

RULEMAKING

NOTATION VOTE

SECY-00-0083

April 12, 2000

FOR: The Commissioners
FROM: William D. Travers
Executive Director for Operations
SUBJECT: PROPOSED RULE: REVISION OF 10 CFR PART 55, "OPERATORS' LICENSES," REGARDING THE USE OF SIMULATION FACILITIES IN OPERATOR LICENSING

- [PURPOSE:](#)
- [BACKGROUND:](#)
- [DISCUSSION:](#)
- [RESOURCES:](#)
- [COORDINATION:](#)
- [RECOMMENDATION:](#)

PURPOSE:

To obtain Commission approval for publication of the proposed rule that would amend [10 CFR Part 55](#), "Operators' Licenses." The proposed rule would 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 use of the actual plant. In addition, the proposed rule would remove current requirements for certification of simulation facilities and routine submittal of simulator performance test reports to the NRC for review. Finally, Part 55 definitions are being revised by the proposed rule.

BACKGROUND:

In [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," dated September 8, 1999, the staff proposed a rulemaking plan to reduce unnecessary regulatory burden associated with establishing license eligibility for operator and senior operator applicants, and to address industry concerns regarding the use of simulation facilities in operator licensing. The Commission approved the rulemaking plan in a staff requirements memorandum ([SRM](#)) issued on October 5, 1999.

DISCUSSION:

The proposed rule, which is provided in the attached notice of proposed rulemaking ([Attachment 1](#)), would amend 10 CFR Part 55, "Operators' Licenses," to 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 use of the actual plant. Where simulators are used to provide control manipulation experience, the proposed rule requires simulator models to replicate nuclear and thermal-hydraulic characteristics of the reactor core in the unit at the time of the examination. 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 ensure that experience gained on the simulator essentially replicates that obtained from actual control manipulations on the plant. Thus, to the extent that such experience contributes to the overall training and readiness of license applicants for plant operation, safety is maintained.

In addition, the proposed rule would remove current requirements for certification of simulation facilities and routine submittal of simulator performance test reports to the NRC for review. Absent certification, assurance of simulator suitability will be provided through NRC reviews and validation of operating test scenarios, with review of performance test results and uncorrected modeling or hardware discrepancies, if needed. Simulator suitability supports effective training and operator performance assessment and reinforces the knowledge, skills, and abilities necessary for safe operation of the facility. If the simulator is found by such review to be unsuitable, the simulator may not be used to conduct an operating test, requalification training, or for performing control manipulations.

Finally, 10 CFR Part 55 definitions are being revised by the proposed rule. The first definition change would clarify, in a manner that will not impose additional requirements on licensees, the definition of "Performance testing" to comport with the definition in the most recent edition of the industry standard for use of nuclear plant simulators in operator training and examination (ANSI/ANS-3.5-1998). The second definition change would reference within the definition of a "Plant-referenced simulator," existing simulator requirements in 10 CFR Part 55 and the proposed revision allowing completion of certain on-the-job training prerequisites for license applicant eligibility on the simulator. The third definition change would include part-task and limited scope simulator devices within the definition of "Simulator facility" since such devices are now referenced in the most recent edition of ANSI/ANS-3.5 and a request could be received for Commission approval of their use.

Since issuance of the SRM, the staff has briefed the Committee to Review Generic Requirements (CRGR) on the proposed rule change. The CRGR agreed with the proposed changes, provided that the rule change and associated Regulatory Guide (RG) 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," Revision 3, are presented to the CRGR before final issuance. The proposed regulatory guide describes methods acceptable to the NRC staff for complying with the Commission's regulations in 10 CFR Part 55 associated with the use of simulation facilities in operator licensing.

Simultaneously, the staff is continuing resolution of public comments on proposed RG 1.149, Revision 3. Comments received to date have been favorable but indicate the presence of many facility-unique implementation questions. The staff intends to combine and address implementation issues between the proposed rule and its associated regulatory guidance in a common implementation workshop. The regulatory analysis ([Attachment 2](#)) in the rulemaking plan provides for both revision of the regulatory guide and an implementation workshop.

RESOURCES:

The resources needed to complete this action are available from those resources currently budgeted for this purpose.

COORDINATION:

The Office of the General Counsel has no legal objection to the proposed rulemaking. The Advisory Committee on Reactor Safeguards reviewed the proposed rulemaking during its meeting on November 4-7, 1998, and issued a letter on November 13, 1998. The Office of the Chief Financial Officer has reviewed the Commission paper for resource impacts and has no objection to its content. The Office of the Chief Information Officer has reviewed the Commission paper for information technology and information management implications and concurs in it.

RECOMMENDATION:

That the Commission:

1. Approve, publication in the *Federal Register* of the attached notice of proposed rulemaking ([Attachment 1](#)).
2. Certify that this rule, if adopted, will not have a significant impact on a substantial number of small entities and satisfies the requirements of the Regulatory Flexibility Act, 5 U.S.C. 605(b).
3. Note:
 - a. The notice of proposed rulemaking ([Attachment 1](#)) will be published in the *Federal Register* for a 75-day public comment period;
 - b. The Regulatory Analysis ([Attachment 2](#)) will be available in the Public Document Room;
 - c. Neither an environmental impact statement nor an environmental assessment has been prepared because the provisions of this proposed rule are the types of actions described in the categorical exclusion in [10 CFR 51.22\(c\)\(1\)](#);
 - d. The Chief Counsel for Advocacy, 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. The appropriate congressional committees will be informed;
 - f. The proposed rule contains information collection requirements that are subject to review by the Office of Management and Budget (OMB). An OMB review package is being prepared and will be submitted to OMB in the near future;
 - g. In accordance with the National Technology Transfer and Advancement Act of 1995, the staff attempted to identify voluntary consensus standards that could be used instead of the proposed rule. No voluntary consensus standard was identified. The staff will consider using a voluntary consensus standard if an appropriate standard is identified in public comments on the proposed rule, as discussed in the *Federal Register* notice;
 - h. A press release will be issued by the Office of Public Affairs when the proposed rulemaking is filed with the Office of the Federal Register; and
 - i. Copies of the *Federal Register* notice of proposed rulemaking will be distributed to all power reactor licensees. The notice will be sent to other interested members of the public upon request.

/RA by Frank Miraglia Acting For/

William D. Travers
Executive Director for Operations

Contact: David Trimble, NRR
(301) 415-1031

Attachments: 1. [Federal Register Notice](#)
2. [Regulatory Analysis](#)

ATTACHMENT 1

[7590-01-P]

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: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations by allowing applicants for operator and senior operator licenses to fulfill a portion of the experience prerequisites for license eligibility by manipulating a plant-referenced simulator as an alternative to use of the actual plant. The proposed rule would amend 10 CFR Part 55, "Operators' Licenses," to 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 use of the actual plant. Where simulators are used to provide control manipulation experience, the proposed rule requires simulator models to replicate nuclear and thermal-hydraulic characteristics of the reactor core in the unit at the time of the examination. 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 ensures that experience gained on the simulator essentially replicates that obtained from control manipulations on the plant. Thus, to the extent that such experience contributes to the overall training and readiness of license applicants for plant operation, safety is maintained. In addition, the proposed rule would remove current requirements for certification of simulation facilities and routine submittal of simulator performance test reports to the NRC for review. Absent certification, assurance of simulator suitability will be provided through NRC reviews and validation of operating test scenarios, with review of performance test results and uncorrected modeling or hardware discrepancies, if needed. Simulator suitability supports effective training and operator performance assessment and reinforces the knowledge, skills, and abilities necessary for safe operation of the facility. If the simulator is found by such review to be unsuitable, the simulator may not be used to conduct an operating test, requalification training, or for performing control manipulations. Finally, three definitions in Part 55 are being revised. The first definition change would clarify, in a manner that will not impose additional requirements on licensees, the definition of "Performance testing" to comport with the definition in the most recent edition of the industry standard for use of nuclear plant simulators in operator training and examination (ANSI/ANS-3.5-1998). The second definition change would reference within the definition of a "Plant-referenced simulator," existing simulator requirements in Part 55 and the proposed revision allowing completion of certain on-the-job training prerequisites for license applicant eligibility on the simulator. The third definition change would include part-task and limited scope simulator devices within the definition of "Simulator facility" since such devices are now referenced in the most recent edition of ANSI/ANS-3.5 and a request could be received for Commission approval of their use.

DATES: Submit comments by [Insert the date 75 days after publication in the Federal Register]. Comments received after this date will be considered if it is practical to do so, but the Commission is able to assure consideration only for comments received on or before this date.

ADDRESSES: Submit written comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, Mail-Stop-O-16C1. Deliver written comments to One White Flint North, 11555 Rockville Pike, Rockville, Maryland, between 7:30 am and 4:15 pm on Federal workdays.

You may also provide comments via the NRC's interactive rulemaking website through the NRC home page (<http://www.nrc.gov>). This site provides the capability to upload comments as files (any format), if your web browser supports that function. For information about the interactive rulemaking website, contact Ms. Carol Gallagher, (301) 415-5905 (e-mail: CAG@nrc.gov). Copies of any comments received and certain documents related to this rulemaking may be examined at the NRC Public Document Room, 2120 L Street NW (Lower Level), Washington, DC. These same documents may be viewed and downloaded electronically via the rulemaking website.

Documents created or received at the NRC after November 1, 1999, 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), which provides text and image files of NRC's public documents. For more information, contact the NRC Public Document Room (PDR) Reference staff at 202-634-3273 or toll-free at 1-800-397-4209, or by email at pdr@nrc.gov.

FOR FURTHER INFORMATION CONTACT: Branch Chief, Operator Licensing, Human Performance and Plant Support Branch, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: (301) 415-1031; or by Internet electronic mail to jfc1@nrc.gov.

- **SUPPLEMENTARY INFORMATION:**
 - Introduction
 - Background
 - Discussion of Proposed Rule Changes
 - Section-by-Section Analysis
 - Issues for Public comment
 - Related Regulatory Activity
 - Referenced Documents
 - Plain Language
 - Environmental Impact: Categorical Exclusion
 - Paperwork Reduction Act Statement
 - Public Protection Notification
 - National Technology Transfer and Advancement Act Statement
 - Regulatory Analysis
 - Regulatory Flexibility Certification
 - Backfit Analysis
 - List of Subjects in Part 55
 - Amendments to 10 CFR Part 55
- **PART 55--OPERATOR'S LICENSES**
 - §55.4 Definitions.
 - § 55.8 Information collection requirements: OMB approval.
 - §55.31, How to apply
 - § 55.45 Operating tests.
 - §55.59 Requalification.

SUPPLEMENTARY INFORMATION:

Introduction

Section 107 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2137), requires the Nuclear Regulatory Commission to prescribe uniform conditions for licensing individuals as operators of production and utilization facilities and to determine the qualifications of these individuals and to issue licenses to such individuals. The regulations implementing these requirements are set out in Part 55 of Title 10, Chapter 1, of the Code of Federal Regulations. To assist licensees and others, the Commission also has issued regulatory guides and generic letters that provide guidance on acceptable methods of meeting these regulatory requirements.

The Commission has become increasingly aware of the need to update its operator licensing regulations and related regulatory guides. These revisions are needed to clarify the extent to which applicants for operator and senior operator licenses may 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, and to remove current requirements for certification of simulation facilities and routine submittal of simulator performance test reports to the NRC for review. The proposed rule changes would improve the operator licensing process. If adopted these revisions should achieve the following objectives: (1) allow applicants for operator and senior operator licenses to fulfill a portion of the experience prerequisites by performing five significant control manipulations on a plant-referenced simulator and/or the actual plant facility for which a license is sought; (2) maintain training integrity through a requirement that ensures adequate simulator replication of the plant and demonstrated fidelity for those simulators used to provide control manipulation experience; (3) remove current requirements for certification of simulation facilities; (4) eliminate routine submittal of simulator performance test reports to the NRC for review; and (5) maintain safety through NRC reviews to ensure simulator suitability for providing effective training in performance assessment of operator license applicants.

Background

On March 25, 1987 (52 FR 9453), the Commission published a final rule in the Federal register that amended 10 CFR Part 55 and became effective May 26, 1987. The amendment requires that an applicant successfully manipulate the controls of the facility for which a license is sought. Five significant control manipulations must be performed which affect reactivity or power level. The amendment also promulgated regulations for the use of simulators in the qualification and requalification of nuclear power plant operators and required certification of simulation facilities.

Discussion of Proposed Rule Changes

Subpart D - Revision of §55.31 to allow performance of control manipulations on the plant-referenced simulator

§55.31(a)(5), which currently requires that five significant control manipulations that affect reactivity or power level be

performed on the actual plant will be revised to allow those manipulations to be performed either on a plant-referenced simulator or on the actual plant, at the facility licensee's discretion. Eligibility for an operator license encompasses education, training, and experience factors. Reactivity manipulations are an operating experience requirement addressed by on-the-job training. Use of a plant-referenced simulator of appropriate fidelity for such manipulations is appropriate based upon improvements in simulator technology and thirteen years of successful experience in using plant-specific simulation facilities since the 1987 revision of Part 55. Modern plant-referenced simulation facilities in operation today are providing accurate and validated operator training and examination scenarios that convey realism in reactivity manipulations, other normal and abnormal procedure operations, complex plant operations, and emergency operating procedure evolutions, including simultaneous task management and faulted conditions. The proposed rule change will allow part of the plant operating experience requirement for license eligibility to be fully satisfied in a timely manner within the facility's accredited training program without impacting operation of the actual plant. The requirement of §55.31(a)(4) to complete the facility licensee's program of education, experience, and on-the-job training (OJT) as a prerequisite of license eligibility would not be affected by the proposed rule change. Performance of control manipulations which affect reactivity or power level constitutes only a small part of an applicant's preparedness to perform licensed duties and would continue to be implemented as a subset of OJT. If adopted, the rule change would alternatively allow use of the actual plant and/or the plant-referenced simulator for control manipulations, thus broadening the range of options available to facility licensees for selecting the most advantageous training method.

Although facility licensees' simulation facilities for the most part are state-of-the-art, the NRC has identified two areas of concern with respect to considering a plant-referenced simulator suitable for fulfilling the experience requirements of a license applicant. First, recognizing that the simulator may differ to a degree from the reference unit and to provide experience essentially replicating that obtained from control manipulations on the plant, reasonable measures should be taken to ensure that the simulated reactor core, at least for the directly associated models such as those for nuclear and thermal-hydraulic characteristics, represents the actual reactor core that will exist in the plant at the time the applicant is tested for a license. Second, the performance of the nuclear and thermal-hydraulic characteristics models must be tested to ensure that the simulator is capable of being used to satisfy predetermined objectives without significant performance discrepancies or deviation from the approved scenario sequence. To address these concerns and thereby maintain plant safety the proposed rule will add a requirement under §55.45(b) for licensees using a plant-referenced simulator to satisfy reactivity manipulation experience requirements to ensure that simulator models relating to nuclear and thermal-hydraulic characteristics replicate the core load that exists in the nuclear power unit for which a license is being sought at the time of the applicant's operating test and simulator fidelity has been demonstrated so that significant control manipulations are completed without procedural exceptions, simulator performance exceptions, or deviations from the approved training scenario sequence. This provision in the proposed rule thus links §55.45(b) with the proposed §55.31(a)(5).

Subpart E - Revision of §55.45 to remove current requirements for simulator certification and routine submittal of performance test reports

The proposed rule will delete requirements that have become outdated and burdensome to the facility licensees and are of limited value to the NRC in the following areas of §55.45(b): (1) certification of simulation facilities; (2) submittal of test schedule information; and (3) submittal of quadrennial test reports.

The 1987 revision of the rule provided a phased implementation schedule for the requirement that facility licensees who propose to use a simulation facility consisting solely of a plant-referenced simulator certify, by means of NRC Form 474, "Simulation Facility Certification," the availability of a simulation facility meeting Commission regulations. The certification requirement also contained associated requirements for submittal of test documentation and test schedules on a quadrennial basis. Licensees have certified plant-referenced simulators at all power reactor facilities, and the NRC staff's experience has shown the quadrennial reports to be of minimal value in assessing simulator suitability for testing of operators.

The proposed rule, will by means of an alternative regulatory approach that will not change substantive existing requirements, eliminate the need for certification and quadrennial reports. Absent certification, assurance of simulator suitability will be provided through NRC reviews and validation of operating test scenarios, with review of performance test results, and uncorrected modeling or hardware discrepancies, if needed. If the simulator is found by such review to be unsuitable, the simulator may not be used to conduct an operating test, requalification training, or for performing control manipulations to establish license applicant eligibility. The current requirement for more recent simulator test and performance data to remain onsite will not be changed.

Facility licensees proposing to use a simulator facility meeting the definition in §55.4 for a plant-referenced simulator are not required to submit an application for Commission approval of that simulator.

For cases in which licensees proposed to use a simulation facility not meeting the definition of a plant-referenced simulator, the Commission requires additional information to determine the acceptability of the simulator and thus will require an application for Commission approval.

Since 1987, the last time the Commission amended its regulations regarding the use of simulators, 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. This standard specifies full-scope, stand-alone testing of system models and simulator training capabilities as part of initial simulator acceptance testing. Licensees continue to test their plant-referenced simulators in the manner of initial development and to submit test schedules and reports on a quadrennial basis to comply with the 1987 final rule that requires periodic scheduling and reporting of test results to the NRC. The industry's approach to computer software development and simulator testing has changed considerably since 1987, and a

new approach has been codified through the issuance of the 1998 version of ANSI/ANS-3.5, Nuclear Power Plant Simulators for Use in Operator Training and Examination. 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 that is associated with the facility's planned simulator usage.

The proposed rule will eliminate the need for certification of simulation facilities to the NRC and the associated testing and reporting requirements that have become outdated by the 1998 revision of the national consensus standard ANSI/ANS-3.5.

If adopted, the proposed rule would eliminate duplicate testing for those licensees that choose to adopt the revised national standard. The proposed rule changes will neither require facility licensees to adopt a newly revised version of the national consensus standard nor will they require facility licensees to modify existing simulator support programs or practices. The proposed rule changes do not impose additional burden or increase the risks to the health and safety of any segment of the nuclear industry or the public.

If adopted, the proposed rule would allow facility licensees to voluntarily adjust their performance test programs consistent with end-user needs as defined by their accredited systems-approach-to-training (SAT) programs or to voluntarily conform existing simulation facility programs to new revisions of ANSI/ANS 3.5. Facility licensees' plant-referenced simulators are continually in the update and maintenance mode of their life-cycle as new computer technology and new plant information is incorporated into the simulation facility. Earlier revisions of the national consensus standard were not intended for today's highly technical, very complex, and sophisticated computer simulation programs that routinely encompass verification, validation, and documentation of a simulator's performance. Identification and resolution of discrepancies are a function of the licensees discrepancy reporting and resolution practices. The proposed rule and associated proposed Regulatory Guide 1.149, "Nuclear Power Simulation Facilities for Use in License Examinations," which would endorse ANSI/ANS-3.5-1998 without exceptions, would reduce apparent inconsistencies between the operational needs of facility licensee programs and simulator testing requirements, thereby relieving unnecessary regulatory burden and freeing resources for more effective developmental and validation testing associated with either simulator modification programs or the operator licensing training and examination processes.

Subpart A - Revision of §55.4, Definitions

Three definitions in 10 CFR Part 55 are being revised. The definition of "Performance testing," which is testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance, is revised, in a manner that will not impose additional requirements on licensees, to comport with the definition for such testing in the most recent edition of the industry standard for use of nuclear plant simulators in operator training and examination (ANSI/ANS-3.5-1998). The definition of a "Plant-referenced simulator," which is a simulator modeling the systems of the reference plant, is revised to reference within the definition existing simulator requirements in 10 CFR Part 55 and the proposed revision allowing completion of certain on-the-job training prerequisites for license applicant eligibility on the simulator. The definition of "Simulation facility," which describes the components that alone, or in combination, can be used for partial conduct of operating tests, is revised to include part-task and limited-scope simulator devices since such devices are now referenced in the most recent edition of ANSI/ANS-3.5 and a request could be received for Commission approval of their use.

Conforming changes to § 55.8 Information collection requirements: OMB approval

As a result of the previously described proposed changes to §55.45(b) that eliminate the simulator certification requirement, a conforming change to §55.8(c)(3) will delete Form 474, "Simulation Facility Certification," OMB approval No. 3150-0138, as currently referred to §55.45(b)(1)(iii) and § 55.45(b)(3)(iii).

Conforming changes to §55.59, Requalification

As a result of the previously described proposed changes to §55.45(b) that eliminate the simulator certification requirement, a conforming change to §55.59(c)(4)(iv) is proposed that will delete the terms "certified or approved" when referring to a simulation facility in this section.

Section-by-Section Analysis

Subpart D - Revisions to allow performance of control manipulations on the plant-referenced simulator

The proposed rule would add a statement that "The Commission may accept evidence of satisfactory performance of control manipulations as part of a Commission-approved training program by a trainee on a plant-referenced simulator acceptable to the Commission under Section 55.45(b) of this part in lieu of use of the actual plant. Control manipulations performed on the simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in Section 55.59(c)(3)(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."

By providing an option for licensee to use plant-referenced simulators for control manipulations, the proposed rule obviates the need for current provisions in Section 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.

Subpart E - Remove current requirements for simulator certification and routine submittal of performance test reports

10 CFR 55.45(b) provides regulations associated with the implementation and use of simulation facilities in operator licensing. §55.45(b)(1) addresses "Administration" of the operating test on a simulation facility. §55.45(b)(2) addresses "Schedule for facility licensees" with respect to submitting a plan by which its simulation facility will be developed and by which an application will be submitted for its use. §55.45(b)(3) addresses "Schedule for facility applicants" with respect to submitting a plan which identifies whether its simulation facility will conform with paragraph (b)(1)(i) or (b)(1)(ii) of this section at the time of application. §55.45(b)(4) addresses "Application for and approval of simulation facilities" with respect to using a simulation facility that is other than solely a plant-referenced simulator as defined in §55.4. §55.45(b)(5) addresses "Certification of simulation facilities" with respect to those facility licensees which propose, in accordance with paragraph (b)(1)(ii) of this section, to use a simulation facility consisting solely of a plant-referenced simulator. Facility licensees have communicated to the NRC and the NRC agrees that some or portions of the rule provisions discussed and identified in this paragraph are unnecessarily burdensome.

§55.45(b)(1)(ii) requires that, "A simulation facility consisting solely of a plant-reference simulator which has been certified to the Commission" be used in administering the operating test. The proposed rule would eliminate the requirement for certification of the simulation facility and more appropriately refer to the definition of a simulation facility as described in §55.4.

§55.45(b)(2) discusses, "Schedule for facility licenses." The proposed rule would eliminate this outdated item in its entirety.

§55.45(b)(2)(i) requires that, "Within one year after the effective date of this part, each facility licensee which proposes to use a simulation facility pursuant to paragraph (b)(1)(i) of this section, except test and research reactors, shall submit a plan by which its simulation facility will be developed and by which an application will be submitted for its use." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(2)(ii) requires that, "Those facility licensees which propose to conform with paragraph (b)(1)(i) of this section, not later than 42 months after the effective date of this rule, shall submit an application for use of this simulation facility to the Commission, in accordance with paragraph (b)(4)(i) of this section." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(2)(iii) requires that, "Those facility licensees which propose to conform with paragraph (b)(1)(ii) of this section, not later than 46 months after the effective date of this rule, shall submit a certification for use of this simulation facility to the Commission on Form NRC-474, "Simulation Facility Certification," available from Records and Reports Management Branch, Division of Information Support Services, U.S. Nuclear Regulatory Commission, Washington, DC 20555, in accordance with paragraph (b)(5)(i) of this section." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(2)(iv) requires that, "The simulation facility portion of the operating test will not be administered on other than a certified or an approved simulation facility after May 26, 1991." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(3) discusses, "Schedule for facility applicants." The proposed rule would eliminate this outdated item in its entirety.

§55.45(b)(3)(i) requires that, "For facility licensee applications after the effective date of this rule, except test and research reactors, the applicant shall submit a plan which identifies whether its simulation facility will conform with paragraph (b)(1)(i) or (b)(1)(ii) of this section at the time of application." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(3)(ii) requires that, "Those applicants which propose to conform with paragraph (b)(1)(i) of this section, not later than 180 days before the date when the applicant proposes that the Commission conduct operating tests, shall submit an application for use of its simulation facility to the NRC, in accordance with paragraph (b)(4)(i) of this section." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(3)(iii) requires that, "Those applicants which propose to conform with paragraph (b)(1)(ii) of this section, not later than 60 days before the date when the applicant proposes that NRC conduct operating tests, shall submit a certification for use of its simulation facility to the Commission on Form NRC-474, in accordance with paragraph (b)(5)(i) of this section." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(4) requires that, "*Application for and approval of simulation facilities.* Those facility licensees which propose, in accordance with paragraph (b)(1)(i) of this section, to use a simulation facility that is other than solely a plant-referenced simulator as defined in §55.4 shall -- ." The proposed rule would eliminate in its entirety this requirement and replace it with language to address "Commission-approved simulation facilities" whereby the Commission would approve a simulation facility if it finds that the simulation facility and its proposed use are suitable for the conduct of operating test for the facility licensee's reference plant, in accordance with paragraph (a) of this section.

§55.45(b)(4)(i) requires that, "In accordance with the plan submitted pursuant to paragraph (b)(2)(i) or (b)(3)(i) of this section, as applicable, submit an application for approval of the simulation facility to the Commission, in accordance with the schedule in paragraph (b)(2)(ii) or (b)(3)(ii) of this section, as appropriate. This application must include:" The proposed rule would eliminate the phrases "In accordance with the plan submitted pursuant to paragraph (b)(2)(i) or (b)(3)(i) of this section, as applicable" and "... in accordance with the schedule in paragraph (b)(2)(ii) or (b)(3)(ii) of this section, as appropriate." and replace its language to address those facility licensees which propose, in accordance with paragraph (b)(1)(i) of this section to use a simulation facility that is other than solely a plant-referenced simulator as defined in Section

55.4 and to also submit an application for approval of the simulation facility to the Commission that include certain items as described in §55.45(b)(2)(i)(A), (B), and (C).

§55.45(b)(4)(i)(A) requires that, "A statement that the simulation facility meets the plan submitted to the Commission pursuant to paragraph (b)(2)(i) or (b)(3)(i) of this section, as applicable;" The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(4)(ii) requires that, "The Commission will approve a simulation facility if it finds that the simulation facility and its proposed use are suitable for the conduct of operating tests for the facility licensee's reference plant, in accordance with paragraph (a) of this section." The proposed rule would eliminate in its entirety this requirement and replace it with language applicable to those facility licensees which use a plant-referenced simulator to establish prerequisites for operator license eligibility in accordance with §55.31(a)(5) and to provide in addition to existing performance testing required for significant control manipulations which affect reactivity; that simulator models relating to nuclear and thermal-hydraulic characteristics replicate the core load that exist in the nuclear power unit for which a license is being sought at the time of the applicants' operating test and 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.

§55.45(b)(4)(iii) requires that facility licensees, "Submit, every four years on the anniversary of the application, a report to the Commission which identifies any uncorrected performance test failures, and submit a schedule for correction of these performance test failures, if any." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(4)(iv) requires that facility licensees, "Retain the results of the performance test conducted until four years after the submittal of the application under paragraph (b)(4)(i), each report pursuant to paragraph (b)(4)(iii), or any reapplication under paragraph (b)(4)(iv) of this section, as appropriate." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(4)(v) requires that, "If the Commission determines, based upon the results of performance testing, that an approved simulation facility does not meet the requirements of this part, the simulation facility may not be used to conduct operating tests." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(4)(vi) requires that, "If the Commission determines, pursuant to paragraph (b)(4)(v) of this section, that an approved simulation facility does not meet the requirements of this part, the facility licensee may again submit an application for approval. This application must include a description of corrective actions taken, including results of completed performance testing as required for approval." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(4)(vii) requires that, "Any application or report submitted pursuant to paragraphs (b)(4)(i), (b)(4)(iii) and (b)(4)(vi) of this section must include a description of the performance testing completed for the simulation facility, and must include a description of performance tests, if different, to be conducted on the simulation facility during the subsequent four-year period, and a schedule for the conduct of approximately 25 percent of the performance tests per year for the subsequent four years." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(5), "*Certification of simulation facilities*" requires that, "Those facility licensees which propose, in accordance with paragraph (b)(1)(ii) of this section, to use a simulation facility that is other than solely a plant-referenced simulator as defined in §55.4 shall -- ." The proposed rule would eliminate in its entirety this requirement and replace it with language to address "*Acceptability of simulation facilities*" such that facility licensees which maintain a simulation facility for the conduct of operating test shall conform to the revised proposed rule and to provide assurance that approved or certified simulation facilities remain acceptable over a period time to meet the requirements paragraph (a) of this section.

§55.45(b)(5)(i) requires that facility licensees, "Submit a certification to the Commission that the simulation facility meets the Commission's regulations. The facility licensee shall provide this certification on Form NRC - 474 in accordance with the schedule in paragraph (b)(2)(iii) or (b)(3)(iii) of this section, as applicable." The proposed rule would eliminate in its entirety this requirement.

§55.45(b)(5)(ii) requires that facility licensees, "Submit, every four years on the anniversary of the certification, a report to the Commission which identifies any uncorrected performance test failures, and submit a schedule for correction of such performance test failures, if any." The proposed rule would partially eliminate this requirement. The facility licensee will have to make available for NRC review, prior to or concurrent with preparations for each operator licensing operating test or requalification program inspection results of any uncorrected performance test failures that will exist at the time of the operating test or requalification program inspection.

§55.45(b)(5)(iii) requires that facility licensees, "Retain the results of the performance test conducted until four years after the submittal of certification under paragraph (b)(5)(i), each report pursuant to paragraph (b)(5)(ii), or recertification under paragraph (b)(5)(v) of this section, as applicable." The proposed rule would revise the rule to require facility licensees to provide recurring assurance of fidelity by performance testing throughout the life of the simulation facility consistent with paragraphs 55.45(b)(2)(ii) and 55.45(b)(3)(i)(B) and only retain the results of performance test conducted for four years or until superseded by updated test results. The proposed rule would require the inclusion of provisions for maintaining examination and test integrity consistent with §55.49.

§55.45(b)(5)(iv) requires that, "If the Commission determines, based upon the results of performance testing, that a certified simulation facility does not meet the requirements of this part, the simulation facility may not be used to conduct operating tests." The proposed rule revises the language such that if the Commission determines, based upon the results of pre-examination scenario validation, a review of performance testing results, or uncorrected modeling or hardware discrepancies,

that a simulation facility consisting solely of a plant-referenced simulator does not meet the requirements of this part as defined §55.4 or the criteria in §55.45(b)(2)(ii) then the plant-referenced simulator may not be used to conduct operating tests, requalification, or control manipulations as described in §55.31(a), §55.45(b)(1), and §55.59(c)(3) of this of this part. Facility licensees proposing to use simulation facilities meeting the definition in §55.4 of a plant-referenced facility are not required to submit an application for Commission approval.

§55.45(b)(5)(v) requires that, "If the Commission determines, pursuant to paragraph (b)(5)(iv) of this section, that a certified simulation facility does not meet the requirements of this part, the facility licensee may submit a recertification to the Commission on Form NRC - 474. This recertification must include a description of corrective actions taken, including results of completed performance testing as required for recertification." The proposed rule eliminates this provision.

§55.45(b)(5)(vi) requires that, "Any certification report, or recertification submitted pursuant to paragraph (b)(5)(i), (b)(5)(ii) or (b)(5)(v) of this section must include a description of performance testing completed for the simulation facility, and must include a description of the performance tests, if different, to be conducted on the simulation facility during the subsequent four-year period, and a schedule for the conduct of approximately 25 percent of the performance tests per year for the subsequent four years." The proposed rule would eliminate in its entirety this requirement.

The proposed rule requirements associated with the implementation and use of simulation facilities would significantly reduce unnecessary burden for facility licensees and the NRC. The proposed rule will allow facility licensees greater flexibility to adjust their performance test programs consistent with user needs as defined by their accredited training programs, and encourage implementation of improved revisions of the national standard which, as endorsed by the NRC, would improve focus on the training and examination environment in which the plant-referenced simulator is used. In addition, the proposed rule will allow facility licensees to reduce cost.

Since §55.45(b) was last revised in March 1987 (52 FR 9453), facility licensees have continually improved and implemented sophisticated simulator modeling and replaced outdated computer hardware to ensure that operator and senior operator applicants as well as licensed operators are trained and qualified on a plant-referenced simulator.

Subpart A - Revisions of §55.4 Definitions

§55.4 defines performance testing as "Performance testing means testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance." The proposed rule would redefine performance testing as "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."

§55.4 defines plant-referenced simulator as "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. 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." The proposed rule would enhance the definition of plant-referenced simulator as "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. 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. A plant-referenced simulator is designed, implemented, and maintained such that it: (1) Is sufficient in scope and fidelity to allow conduct of the evolutions listed in paragraphs 55.45(a)(1) through (13), and 55.59(c)(3)(i)(A) through (AA), as applicable to the design of the reference unit; (2) Allows for the completion of on-the-job training experience prerequisites for license operator eligibility consistent with paragraph 55.45(b)(2)(ii)."

§55.4 defines simulation facility as "Simulation facility 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 candidates: (1) The plant, (2) A plant-referenced simulator, (3) Another simulation device." The proposed rule would update the definition of simulation facility to "Simulation facility 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 applicants: (1) The plant, (2) A plant-referenced simulator, (3) A Commission-approved simulator in accordance with §55.45(b)(2), (4) Another simulation device, including part-task and limited scope simulation devices."

Subpart A - General Provisions, § 55.8 Information collection requirements: OMB approval

§ 55.8(c)(3) identifies the information collection requirement and the control number under which the requirement is approved regarding Form 474, "Simulation Facility Certification," OMB approval No. 3150-0138. If adopted, the proposed rule would eliminate the need for the certification form.

Subpart F - Licenses, §55.59, Requalification

§55.59(c)(4)(iv) requires that, ".... After the provisions of §55.45(b) have been implemented at a facility, the certified or approved simulation facility must be used to comply with this paragraph." The proposed rule would eliminate the words "certified or approved" as a result of eliminating the certification requirement as described in the proposed rule §55.45(b).

Issues for Public comment

Comments concerning the content, level of detail specified, and the implementation of the proposed amendments are encouraged. Suggestions of alternatives other than those described in this notice and estimates of cost for implementation are encouraged. Since the intent of the proposed rule changes to §55.31(a)(5) and §55.45(b)(1) is to reduce unnecessary regulatory burden by providing acceptable methods to comply with the Commission's regulations, the NRC is particularly interested in receiving from the public comments on the following issues related to this proposed rule:

1. Are there rulemaking alternatives to this proposed rule that were not considered in the regulatory analysis for this proposed rule?
2. Are the revised definitions as used in §55.4 clearly defined?
3. Would the revised requirements permitting control manipulations to be performed on a plant-referenced simulator as prescribed in §55.31(a)(5) reduce unnecessary regulatory burden associated with establishing license eligibility for operators and senior operators and yet continue to maintain safety by ensuring that experience gained on the simulator essentially replicates that obtained from control manipulations on the plant?
4. Would the revised requirements in §55.45 to eliminate the need for certification of simulation facilities and duplicate testing and reporting requirements accomplish their intended purpose of eliminating unnecessary regulatory burden?
5. Would the proposed NRC reviews of simulators ensure requisite simulator suitability to support effective training and operator performance assessment and thereby maintain plant safety?

Related Regulatory Activity

NRC Endorsement of ANSI/ANS 3.5-1998

The staff has reviewed ANSI/ANS 3.5-1998 with respect to revision of Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in License Examinations." The 1998 revision of the standard was developed with full NRC participation and insight. Accordingly, the staff believes that those testing and fidelity concerns that have required exceptions and clarifications in the regulatory positions of the previous revisions of Regulatory Guide 1.149, are adequately addressed in this latest revision of the standard. The staff further believes that industry's concerns have been addressed in this latest revision of the standard. As noted in the introductory paragraph to the standard, "the consensus committee was balanced to ensure that competent, concerned, and varied interests have had an opportunity to participate." The staff is considering endorsing ANSI/ANS 3.5-1998 without the exceptions or clarifications that have characterized NRC's endorsement of previous revisions.

The staff noticed the availability for public Draft Guide DG-1080 (proposed Revision 3 of Regulatory Guide 1.149) on August 23, 1999 (64 FR 162). The public comment period closed on November 12, 1999. NRC Form-474 and the associated OMB clearance will also be modified to reflect NRC's endorsement of the 1998 revision of the standard upon final issuance of Regulatory Guide 1.149 and final Commission action on changes described in this proposed rule.

Facility licensees will not be required to automatically adopt the new standard. The 1993 revision is still recognized by ANS and the 1985 revision is considered to be a "historical" standard. Simultaneous endorsement of more than one version of the standard is consistent with both the NRC policy of evaluating the latest version of national consensus standards in terms of their suitability for endorsement by regulations or regulatory guides and the established regulatory position regarding simulators, allowing industry to establish recommended and required capabilities and acceptability criteria.

Referenced Documents

Copies of SECY-99-0225, DG-1080 (Proposed Revision 3 to Regulatory Guide 1.149), NRC Form 474, NUREG-1262, NUREG-1258, and NUREG-1021 are available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, DC.

Plain Language

The Presidential memorandum dated June 1, 1998, entitled, "Plain Language in Government Writing," directed the government's writing be in plain language. This memorandum was published June 10, 1998 (63 FR 31883). In complying with this directive, editorial changes have been made in this proposed amendment to improve readability of the existing language of the provisions being revised. These types of changes are not discussed further in this document. The NRC requests comment on the proposed rule specifically with respect to the clarity and effectiveness of the language used. Comments should be sent to the address listed under the ADDRESSES caption of the preamble.

Environmental Impact: Categorical Exclusion

The NRC has determined that this proposed rule is the type of action described as a categorical exclusion in 10 CFR 51.22(c)(1). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared for this proposed regulation.

Paperwork Reduction Act Statement

This proposed rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44

U.S.C. 3501 et seq). This rule has been submitted to the Office of Management and Budget for review and approval of the information collection requirements.

The public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information (i.e., preparing the examinations). The U.S. Nuclear Regulatory Commission is seeking public comment on the potential impact of the collection of information contained in the proposed rule and on the following issues:

1. Is the proposed collection of information necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility?
2. Is the estimate of burden accurate?
3. Is there a way to enhance the quality, utility, and clarity of the information to be collected?
4. How can the burden of the collection of information be minimized, including the use of automated collection techniques?

Send comments on any aspect of this proposed collection of information, including suggestions for reducing the burden, to the Information and Records Management Branch (T-6F-33), 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 (3150-0018, and 3150-0101), Office of Management and Budget, Washington, DC 20503.

Comments to OMB on the collections of information or on the above issues should be submitted by [insert date 30 days after publication in the Federal Register]. Comments received after this date will be considered if it is practical to do so, but assurance of consideration cannot be given to comments received after this date.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Technology Transfer and Advancement Act Statement

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless the use of such a standard is inconsistent with applicable law or otherwise impractical. Regulatory Guide 1.149 describes an acceptable method by which facility licensees might implement specific parts of this proposed rule and references the 1985, 1993, and 1998, revisions of voluntary standard American National Standards Institute/American Nuclear Society (ANSI/ANS) 3.5, "Nuclear Power Plant Simulators for Use in Operator Training and Examination."

Comments are being solicited, particularly with respect to effects of application of ANSI/ANS 3.5-1998 on existing simulator support and operator training programs and perceived compatibility with the proposed regulations. Comments are also being solicited with respect to applicability of earlier versions of ANSI/ANS 3.5 or applicability of standards and guidance other than ANSI/ANS 3.5 for use in training and examination of operators at nuclear power plants.

Regulatory Analysis

The Commission has prepared a regulatory analysis on this proposed regulation. The analysis examines the costs and benefits of the alternatives considered by the Commission. The regulatory analysis is available for inspection in the NRC Public Document Room, 2120 L Street NW (Lower Level), Washington, DC. Single copies of the analysis may be obtained from the Branch Chief, Operator Licensing, Human Performance and Plant Support Branch, Office Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, at 301-415-3173 or by e-mail at jfc@nrc.gov. The Commission requests public comment on the regulatory analysis. Comments on the analysis may be submitted to the NRC as indicated under the ADDRESSES heading.

Regulatory Flexibility Certification

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 605(b)), the Commission certifies that this rule will not, if issued, have a significant economic impact on a substantial number of small entities. This proposed 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 Small Business Size Standards set out in regulations issued by the Small Business Administration at 13 CFR Part 121.

Backfit Analysis

The NRC has determined that the backfit rule does not apply to this proposed rule; therefore, a backfit analysis is not required for this proposed rule because these amendments do not involve any provisions that would impose backfits as defined in 10 CFR 50.109(a)(1).

Facility licensees would not be required by this rulemaking to change existing programs or to adopt new regulatory guidance.

Rather, the proposed rule would permit training to be conducted on five significant control manipulations at either the facility or a plant-referenced simulator. The proposed rule would add criteria on simulator fidelity assurance in order to support the proposed changes permitting simulator training of five significant control manipulations, and would clarify that the requirements of §55.45(b) apply to all planned uses of the simulation facility. The proposed rule would also eliminate certification of simulation facilities and submittal of quadrennial test reports and schedule information.

All of the proposed changes constitute either permissible relaxations from current requirements or provide an alternative regulatory approach without changing substantive existing requirements. Accordingly, the proposed rule's provisions do not constitute a backfit and a backfit analysis need not be proposed. However, the staff has prepared a regulatory analysis which identifies the benefits and costs of the proposed rule, and evaluates other options for addressing the identified issues. As such, the regulatory analysis constitutes a "disciplined approach" for evaluating the merits of the proposed rule and is consistent with the underlying intent of the Backfit Rule.

List of Subjects in Part 55

The following subjects are addressed in Part 55; General Provisions, Exemptions, Medical Requirements, Applications, Written Examinations and Operating Test, Licenses, Modifications and Revocation of Licenses, and Enforcement.

Amendments to 10 CFR Part 55

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. 553; notice is hereby given that the NRC is proposing to adopt the following amendments to 10 CFR Part 55.

PART 55--OPERATOR'S 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 sec. 306, 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 "Performance Testing," "Plant-referenced Simulator," and "Simulation facility," are revised to read as follows:

§55.4 Definitions.

* * * * *

"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.

* * * * *

"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. 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. A plant-referenced simulator is designed and implemented such that it:

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

(2) Allows for the completion of on-the-job training experience prerequisites for licensed operator applicant eligibility consistent with paragraph 55.45(b)(3)(i).

* * * * *

"Simulation facility" 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 applicants or to establish on-the-job training experience prerequisites for operator license eligibility:

(1) The plant,

(2) A plant-referenced simulator,

(3) A Commission-approved simulator in accordance with §55.45(b)(2).

(4) Another simulation device, including part-task and limited scope simulation devices.

* * * * *

3. In §55.8, paragraph (b) and (c) 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 §§55.23, 55.25, 55.27, 55.31,55.35, 55.47, 55.53, 55.57, and 55.59.

(C) *****

(1) *****

(2) *****

(3) In §§55.41, 55.43, 55.45, and 55.59, clearance is approved under control number 3150-0101.

* * * * *

4. In §55.31, "How to apply," 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 the facility for which a license is sought. At a minimum, five significant control manipulations must be performed which affect reactivity or power level. Evidence of satisfactory performance of control manipulations may be demonstrated on a plant-referenced simulator that meets the requirements of §55.45(b)(3). Control manipulations performed on the simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in §55.59(c)(3)(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, Operating Licenses, paragraph (b) is revised to read as follows:

§ 55.45 Operating tests.

* * * * *

(b) Implementation

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

(i) A simulation facility which the Commission has approved for use after application has been made by the facility licensee, or

(ii) A plant-referenced simulator as defined in §55.4.

(2) *Commission-approved simulation facilities.*

(i) Facility licensees who propose to use a simulation facility in the administration of the operating test in accordance with paragraph (b)(1)(i) of this section shall submit an application for approval of the simulation facility to the Commission. This application must include:

(A) A description of the components of the simulation facility which are intended to be used for each part of the operating test, unless previously approved; and

(B) A description of the performance tests as part of the application, and the results of such tests.

(C) A description of the procedures for maintaining examination and test integrity consistent with the requirements of §55.49.

(ii) The Commission will approve a simulation facility if it finds that the simulation facility and its proposed use are suitable for the conduct of operating tests for the facility licensee's reference plant under paragraph (a) of this section.

(3) *Plant-referenced simulators.*

(i) Facility licensees which propose to use a plant-referenced simulator to meet the experience requirements in §55.31(a)(5) must ensure that:

(A) the plant-referenced simulator utilizes models relating to nuclear and thermal-hydraulic characteristics that replicate the core load that exists in the nuclear power unit for which a license is being sought at the time of the applicant's operating test.

(B) 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.

(ii) If the Commission determines that a simulation facility consisting solely of a plant-referenced simulator does not meet either the definition of a plant-referenced simulator as defined in §55.4, or the criteria in §55.45(b)(4)(A) and (D), the Commission will not accept the plant-referenced simulator for conducting operating tests as described in §55.45(b)(1) 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).

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

(A) Conduct performance testing throughout the life of the simulation facility in a manner sufficient to assure that the criteria of paragraphs 55.45(b)(4)(C) and 55.45(b)(3)(i)(B) as applicable, 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.

(B) Correct scenario validation, performance test, modeling, and hardware discrepancies.

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

(D) Maintain the provisions for examination and test integrity consistent with §55.49.

* * * * *

6. In §55.59, Requalification, 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. Where 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 shall accurately reproduce the operating characteristics of the facility involved and the arrangement of

the instrumentation and controls of the simulator shall closely parallel that of the facility involved. After the provisions of §55.45(b) have been implemented at a facility, the simulation facility must be used to comply with this paragraph.

* * * * *

Dated at Rockville, Maryland, this ____ day of _____, 2000.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission

REVISION OF 10 CFR PART 55 - OPERATORS' LICENSES

(10 CFR Parts 55.31(a)(5), §55.45(b), §55.4, and §55.59(c)(4)(iv))

Use of Simulation Facilities in Operator Licensing

- STATEMENT OF THE PROBLEM AND OBJECTIVE (REGULATORY ISSUE)
- BACKGROUND (EXISTING REGULATORY FRAMEWORK)
- HOW THE REGULATORY PROBLEM WILL BE ADDRESSED BY RULEMAKING
- IDENTIFICATION AND ANALYSIS OF ALTERNATIVE APPROACHES
 - OPTION 1 - STATUS QUO
 - OPTION 2 - DELETE CURRENT REQUIREMENTS
 - OPTION 3 - INTEGRATED RULEMAKING
- DISCUSSION
- BACKFIT RULE CONCERNS
- REGULATORY IMPACT - COSTS AND BENEFITS
- OPTION 3 VALUES (BENEFITS)
- OPTION 3 IMPACTS (COSTS)
- ASSUMPTIONS USED FOR COST BENEFIT ESTIMATES
- OPTION 3 VALUE (BENEFITS) ANALYSIS
- OPTION 3 IMPACTS (COSTS) ANALYSIS
- DECISION RATIONAL (RECOMMENDED OPTION)
- IMPLEMENTATION
- REFERENCES

STATEMENT OF THE PROBLEM AND OBJECTIVE (REGULATORY ISSUE)

10 CFR 55.31(a)(5) requires that five significant control manipulations which 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, 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. 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 its present form, have become an impediment to facility licensees who 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.

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 which 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 American National Standards Institute/American Nuclear Society (ANSI/ANS) national standard 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. 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 industry's standard through the issuance of the 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 obstacle to change.

HOW THE REGULATORY PROBLEM WILL BE ADDRESSED BY RULEMAKING

The requested proposed rulemaking will promote more effective plant operating experience for initial license applicants through improved on-the-job training by allowing use of the simulation facility in lieu of the actual plant to satisfy the license eligibility requirement for performance of control manipulations that affect reactivity or power level.

The proposed rule also will 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. This proposed rule will bring the current requirements up to date with evolutionary changes in simulation technology and training and examination programs. The proposed rule will clarify minimum simulator capabilities in place of the existing requirements for simulator certification and pre-scheduled, stand-alone performance testing. The proposed rule will expedite full implementation of the national standard that the wording of the current rule has created.

The proposed rule will directly reduce unnecessary regulatory burden by eliminating the current requirement for submittal of certification and performance test reports on a quadrennial basis.

The proposed rule will allow the requirement for performing five significant control manipulations that affect reactivity to be performed on the actual plant or on the simulation facility. The operating experience requirement will be fully satisfied as a prerequisite to license eligibility. The distinction between "cold" and "hot" facility licenses will be deleted from the control manipulations requirement.

The proposed rule deletes the requirement for prescriptive simulator test performance and scheduling. 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.

The proposed rule will aid in removing apparent inconsistencies between the operational phase of facility licensee programs and simulator testing requirements. For the past several years, the simulators have been in an update and maintenance portion of the life-cycle model, 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.

IDENTIFICATION AND ANALYSIS OF ALTERNATIVE APPROACHES

A regulatory analysis of the following options were considered by the staff.

OPTION 1 - STATUS QUO

The existing rule could be left as-is and facility licensees could continue to provide all experience prerequisites for license eligibility using the actual plant and continue to test and report on simulator fidelity. Option 1- Status Quo 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 NRC could initiate proposed rulemaking to delete requirements which are considered to be unnecessarily burdensome on a case-by-case basis. Although Option 2 "delete current requirements" 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. The "delete current requirements" option would increase the possibility of negative training and also would fail to address suitability of the simulator for satisfying an operating experience requirement. Therefore, no analysis was performed regarding this option.

OPTION 3 - INTEGRATED RULEMAKING

Option 3 - Integrated Rulemaking supports amending 10 CFR Part 55 regulations 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 proposed 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 Part 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 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 decision making processes a decade ago are of significantly lesser concern.

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

BACKFIT RULE CONCERNS

The NRC has determined that the backfit rule does not apply to this proposed rule; therefore, a backfit analysis is not required for this proposed 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 would not be required by this rulemaking to change existing programs or to adopt new regulatory guidance, the proposed rule would permit training to be conducted on five significant control manipulations at either the facility or a plant-referenced simulator and would eliminate certification of simulation facilities and submittal of quadrennial test reports and schedule information. Finally, the proposed rule would add criteria on simulator fidelity assurance in order to support the proposed changes permitting simulator training of five significant control manipulations, and would clarify that the requirements of §55.45(b) apply to all planned uses of the simulation facility.

All of the proposed changes constitute either permissible relaxations from current requirements or provide a new alternative to compliance with the existing requirements of the rule. Accordingly, the proposed 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 proposed rulemaking, 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 "industry," such as the cost of changes to an existing accreditation program. Values and impacts are presented for the first (implementation) year and subsequent three years. The analysis assumes that all plants voluntarily opt to change existing programs, including adoption of ANSI/ANS 3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," 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 industry in the analysis.

The regulatory analysis considered both one-time implementation costs and recurring costs. The analysis, therefore, is based on a four year simulator cycle, similar to the quadrennial reporting cycle of the present language of the rule.

OPTION 3 VALUES (BENEFITS)

The following values (benefits) are considered in the regulatory analysis:

Reduced Review for Routine (Quadrennial) Reports - NRC staff will realize savings in the form of reduced review time for routine reports by the proposed deletion of the quadrennial test reporting requirement. The value of the change is based on an assumed four 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 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations," and is not changed by the proposed rule.

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

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 per cent 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 northeast 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 proposed 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, as endorsed by Regulatory Guide 1.149, and is not changed by the proposed rule.

Reduced Duplicate Testing - The analysis assumes that facility licensee simulator support programs adopt ANSI/ANS 3.5-1998 and change to scenario-based testing which is a function of the accredited training program. One-hundred and sixty hours simulator support staff hours per year are assumed to be saved by elimination of redundant testing due to improved coordination between the simulator support and user organizations.

Reduced Record Keeping - Record keeping costs, associated with reduced licensee duplicate testing, including administrative and archival costs, are assumed as 20 percent of the cost of the associated activity.

Reduced Number of Discrepancies - The regulatory analysis assumes that adoption of the ANSI/ANS 3.5 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 due to 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 & Backshift Testing - The regulatory analysis assumes that adoption of ANSI/ANS 3.5-1998 provides a benefit that is measurable in a reduction in reduced need for overtime and backshift testing due to 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 ten per cent of the reductions in routine test reporting and duplicate testing.

OPTION 3 IMPACTS (COSTS)

The following impacts (costs) are considered in the regulatory analysis:

Rulemaking - NRC will realize direct costs from the proposed rulemaking process. The proposed rulemaking assumes 0.8 FTE per year for two years, although the total cost associated with proposed rulemaking are shown in the first year.

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

Revise Regulatory Guidance (NUREG -1262) - NUREG -1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses," will be revised in part to conform to the language of the proposed rule the revised RG-1.149. This is a one-time NRC cost based on an assumed 3 month (480 hour) effort in the first year only.

Revise Regulatory Guidance (NUREG -1258) - NUREG -1258, "Evaluation Procedure for Simulation Facilities Certified Under 10 CFR 55," will be revised in part to conform to the language of the proposed rule the revised RG-1.149. This is a one-time NRC cost based on an assumed 2 month (320 hour) effort. This effort is expected to occur after implementation, in the second year of the cycle. However, the analysis shows the NUREG-1258 revision as a one-time first year effort to avoid confusion with other recurring costs in the out-years.

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 proposed rule the revised RG-1.149. 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 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 - NRC will incur one-time costs associated with preparation for and conduct of a one-week (40 hour) implementation workshop for facility licensees. A four-to-one preparation-execution ratio is assumed.

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

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 the four year cycle of the analysis, two core model modifications are assumed. An effort of six weeks (240 hours) development and 2 weeks (80) testing/validation per simulation facility is assumed.

Develop & 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 ten scenarios per facility. An effort of ten 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 three 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 one month (160 hours) per facility is assumed.

Implementation Workshop - Facility licensees will incur one-time costs associated with participation in a one-week (40 hour) implementation workshop. Participation by two persons (one simulator support staff and one training staff) 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 twelve 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 - Industry will realize a one-time cost in the first year associated with development and promulgation of appropriate accreditation criteria for reactivity manipulation scenario integration with existing accredited training programs. An effort consisting of a six person task group for three months (480 hours) each and eighty hours of review per facility is assumed.

Increased Application Review Time for Reactivity Manipulations - NRC and facility licensees 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 - 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.

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 |
| Record keeping & 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 |

OPTION 3 VALUE (BENEFITS) ANALYSIS

| VALUES (BENEFITS) | YEAR 1(\$) | YEARS 2-4(\$) | |
|-----------------------------|-------------------|----------------------|---|
| NRC Savings | | | |
| | 9,800 | 29,400 | reduced review for routine (4 yr) reports |
| | <u>1,960</u> | <u>5,880</u> | reduced record keeping |
| Total NRC Savings | 11,760 | 35,280 | |
| Licensee Savings | | | |
| | 6,875,000 | 20,625,000 | reduced replacement power demand |
| | 4,704,000 | 14,112,000 | reduced routine (quadrennial) reporting |
| | 1,568,000 | 4,704,000 | reduced duplicate testing |
| | 940,800 | 2,822,400 | reduced record keeping |
| | 392,000 | 1,176,000 | reduced number of discrepancies |
| | 449,166 | 1,347,498 | reduced examination preparation time |
| | <u>627,200</u> | <u>1,881,600</u> | reduced overtime & backshift testing |
| Total Licensee Savings (\$) | 15,556,166 | 46,668,498 | |
| Total NRC +Licensee Savings | 15,567,926 | 46,703,778 | |
| Total Proposed Rule Savings | | 62,271,704 | (Years 1 through 4) |

OPTION 3 IMPACTS (COSTS) ANALYSIS

| IMPACTS (COSTS) | YEAR 1(\$) | YEARS 2-4(\$) | |
|------------------------|-------------------|----------------------|--|
| NRC Cost | | | |
| | 327,040 | | rulemaking |
| | 61,320 | | revise regulatory guidance (RG-1.149) |
| | 67,200 | | revise regulatory guidance (NUREG -1262) |
| | 44,800 | | revise regulatory guidance (NUREG -1258) |
| | 22,400 | | revise exam standards (NUREG - 1021) |
| | 28,000 | | implementation workshop |
| | 38,500 | 115,500 | increase NRC-398 review for manipulations |
| | 3,208 | 9,624 | increase examination prep for simulator review |
| | <u>52,640</u> | <u>21,420</u> | train NRC examiners |
| Total NRC Cost | 645,108 | 146,544 | |
| Licensee Cost | | | |
| | 3,136,000 | 3,136,000 | create cycle-specific core model |
| | 980,000 | | develop & validate reactivity scenarios |

| | | | |
|-----------------------------------|--------------|--------------|--|
| | 1,568,000 | | revise simulator configuration management |
| | 4,704,000 | | revise simulator test program |
| | 1,568,000 | | revise administrative procedures |
| | 3,136,000 | | revise training program |
| | 784,000 | | implementation workshop |
| | 705,664 | 530,460 | train licensee instructors |
| | 1,187,200 | | develop scenario accreditation criteria |
| | <u>3,208</u> | <u>9,624</u> | Increase examination prep for simulator review |
| Total Licensee Cost | 17,772,072 | 3,676,084 | |
| Total NRC + Licensee Cost (\$) | 18,417,180 | 3,822,628 | |
| Total Proposed Rule Cost | | 22,239,808 | (Years 1 through 4) |
| Net Value Calculation (Years 1-4) | 40,031,896 | | |

DECISION RATIONAL (RECOMMENDED OPTION)

Based upon 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 credentials. 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 cost on the part of both NRC and industry for one-time revision of existing programs, the regulatory analysis suggests that industry could recover these costs in the immediate following years for a net gain.

The proposed rulemaking will revise the requirement for five significant control manipulations which affect reactivity which currently must be performed on the actual plant, to allow these manipulations to be performed on a simulator. Until this rulemaking is complete, the staff is prepared to favorably consider requests for exemptions from this requirement on a case-by-case basis, as long as a facility licensee can provide evidence that simulator fidelity is controlled in a structured software environment with scenario-based simulator performance testing.

In addition, the proposed rulemaking will revise the periodic scheduling and reporting of test results that are currently required on a quadrennial basis. The revised proposed regulation will allow facility licensees to voluntarily adjust their performance test programs consistent with user needs as defined by their accredited training programs and remove obstacles to voluntary implementation of improved revisions of the national standard which, 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 Proposed Rule Notice and public comment, and a Final Rule. Implementation can begin immediately following the enactment of the Final rulemaking. No impediments to implementation of the recommended alternative, i.e. Option 3, have been identified.

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 2, Washington, D.C., April 1997.
4. U.S. Nuclear Regulatory Commission, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," [NUREG/BR-0058](#), Revision 2, Washington, D.C., November 1995.
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. American Nuclear Society / American National Standard, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," ANSI/ANS-3.5-1981.
8. American Nuclear Society / American National Standard, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," ANSI/ANS-3.5-1985.
9. American Nuclear Society / American National Standard, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," ANSI/ANS-3.5-1998.