation facilities.

(a) General. This section addresses the use of a simulation facility for the administration of the operating test and plant-referenced simulators to meet experience requirements for applicants for operator and senior operator licenses.

(b) *Commission-approved simulation facilities and Commission approval of use of the plant in the administration of the operating test*

(1) Facility licensees that propose to use a simulation facility, other than a plant-referenced simulator, or the plant in the administration of the operating test under §§55.45(b)(1) or 55.45(b)(3), shall request approval from the Commission. This request must include:

(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 §55.49.

(2) 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 §55.45(a).

(c) *Plant-referenced simulators.*

(1) A plant-referenced simulator used for the administration of the operating test or to meet experience requirements in §55.31(a)(5) must demonstrate expected plant response to operator input and to normal, transient, and accident conditions to which the simulator has been designed to respond. The plant-referenced simulator must be designed and implemented so that it:

(i) Is sufficient in scope and fidelity to allow conduct of the evolutions listed in §§55.45(a)(1) through (13), and 55.59(c)(3)(i)(A) through (AA), as applicable to the design of the reference plant.

(ii) Allows for the completion of control manipulations for operator license applicants.

(2) Facility licensees that propose to use a plant-referenced simulator to meet the control manipulation requirements in §55.31(a)(5) must ensure that:

(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

(ii) 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.

(3) A simulation facility consisting solely of a plant-referenced simulator must meet the requirements of paragraph (c)(1) of this section and the criteria in paragraphs (d)(1) and (4) of this section for the Commission to accept the plant-referenced simulator for conducting operating tests as described in §55.45(a) of this part, requalification training as described in §55.59(c)(3) of this part, or for performing control manipulations that affect reactivity to establish eligibility for an operator's license as described in §55.31(a)(5).

(d) *Continued assurance of simulator fidelity.* Facility licensees that maintain a simulation facility shall:

(1) Conduct performance testing throughout the life of the simulation facility in a manner sufficient to ensure that paragraphs (c)(2)(ii), as applicable, and (d)(3) of this section are met. The results of performance tests must be retained for four years after the completion of each performance test or until superseded by updated test results;

(2) Correct modeling and hardware discrepancies and discrepancies identified from scenario validation and from performance testing;

(3) Make results of any uncorrected performance test failures that may exist at the time of the operating test or requalification program inspection available for NRC review, prior to or concurrent with preparations for each operating test or requalification program inspection; and

(4) Maintain the provisions for license application, examination, and test integrity consistent with §55.49.

7. In §55.59, paragraph (c)(4)(iv) is revised to read as follows:

§55.59 Requalification.

* * * * *

(c) * * *

(4) * * *

(iv) Simulation of emergency or abnormal conditions that may be accomplished by using the control panel of the facility involved or by using a simulator. When the control panel of the facility is used for simulation, the actions taken or to be taken for the emergency or abnormal condition shall be discussed; actual manipulation of the plant controls is not required. If a simulator is used in meeting the requirements of paragraph (c)(4)(iii) of this section, it must accurately reproduce the operating characteristics of the facility involved and the arrangement of the instrumentation

and controls of the simulator must closely parallel that of the facility involved. After the provisions of §55.46 have been implemented at a facility, the Commission approved or plant-referenced simulator must be used to comply with this paragraph.

* * * * *

Dated at Rockville, Maryland, this day of , 2001.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.



REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

PREPUBLICATION

REGULATORY GUIDE 1.149

(Draft was issued as DG-1080)

NUCLEAR POWER PLANT SIMULATION FACILITIES FOR USE IN OPERATOR TRAINING AND LICENSE EXAMINATIONS

A. INTRODUCTION

This regulatory guide describes methods acceptable to the NRC staff 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.

In 10 CFR Part 55, "Operators' Licenses," Paragraphs 55.45(a) and 55.45(b) require that an applicant for an operator or senior operator license demonstrate both an understanding of and the ability to perform certain essential job tasks. The operating test will be administered in a plant walk-through and on a simulation facility or on the actual plant if approved by the Commission.

A simulation facility as defined in 10 CFR 55.4 means one or more of the following components, alone or in combination, used for the partial conduct of operating tests for operators, senior operators, and license

Regulatory guides are issued to describe and make available to the public such information as methods acceptable to the NRC staff for implementing specific parts of the NRC's regulations, techniques used by the staff in evaluating specific problems or postulated accidents, and data needed by the NRC staff in its review of applications for permits and licenses. Regulatory guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions different from those set out in the guides will be acceptable if they provide a basis for the findings requisite to the issuance or continuance of a permit or license by the Commission.

This guide was issued after consideration of comments received from the public. Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. Written comments may be submitted to the Rules and Directives Branch, ADM, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

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applicants or to establish on-the-job training experience prerequisites for operator license eligibility: (1) a plant-referenced simulator, (2) a Commission-approved simulator in accordance with 10 CFR 55.46(b), or (3) another simulation device, including part-task and limited scope simulation devices approved under 10 CFR 55.46(b).

The requirements for the use of a simulation facility for the administration of the operator licensing operating test are in 10 CFR 55.46, as are the requirements for the use of a plant-referenced simulator for fulfilling a portion of the experience requirements for applicants for operator and senior operator licenses. The requirements for the licensed operator requalification programs, including evaluation, are in 10 CFR 55.59(c)(3) and (4).

The information collections contained in this regulatory guide are covered by the requirements of 10 CFR Part 55, which were approved by the Office of Management and Budget (OMB), approval number 3150-0018. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to the information collection.

B. DISCUSSION

THE ROLE OF SIMULATORS IN OPERATOR LICENSING

Facility licensees are responsible for ensuring that individuals who receive operator or senior operator licenses possess the knowledge, skills, and abilities necessary to operate the facility in a safe manner. In 10 CFR Part 55, Section 55.45, "Operating Tests," requires the applicant for a license to demonstrate (1) an understanding of and the ability to perform the actions necessary during normal, abnormal, and emergency situations; (2) the operation of systems that affect heat removal or reactivity changes; and (3) behaviors that show the individual's ability to function within the control room team in such a way that the facility licensee's procedures are adhered to and that the limitations in its license and amendments are not violated.

The use of a plant-referenced simulator for testing enables the examiner to evaluate a license applicant's performance in a manner that replicates conditions in the plant for which that applicant has applied for a license. When applicants are tested on plant-referenced simulators, major facility differences are minimized between testing and operating environments, and examiners are able to make pass-fail judgments with confidence.

REGULATORY BACKGROUND

In 1981, the industry developed ANSI/ANS-3.5-1981, "Nuclear Power Plant Simulators for Use in Operator Training." ANSI/ANS-3.5 has been revised three times: in 1985, 1993, and 1998.

Regulatory Guide 1.149 has been revised to endorse successive versions of ANSI/ANS-3.5. Exceptions to previous standards in the area of performance testing were specified in the initial issuance through Revision 2 in 1996 of Regulatory Guide 1.149 to ensure that application of previous standards would support the requirements of the regulations and be responsive to the NRC's concern that simulator fidelity must be ensured on a continuing basis.

SIMULATOR PERFORMANCE TESTING

The 1981 version of the standard specified a testing regimen that was written in the context of initial simulator procurement. Until the 1998 revision, the primary focus of the standard was the initial design and construction of the simulator, a unique condition in which extensive factory acceptance testing is performed on the basis of individual simulator capabilities before establishing a software configuration baseline. Except for infrequent simulator replacements and modifications, facility licensees' simulators are now in an update and maintenance phase of the simulator life cycle (an area for which previous revisions of the standard were not intended and for which the standard has offered little specific guidance); these simulators therefore do not need to repeat exhaustive full-scope testing. The type of testing described in previous revisions of the standard provides basic assurance that no noticeable differences exist between the simulator control room and simulated systems, when evaluated against the control room and systems of the referenced unit.

The performance testing formerly specified in 10 CFR 55.45 was suited for a capabilities and schedule-based performance testing program. This requirement is difficult to apply to the process of structured software development coupled with the scenario-based testing that is now fully adopted by the 1998 revision of the standard. The software development and performance testing requirements of ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination,"¹ although neither prescriptive nor as extensive as those of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, bring the simulation facility into closer conformance with current industry norms and practices for software quality assurance and training program administration than did the 1985 and 1993 revisions of the standard. The NRC staff considers this improved software development and testing philosophy to be consistent with the NRC's intent that the simulation facility's ability to faithfully portray malfunctions and its general operability are to be verified by periodic performance testing.

In the staff's view, verification and validation testing in the software development process, coupled with scenario-based testing in the training and examination preparation processes, provides additional assurance of acceptable simulator performance over that provided by previous simulator capabilities-based, stand-alone testing programs.

¹ Copies of this standard may be obtained from the American Nuclear Society, 555 N. Kensington Avenue, La Grange Park, IL 60525.

C. REGULATORY POSITION

1. ENDORSEMENT OF ANSI/ANS-3.5-1998

ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," sets forth provisions acceptable to the NRC staff 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, "Operators' Licenses," for use in reactor operator and senior operator training and NRC license examinations. The following clarifications are applicable to the endorsement of ANSI/ANS-3.5-1998:

1.1 Licensees using a plant-referenced simulator in the conduct of operator licensing examinations after the date of this regulatory guide should meet the applicable requirements of ANSI/ANS-3.5-1998.

1.2 Unless otherwise specifically endorsed by the NRC, other documents referenced in Section 1.2, "Background," of ANSI/ANS-3.5-1998 are not endorsed in this regulatory guide.

1.3 Section 4.4.3, "Simulator Performance Testing," of ANSI/ANS-3.5-1998 requires that a record of the performance test results be maintained, including data comparisons. Section 4.4.3 has a footnote reference to Appendix A, "Guideline for Documentation of Simulator Design and Test Performance," of ANSI/ANS-3.5-1998. Appendix A provides examples that are applicable only to Section 4.4.3.1, "Simulator Operability Testing."

1.4 In regard to Section 4.4.3.2, "Scenario-Based Testing," documentation and performance test results should be consistent with facility licensees' defined objectives of the accredited training program or approved operator licensing operating tests.

1.5 The standard's quality assurance methodology (i.e., verification and validation during software development in a controlled configuration environment with ongoing scenario-based and recurring operability testing) is not expected to be included in the facility's Quality Assurance Program as described in Appendix B to 10 CFR Part 50. Appendix B does not apply to simulation facilities; it applies to nuclear power plants and fuel reprocessing plants, including their structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. Appendix B establishes quality assurance requirements for the design, construction, and operation of those structures, systems, and components.

1.6 Editions of ANSI/ANS-3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations.

2. USE OF A SIMULATOR FOR MULTIPLE PLANTS

If a licensee wishes to use a simulation facility to train or examine operators for more than one nuclear power plant, it must be able to demonstrate to the NRC that the differences between the plants are not so significant that they will result in negative training. This demonstration should include an analysis and summary of the differences between each plant, including:

1. Facility design and systems relevant to control room personnel,
2. Technical specifications,
3. Procedures, primarily abnormal and emergency operating procedures,
4. Control room design and instrument/control location, and
5. Operational characteristics.

3. ACCEPTABILITY OF LICENSEE'S SIMULATION FACILITY

Licensees who maintain simulation facilities certified under editions of ANSI/ANS-3.5 that were previously endorsed by the NRC may, but are not required to, revise their software and testing documentation so that the simulation facility will be maintained in accordance with ANSI/ANS-3.5-1998. The NRC expects that a simulation facility will be maintained in accordance with a single revision of the standard.

4. SCHEDULING OF PERFORMANCE TESTING

The scheduling and evaluation of simulation facility testing under ANSI/ANS-3.5-1998 are set forth in Section 4.4.3. of the standard and are considered a function of the facility licensee's accredited training program.

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants and licensees about the NRC staff's plans for using this regulatory guide.

Except in those cases in which an applicant or facility licensee proposes an acceptable alternative method for complying with the specified portions of the NRC's regulations, the methods described in this guide will be used in the evaluation of the implementation of a facility licensee's simulation facility.

REGULATORY ANALYSIS

A separate Regulatory Analysis has not been prepared for this regulatory guide. A Regulatory Analysis was prepared for the recent amendments to 10 CFR Part 55; this Regulatory Analysis applies to Revision 3 of Regulatory Guide 1.149. A copy of the Regulatory Analysis is available for inspection and copying for a fee at the NRC Public Document Room at 11555 Rockville Pike, Rockville, MD; the PDR's mailing address is USNRC PDR, Washington, DC 20555; telephone (301)415-4737 or toll-free 1-800-397-4209, fax (301)4153548; email PDR@NRC.GOV. Electronic copies of the Regulatory Analysis are available in NRC's Public Electronic Reading Room, which can be accessed through the NRC's web site, <WWW.NRC.GOV> .

**NRC Staff Responses to Public Comments Regarding
Draft Regulatory Guide DG-1080,
“Nuclear Power Plant Simulation Facilities for Use in
Operator Training and License Examinations”**

Draft Regulatory Guide DG-1080, “Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations,” was published for public comment in the *Federal Register* on August 23, 1999 (64 FR 45985). DG-1080 is a proposed Revision 3 of Regulatory Guide 1.149. Comments were received from six facility licensees and one facility training organization. Most commenters expressed support for the proposed revised regulatory guide and the endorsement of the newly revised American National Standards Institute/American Nuclear Society standard, ANSI/ANS-3.5-1998, “Nuclear Power Plant Simulators for Use in Operator Training and Examination.” However, some commenters objected to some of the specific provisions of the draft regulatory guide and others provided specific recommendations for changes. The resolution of public comments is summarized below. This summary addresses the principal comments (i.e., comments other than those that are minor or editorial in nature, supportive of the approach described in the draft regulatory guide, or are applicable to another area or activity outside the scope of the draft regulatory guide).

Comments on “Introduction”

Comment A:

References to 'plant' should be changed to 'unit.' The recent revision of ANSI/ANS-3.5-1998 went to great lengths to make this change, and so should the regulatory guide. Consistent phraseology will minimize conflicts in the interpretation of the regulatory guide and the ANSI standard.

Response: The NRC staff does not agree that it is necessary to replace the term “plant” with the term “unit” in the regulatory guide. The regulatory guide uses phraseology consistent with the regulation. The term "reference plant" is defined in §55.4 as "the specific nuclear power plant from which a simulation facility's control room configuration, system control arrangement, and design data are derived." This definition remains the same in the final rule and continues to clarify that for a simulation facility, a specific plant (unit) at a multi-plant (unit) site is the "reference plant." The NRC staff realizes that the use of inconsistent terminology can be confusing and has made clarifications where appropriate in preparing the final rule. However, the NRC staff intends to re-evaluate the use of the term "reference plant" in the future.

Comment B:

There appears to be some inconsistency between the draft guide and 10 CFR 55.45b. The guide mentions that 10 CFR 55.45b was suited for a different form of testing and is 'difficult to apply' . . . 10 CFR 55.45b still requires a 4 year schedule with 25% of tests run each year, whereas ANSI/ANS-3.5-1998 requires running the steady state and operability tests annually along with scenario testing. 10 CFR 55.45 needs to be revised to conform to the new positions or the regulatory guide should give guidance on the use of ANSI/ANS-3.5-1998 within the context of 10 CFR 55.45.

Response: The staff agrees with the commenter that the performance testing in the current section 55.45 is suited for a capabilities-based and schedule-based performance testing program and is difficult to apply to the process of structured software development coupled with scenario-based testing that is now fully adopted by ANSI/ANS-3.5-1998. In the final rule, Section 55.45(b) has been separated from the requirements for operating tests in Section 55.45 and consolidated in a new Section 55.46, "Simulation Facilities." The requirement for a 4-year schedule with 25 percent of the tests run per year has been deleted.

Comments on "Discussion"

Comment C:

The verification and validation process in software development is the standard procedure for changes to the simulation environment. Scenario-based testing is a new requirement that could add extra burden to the utilities depending upon what the scope of testing is defined to be. Presently, scenarios are tested by instructors to ensure they meet their training objectives, and this aspect is currently a part of the SAT [Systems Approach to Training] process. If a modification is installed into the simulator and is verified to operate as designed for the known set of conditions, the modification should not have to be verified for a variety of scenarios to meet the requirement of scenario-based testing. For the case of adding a containment pressure indicator to one that is already there -- does it have to be tested with a MSLB [Main Steam Line Break], FWLB [Feedwater Line Break], LOCA [Loss of Coolant Accident], with varying degrees of [severities] since they all represent different scenarios with multiple other malfunctions? Additional guidance should be provided to define when a modification has been satisfactorily 'scenario-base tested.'

Response: Editions of ANSI/ANS 3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations. Because adoption of ANSI/ANS-3.5-1998 is voluntary, scenario-based testing is not a new requirement.

The NRC staff agrees that the verification and validation (V&V) process in software development is the standard procedure for changes to the simulation environment, including the commenter's example modification adding a containment pressure indicator. The commenter incorrectly assumes that such changes have to undergo scenario-based testing. As described in Section 4.4.3.2 of ANSI/ANS-3.5-1998, scenario-based testing is associated with scenarios developed for the simulator that need to be tested before their use in operator training or examination. Scenario-based testing is related to the use of fully verified and validated software. Scenario-based testing confirms that the simulator will support training program requirements as described in the lesson plans and learning objectives. The staff agrees that modifications, such as "adding a containment pressure indicator to one that is already there," should not have to be verified for a variety of scenarios to meet the expectations of ANSI/ANS-3.5-1998. The staff does not believe that scenario-based testing will add extra burden. It should be noted that the approach to testing provided in ANSI/ANS-3.5-1998 would offset any potential burden increase resulting from scenario-based testing through reduced requirements for performance testing.

Comment D:

Regulatory Guide 1.149 should not discuss software quality assurance as a description of the current process. The 'software QA [quality assurance]' phrase has meaning in the nuclear industry that is not applicable to simulation software. Use of 'software configuration control and verification/validation testing' or similar wording would be more appropriate for this application.

Response: The NRC staff disagrees that the regulatory guide should not discuss software quality assurance. As stated in the regulatory guide, the term “software QA” refers to the ANSI/ANS-3.5-1998 requirements for V&V during software development in a controlled configuration environment with ongoing scenario-based and recurring operability testing. This meaning is consistent with more general usage of the term in the computer/software industry, that is, quality assurance is the appropriate term for software configuration management and V&V testing. The acceptability of ANSI/ANS-3.5-1998 is based in large part on its provisions for improved software QA. The software development and performance testing criteria of ANSI/ANS-3.5-1998, while not prescriptive with respect to the details of implementation, bring the simulator application into closer conformance with current industry norms and practices for software quality assurance and training program administration than did the 1985 and 1993 versions of the national standard. The NRC staff acknowledges that the phrase “software QA” may have a different meaning in the context of a nuclear power plant than intended by the regulatory guide for a site-specific, plant-referenced simulator. The quality assurance methodology in ANSI/ANS-3.5-1998 is not expected or intended to be included in the facility’s quality assurance program as described in 10 CFR Part 50, Appendix B, “Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants.” Appendix B does not apply to simulation facilities. Appendix B clearly applies to nuclear power plants and fuel reprocessing plants, including their structures, systems, and components that prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public. Appendix B establishes quality assurance requirements for the design, construction, and operation of those structures, systems, and components. The final revision of the regulatory guide makes this clear.

Comment E:

Additional guidance should be provided to define when a modification has been satisfactorily 'scenario base tested.'

Response: The NRC staff disagrees with the commenter’s assertion that additional guidance should be provided to define when a modification has been satisfactorily “scenario base tested.” See response to Comment C. Although the regulatory guide is silent in providing specific guidance in this area, the ANSI/ANS-1998 is not. For example, Section 4.4.3.2, “Simulator Scenario-Based Testing,” of ANSI/ANS-3.5-1998 provides sufficient guidance by stating that “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.”

Comment F:

When modeling is truly performed with the use of first law principles, where matter and energy are fully accounted, scenario-based testing for the sake of validity is unnecessary. Scenario-based testing is only necessary to ensure that the

students are trained on the procedure flow paths that are required for the training objectives.

Response:

The staff agrees that first law principles must be met for models to be valid. However, the complexity of integrated models extends beyond first law principles. The staff believes that scenario-based testing provides additional assurance of the simulator fidelity with the reference plant. The fidelity of simulator modeling is assured through a V&V process as described in the ANSI/ANS-3.5 standard. This assurance is obtained by comparison of simulator performance data with referenced plant design data in either a stand-alone or an integrated manner. Scenario-based testing provides additional assurance of simulator fidelity by ensuring that simulator models that have been thoroughly verified and validated support operator training and/or operator examination objectives in a fully integrated environment. Scenario-based testing does not ensure that operators are trained on the proper procedure flow paths; that is a function of the systems approach to training (SAT) accredited program. Editions of ANSI/ANS 3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations.

Comment G:

If scenario-based testing is required for modeling changes, the regulatory guide should address what reference data would be used to determine the test acceptance criteria. For example, in single failure/malfunction testing, many plant responses are best estimate in that very little actual plant data can be obtained to verify the correct simulator response. Placing several such malfunctions together will only complicate the testing process and make it more difficult to 'test' whether the simulator behavior is correct.

Response: As a point of clarification, as discussed in Sections 4.4.1 and 4.4.2 of ANSI/ANS-3.5-1998, modeling changes are to undergo verification testing and validation testing. The commenter incorrectly assumes that modeling changes have to undergo scenario-based testing. As discussed in Section 4.4.3.2 of ANSI/ANS-3.5-1998, scenario-based testing is associated with scenarios developed for the simulator that need to be tested before use for operator training or examination. Scenario-based testing is related to the use of fully verified and validated software (i.e., simulator models). Scenario-based testing confirms that the simulator will support the training program requirements as described in the lesson plans or learning objectives. That being said, the staff acknowledges that placing several such malfunctions together complicates the testing process and makes it more difficult to determine whether the simulator behavior is correct.

However, the staff believes that reference data can be obtained and that the regulatory guide is appropriately silent regarding what reference data would be used in determining acceptance criteria. Sections 5.1 and 5.1.1 of ANSI/ANS-3.5-1998 list example sources of simulator baseline reference data (e.g., reference unit design data, reference unit performance data, reference unit engineering analyses, simulator supporting calculations and analyses, etc.) Furthermore, acceptance criteria for scenario-based testing can be drawn from learning and examination objectives.

Comment H:

ANSI/ANS-3.5-1998 describes and requires 'Verification Testing' in the software development process, and requires documentation of same. If a utility chooses to upgrade its program to conform to the 1998 standard, would it be required to demonstrate that it met the Verification Testing requirement over the entire life of the simulator software?

Response: If a facility licensee chooses to upgrade its program to the ANSI/ANS-3.5-1998 standard, the verification testing documentation requirements of ANSI/ANS-3.5-1998 would apply from the date of implementation forward.

Comments on “Regulatory Position”

Comments on ?Endorsement of ANSI/ANS-3.5-1998”

Comment I:

The requirements in ANSI/ANS-3.5-1998 provide methods acceptable to the NRC staff for a facility licensee (1) to certify a simulation facility consisting solely of a plant-referenced simulator or (2) to obtain approval of a simulation facility for use in portions of reactor operator and senior operator license examinations, subject to the following clarifications:

- 1.1 Simulation facilities as defined in 10 CFR 55.4, to the extent that the facility licensee applies for approval under the requirements of 10 CFR 55.45(b), should meet the applicable requirements of ANSI/ANS-3.5-1998.*
- 1.2 In Section 1.2, 'Background,' the standard identifies other documents to be included as part of the standard. The applicability of one of these documents, ANSI/ANS-3.1, is covered in Revision 2, Regulatory Guide 1.8, 'Qualification and Training of Personnel for Nuclear Power Plants.'*

Do 1.1 and 1.2 apply to both (1) and (2) above in the preceding paragraph or only to (2)? The structure of the sentence implies that the clarifications apply to only (2).

Response: The requirement in 10 CFR Part 55 for facility licensee certification of plant-referenced simulators has been eliminated. Regulatory Position C.1 in RG 1.149, Revision 3, states, in part, that ANSI/ANS-3.5-1998 provides methods acceptable to the NRC staff for a facility licensee to demonstrate that through meeting the criterion of ANSI/ANS-3.5-1998, the plant-referenced simulator possesses a sufficient degree of completeness and accuracy to meet the requirements of the NRC as described in 10 CFR Part 55, “Operators' Licenses.” Thus, clarification 1.1 applies to plant-referenced simulators only. Clarification 1.1 has been revised to read, “Licensees using a plant-referenced simulator in the conduct of operator licensing examinations after the date of this regulatory guide should meet the applicable requirements of ANSI/ANS-3.5-1998.” Clarification 1.2 has been revised to read, “Unless otherwise specifically endorsed by the NRC, other documents referenced in Section 1.2, ‘Background,’ of ANSI/ANS-3.5-1998 are not endorsed in this regulatory guide.”

Comment J:

. . . , 1.1 states that facilities should meet the requirements of ANSI/ANS-3.5-1998. It should be acceptable to meet the requirements of ANSI/ANS-3.5-1993 as an alternative to ANSI/ANS-3.5-1998.

Response: The NRC staff agrees with the comment. RG 1.149 states that editions of ANSI/ANS-3.5 that were previously endorsed by the NRC remain acceptable methods of meeting the regulations.

Comments on "Use of a Simulator for Multiple Plants"

Comment K:

At the beginning of this document I believe it is implied that a facility must first obtain approval for using a simulation facility if it is to be used for testing on a design other than the reference unit. If this is true, then why must a licensee demonstrate to the NRC in its certification that the differences between the plants are not so significant that they have an impact on the ability of the simulation facility to meet the requirements and guidance of ANSI/ANS-3.5-1998 as qualified in this regulatory guide for each of the plants? - keyword is certification - shouldn't the demonstration be made solely in application for approval to use a simulation facility?

Response: The position addressing "Use of a Simulator for Multiple Plants" considers the case in which a facility licensee wishes to use a simulation facility that is designed to simulate a single reference plant (or, using terminology from the ANSI/ANS-3.5-1998, "unit") to train or examine operators of a second or similar plant (unit). Because certification is being eliminated in the final rule, the staff has updated the regulatory guide to clarify that the summary and analysis of the differences between each plant is necessary for the NRC to assess the suitability of the simulation facility for training and examination on plants (units) other than the referenced plant (unit).

In the final regulatory guide, Section C.2, regarding the use of a simulation facility for multiple plants has been revised to reflect that if a facility licensee wishes to use a simulation facility to train and examine operators for more than one nuclear power plant, the facility licensee needs to demonstrate to the NRC that the differences between the plants are not so significant that they will cause negative training. As a point of clarification, ANSI/ANS-3.5-1998, in Section 4.2.1.4, is applicable to deviations between the plant-referenced simulator and its referenced plant rather than differences between the non-reference plant and the referenced plant.

Comment L:

'Significant' should be better explained or defined, and examples given. Without additional guidance NRC inspectors may make individual interpretations that will not promote consistent regulation.

Response: The NRC staff has updated the regulatory guide to clarify that if a licensee wishes to use a simulation facility to train or examine operators for more than one nuclear power plant (unit), it must be able to demonstrate to the NRC that the differences between the plants are not so significant that they will cause negative training. In addition, adequate guidance is provided to NRC inspectors and/or examiners in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors."

Comment M:

The term 'nuclear power plant' should be changed to 'nuclear power plant unit.' If the licensing basis shows that an operator needs to have a multi-unit license for a nuclear power plant with more than one unit, then the simulator, referenced to one unit, should be able to train operators for use on both units. This point is not evident in ANSI/ANS-3.5 (any version), so the clarification provided here is needed. This analysis of the differences between each unit, however, does not seem to align well with ANSI/ANS-3.5-1998 section 4.2.1.4. The additional requirements of DG-1080 need further clarification.

Response: The NRC staff disagrees with the commenter that the term "nuclear power plant" should be changed to "nuclear power plant unit." The rationale of the staff's response to Comment A applies here.

In the final regulatory guide, Regulatory Position C.2, regarding the use of a simulation facility for multiple plants, has been revised to reflect that if a facility licensee wishes to use a simulation facility to train and examine operators for more than one nuclear power plant, the facility licensee needs to demonstrate to the NRC that the differences between the plants are not so significant that they will cause negative training. As a point of clarification, the ANSI/ANS-3.5-1998, in Section 4.2.1.4, is applicable to deviations between the plant-referenced simulator and its referenced plant rather than differences between the non-referenced plant and the referenced plant.

Comments on "Acceptability of Licensee's Simulation Facility"

Comment N:

Licensees whose simulation facilities are currently certified under ANSI/ANS-3.5-1985 should be provided guidance on documenting their review of simulator programs for conformance to an active edition of the standard.

Response: The NRC staff agrees and has updated the regulatory guide to state that licensees that maintain simulation facilities certified under editions of ANSI/ANS-3.5 that were previously endorsed by the NRC may, but are not required to, revise their software and testing documentation, so that the simulation facility will be maintained under ANSI/ANS-3.5-1998.

If a facility licensee chooses to upgrade its program to the ANSI/ANS-3.5-1998 standard, the verification testing documentation requirements of ANSI/ANS-3.5-1998 would apply from the date of implementation forward.

Comments on "Scheduling of Performance Testing"

Comment O:

If this Regulatory Guide is adopted, how would the timetable for simulator testing that was submitted earlier in the facility's Form 474 be addressed?

Response: The final rule amends 10 CFR Part 55 to eliminate the requirement for submitting a testing schedule and quadrennial reports. The staff revised Regulatory Position C.4, "Scheduling of Performance Testing," of the final regulatory guide to address this comment. The regulatory position now points out that the scheduling and evaluation of simulation facility testing under ANSI/ANS-3.5-1998 is a function of the facility licensee's accredited training program. NRC's endorsement of ANSI/ANS-3.5-1998 allows implementation of a testing program that is fundamentally different from that described in earlier versions of the regulatory guide. Simulation facility licensees that use ANSI/ANS-3.5-1998 would be allowed to replace or update their current timetable for simulator performance testing with a schedule that is a function of their accredited training program.

Comment P:

It is recommended that NRC provide interpretation and guidance in the regulatory guide regarding the documentation requirements of ANS-3.5 for scenario-based testing. Reason: The intent of the ANS-3.5 committee was apparently to provide for more realistic and better testing, while at the same time providing for a more cost-effective approach to the periodic testing of simulator performance. However, the documentation requirement of Section 4.4.3, "Simulator Performance Testing," literally interpreted requires the same amount of detailed documentation, as in the past, for both the annual operability test and scenario-based testing. Section 4.4.3 requires data comparison for both, and the user of the standard is referred to Appendix A for acceptable documentation practices applicable for both the annual operability tests and scenario-based testing. The Appendix would require recording of critical parameters and data comparison and documented evaluations for all scenario-based testing. Rather than reduce the burden from the previous malfunction based testing approach, a literal interpretation of the ANS 3.5 documentation requirement, particularly for scenario-based testing, would increase the burden. This is further compounded by the apparent requirement in Section 4.4.3.2, Simulator Scenario-Based Testing, that all scenarios (training, examination, JPM's [Job Performance Measures], etc.) be part of the ANS 3.5 testing program. Since it will be at least 3-4 more years until a revision of ANS 3.5 can be developed that may provide more clarification of the intent of the standard, it is suggested that NRC consider providing clarification in the regulatory guide. NRC may also consider providing clarification of the applicability of the repeatability requirement of the standard (Section 4.1.1) to scenario-based testing.

Response: The NRC staff does not have a response to the commenter regarding the intentions of the ANS 3.5 Standards Committee Working Group (WG) . The commenter's speculations regarding the intentions of the ANS-3.5 WG are not germane to the draft regulatory guide. The revised regulatory guide endorses ANSI/ANS-3.5-1998 because it is an improvement over previous revisions of the standard.

The NRC staff disagrees with the commenter that the documentation requirement of Section 4.4.3, "Simulator Performance Testing," of ANSI/ANS-3.5-1998 requires the same amount of detailed documentation as in the past for both the annual operability test and scenario-based testing. Contrary to the commenter's opinion, the staff's reading of ANSI/ANS-3.5-1998 reveals that the amount of detailed documentation is not addressed by ANSI/ANS-3.5-1998. ANSI/ANS-3.5-1998 provides that a record of the conduct of the simulator performance test and its evaluation shall be maintained. Appendix A only provides an acceptable format for demonstration of a simulator's conformance to the requirements of ANSI/ANS-3.5-1998 and it appears that the intent is that documentation be provided to the extent necessary to form a sufficient basis for verification of simulator performance, configuration control, and maintenance. Clarification 1.3 of the regulatory guide states that Appendix A of ANSI/ANS-3.5-1998 is only applicable to operability testing and not to scenario-based testing. Scenario-based testing documentation should be consistent with the facility licensee's defined objectives of the accredited training program or approved operator licensing examinations.

The NRC staff agrees with the commenter, in part, that Section 4.4.3, "Simulator Performance Testing," of ANSI/ANS-3.5-1998 requires a record of the conduct of simulator performance testing and a comparison showing that the results meet reference unit data for both operability and scenario-based testing. However, it should be pointed out that data comparison for scenario-based testing may be very limited as no actual data may exist for certain scenarios. Section 4.4.3.2, "Simulator Scenario-Based Testing," of ANSI/ANS-3.5-1998 states that 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.

The NRC staff disagrees with the commenter's supposition that "rather than reduce the burden from the previous malfunction based testing approach, a literal interpretation of the ANS-3.5 documentation requirement, particularly for scenario-based testing, would increase the burden." The staff points out that scenario-based testing can, under certain conditions, be credited toward operability testing, which can reduce overall testing requirements. Additionally, as noted above, scenario-based testing documentation need not follow the guidance of Appendix A and, depending on the scenario, may be limited. Because the commenter provides no information or basis to support his comment on this, the staff cannot respond further. The staff also disagrees with the commenter's supposition that an increase in burden is further compounded by the requirements of Section 4.4.3.2, "Simulator Scenario-Based Testing," of ANSI/ANS-3.5-1998, and that all scenarios (training, examination, JPMS, etc.) be part of the testing program. Section 4.4.3.2 of ANSI/ANS-3.5-1998 states that scenarios developed for the simulator shall be tested before use for operator training or examination.

The NRC staff does not agree with the commenter that "clarification of the applicability of the repeatability requirement of ANSI/ANS-3.5-1998 (Section 4.1.1) to scenario-based testing" should be provided in the regulatory guide. Section 4.1.1, "Real Time and Repeatability," of ANSI/ANS-3.5-1998 adequately describes the repeatability expectations of the simulator in that it shall be demonstrated that between successive simulator tests no noticeable differences exist with respect to time-base relationships, sequences, durations, rates, and accelerations. Scenarios that have been tested for use in training or examination of operators are expected to meet this criterion of ANSI/ANS-3.5-1998. It should be pointed out that the initial test conditions

for the conduct of the scenario being tested should be the same as or similar to those initially set up for the scenario.

Comment Q:

ANSI/ANS-3.5-1998 discusses repeatability in the definitions and Section 4.1.1. Specific guidance on what testing requires repeatability and what are acceptable limits of repeatability should be included.

Response: The NRC staff agrees, in part, with the commenter that the ANSI/ANS-3.5-1998 defines the term “repeatability” and that Section 4.1.1, “Real Time and Repeatability,” briefly discusses “repeatability” in the context that it shall be demonstrated that the simulator performs the capabilities defined in Section 3.1, “Simulator Capabilities,” completes execution within the designed time interval, and that the simulation is repeatable. The staff notes that Section 3.1.1, “Real Time and Repeatability,” of ANSI/ANS-3.5-1998 also states that the simulator shall, in a repeatable manner, operate in real time while conducting any of the evolutions required by this section. The staff disagrees with the commenter that specific guidance on which testing requires repeatability and the acceptable limits of repeatability should be included in the regulatory guide. Sections 3.1.1 and 4.1.1 of ANSI/ANS-3.5-1998 adequately describe the repeatability expectations of the simulator by specifying the capabilities for which test repeatability is required and the limits for acceptability in that it shall be demonstrated that between successive simulator tests, no noticeable differences exist with respect to time-base relationships, sequences, durations, rates, and accelerations.

Comment R:

ANSI/ANS-3.5-1998 specifically states that once per year simulator performance testing will be conducted. It also states that performance based testing is comprised of operability and scenario-based testing. Specific tests that can be done by the scenario-based testing are normal evolutions, malfunctions, local operator actions, and other features exercised by the scenario. It appears that all ANSI required malfunctions no longer need to be tested yearly, only those which are used by the scenarios for a given year. This also appears to be an open-ended way to include all malfunctions under the “certification” umbrella, such that any malfunction on the simulator must be certified if it is ever used. There would no longer be a differentiation between the two.

Response: The NRC staff agrees with the commenter that ANSI/ANS-3.5-1998 states, in Section 4.4.3 that simulator performance testing comprises operability and scenario-based testing. Also, the staff is in general agreement with the commenter that simulator operability testing credit, as also discussed in Section 4.4.3.1 of ANSI/ANS-3.5-1998, 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 certain conditions are satisfied.

Not all of the malfunctions listed in Section 3.1.4 of ANSI/ANS-3.5-1998 need to be tested as part of the operability testing. ANSI/ANS-3.5-1998 provides adequate guidance in Section 4.4.3.1 regarding the testing of malfunctions as part of the simulator operability testing. The revised

regulatory guide points out in Regulatory Position C.4, "Schedule of Performance Testing," that the scheduling and evaluation of simulation facility testing under ANSI/ANS-3.5-1998 are functions of the facility licensee's accredited training program. In other words, the need for scenario-based testing in a given year is based upon the content of the facility licensee's training program. Scenario-based testing may be used to satisfy operability testing requirements when the same function is exercised.

The NRC staff also disagrees with the commenter's opinion that "this also appears to be an open-ended way to include all malfunctions under the 'certification' umbrella, such that any malfunction on the simulator must be certified if it is ever used. There would no longer be a differentiation between the two." The commenter incorrectly infers that there is a "certification umbrella such that any malfunction on the simulator must be certified if it is ever used." Neither the revised regulatory guide nor the final rule require that malfunctions be certified in order to be used on the simulator. In summary, there is no regulatory distinction between "certified" and "non-certified" simulator capabilities, and there never has been. Currently, NRC Form 474, "Simulation Facility Certification," has been utilized to certify that the simulation facility meets the guidance contained in ANSI/ANS-3.5-1985 or ANSI/ANS-3.5-1993, as endorsed by NRC RG 1.149. In other words, the entire simulation facility was certified. In the final rule the requirement for certification is being eliminated.

Comment S:

The new standard allows the use of an accredited training program and license training schedules to perform 25% of the yearly tests. With the new standard the malfunctions, overrides, remote functions, and procedures to be tested are not known until the end of the year. If the scenarios are already tested based upon the scenario-based testing process, the Reg. Guide should specify what would constitute the 25%. One interpretation could be that only 25% of the scenarios have to be scenario-tested for a given year. This should be clarified.

Response: The requirements contained in sections 55.45(b)(4)(vii) and 55.45(b)(5)(vi) have been deleted by the final rule. The scheduling and evaluation of simulation facility performance testing are set forth in Section 4.4.3 of ANSI/ANS-3.5-1998 and are a function of the facility licensee's accredited training program.

Comment T:

. . . the licensee may reference the licensed operator training schedules of the accredited training program as adequate submittal of a schedule for conduct of approximately 25 percent per year of the performance tests required by 10 CFR 55.45.

We assume, if all scenarios are currently approved, that a complete revalidation is not required. Proper documentation of validation is that they are approved scenarios.

Response: The requirements in sections 55.45(b)(4)(vii) and 55.45(b)(5)(vi) for submittal of a schedule for conduct of approximately 25 percent per year of the performance tests has been deleted from the regulations. The staff disagrees with the commenter's assumption that if all scenarios are currently approved, a complete revalidation is not required, and with the

commenter's assertion that proper documentation of validation is that the scenarios are all approved scenarios. Documentation of scenario-based testing is expected to be a function of the accredited training program. Scenario-based testing confirms that the simulator may be used in its intended manner within the operator training or examination program. The NRC staff expects that facility licensees that opt to maintain their simulation facilities in accordance with ANSI/ANS-3.5-1998 will establish suitable controls to establish an initial software and training application baseline. From that point forward, the documentation requirements of ANSI/ANS-3.5-1998 would apply. A complete "revalidation" of any given scenario may or may not be needed, depending on the acceptance criteria for the scenario in question. Scenario-based performance tests are expected to have proper validation documentation. Scenario-based testing makes use of verified and validated software. Criteria are delineated in the ANSI/ANS-3.5-1998 for validation and testing for whether the simulator behavior is correct. Scenario-based testing, the acceptance criteria, and documentation expectations that are defined in Section 4.4.3.2 of ANSI/ANS-3.5-1998 confirm that the simulator will support the operator training program requirements as described in lesson plans or learning objectives.

Comment U:

The statement is made that the licensee may reference the licensed operator training schedules of the accredited training program as adequate submittal of a schedule for conduct of approximately 25 percent per year of the performance tests required by 10 CFR 55.45(b)(4)(iii) and (vii) and 10 CFR 55.45(b)(5)(vi). Based on this statement, the quadrennial report will not contain a simulator malfunction test schedule. Credit for malfunction testing will be taken by use of the malfunctions in the validated scenarios of the accredited training program. The quadrennial report will only reference the accredited training program schedule.

Response: The requirements in sections 55.45(b)(4)(vii) and 55.45(b)(5)(vi) concerning submittal of a schedule for conduct of approximately 25 percent per year of the performance tests and the requirement for a quadrennial report have been deleted from the regulations, therefore, there is no conflict.

Comment V:

Regulatory Position 4, "Scheduling of Performance Testing," states that the requirements of 10 CFR 55.45(b)(4)(iii) and (vi), and 10 CFR 55.45(b)(5)(vi) related to submitting a report every four years that includes "a schedule for the conduct of approximately 25 percent of the performance tests per year for the subsequent four years," may be met by referencing the licensed operator training schedules of the accredited training program. The commenter believes, that in the long term, less confusion will exist in the industry if 10 CFR Part 55 is modified to delete the reporting and test scheduling requirements.

Response: The staff agrees with the comment because the requirements in sections 55.45(b)(4)(vii) and 55.45(b)(5)(vi) concerning submittal of a schedule for conduct of approximately 25 percent per year of the performance tests and the requirement for a quadrennial report have been deleted from the regulations.

Comments on “Implementation”

Comment W:

Will the NRC permit Reactivity Manipulations to be performed on the simulator, in accordance with 10 CFR Part 55 (proposed change), if a licensee does not adopt the ANSI/ANS-3.5-1998 standard in total?

Response: Yes, facility licensees may permit applicants to perform control manipulations on a plant-referenced simulator provided that the final rule requirements section 55.46(c)(2)(i) and (ii) are met.

Comment X:

. . . has reviewed letter SECY 99-225, 'Rulemaking Plan for Changes to 10 CFR Part 55 to Reduce Unnecessary Regulatory Burden Associated with the Use of Simulation Facilities in Operator Licensing,' and found that the proposed changes to 10 CFR Part 55 would also require a revision to the Draft Regulatory Guide due revised paragraph numbering and deletion of reporting requirements referenced in the Draft Regulatory Guide. If it is the NRC's intent to implement the Regulatory Guide revision concurrent with the rulemaking plan, the Regulatory Guide wording must agree with the proposed text of the 10 CFR Part 55 change. Otherwise, assuming the revision to the Regulatory Guide is effective prior to the changes to 10 CFR Part 55, another revision to the Regulatory Guide must be issued concurrent with the rulemaking plan.

Response: The NRC staff agrees with the comment. The final version of the regulatory guide has been revised to conform with the amended 10 CFR Part 55.

FINAL RULE REGULATORY ANALYSIS

REVISION OF 10 CFR PART 55 - OPERATORS' LICENSES Operator License Eligibility and the Use of Simulation Facilities in Operator Licensing

Proposed Action

The Nuclear Regulatory Commission (NRC) is amending 10 CFR Part 55, "Operators' Licenses" to

(1) Allow applicants for operator and senior operator licenses to fulfill a portion of the experience prerequisites by manipulating a plant-referenced simulator as an alternative to manipulation of the controls of the actual nuclear power plant,

(2) Remove current requirements for facility licensee certification of their simulation facilities, and

(3) Eliminate the necessity for routine submittal of reports to the NRC for review that identify any uncorrected performance test failures and a schedule for correction.

In conjunction with supporting the above objectives, the final rule also revises two definitions in 10 CFR Part 55, and adds clarity to the regulations by relocating language relating to the use of a simulation facility to a new Section 55.46 dedicated to "Simulation Facilities."

Statement of the Problem and Objective (Regulatory Issue)

Section 55.31(a)(5) requires that five significant control manipulations that affect reactivity or power level be performed on the actual plant as a prerequisite for license eligibility. Those facility licensees whose plants have been shut down for extended periods have found this requirement to be particularly burdensome during restart. The plant ascension must be interrupted so that a number of newly licensed operators and license candidates can sequentially manipulate the controls of the reactor in order to remove restrictions from their licenses or to establish license eligibility. Plant operations managers cite not only potential cost savings associated with using the simulator, particularly during periods of steady-state operation, but also enhanced training through a wider range of available operation in an environment that is more conducive to individualized instruction.

The current revision of the national standard, American National Standards Institute/American Nuclear Society (ANSI/ANS) ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination" employs a scenario-based testing and quality control philosophy that is inconsistent with the testing assumptions and requirements of the current rule. The staff believes that implementation of ANSI/ANS-3.5-1998 by facility licensees without revision of the rule would result in duplicate and inefficient simulator performance testing. The requirements of 10 CFR 55.45(b), in their present form, have become an impediment to facility licensees that might seek to reduce unnecessary regulatory burden and increase training program efficiency by adopting the staff's endorsement of later revisions of the national standard.

For the past several years, simulators have been in an update and maintenance phase, an area for which previous revisions of the standard were not intended and for which the standard has offered virtually no specific guidance. Most utilities have simply archived software specification documents and initial performance data and have built their required performance testing programs around repetition of previous tests and resolution of documented performance discrepancies. Major modifications to simulation modules, operating environments, and computer platforms are continually being performed by both facility licensees and simulator vendors, often with minimal verification, validation, and documentation. Identification and resolution of discrepancies are then made a function of the discrepancy reporting and resolution practice, resulting in a large number of discrepancies being identified by the trainees.

Background (Existing Regulatory Framework)

In 1984, the Commission took the position that simulator training is not necessarily equivalent to actual plant operating experience. This position supported comments from the industry and the public objecting to simulator training taking the place of actual plant operating experience because of inherent problems and uncertainties in simulator technology and because there were few plant-specific simulators in 1984. Consequently, §55.31(a)(5), as amended in 1987, requires five significant control manipulations that affect reactivity or power level to be performed on the actual plant as a prerequisite for license eligibility. The rule made a distinction between "cold" and "hot" license applicants by allowing "cold" license applicants to take the operating test before performing the reactivity control manipulations, although only a conditional license would be issued pending completion of the requirement.

As a result of the revisions to §55.45(b) published in 1987, facility licensees began to develop simulators for certification in accordance with ANSI/ANS-3.5-1985, "Nuclear Power Plant Simulators for Use in Operator Training." This national standard specified full-scope, stand-alone testing of system models and simulator training capabilities as part of initial simulator acceptance testing. The rule, based upon the assumption that similar testing would continue after the simulator was put in service, required periodic scheduling and reporting of test results. Facility licensees continue to test simulators in the manner of initial development and to submit test schedules and reports on a quadrennial basis to comply with the rule. The approach to simulator testing has changed considerably since the rule was published, and a new approach has been adopted as the industry's standard through the issuance of ANSI/ANS-3.5-1998.

The existing rule contains prescriptive aspects that may no longer be technically needed or required to support the training and examination programs. The existing rule, for example, contains outdated schedule requirements for initial procurement and certification of simulation facilities. The existing rule also contains reporting requirements that impose a performance testing program based on repetition of 25 percent of the full simulator training capability, including thousands of malfunctions, annually. Facility licensees that choose to adopt the latest industry standard and to change their testing programs would find the existing rule to be an impediment to change.

How The Regulatory Problem Will Be Addressed By Rulemaking

The final rule will promote an alternative method of providing effective plant operating experience for initial license applicants by allowing use of the simulation facility in lieu of the actual plant to satisfy the license eligibility requirement for performance of the required control manipulations that affect reactivity or power level. In addition, the distinction between "cold" and "hot" facility licenses will be deleted from the control manipulations requirement.

The rulemaking effort will also facilitate adaptation of existing simulator support and requalification training programs to the 1998 revision of the national standard in order to eliminate recurring, outdated, duplicate, and inefficient simulator performance testing and reporting requirements. The final rule will clarify minimum simulator capabilities in place of the existing requirements for simulator certification and prescheduled, stand-alone performance testing. The final rule is expected to expedite implementation of the national standard.

The final rule will directly reduce unnecessary regulatory burden by eliminating the current requirement for submittal of certification and performance test reports on a quadrennial basis. Facility licensees will be able to voluntarily adjust their simulator performance test programs consistent with user needs as defined by their accredited training programs or voluntarily conform existing simulator programs to current revisions of the national standard. The 1981 version of the standard specified a testing regimen that was written in the context of initial simulator procurement, so much so that the testing program served as the simulator procurement acceptance test list. Since that time, industry initiative has changed ANSI/ANS 3.5 twice, in 1985 and in 1993, but the focus of the standard remained initial construction, a unique condition in which extensive factory acceptance testing is performed on the basis of individual simulator capabilities before establishing a software configuration baseline. This type of testing does not adequately consider the training and examination environment in which the simulator will be used.

Identification and Analysis of Alternative Approaches

A regulatory analyses of the following options were considered by the NRC staff.

Option 1 - Status Quo

The existing rule could be left as is and facility licensees could continue to conduct all experience prerequisites for license eligibility using the actual plant and could continue to test and report on simulator fidelity. Option 1 does not bring facility licensee simulator programs into conformance with the industry's current national standard. Because there are no new benefits or costs derived from maintaining the status quo, no analysis was performed regarding this option.

Option 2 - Delete Current Requirements

The final rule deletes current requirements, that are considered to be unnecessarily burdensome on a case-by-case basis. Although Option 2 would provide immediate relief from recurring performance testing and reporting requirements associated with the certification and approval of the simulation facility, it would not address the Commission's previously expressed

concerns about ensuring sufficient testing to prevent negative training. This option would increase the possibility of negative training and would also fail to address the suitability of the simulator for satisfying an operating experience requirement. Therefore, no analysis was performed regarding this option.

Option 3 - Integrated Rulemaking

Option 3 supports amending 10 CFR Part 55 by allowing applicants for operator and senior operator licenses to fulfill a portion of the experience prerequisites for license eligibility with the performance of five significant control manipulations on a plant-referenced simulator as an alternative to use of the actual plant. In addition, Option 3 would remove current requirements for certification of simulation facilities and routine submittal of simulator performance test reports to the NRC for review. The staff considered separate rulemaking activities but opted for an integrated approach because the issues are closely related. The net effect is a reduction in unnecessary regulatory burden while maintaining safety in the area of operators' licensing. In addition, the regulatory analysis indicates that the industry as a whole is expected to realize net cost savings and schedule flexibility.

Discussion

The regulatory position for requiring actual plant operating experience has, in one form or another, existed since 1963. The requirement is intended to ensure that the applicant has learned to operate the controls of the facility before receiving a license. Historically, there has been a difference between the wording of the rule and its implementation in practice. The final rulemaking addresses that difference.

Since the Commission developed its initial position regarding simulator training, the concerns that precluded or limited the acceptability of simulator training as equivalent to plant operation have been mitigated by advancements in simulation technology and availability. The 1987 changes to 10 CFR 55.45 resulted in certification of a simulation facility by each facility licensee. With increased availability of simulation facilities, the industry also experienced maturing of the evolving simulation technology through three revisions of the governing national standard, with concomitant increases in computing capability, model complexity, and fidelity. Today, simulator model fidelity and computational limitations that influenced decisionmaking processes a decade ago are of significantly less concern.

When NRC's regulatory position was initially adopted in 1981, the nuclear industry was active in developing and adopting a national standard for simulators, ANSI/ANS-3.5. The basis for NRC's earlier choice of procedural alternatives for its regulatory position is still valid in terms of the industry's continuing active revision of the standard. However, the majority of facility licensees choose to maintain their simulators under the 1985 revision of the national standard because the current §55.45(b) requires schedule-based performance testing and reporting that are inconsistent with the scenario-based testing and quality control philosophy that have become acceptable in later revisions of the national standard. The final rule will help to remove obstacles to full and voluntary implementation of improved revisions of the national standard by facility licensees.

The assumptions in the proposed rule regulatory analysis remain and with minor changes that have been made to the regulatory analysis to prorate the cost and benefit of the final rule over the average remaining years of the operating life of the facility. The 4-year simulation facility performance testing cycle required by the current regulation is no longer required by the final rule.

Since the proposed rulemaking notice, the staff has determined that it is not necessary to revise and update NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operator's Licenses" and NUREG-1258, "Evaluation Procedure for Simulation Facilities Certified Under 10 CFR 55." If clarifications to the final rule are necessary, answers to questions will be posted on the NRC's home page at <WWW.NRC.GOV> in the Nuclear Reactors icon under Principal Reactor Programs under Operator Licensing Program. In addition, it is expected that the public workshop concerning this final rulemaking may lead to questions which will be posted on the website. Therefore, the Option 3 NRC cost associated with the NUREG's have been eliminated and the calculations revised accordingly.

Backfit Rule Concerns

The NRC has determined that the backfit rule does not apply to this final rule; therefore, a backfit analysis is not required for this final rule because these amendments do not involve any provisions that would impose backfits as defined in 10 CFR 50.109(a)(1). Although facility licensees will not be required by this rulemaking to change existing programs or to adopt new regulatory guidance, the final rule will allow applicants to perform the required control manipulations at either the facility or a plant-referenced simulator and will eliminate certification of simulation facilities and submittal of quadrennial test reports and schedule information. Finally, the final rule will add criteria on simulator fidelity assurance in order to support the final changes permitting control manipulations and would clarify that the requirements of §55.46(d) apply to all planned uses of the simulation facility.

The changes of the final rule entail costs on the part of both the NRC and the industry for one-time revision of existing programs. However, the cost/benefit analysis suggests that industry could recover these costs and the final rule would have a long-term positive net value.

All of these changes constitute either permissible relaxations from current requirements or provide a new alternative to compliance with the existing requirements of the rule. Accordingly, the final rule's provisions do not constitute a backfit, and a backfit analysis was not performed.

Regulatory Impact - Costs and Benefits

The regulatory analysis consists of the results of a value-impact (benefit-cost) quantitative assessment of the final rule, using estimated data and stated assumptions.

The regulatory analysis considered direct values and impacts for NRC and facility licensees. It also considered indirect costs that are borne by the NRC and by the larger nuclear "industry," such as the cost of changes to an existing accreditation program. Values and impacts are presented for the first (implementation) year and subsequently for the average

remaining years of life of the plants, for example, assuming 15 years without license renewal. The analysis assumes that all plants voluntarily opt to change existing programs, including adoption of ANSI/ANS-3.5-1998, and use of the simulation facility to complete the reactivity manipulations prerequisite for an operator's license. A common professional labor rate was assumed for both NRC and the industry in the analysis. The regulatory analysis considered both one-time implementation costs and recurring costs.

Option 3 Values (Benefits)

The following NRC and facility licensee values (benefits) are considered in the regulatory analysis:

NRC

Reduced Review for Routine (Quadrennial) Reports - The NRC staff will realize savings in the form of reduced review time for routine reports by the deletion of the quadrennial test reporting requirement. The value of the change is based on an assumed 4 hours per review at a rate of one-fourth of the total number of simulation facilities per year. This change affects only the cost associated with quadrennial performance test reports, not the testing itself. The requirement for recurring performance testing is a function of ANSI/ANS-3.5, as endorsed by Regulatory Guide (RG) 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations" and is not changed by the final rule or the revised regulatory guide.

Reduced Recordkeeping - Recordkeeping costs associated with reduced staff review for routine (quadrennial) reports, including administrative and archival costs, are assumed to be 20 percent of the cost of the associated activity.

Facility Licensee

Reduced Replacement Power Demand - The cost of cycling the actual plant to complete reactivity manipulations as a prerequisite for license eligibility is considered in terms of the cost of replacement energy from the electrical grid, assuming that the nuclear power plant is being brought down from full power. A power reduction of 10 percent of a 1000-MWe unit for a duration of one hour was considered. It is also assumed that all license applicants perform five evolutions each. The cost of replacement energy is assumed at \$25/MW-hr, which is consistent with on-peak interchange prices for the northeastern United States.

Reduced Routine (Quadrennial) Reporting - Facility licensee simulator support staff and regulatory compliance staff will realize savings in the form of reduced preparation and review time for routine reports by the deletion of the quadrennial test reporting requirement. Three staff-months per facility per year was assumed. This change affects only the cost associated with preparation and transmittal of quadrennial performance test reports, not the testing itself. The requirement for recurring performance testing is a function of ANSI/ANS-3.5-1998, as endorsed by RG 1.149, and is not changed by the final rule or the revised regulatory guide.

Reduced Duplicate Testing - The analysis assumes that facility licensee simulator support programs adopt ANSI/ANS-3.5-1998 and change to scenario-based testing, that is a function of the accredited training program. One hundred and sixty simulator support staff hours

per year are assumed to be saved by elimination of redundant testing as a result of improved coordination between the simulator support and user organizations.

Reduced Recordkeeping - Recordkeeping costs associated with reduced facility licensee duplicate testing, including administrative and archival costs, are assumed to be 20 percent of the cost of the associated activity.

Reduced Number of Discrepancies - The regulatory analysis assumes that adoption of ANSI/ANS-3.5-1998 provides an efficiency benefit that is measurable in a reduction in significant performance discrepancies. A reduction of five discrepancies per year per simulation facility is assumed. Eight hours labor per discrepancy was assumed for troubleshooting, software correction, and subsequent retesting.

Reduced Examination Preparation Time - The regulatory analysis assumes that adoption of ANSI/ANS-3.5-1998 provides a benefit that is measurable in a reduction in reduced examination preparation time as a result of improved simulator fidelity with fewer unresolved performance discrepancies. An efficiency improvement of one-half hour per scheduled examination is assumed. The number of scheduled examinations is determined to be the total number of applicants divided by an assumed six applicants per scheduled examination.

Reduced Overtime and Backshift Testing - The regulatory analysis assumes that adoption of ANSI/ANS-3.5-1998 provides a benefit that is measurable in a reduction in the need for overtime and backshift testing as a result of improved coordination between simulator support and simulator user organizations and scenario-based testing. The analysis assumes the reduction in overtime and backshift testing to be 10 percent of the reductions in routine test reporting and duplicate testing.

Option 3 Impacts (Costs)

The following NRC and facility licensee impacts (costs) are considered in the regulatory analysis:

NRC

Revise Regulatory Guidance (RG 1.149) - RG 1.149 will be revised to endorse ANSI/ANS-3.5-1998. This is a one-time NRC cost based on a 0.3 full time equivalent (FTE) position in the first year only.

Revise Regulatory Guidance (NUREG-1021) - Appropriate sections of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors" will be revised to conform to the language of the final rule. This is a one-time NRC cost based on an assumed 1-month (160-hour) effort. This effort is expected to occur after implementation, in the second year of the 4-year cycle. However, the analysis shows the NUREG-1021 revision as a one-time first year effort to avoid confusion with other recurring costs in the out-years.

Implementation Workshop - The NRC will incur one-time costs associated with preparation for and conduct of a 1-week (40-hour) implementation workshop for facility licensees. A four-to-one preparation-execution ratio is assumed.

Train Examiners - The NRC will realize a recurring cost associated with training examiners. The analysis assumes 4 hours of training each for 50 examiners in the first year and 1 hour per year of refresher training in the out-years.

Increased Application Review Time for Reactivity Manipulations - The NRC will realize increased review costs for license applications related to reactivity manipulations performed on the simulator. One-half hour per license application is assumed.

Increased Examination Preparation Time for Simulator Status Review - The NRC will realize increased cost per scheduled examination related to confirmation of simulator acceptability. One-half hour per scheduled examination is assumed. The number of scheduled examinations is determined to be the total number of applicants divided by an assumed six applicants per scheduled examination.

Facility Licensee

Create Cycle-specific Core Model - The analysis assumes that the nuclear and thermal-hydraulic core models will be modified to replicate the particular core configuration that exists in the plant for which applicants are establishing license eligibility. Over a period of 4 years, two core model modifications are assumed. An effort of 6 weeks (240 hours) of development and 2 weeks (80 hours) of testing/validation per simulation facility is assumed.

Develop and Validate Reactivity Scenarios - Facility licensees will realize a one-time cost in the first year related to developing and validating a bank of reactivity manipulation scenarios with which license applicants may use the simulator to establish license eligibility. The analysis assumes a bank of 10 scenarios per facility. An effort of 10 hours per scenario is assumed.

Revise Simulator Configuration Management - Facility licensees will incur a one-time cost in the first year associated with revision of simulator configuration management programs. An effort of one month (160 hours) per facility is assumed.

Revise Simulator Test Program - Facility licensees will incur a one-time cost in the first year associated with revision of existing simulator test programs to scenario-based testing. An effort of 3 months (480 hours) per facility is assumed.

Revise Administrative Procedures - Facility licensees will incur a one-time cost in the first year associated with revision of existing simulator-related administrative procedures to accommodate scenario-based testing, changes in record retention processes, and examination security provisions. An effort of 1 month (160 hours) per facility is assumed.

Implementation Workshop - Facility licensees will incur one-time costs associated with participation in a 1-week (40 hour) implementation workshop. Participation by two persons (one simulator support staff member and one training staff member) per facility is assumed.

Train Licensee Instructors - Facility licensees will realize a recurring cost associated with training instructors and simulator support staff. The analysis assumes 12 hours of training

each for six staff members per facility in the first year and 3 hours per year of refresher training in the out-years.

Develop Accreditation Criteria for Reactivity Evolutions - The nuclear industry will realize a one-time cost in the first year associated with development and promulgation of appropriate accreditation criteria for integration of reactivity manipulation scenarios with existing accredited training programs. An effort consisting of a six-person task group for 3 months (480 hours) each and 80 hours of review per facility is assumed.

ASSUMPTIONS USED FOR COST-BENEFIT ESTIMATES

ITEM	VALUES
Full-time equivalent (FTE) (hr/yr)	1,460
Number of simulators	70
Examinations per year	550
Labor rate (\$/hr)	140
Replacement power (peak \$/Mw-hr)	25
Load change/reactivity manipulation (MW-hr/evolution)	100
Average time per reactivity manipulation (hr/evolution)	1
Recordkeeping and administrative (% task)	0.2
Discrepancy resolution (hrs/discrepancy)	8
Proposed rulemaking duration (yrs)	2
Cycle duration (yrs)	4
Number of reactivity scenarios	10
NRC staff training (hrs/examiner)	4
Industry instructor training (hrs/instructor)	12

OPTION 3 VALUE IMPACT ANALYSIS

(In Thousands of Dollars)

VALUES (BENEFITS)	YEAR 1	ANNUAL VALUE YEARS 2-15	3 % DISCOUNT (Note 1)	7% DISCOUNT (Note 1)	
NRC Savings					
	10	7			Reduced review for routine (4-yr) reports
	<u>2</u>	<u>2</u>			Reduced record keeping
Total NRC Savings	12	9	114	87	
Licensee Savings					
	6,875	5,156			Reduced replacement power demand
	4,704	3,528			Reduced routine (quadrennial) reporting
	1,568	1,176			Reduced duplicate testing
	941	706			Reduced record keeping
	392	294			Reduced number of discrepancies
	449	337			Reduced examination preparation time
	<u>627</u>	<u>470</u>			Reduced overtime & backshift testing
Total Licensee Savings	15,556	11,667	150,310	114,959	
Total NRC and Licensee Savings	15,568	11,676	150,424	115,046 (Years 1 through 15)	

Note 1: The summation of the first year value with the discounted flow of funds for years 2 through 15.

OPTION 3 VALUE IMPACT ANALYSIS
(In Thousands of Dollars)

IMPACTS (COSTS)	YEAR 1	ANNUAL VALUE YEARS 2-15	3 % DISCOUNT (Note 1)	7 % DISCOUNT (Note 1)	
NRC Cost					
	327				Rulemaking
	61				Revise RG 1.149
	22				Revise NUREG-1021 (exam standards)
	28				Implementation workshop
	39	29			Increase review for manipulations
	3	2			Increase examination preparation for simulator review
	<u>53</u>	<u>5</u>			Train NRC examiners
 Total NRC Cost	 533	 36	 956	 845	

Note 1: The summation of the first year value with the discounted flow of funds for years 2 through 15.

OPTION 3 VALUE IMPACT ANALYSIS (CONTINUED)
(In Thousands of Dollars)

IMPACTS (COSTS)	YEAR 1	ANNUAL VALUE YEARS 2-15	3 % DISCOUNT (Note 1)	7 % DISCOUNT (Note 1)	
Licensee Cost					
	3,136	784			Create cycle-specific core model
	980				Develop and validate reactivity scenarios
	1,568				Revise simulator configuration management
	4,704				Revise simulator test program
	1,568				Revise administrative procedures
	3,136				Revise training program
	784				Implementation workshop
	706	133			Train licensee instructors
	1,187				Develop scenario accreditation criteria
	<u>3</u>	<u>2</u>			Increase examination preparation for simulator review
Total Licensee Cost	17,772	919	28,387	25,602	
Total NRC and Licensee Cost	18,305	955	29,343	26,447	
Net Value Calculation (Years 1-15)			120,081	88,599 (Years 1 through 15)	

Note 1: The summation of the first year value with the discounted flow of funds for years 2 through 15.

Decision Rationale (Recommended Option)

On the basis of the analysis, it is recommended that Option 3, "Integrated Rulemaking" rather than Option 1 or Option 2 be adopted because it reduces unnecessary burden and provides significant savings for the industry while maintaining NRC's reasonable assurance of simulator fidelity and eligibility of operator and senior operator applicants. Option 3 also provides the greatest operating flexibility to facility licensees in structuring simulator support programs to support changing training objectives and revised industry standards. Although the implementation of Option 3 would entail costs on the part of both NRC and the industry for one-time revision of existing programs, the regulatory analysis suggests that the industry could recover these costs in the immediate following years for a net gain.

In addition, the final rule will revise the periodic scheduling and reporting of test results that are currently required on a quadrennial basis. The revised final regulation will allow facility licensees to voluntarily adjust their performance test programs consistent with user needs as defined by their accredited training programs and to remove obstacles to voluntary implementation of improved revisions of the national standard, that, as endorsed by the NRC, focuses on the training and examination environment in which the simulator will be used (whereas earlier national standards appropriately focused on the initial construction of simulators).

Implementation

This action is being enacted through a final rule, with implementation to begin immediately following enactment. No impediments to implementation of the recommended alternative, that is, Option 3, have been identified. The final rule will be implemented after it is published in the *Federal Register* notice.

References

1. U.S. Nuclear Regulatory Commission, "Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations," Regulatory Guide 1.149, Revision 2, Washington, D.C., April 1996.
2. U.S. Nuclear Regulatory Commission, Draft Regulatory Guide DG-1080 (Proposed Revision 3 of Regulatory Guide 1.149) "Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations," Draft DG-1080, Revision 1, Washington, D.C., August 1999.
3. U.S. Nuclear Regulatory Commission, "Qualification and Training of Personnel for Nuclear Power Plants," Regulatory Guide 1.8, Revision 3, Washington, D.C., May 2000.
4. U.S. Nuclear Regulatory Commission, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," NUREG/BR-0058, Revision 3, Washington, D.C., June 2000.
5. U.S. Nuclear Regulatory Commission, "Operator Licensing Examination Standards for Power Reactors," NUREG-1021, Revision 8, Washington, D.C., April 1999.
6. U.S. Nuclear Regulatory Commission, "Rulemaking Plan for Changes to 10 CFR Part 55 to Reduce Unnecessary Regulatory Burden Associated With the Use of Simulation Facilities in Operator Licensing," SECY-99-225, Washington, D.C., September 1999.
7. U.S. Nuclear Regulatory Commission, "Proposed Rule: Revision of 10 CFR Part 55, "Operators' Licenses," Regarding the Use of Simulation Facilities in Operator Licensing," SECY-00-0083, Washington, D.C., April 2000.
8. American National Standard Institute/ American Nuclear Society, "Nuclear Power Plant Simulators for Use in Operator Training," ANSI/ANS-3.5-1981.
9. American National Standard Institute/ American Nuclear Society, "Nuclear Power Plant Simulators for Use in Operator Training," ANSI/ANS-3.5-1985.
10. American National Standard Institute/ American Nuclear Society, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," ANSI/ANS-3.5-1993.
11. American National Standard Institute/ American Nuclear Society, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," ANSI/ANS-3.5-1998.

May 29, 2001

MEMORANDUM TO: William D. Travers
Executive Director for Operations

FROM: Joseph Murphy, Chairman **/RA/**
Committee To Review Generic Requirements

SUBJECT: MINUTES OF THE COMMITTEE TO REVIEW GENERIC
REQUIREMENTS MEETING NUMBER 363

The Committee To Review Generic Requirements (CRGR) held the Committee's 363rd meeting on Monday, May 21, 2001, from 10:30 a.m. to 11:30 a.m. Attachment 1 contains the attendance list of this meeting. The purpose of the meeting was to discuss:

- Final rulemaking to amend 10 CFR Part 55, "Operators' Licenses," "Operator License Eligibility and Use of Simulation Facilities in Operator Licensing" including analysis of public comments (ADAMS Accession Nos. ML011240186 and ML011420349).
- Revision 3 of Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations" (ADAMS Accession No. ML011420481).
- "NRC Staff Responses to Public Comments Regarding Draft Regulatory Guide DG-1080" [1.149] (ADAMS Accession Nos. ML011240237).
- "Final Rule Regulatory Analysis" (ADAMS Accession No. ML011240217).

The members commended the staff on the clarity of the Federal Register Notice and the high quality of the Regulatory Analysis. The Committee found no backfits in these documents, after they were revised to resolve the Committee's comments.

Mr. Bruce Boger, Director, Division of Inspection Program Management (DIPM), Office of Nuclear Reactor Regulation (NRR), provided background on the rule change. He compared the experience with simulators in 1987 when simulator regulations in 10 CFR Part 55.45 were revised, with today. He recalled that nuclear power plants used to trip four or five times a year, which provided training opportunities for operator license candidates, while plants typically trip less than once a year now. Without those training opportunities, licensees cycled their plants in the mid-1990s to provide operator training, which was an unnecessary regulatory burden.

Ms. Clare Goodman, NRR/DIPM, Operator Licensing, Human Performance and Plant Support Branch, discussed the final 10 CFR 55 rule changes; her slide presentation may be found in Attachment 2 (ADAMS Accession No. ML011410431). The final rule allows operator licensing candidates to fulfill a portion of their required experience by manipulating a plant-reference

simulator instead of the plant; removes requirements for facility licensee certification of simulators; and eliminates routine, quadrennial reports to the NRC identifying uncorrected performance test failures. The NRC will have continued assurance of simulator fidelity because licensees will be required by 10 CFR Part 55.46 to conduct performance testing, to correct simulator discrepancies through their corrective action programs (which are monitored in the NRC's oversight process), and to make results of performance test failures available on site so inspectors can verify whether operator examinations should be conducted. The rule requires that when a plant reference simulator is used to perform control manipulations, it must replicate the nuclear and thermal hydraulic characteristics of the most recent core load of the reference plant. Five significant control manipulations must be completed without procedural or simulator performance exceptions. Any of these manipulations may be done on the simulator or the plant itself. This final rule does not affect on-the-job training requirements, which will still continue. None of the fifteen public commenters expressed concern about backfits or the Regulatory Analysis. Burden reduction will be a positive net value for the industry over time. Some licensees could incur initial costs to update their simulator core models, to eliminate simulator reporting to the NRC, and to update their commitment to the 1998 standard. NRR will continue discussing these changes with regional examiners and will change the inspection procedures as soon as these rule changes are approved. A backfit analysis was not prepared because the rule does not propose new requirements (as licensee commitment to ANSI/ANS-3.5-1998 is voluntary), but relaxes or reduces existing requirements.

Ms. Goodman noted that Revision 3 of Regulatory Guide 1.149 will be published in conjunction with the 10 CFR Part 55 changes. This guide endorses ANSI/ANS-3.5-1998 without exception and with only minor clarifications. Prior editions of ANSI/ANS-3.5 remain acceptable methods of meeting NRC regulations. While licensees may change their commitment to a revision of the standard via their commitment management program, the NRC expects a simulator be to maintained in accordance with a single revision of the standard. Licensees may want to endorse the 1998 standard because it may fit better with their accreditation and training programs, and their needs for qualification and other exams. Questions were asked during public comment, but no one expressed backfit concerns. As a result, NRR will meet with licensees after the rule changes are issued to discuss these questions and the NRC responses. There are no backfit considerations because licensees may retain their current commitments.

Minor changes in the Federal Register Notice amending 10 CFR Part 55, Regulatory Guide 1.149, and the "Staff Responses to Public Comment Regarding Draft Regulatory Guide DG-1080 [1.149] Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations" requested by CRGR Members, were subsequently reviewed by the CRGR staff, per the CRGR Chairman's request, and found to have resolved the Committee's concerns. The revised ADAMS versions of these documents are referenced herein.

The CRGR believes the proposed final rule change and regulatory guide do not impose a backfit and should be approved.

Questions about these meeting minutes should be referred to Bob Spence at RAS2@nrc.gov.

Attachments: As stated

cc w/atts.: See attached list

Memorandum dated: 05/29/01

SUBJECT: MINUTES OF THE COMMITTEE TO REVIEW GENERIC REQUIREMENTS
MEETING NUMBER 363

cc w/atts.:

Chairman Meserve

Commissioner Dicus

Commissioner Diaz

Commissioner McGaffigan

Commissioner Merrifield

SECY

WKane, DEDR

CPaperiello, DEDMRS

RBorchardt, OE

HBell, OIG

KCyr, OGC

JLarkins, ACRS

HMiller, R-I

LReyes, R-II

JDyer, R-III

EMerschhoff, R-IV

MVirgilio, NMSS

AThadani, RES

SCollins, NRR

CRGR members

MMayfield, RES

STurk, OGC

BBorchardt, NRR

BBoger, NRR

GTracy, NRR

DTrimble, NRR

CGoodman, NRR

LVick, NRR

CRGR MEETING No. 363
LIST OF ATTENDEES
(May 21, 2001)

CRGR Members

J. Murphy, Chairman
M. Mayfield, RES (alternate)
B. Mallett, R-II
S. Turk, OGC (alternate)
B. Sheron, NRR

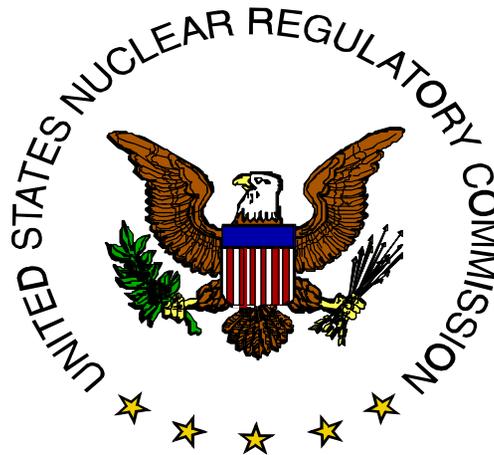
NRC Staff

B. Borchardt, NRR
B. Boger, NRR
G. Tracy, NRR
D. Trimble, NRR
C. Goodman, NRR
L. Vick, NRR

CRGR Staff

R. Spence, RES

Final Rulemaking On the Use of Simulation Facilities (10 CFR Part 55) Regulatory Guide 1.149



CRGR Briefing

May 21, 2001

Clare Goodman (IOLB, 415-1047)
Lawrence Vick (IOLB, 415-3181)

10 CFR Part 55

Background

- Rulemaking plan SECY-99-225 (September, 1999)
- Regulatory analysis prepared
- Proposed rule SECY-00-0083 (April, 2000)
- SRM (May, 2000)
- Proposed rule *Federal Register* notice (July, 2000)

10 CFR Part 55

Operator License Eligibility and the Use of Simulation Facilities in Operator Licensing

- (1) Applicants for operator licenses may fulfill a portion of the required experience prerequisites by manipulating a plant-referenced simulator as an alternative to the actual plant
- (2) Removes requirements for facility licensee certification of simulation facilities
- (3) Eliminates the necessity for routine (quadrennial) submittal of reports to the NRC for review that identify any uncorrected performance test failures

10 CFR Part 55

Continued assurance of simulator fidelity is provided because a facility licensee must

(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 onsite

(4) maintain the provisions for license application, examination, and test integrity consistent with 10 CFR 55.49

10 CFR Part 55

When a plant-referenced simulator is used to provide for performance of required control manipulations, the final rule requires that:

- Simulator models must 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
- Significant control manipulations must be completed without procedural exceptions, simulator performance exceptions, or deviation from the approved training scenario sequence

10 CFR Part 55

Public Comments

No backfits/ Reg. Analysis concerns expressed by 15 commenters

- Nuclear Energy Institute (NEI)
- Standards Committee Working Group (WG) ANS-3.5
- Professional Reactor Operators Society (PROS)
- 9 Facility Licensees (Utilities)
- 3 Individuals

10 CFR Part 55

Backfit Considerations

- Backfit analysis was not prepared because rule does not impose new requirements or backfits as defined in 10 CFR 50.109(a)(1)
- Rule modifies, relaxes and reduces existing requirements
- Industry is expected to recover initial costs ($\approx 18\text{M}$) and the rule would be an overall burden reduction (positive net value of $\approx 88\text{M}$)

Regulatory Guide 1.149

"Nuclear Power Plant Simulation Facilities For Use in Operator Training and License Examinations"

- Revision 3 to be published with 10 CFR 55 changes
- Endorses ANSI/ANS-3.5-1998 without exceptions and with minor clarifications
- Prior editions of ANSI/ANS-3.5 remain acceptable methods of meeting the regulations
- Draft regulatory guide (RG 1.149) was published in *Federal Register* (August, 1999)

Regulatory Guide 1.149

History and Background of ANSI/ANS Standard

- In 1981 the industry developed ANSI/ANS-3.5-1981 which has been revised 3 times: 1985, 1993, and 1998
- ANSI/ANS-3.5-1985 has prescriptive, stand-alone testing of system models and simulator training capabilities as part of initial simulator acceptance testing
- ANSI/ANS-3.5-1998 has performance testing that includes operability and scenario-based testing
- ANSI/ANS-3.5-1998 reduces inconsistencies between needs of licensee programs and simulator performance testing

Regulatory Guide 1.149

Public Comments

No backfit concerns expressed by 7 commenters

- 6 utilities or facility licensees
- 1 facility training organization

Regulatory Guide 1.149

Backfit Considerations

- Prior editions of ANSI/ANS-3.5 remain acceptable methods of meeting the regulations
- Adoption of ANSI/ANS-3.5-1998 is voluntary, therefore no backfit concerns are warranted



UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

May 15, 2001

MEMORANDUM TO: William D. Travers
Executive Director for Operations

FROM: *for* John T. Larkins, Executive Director
Advisory Committee on Reactor Safeguards

A handwritten signature in black ink, appearing to read "A. E. Lyons", written over the printed name of the Executive Director.

SUBJECT: PROPOSED FINAL RULEMAKING TO AMEND 10 CFR PART 55
AND ASSOCIATED REGULATORY GUIDE 1.149, REVISION 3

During the 482nd meeting of the Advisory Committee on Reactor Safeguards, May 10-11, 2001, the Committee considered the proposed final rulemaking to amend 10 CFR Part 55, "Operators' Licenses," regarding operator license eligibility and the use of simulation facilities in operator licensing; and proposed final Revision 3 of Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," and decided not to review these documents. The Committee has no objection to issuing the proposed final rule and associated Regulatory Guide 1.149, Revision 3.

Reference:

Memorandum dated May 2, 2001, from Bruce A. Boger, Nuclear Reactor Regulation, to John T. Larkins, Executive Director, ACRS, Subject: Final Rulemaking to Amend 10 CFR Part 55, "Operators' Licenses," Regarding Operator License Eligibility and the Use of Simulation Facilities in Operator Licensing; and Final Revision 3 of Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations."

cc: A. Vietti-Cook, SECY
J. Craig, EDO
I. Schoenfeld, EDO
S. Collins, NRR
B. Boger, NRR
C. Goodman, NRR
L. Vick, NRR
A. Thadani, RES



24722

Submission of Federal Rules Under the Congressional Review Act

President of the Senate

Speaker of the House of Representatives

GAO

Please fill the circles electronically or with black pen or #2 pencil.

1. Name of Department or Agency

U.S. Nuclear Regulatory Commission

2. Subdivision or Office

Office of Nuclear Reactor Regulation

3. Rule Title

10 CFR Part 55, "Operators' Licenses," Regarding Operator License Eligibility and the Use of Simulation Facilities in Operator Licensing

4. Regulation Identifier Number (RIN) or Other Unique Identifier (if applicable)

[7590-01-P1]

5. Major Rule Non-major Rule

6. Final Rule Other

7. With respect to this rule, did your agency solicit public comments? Yes No N/A

8. Priority of Regulation (fill in one)

Economically Significant; or Significant; or Substantive, Non Significant

Routine and Frequent or Informational/Administrative/Other (Do not complete the other side of this form if filled in above.)

9. Effective Date (if applicable)

10. Concise Summary of Rule (fill in one or both) attached stated in rule

Submitted by: _____ (signature)

Name: _____

Title: _____

For Congressional Use Only:

Date Received: _____

Committee of Jurisdiction: _____



24722

	Yes	No	N/A
A. With respect to this rule, did your agency prepare an analysis of costs and benefits?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. With respect to this rule, by the final rulemaking stage, did your agency			
1. certify that the rule would not have a significant economic impact on a substantial number of small entities under 5 U.S.C. § 605(b)?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. prepare a final Regulatory Flexibility Analysis under 5 U.S.C. § 604(a)?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
C. With respect to this rule, did your agency prepare a written statement under § 202 of the Unfunded Mandates Reform Act of 1995?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
D. With respect to this rule, did your agency prepare an Environmental Assessment or an Environmental Impact Statement under the National Environmental Policy Actg (NEPA)?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
E. Does this rule contain a collection of information requiring OMB approval under the Paperwork Reduction Act of 1995?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Did you discuss any of the following in the preamble to the rule?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
• E.O. 12612, Federalism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• E.O. 126630, Government Actions and Interference with Constitutionally Protected Property Rights	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• E.O. 12866, Regulatory Planning and Review	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• E.O. 12875, Enhancing the Intergovernmental Partnership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• E.O. 12988, Civil Justice Reform	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Other statutes or executive orders discussed in the preamble concerning the rulemaking process (please specify)			

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[7590-01-P]

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[7590-01-P]

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