

DOCKET NO. PR-050  
(64FR53270)

In the Matter of  
EMERGENCY CORE COOLING SYSTEM EVALUATION MODELS

DATE DOCKETED	DATE OF DOCUMENT	TITLE OR DESCRIPTION OF DOCUMENT
09/28/99	09/27/99	FEDERAL REGISTER NOTICE - PROPOSED RULE
11/01/99	10/26/99	COMMENT OF VIRGINIA POWER (JAMES H. MCCARTHY) ( 1)
12/14/99	12/09/99	COMMENT OF TENNESSEE VALLEY AUTHORITY (MARK J. BURZYNSKI) ( 2)
12/16/99	12/15/99	COMMENT OF CALDON INCORPORATED (CALVIN HASTINGS) ( 3)
12/27/99	12/15/99	COMMENT OF PECO ENERGY COMPANY (JAMES A. HUTTON, JR., DIR. - LIC.) ( 4)
12/27/99	12/15/99	COMMENT OF NUCLEAR ENERGY INSTITUTE (DAVID J. MODEEN) ( 5)
12/29/99	12/20/99	COMMENT OF NEW YORK POWER AUTHORITY (HARRY P. SALMON, JR., VICE PRES.) ( 6)

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White Plains, New York 10601  
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USNRC



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Harry P. Salmon, Jr.  
Vice President Engineering

OFFICE OF GENERAL COUNSEL  
RULEMAKING AND ADJUDICATIONS  
ADJUDICATIONS DIVISION

DOCKET NUMBER  
PROPOSED RULE **PR 50**  
(64FR 53270)

December 20, 1999  
JPN-99-044  
IPN-99-130

Secretary  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001  
Attention: Rulemakings and Adjudications Staff  
Mail Stop O-16C1.

Subject: James A. FitzPatrick Nuclear Power Plant  
Docket No. 50-333  
Indian Point 3 Nuclear Power Plant  
Docket No. 50-286  
**Comments on Proposed Rulemaking**  
**Emergency Core Cooling System Evaluation Models**

Reference: Federal Register, Vol. 64, No. 190, Friday October 1, 1999, pgs.  
53270-53275, proposed rule regarding emergency core cooling  
system evaluation modes.

Dear Sir:

The New York Power Authority supports the changes recently proposed by the NRC to 10 CFR 50.46. If approved, these changes will permit licensees to reduce the assumed power level used in evaluations of emergency core cooling system (ECCS) performance. These changes will reduce the regulatory burden associated with Appendix K compliance by eliminating an unnecessary conservatism in ECCS analyses. Reduced uncertainties in reactor power measurements facilitate these changes without compromising plant safety. Advances in accident and transient analyses provide additional confidence that small power uprates can be realized safely. In general, the Authority agrees with the conclusions stated in the Federal Register (FR) notice (Reference).

FEB 17 2000  
Acknowledged by card

### Other Potential Benefits

In addition to permitting licensees to pursue small power uprates without undue regulatory burden, the Authority sees other potential benefits not enumerated in the FR notice. There may be other ways in which a licensee could take benefit from this rule change without increasing the maximum allowable reactor power limit. For example, new containment analyses performed at power levels less than 102 percent may predict reduced peak containment pressures or temperatures. In turn, this may obviate the need for plant modifications, expensive analyses, or permit extended maintenance and EQ equipment replacement schedules. Plants might be able to benefit from this rule change by relaxing or eliminating existing operating restrictions -- such as restrictions on maximum ultimate heat sink (UHS) temperatures. UHS temperatures approaching analyzed limits have been a problem at some U.S. plants during hot summer months.

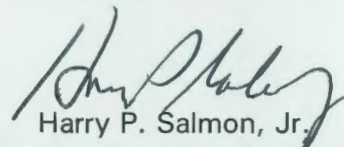
### Conforming Technical Specifications

The need for NRC review and approval of conforming technical specifications is discussed towards the end of the FR notice. The FR discussion outlines a hypothetical case where a new limiting condition for operation (LCO) for feedwater flow instrumentation was suggested. Several aspects of this scenario warrant further examination before it can be accepted as valid. An LCO like this, or any other new LCO, must meet the criteria detailed in 10 CFR 50.36.

Potential new technical specifications need not be addressed in the statement accompanying the final rule. If the final rule does address the TS changes, the statement accompanying the final rule should clarify that excluding other regulatory requirements, a license amendment, or technical specification change may not be a prerequisite in all cases.

There are no commitments made by the Authority in this letter. If you have any questions, please contact Ms. C. Faison.

Very truly yours,



Harry P. Salmon, Jr.  
Vice President Engineering

cc: See next page

cc: Regional Administrator  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

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Mr. George F. Wunder, Project Manager  
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NUCLEAR ENERGY INSTITUTE

5

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USMRC

99 DEC 27 P 6:07  
David J. Modeen  
DIRECTOR, ENGINEERING  
NUCLEAR GENERATION DIVISION

DOCKET NUMBER  
PROPOSED RULE **PR 50**  
(64FR53270)

December 15, 1999

Secretary  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Attention: Rulemakings and Adjudications Staff

**SUBJECT:** Transmittal of Comments on Proposed Change to 10 CFR Part 50, *Emergency Core Cooling System Evaluation Models* (64 Fed. Reg. 53270) Request for Comments

**PROJECT NUMBER: 689**

Dear Sir or Madam:

The Nuclear Energy Institute has received comments from a number of licensees on the proposed rulemaking to 10 CFR Part 50, *Emergency Core Cooling System Evaluation Models*, issued for public comment on October 1, 1999. The purpose of this letter is to forward these comments and recommended changes to the NRC for consideration prior to finalizing the proposed rule.

In general, the industry comments received by NEI were in favor of the proposed rulemaking. There were a number of comments requesting clarification of the language in the proposed rule and several responses to the section entitled, "Issues for Public Comment." The comments received by NEI have been consolidated and are included in an enclosure. NEI supports the proposed rulemaking and is encouraged to see the NRC pursue changes, such as this one, that offer relief from unnecessarily burdensome regulation.

Response to these comments and any other questions regarding this letter or the enclosure should be directed to Jim Riley at NEI (202-739-8137 or jhr@nei.org).

Sincerely,

David J. Modeen

JHR  
Enclosure

Acknowledged by card FEB 17 2000

## Comments on Proposed Rulemaking on Emergency Core Cooling System Evaluation Models

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1. **Issue for Public Comment #1:** "The current rule states that the required 2-percent analysis margin is to account for "*such* uncertainties as instrumentation error. " (Emphasis added). This suggests that the 2-percent margin was intended to account for other sources of uncertainty in addition to instrumentation error. However, explicit documentation of the basis for the value of the margin does not appear to be contained in the rulemaking record for the original 1974 ECCS rulemaking. The Commission is interested in whether there are other sources of uncertainty, relevant to sources of heat following a LOCA, that should be considered when licensees seek to reduce the margin in the Appendix K requirement for assumed power. If other contributors are suggested, a clear technical justification should accompany the suggestion."

**Response:** NEI has not identified any additional uncertainties that should have been covered in the 2% Reactor Thermal Power (RTP) uncertainty in addition to normal power measurement instrument uncertainties. We interpret the 2% RTP allocation to be only power measurement instrument uncertainties.

2. **Issue for Public Comment #2:** Are there rulemaking alternatives to this proposed rule that were not considered in the regulatory analysis for this proposed rule?"

**Response:** NEI has not identified any other rulemaking alternatives to this proposed rule that would better reduce the unnecessarily burdensome regulatory requirements or avoid unnecessary exemption requests.

3. **Issue for Public Comment #3:** : "What criteria should be used for determining whether a proposed reduction in the 2 percent power margin has been justified, based upon a determination of instrumentation error? For example, should a demonstrated instrumentation error of 1 percent in power level be presumptive of an acceptable reduction in assumed power margin of 1 percent?"

**Response:** The criteria to use in determining whether a proposed reduction in the 2% power margin has been justified should be based on instrument error. It has already been concluded that margin exists elsewhere in LOCA to allow avoiding an unnecessary 2% power measurement uncertainty. Therefore, no

## Comments on Proposed Rulemaking on Emergency Core Cooling System Evaluation Models

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additional margin is warranted, and assumed power level should be based solely on rated power level with instrument uncertainty.

ECCS evaluation models use conservative codes applied conservatively. Licensees should be allowed to approach the power margin associated with the Appendix K criteria on a safety neutral basis. The overall impact on safety should be considered and the result should either be neutral or demonstrate additional safety benefit. For example, a straight 1 percent "even trade" should be allowed if the probability of exceeding the current appendix K analytical safety limit of 1.02 does not increase. This would prevent a condition that is less safe than the present operating condition allows.

4. **Issue for Public Comment #4:** "How should the proposed rule address cases in which licensees determine that power measurement instrument error is greater than 2 percent?"

**Response:** The Appendix K LOCA should be performed at the rated thermal power level plus power level measurement uncertainties, whether they are 1% of RTP or 3% of RTP. Licensees are required to maintain the validity of their Safety Analysis regardless of the proposed rule. Should a licensee find that its uncertainty analysis does not support the required margin assumed in its Safety Analysis, it is incumbent upon the licensee to limit operation of its plant (derate if necessary) in order to maintain the validity of its Safety Analysis. For example, if the plant is rated at 3411.00 MWt, and if the LOCA analysis is done at 3479.22 MWt ( $1.02 * 3411.00$ ), then the allowable rated thermal power level should be derived from the revised power measurement uncertainties. If the uncertainty is found to be 3% of RTP, then the reactor should be derated. The increase in measurement uncertainties from 2% to 3% would result in a derating of 0.97% RTP ( $((3377.88 - 3411.00) / 3411)$ ). This assumes that the measurement uncertainties have not increased due to the reduced rated thermal power level. If they are found to be higher at this reduced power level, then the revised RTP should be adjusted downward accordingly or the facility should demonstrate that the amount of the power measurement uncertainty greater than 2% can be accounted for in existing PCT margin to 2200 degrees F. Alternatively, the increase in instrument measurement uncertainties could be offset by the identification of other conservatisms in the Appendix K methodology that can be credited without a reduction in the margin of safety of the facility.

## **Comments on Proposed Rulemaking on Emergency Core Cooling System Evaluation Models**

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5. **Uncertainties from Additional Heat Sources:** Utilities will be able to use this rule to reduce their decay heat input to Appendix K evaluations by performing a 50.59 evaluation that uses their power measurement uncertainty to ensure that the expected decay heat bounds the full rated plant power plus the uncertainty value. This uncertainty value should include the effects of uncertainty in feedwater flow, feedwater temperature measurement, blowdown flow, blowdown temperature, feedwater pressure, etc.

**Recommended Change:** If there are any specific calculation requirements (i.e. allowance for RCP heat, letdown flow losses, etc.) the final rule should contain reference to or guidance on the expected treatment of these types of considerations.

6. **Consistency Among NRC Documents:** Besides the proposed § 50.46 rule change, there are other NRC documents that provide NRC staff positions relative to heat balance uncertainty and reactor power level. For example, it is assumed that the basis for the 1.02 multiplier in Reg. Guide 1.49, *Power Levels of Nuclear Power Plants*, is also heat balance uncertainty. In addition, some plants may not be committed to Reg. Guide 1.49 and others may have non-LOCA analyses which place a two percent uncertainty on assumed power level.

**Recommended Change:** Conforming changes to Regulatory Guide 1.49 are necessary to replace the 1.02 power level requirement. NRC staff should ensure that other conforming changes are not overlooked.

7. **Requirement for Upgrade to Feedwater Flow Measurement:** The proposed rule discusses the fact that the current Appendix K requirement for margin on assumed power level can be reduced as long as justified by a power level uncertainty analysis. However, under the sections "Conservatism in Appendix K ECCS Evaluation Model" and "Calorimetric Uncertainty and Feedwater Flow Measurement," it is implied that the basis for the proposed rule is application of upgraded feedwater flow technology.

**Recommended Change:** The rule language or associated implementing guidance should make it clear that even licensees utilizing a venturi-based system for feedwater flow measurement may apply the provisions of the final rule if supported by the appropriate uncertainty analyses.



## Comments on Proposed Rulemaking on Emergency Core Cooling System Evaluation Models

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8. **Reportability Under 10 CFR 50.46(a)(3):** In the section entitled "Section-by-Section Analysis – Appendix K to Part 50--ECCS Evaluation Models (I)(A) - Sources of heat during the LOCA," the NRC mentions the subject of reportability pursuant to 10 CFR 50.46(a)(3). Therein the NRC states:

"Estimated changes in ECCS performance due to revised analysis inputs are reported under Sec. 50.46 (a)(3), at least annually."

This statement may be misleading and needs further clarification. Our understanding is that 10 CFR 50.46(a)(3) does not apply to changes in peak clad temperature (PCT) resulting from plant specific analysis input parameter values (i.e., plant specific design information). The industry, and we believe the NRC, has always interpreted this requirement as relating to ECCS Evaluation Model input parameters not plant design input parameters; which can be inferred from the above statement.

**Recommended Change:** NEI believes that the wording should be clarified in the publication of the final rule to assure that the intent is clear. NEI suggests the following language:

"Estimated changes in ECCS performance due to revised Evaluation Model inputs are reported under Sec. 50.46 (a)(3), at least annually. Changes resulting from plant specific design parameter changes, including cycle-to-cycle reload fuel parameters, are not reportable under 10 CFR 50.46(a)(3)."

We base our interpretation on two sources. First, from the Statement of Consideration (SOC) for the 1988 change to 10 CFR 50, Appendix K rulemaking (53 FR 35996). The SOC sheds some light on the question of reportability for PCT changes due to input parameters, whether caused by reload cycles or other facility changes. The NRC explained in response to a commentor:

"One commentor interpreted the use of the words 'or in the application of such a model' as requiring reporting when facility changes" ... "resulting in model input changes, occur."

"The regulatory language referred to is intended to ensure that APPLICATIONS OF MODELS to areas not contemplated during initial REVIEW OF THE MODEL do not result in errors by extending a MODEL beyond the range that it was intended."(Emphasis added.)

## **Comments on Proposed Rulemaking on Emergency Core Cooling System Evaluation Models**

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In its response, the NRC clarified its intent for the word "application" to distinguish it from application in the sense of the execution (i.e., running) of computer cases using plant-specific input parameters which may change due to cycle-to-cycle reload fuel or facility modifications. The NRC response indicates that its reportability interest is with the Evaluation Model itself, both overall and its individual component models. The NRC reviewed various models and correlations and approved their makeup, ranges of applicability, degree of inherent conservatism and so on. Undoubtedly, the NRC knows that cycle-to-cycle reload fuel differences or facility modifications would occur over a plant's operating life. Such design parameter changes would in turn affect the input parameters which drive an evaluation model to generate the plant and cycle specific result documented in the Safety Analysis Report or Reload Analysis Report. Therefore, we conclude that changes in PCT caused by plant specific input parameter changes to design information fall outside the scope of reportability under 10 CFR 50.46(a)(3). We believe that the NRC's intent for the word "application" is rightly connected only to the application of the approved models in a proper manner and within their proper ranges of applicability; as originally reviewed and approved by the NRC.

The second source of information regarding the applicability of 10 CFR 50.46(a)(3) comes from direct feedback from a former NRC staff reviewer from the Reactor Systems Branch. During meetings related to a vendor's evaluation model, a member of the vendor's staff received verbal confirmation from the then cognizant Reactor Systems Branch reviewer that PCT changes resulting from input changes to facility design parameters are not encompassed by 10 CFR 50.46(a)(3). Rather, the reporting requirement was applicable only to changes to the Evaluation Model itself, including changes to input parameters that controlled how a particular model functioned relative to what had been originally reviewed and approved by the NRC.



# PECO NUCLEAR

A Unit of PECO Energy

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USNRC

PECO Energy Company  
965 Chesterbrook Boulevard  
Wayne, PA 19087-5691

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December 15, 1999

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Secretary  
U.S. Nuclear Regulatory Commission  
Attn: Rulemakings and Adjudications Staff  
Washington, DC 20555-0001

DOCKET NUMBER  
PROPOSED RULE **PR** 50  
(64FR53270)

Subject: Comments Concerning "Emergency Core Cooling System Evaluation Models" (64FR53270, dated October 1, 1999)

Dear Sir/Madam:

This letter is being submitted in response to the Nuclear Regulatory Commission's (NRC) request for comments concerning the proposed rule "Emergency Core Cooling System Evaluation Models" which was published in the Federal Register (i.e., 64FR53270, dated October 1, 1999). The NRC is proposing to amend its regulations to allow holders of operating licenses for nuclear power plants to reduce the assumed reactor power level used in evaluations of emergency core cooling systems (ECCS) performance. Under the proposed rule, licensees would be given the option to apply a reduced margin for ECCS evaluation or to maintain the value of reactor power currently mandated in the regulation. This action would allow licensees to pursue small, but cost beneficial, power uprates and would reduce unnecessary regulatory burden without compromising the margin of safety of the facility.

PECO Energy appreciates the opportunity to comment on the proposed rule "Emergency Core Cooling System Evaluation Models." PECO Energy supports the proposed rule, in light of the potential benefits to be derived from the proposed changes.

If you have any questions, please do not hesitate to contact us.

Very truly yours,

James A. Hutton, Jr.  
Director - Licensing

FEB 17 2000

Acknowledged by card

**Caldon Comments on NRC Proposed Rule  
ECCS Evaluation Models  
December 15, 1999**

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USNRC

Comments on Specific NRC Issues Presented in the Proposed Rule<sup>99</sup> DEC 16 P2:34  
64 Fed. Reg. 53270, 53273 (October 1, 1999)

1. **NRC Issue:** "The current rule states that the required 2-percent analysis margin is to account for "such uncertainties as instrumentation error. . . ." (emphasis added). This suggests that the 2-percent margin was intended to account for other sources of uncertainty in addition to instrumentation error. However, explicit documentation of the basis for the value of the margin does not appear to be contained in the rulemaking record for the original 1974 ECCS rulemaking. The Commission is interested in whether there are other sources of uncertainty, relevant to sources of heat following a LOCA, that should be considered when licensees seek to reduce the margin in the Appendix K requirement for assumed power. If other contributors are suggested, a clear technical justification should accompany the suggestion."

**Comment:** Caldon has researched this issue in detail including legal research and a review of the Standard Review Plan and provided the results to the NRC in "Responses and Further Clarifications to NRC Questions from September 29, 1998 Meeting." The results have indicated no other contributors.

Caldon has also researched the data base of Licensee Event Reports to determine how many overpower events have been recorded since such record-keeping began in 1982. The results of this research indicate that the 2 percent margin has historically served the industry well, with few recorded events in excess of 102 percent power. All of these events were due to undetected instrument failures. Therefore, with the exception of undetected failures, the 2 percent margin has represented a reasonable expectation for performance of nozzle-based instrumentation.

At this time, with advances in instrumentation capabilities, it is reasonable to provide for licensee demonstration of more precise instrument accuracies on a plant-specific basis. Reasonable assurance of protection of the public health and safety is provided where licensees are able to justify a change in the 2% margin, as would be permitted under this rulemaking, provided that (a) the design basis for the instrument includes a bounding uncertainty analysis ("book" uncertainty) justifying the change, and (b) assurances are provided that no undetected failures will occur.

2. **NRC Issue:** "Are there rulemaking alternatives to this to this proposed rule that were not considered in the regulatory analysis for this proposed rule?"

**Comment:** It appears that the rulemaking has been proposed in such a way as to provide maximum flexibility to licensees in determining the reasonable and prudent reduction in power margin to be achieved. Both economic and safety interests are best

**Caldon Comments on NRC Proposed Rule  
ECCS Evaluation Models  
December 15, 1999**

served by a thermal power measurement that is as accurate as possible and is verifiable on line. This rulemaking provides the incentive to do so. Guidance in how to define and justify reasonable and prudent margin reductions would aid both licensees in preparing license amendment submittals and the NRC Staff in their reviews of those submittals.

3. **NRC Issue:** "What criteria should be used for determining whether a proposed reduction in the 2 percent power margin has been justified, based upon a determination of instrumentation error? For example, should a demonstrated instrumentation error of 1 percent in power level be presumptive of an acceptable reduction in assumed power margin of 1 percent?"

**Comment:** The improved instrument error may be used to determine the reduction in margin; i.e. a 1% demonstrated instrument error can justify a 1% increase in thermal power provided certain criteria are met. Fundamentally, the criteria should assure that the accuracy analysis identifies and bounds uncertainty contributors and sensitivities, and demonstrates that failure modes are detectable.

It is the responsibility of the licensee to reconcile the requested power increase with a properly bounded analysis. A bounding analysis which has already been demonstrated as sufficient met the following criteria:

1. Instrument uncertainty, in combination with the proposed power increase, must present an equal or lower probability of exceeding the analyzed power as compared to the current instrumentation at the current power level.
2. Instrument uncertainty must be calculated on a 2 standard deviation basis, with contributing errors normally distributed. Error contributors must be combined by the root sum squared if independent and algebraically if correlated and systematic.
3. It is necessary to be able to relate the variables measured by the instrument or instruments to the determination of the thermal power, using mathematical expressions of accepted physical principles. These physical/mathematical relationships are required to calculate the impact of uncertainties in the instrument measurements on the thermal power determination.
4. The instrument must have an established record of performance consistent with its analyzed accuracy. Long-term field experience is the best way to demonstrate that undetected failure modes and sensitivities are not present.

**Caldon Comments on NRC Proposed Rule  
ECCS Evaluation Models  
December 15, 1999**

5. Model test data, traceable to national standards, must be sufficient to assure that all instrument sensitivities are identified and bounded. Uncertainties arising due to all potential differences between test and plant conditions must be explicitly identified and bounded.
6. Modeling and extrapolation uncertainty bounds must be validated using data from the installed instrument in the plant.
7. Continuous verification of feedwater mass flow and feedwater temperature is required. Periodic verification of feedwater and steam pressures is required.

It would be beneficial to formalize these criteria, such as through guidance in the final rule statement of considerations or development of a regulatory guide. Formal guidance will aid licensees in the preparation of license amendment applications and NRC reviews of those applications will be based on consistent criteria.

4. **NRC Issue:** "How should the proposed rule address cases in which licensees determine that power measurement instrument error is greater than 2 percent?"

**Comment:** It appears from the review of prior overpower events, noted above, that the current NRC regulatory mechanisms for reporting and corrective action provide a reasonable regulatory mechanism for addressing such situations.

Calvin Hastings, Caldon Incorporated  
1070 Banksville Avenue  
Pittsburgh, PA 15216

**From:** Carol Gallagher  
**To:** Adria Byrdsong, Joseph Donoghue  
**Date:** Thu, Dec 16, 1999 12:59 PM  
**Subject:** Comment on ECCS Proposed Rule

Attached is a comment letter on the ECCS Proposed Rule that I received via the rulemaking website. The commentor's name is:

Calvin Hastings, Caldon Incorporated  
1070 Banksville Avenue  
Pittsburgh, PA 15216

Carol Gallagher



DOCKET NUMBER  
PROPOSED RULE PR 50  
(64FR53270)

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USNRC

'99 DEC 14 P4:33

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2881

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

December 9, 1999

Secretary of the Commission  
ATTN: Rulemakings and Adjudications Staff  
Mail Stop O-16C1  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Gentlemen:

NUCLEAR REGULATORY COMMISSION (NRC) - EMERGENCY CORE COOLING SYSTEM  
EVALUATION MODELS (Volume 64 *Federal Register* 53270)

The Tennessee Valley Authority (TVA) appreciates the opportunity to comment on the proposed rule (64FR53270). TVA concurs with the proposal. This proposal would allow licensees the option to take advantage of improved feedwater flow measurement technology in a cost beneficial manner. When applied, the improved technology would allow for a reduced margin for emergency core cooling system evaluation for reactor power level without compromising plant safety margin.

If you have any questions, please contact Rob Brown at (423) 751-7228.

Sincerely,

Mark J. Burzynski  
Manager  
Nuclear Licensing

cc: U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

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JAN 14 1999

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DOCKET NUMBER  
PROPOSED RULE **PR 50**  
(64FR 53270)

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USNRC

Wmsbrook Technical Center  
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Glen Allen, Virginia 23060



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OFFICE OF SECRETARY  
RULEMAKING AND  
ADJUDICATIONS STAFF



VIRGINIA POWER

October 26, 1999

GL99-063

Secretary  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001  
Attn: Rulemaking and Adjudications Staff, Mail Stop O-16C1

**EMERGENCY CORE COOLING SYSTEM  
EVALUATION MODELS; 10 CFR 50**

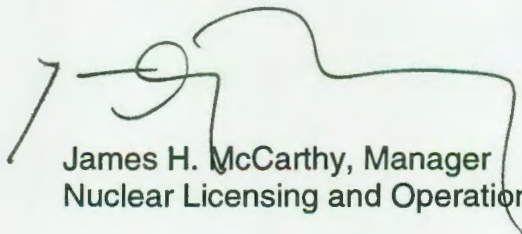
Virginia Power appreciates the opportunity to comment on the NRC's proposed rule to reduce the assumed reactor power level used in evaluations of emergency core cooling system (ECCS) performance. Notice of the proposed rule was published in the Federal Register (Vol. 64, No. 190) on October 1, 1999, pages 53270-53275.

We endorse the proposed rulemaking and are encouraged to see the NRC to pursue changes, such as this one, that offer relief from overly burdensome regulation. If you need further information, please contact either:

Mayo Oppenhimer Mayo\_Oppenhimer@vapower.com or  
(804) 273-3244

Gwen Newman Gwen\_Newman@vapower.com or (804) 273-4255

Respectfully,



James H. McCarthy, Manager  
Nuclear Licensing and Operations Support

NOV 10 1999

Acknowledged by card

DOCKET NUMBER  
PROPOSED RULE **PR 50**  
(64FR53270)

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USNRC  
[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

RIN 3150 - AG26

Emergency Core Cooling System Evaluation Models

'99 SEP 28 A7:17

OFFICE OF SECRETARY  
RULEMAKINGS AND  
ADJUDICATIONS STAFF

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to allow holders of operating licenses for nuclear power plants to reduce the assumed reactor power level used in evaluations of emergency core cooling system (ECCS) performance. Under the proposed rule, licensees would be given the option to apply a reduced margin for ECCS evaluation or to maintain the value of reactor power currently mandated in the regulation. This action would allow interested licensees to pursue small, but cost-beneficial, power uprates and would reduce unnecessary regulatory burden without compromising the margin of safety of the facility.

*December 15, 1999*

DATES: The comment period expires on ~~[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 NRC is able to assure consideration only for comments received on or before this date.

ADDRESSES: Mail written comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, Attention: Rulemakings and Adjudications Staff, Mail Stop O-16C1.

*Pub. on 10/1/99*

Deliver written comments to: One White Flint North, 11555 Rockville Pike, Rockville, Maryland between 7:30 a.m. and 4:15 p.m. on Federal workdays.

Documents related to this rulemaking may be examined at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, D.C. Documents also may be viewed and downloaded electronically via the interactive rulemaking Web site established by NRC for this rulemaking (see the discussion under Electronic Access in the Supplementary Information section). Obtain single copies of the environmental assessment and the regulatory analysis from the NRC contact given below.

FOR FURTHER INFORMATION CONTACT: Mr. Joseph E. Donoghue, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; telephone: 301-415-1131; or by Internet electronic mail to [jed1@nrc.gov](mailto:jed1@nrc.gov).

#### SUPPLEMENTARY INFORMATION:

##### Background

A holder of an operating license (i.e., the licensee) for a light-water power reactor is required by regulations issued by the NRC to submit a safety analysis report that contains an evaluation of emergency core cooling system (ECCS) performance under loss-of-coolant accident (LOCA) conditions. 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," requires that ECCS performance under LOCA conditions be evaluated and that the estimated performance satisfy certain criteria. Licensees may conduct an analysis that "realistically describes the behavior of the reactor system during a LOCA" (often termed a "best-estimate analysis"), or they may develop a model that conforms

with the requirements of Appendix K to 10 CFR Part 50. Most ECCS evaluations are based on Appendix K requirements. The opening sentence of Appendix K establishes the requirement to conduct ECCS analyses at a specified power level: "It shall be assumed that the reactor has been operating continuously at a power level at least 1.02 times the licensed power level (to allow for such uncertainties as instrumentation error)." Licensees have proposed using instrumentation that would reduce the uncertainties associated with measurement of reactor power when compared with existing methods of power measurement. This would justify a reduced margin between the licensed power level and the power level assumed for ECCS evaluations. The proposed rule would revise this provision in Appendix K, thereby allowing licensees the option of using a value lower than 102 percent of licensed power in their ECCS analyses where justified.

Several licensees have expressed interest in using updated feedwater flow measurement technology discussed later in "Calorimetric Uncertainty and Feedwater Flow Measurement" as a basis for seeking exemptions from the Appendix K power level requirement and to implement power uprates. One licensee, Texas Utilities Electric Company (TUE), has obtained an exemption from the Appendix K requirement for Comanche Peak Units 1 and 2 and is pursuing an increase in licensed power based, in part, on more accurate feedwater flow measurement capability. The prospect of additional exemption requests from other licensees provides the impetus for the proposed rule.

The objective of this rulemaking is to reduce an unnecessarily burdensome regulatory requirement. Appendix K was issued to ensure an adequate performance margin of the ECCS in the event a design-basis LOCA were to occur. The margin is provided by conservative

features and requirements of the evaluation models and by the ECCS performance criteria. The existing regulation does not require that the power measurement uncertainty be demonstrated, but rather mandates a 2-percent margin to account for uncertainties, including those expected to be involved with measuring reactor power. By allowing licensees to justify a smaller margin for power measurement uncertainty, the proposed rule does not violate the underlying purpose of Appendix K. The intent of Appendix K, to ensure sufficient margin to ECCS performance in the event of a LOCA, would still be met because of the substantial conservatism of other Appendix K requirements. The proposed rule would not significantly affect plant risk, as discussed in the section entitled, "ECCS Evaluation Conservatism."

Another objective is to avoid unnecessary exemption requests. As discussed above, a licensee has obtained an exemption from the 2-percent margin requirement in 10 CFR Part 50, Appendix K. It is likely that additional exemption requests will be submitted. Revising the rule to remove the need for licensees to obtain exemptions is considered by the NRC to be a prudent regulatory action.

If adopted, the proposed rule would give licensees the option of applying a reduced margin between the licensed power level and the assumed power level for ECCS evaluation, or maintaining the current margin of 2-percent power. As discussed in the section entitled "ECCS Evaluation Conservatism," the NRC has concluded that the 2 percent power margin requirement in the existing rule appears to be based solely on considerations associated with power measurement extant at the time of the original ECCS rulemaking. If licensees can show that the uncertainties associated with power measurement instrumentation errors are less than

2 percent, thereby justifying a smaller margin, then the current rule unnecessarily restricts operation.

Making this change to the rule would give licensees the opportunity to use a reduced margin if they determine that there is a sufficient benefit. Licensees could apply the margin to gain benefits from operation at higher power, or the margin could be used to relax ECCS-related technical specifications (e.g., pump flows). Another potential benefit would be in modifying fuel management strategies (e.g., possibly by altering core power peaking factors). However, the proposed rule by itself does not allow increases in licensed power levels. Because licensed power level for a plant is a technical specification limit, proposals to raise the licensed power level must be reviewed and approved under the license amendment process. The license amendment request should include a justification of the reduced power measurement uncertainty and the basis for the modified ECCS analysis, including the justification for reduced power measurement uncertainty, should then be included in documentation supporting the ECCS analysis (see Section-by-Section Analysis).

In the short term, the NRC intends to grant exemptions to the assumed power level provision of Appendix K for properly supported exemption requests. In addition to satisfying the provisions of 10 CFR 50.12, properly supported exemption requests are expected to quantify the uncertainties associated with measuring reactor thermal power that are associated with the current 2-percent power margin.

In the longer term, the NRC intends to review the affected safety analysis guidance and will evaluate the impact of the proposed rule on those safety analyses. Further, the NRC is

considering the need for specific guidance to help licensees appropriately account for power measurement uncertainty in safety analyses. However, the NRC expects that power uprate amendment requests based on the proposed rule will address the suitability of non-LOCA analyses for operation at proposed higher power levels.

In addition to comments on the proposed rule, the NRC is seeking comments on the specific issues set forth below under "Issues for Public Comment."

#### Conservatism in Appendix K ECCS Evaluation Model

Appendix K defines conservative analysis assumptions for ECCS performance evaluations during design-basis LOCAs. Large safety margins are provided by conservatively selecting the ECCS performance criteria as well as conservatively establishing ECCS calculational requirements. The major analytical parameters and assumptions that contribute to the conservatism in Appendix K are set forth in Sections A through D of the rule:

(A) "Sources of Heat During the LOCA" (the 102-percent power provision is a key factor), (B) "Swelling and Rupture of the Cladding and Fuel Rod Thermal Parameters," (C) "Blowdown Phenomena," and (D) "Post-blowdown Phenomena: Heat Removal by ECCS." In each of these areas, several assumptions are typically used to ensure substantial conservatism in the analysis results. For instance: under "Sources of Heat During the LOCA," decay heat is modeled on the basis of an American Nuclear Society standard with an added 20-percent penalty, and the power distribution shape and peaking factors expected during the operating cycle are chosen to yield the most conservative results. In "Blowdown Phenomena," the rule requires use of the Moody model and the discharge coefficient that yields the highest peak

cladding temperature. "Post-Blowdown Phenomena; Heat Removal by the ECCS," requires that the analysis assume the most damaging single failure of ECCS equipment.

One of several conservative requirements in Section A is to assume that the reactor is operating at 102 percent power when the LOCA occurs "to allow for *such uncertainties as instrumentation error....*" (Appendix K, Section I.A., first sentence, emphasis added). The phrase, "such as," suggests that the two percent power margin was intended to address uncertainties related to heat source considerations beyond instrument measurement uncertainties. However, the basis for the required assumption of 102 percent power (2 percent power margin) does not appear to be contained in the rulemaking record for the ECCS rules, 10 CFR 50.46 and Appendix K. These rules were adopted in 1974 (39 FR 1001, January 4, 1974), and were preceded by a formal rulemaking hearing which ultimately resulted in a Commission decision on the proposed rulemaking, CLI-73-39, 6 AEC 1085 (December 28, 1973). Neither the statement of considerations (SOC) for the final rule nor the Commission decision appear to provide specific basis for the required assumption of 102 percent power.

The SOC for the final 1974 rule discusses the 102 percent power assumption in general terms, and does not mention instrumentation uncertainty:

The Commission believes that the implementation of the new regulations will ensure an adequate margin of performance of the ECCS should a design basis LOCA ever occur. This margin is provided by conservative features of the evaluation models and by the criteria themselves. Some of the major points that



contribute to the conservative nature of the evaluations and the criteria are as follows:

(1) *Stored heat*. The assumption of 102 percent of maximum power, highest allowed peaking factor, and highest estimated thermal resistance between the  $UO_2$  and the cladding provides a calculated stored heat that is possible but unlikely to occur at the time of a hypothetical accident. While not necessarily a margin over the extreme condition, it represents at least an assumption that an accident happens at a time which is not typical.

39 FR at 1002 (first column)<sup>1</sup>. Thus, while the pre-accident power level assumption is connected with the modeling of the rate of heat generation after the LOCA occurs, a clear basis for the 102 percent assumed power level requirement is not provided, nor does the SOC explain whether there are other uncertainties besides instrumentation uncertainties for which the 102 percent assumed power level is intended to compensate.

The Commission's decision in the ECCS rulemaking hearing also does not explain whether the 102 percent assumed power level was intended to address uncertainties other than instrumentation uncertainties. Section I of the Commission decision was the basis for the SOC discussion on the 102 percent assumed power level (See 6 AEC at 1093-94). Section III. A. of the Commission's decision, "Required and Acceptable Features of the Evaluation

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<sup>1</sup>This statement in the SOC was taken unchanged from Section I of the Commission's ECCS decision. See CLI-73-39, 6 AEC 1085, 1093-94 (December 28, 1973).

Model," does not offer a detailed technical the basis for the power level chosen, but instead uses the language ultimately adopted in the final Appendix K rule :

For the heat sources listed in paragraphs 1 to 4 below it shall be assumed that the reactor has been operating continuously at a power level at least 1.02 times the licensed power level (to allow for such uncertainties as instrumentation error), with the maximum peaking factor allowed by the technical specifications.

6 AEC at 1100. Thus, the Commission's decision does not shed further light on the basis for the 102 percent assumed power level, nor whether the Commission had in mind uncertainties other than those associated with the instrumentation for measurement of power level.

NRC review of the ECCS rulemaking hearing record did not disclose presentations relating to quantification of power measurement uncertainties, or the magnitude of other uncertainties that the 102 percent assumed power level may have been intended to address. The Commission decision (CLI-73-39, 6 AEC 1085, December 28, 1973) cited three documents in the rulemaking hearing record. The first, cited in the Commission decision as Exhibit 1113, was "Supplemental Testimony of the AEC Regulatory Staff on the Interim Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Cooled Power Reactors," (filed October 26, 1972). In Section 10 of the document, stored energy in the fuel was considered, specifically the expected power distributions in fuel rods. The 102-percent power analysis requirement is not discussed. The second item, cited in the Commission decision as Exhibit 1137 was "Redirect and Rebuttal Testimony of Dr. Donald H. Roy on

Behalf of Babcock & Wilcox," (October 26, 1972) in which the characteristic of the decay heat release following reactor shutdown was discussed. In this document, the 102-percent assumption is associated with the predicted decay heat generation rate. The over-power condition is associated with a "design-basis maneuvering operation," but the basis for the value of power chosen for the analysis (i.e., 102 percent) is not disclosed. Finally, in the "Concluding Statement of Position of the Regulatory Staff – Public Rulemaking Hearing on: Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Cooled Nuclear Power Reactors," April 16, 1973 (the Concluding Statement), the power level assumption is included as part of the proposed rule itself. The proposed rule language clearly states that the power level assumption is to "allow for instrumentation error." The term "such as" does not appear here. It is unclear when or why the proposed language in this regard was changed to its current form. The power level assumption is mentioned again in the Concluding Statement indirectly in association with power level changes before the LOCA and the effect on decay heat generation. But it is discussed most directly with regard to initial stored energy in the fuel. In the discussion on stored energy, the 102-percent assumption is attributed to "uncertainties inherent in the measurement of the operating power level of the core," (page 144 of the Concluding Statement). Reasons for choosing 102-percent as the value are not discussed.

When Appendix K was first issued, as is the case today, the thermal power generated by a nuclear power plant was determined by steam plant calorimetry, which is the process of performing a heat balance around the nuclear steam supply system (called a calorimetric). The heat balance depends upon measurement of several plant parameters, including flow rates and fluid temperatures. The differential pressure across a venturi installed in the feedwater flow path is a key element in the calorimetric measurement. Licensees have

proposed using instrumentation other than a venturi-based system to obtain feedwater flow rate for calorimetrics. The lower uncertainty associated with the new instrumentation is information that was apparently not available during the original Appendix K rulemaking.

In view of the regulatory history for Appendix K, the Commission now believes that the 2-percent margin embodied in the requirement for a 102-percent assumed power level in Appendix K was based solely on uncertainties associated with the measurement of reactor power level.

#### Proposed Reduction in 102 Percent Assumed Power Level

The Commission believes that other requirements of Appendix K modeling include substantial conservatisms of much greater magnitude than the 2 percent margin embodied in the requirement for a 102 percent assumed power level. This point was discussed in "Conservatisms in Appendix K ECCS Evaluation Model," above.

The Commission is also aware of new information gained since the 1974 rulemaking which shows that the Appendix K model contains substantial conservatisms. Evidence from experiments designed to simulate LOCA phenomena suggest that these conservatisms added hundreds of degrees Fahrenheit to the prediction of peak fuel cladding temperature than would actually occur during a LOCA. The significant conservatism was necessary when the rule was written because of a lack of experimental evidence at that time with respect to the relative effects of analysis input parameters, including pre-accident power level. Since that time, there has been substantial additional research on LOCA. NUREG-1230, "Compendium of ECCS Research for Realistic LOCA Analysis," December 1988, contains the technical basis for

improved understanding of LOCA progression and ECCS evaluation gained after the ECCS rule was issued. The NUREG includes a discussion of the basis for uncertainties in detailed fuel bundle power calculations as part of the consideration of overall calculational uncertainty inherent in best-estimate evaluations. Chapters 7 and 8 of the NUREG include consideration of the changes in licensed power level that could result from application of best-estimate evaluation methods. The discussion includes an estimated sensitivity of predicted peak clad temperature associated with changes in pre-accident power level. From that estimate, the NRC expects peak cladding temperature changes of approximately 15°F to result from 1-percent changes in plant power level that could result from the proposed rule.

In view of: (i) substantial conservatisms embodied in the Appendix K requirements for ECCS evaluations, (ii) new information developed since the 1974 rulemaking which shows additional conservatism in the Appendix K modeling requirements beyond that understood by the Commission when it adopted the 1974 rule, and (iii) the relative insensitivity of the calculated clad temperatures to assumed power level, the Commission concludes that it is acceptable to allow a reduction in the currently-required 102 percent power level assumption if justified by the actual power level measurement instrumentation uncertainty. Accordingly, the Commission proposes to amend the Appendix K requirement for an assumed 102 percent power level. The proposed rule would allow a licensee to use an assumed power level of less than 102 percent (but not less than 100 percent), provided that the licensee has determined that the uncertainties in the measurement of core power level justifies the reduced margin.

### Calorimetric Uncertainty and Feedwater Flow Measurement

The NRC staff has approved an exemption to the 102-percent power level requirement for Comanche Peak Units 1 and 2. The basis for the action is application of upgraded feedwater flow measurement technology at the plant. As indicated, the prospect of additional licensees requesting similar action has prompted the proposed rule. Other methods, systems, or analyses could be used as the basis for demonstrating reduced power measurement uncertainty.

In most nuclear power plants, operators obtain a continuous indication of core thermal power from nuclear instruments, that provide a measurement of neutron flux. The nuclear instruments must be periodically calibrated to counteract the effects of changes in flux pattern, fuel burnup, and instrument drift. Steam plant calorimetry, which is the process of performing a heat balance around the nuclear steam supply system (called a calorimetric), is used to determine core thermal power and is the basis for the calibration. The differential pressure across a venturi installed in the feedwater flow path is a key element in the calorimetric measurement. Some plants use this calorimetric value directly to indicate thermal power; the nuclear instruments are used as anticipatory indicators for transients and for reactivity adjustments made with the control rods.

The system in use at Comanche Peak Units 1 and 2 is the Leading Edge Flowmeter (LEFM), manufactured by Caldon, Inc. The LEFM system is an ultrasonic flow meter that measures the transit times of pulses traveling along parallel acoustic paths through the flowing fluid. LEFM technology has been employed in non-nuclear applications, such as petroleum, chemical, and hydroelectric plants for several years. This operating experience will provide

reliability data, supplementing data from nuclear applications. Additional information on the Comanche Peak Appendix K exemption and on the Caldon, Inc. LEFM system appears in safety evaluations issued by the NRC staff on March 8, 1999, and May 6, 1999.

ABB Combustion Engineering has expressed interest in the proposed rule because its flow-measuring system, known as Crossflow (which is also an ultrasonic flow-measuring device), is expected to be part of a licensee exemption request in the near future.

#### Issues for Public Comment

The NRC is seeking comments from the public on the following issues related to this proposed rule:

1. The current rule states that the required 2-percent analysis margin is to account for "*such* uncertainties as instrumentation error...." (emphasis added). This suggests that the 2-percent margin was intended to account for other sources of uncertainty in addition to instrumentation error. However, explicit documentation of the basis for the value of the margin does not appear to be contained in the rulemaking record for the original 1974 ECCS rulemaking. The Commission is interested in whether there are other sources of uncertainty, relevant to sources of heat following a LOCA, that should be considered when licensees seek to reduce the margin in the Appendix K requirement for assumed power. If other contributors are suggested, a clear technical justification should accompany the suggestion.

2. Are there rulemaking alternatives to this proposed rule that were not considered in the regulatory analysis for this proposed rule?
3. What criteria should be used for determining whether a proposed reduction in the 2 percent power margin has been justified, based upon a determination of instrumentation error? For example, should a demonstrated instrumentation error of 1 percent in power level be presumptive of an acceptable reduction in assumed power margin of 1 percent?
4. How should the proposed rule address cases in which licensees determine that power measurement instrument error is greater than 2 percent?

#### Section-by-Section Analysis

##### Appendix K to Part 50 — ECCS Evaluation Models (I)(A) - Sources of heat during the LOCA

This section would be amended by removing words from the first sentence in the section to specifically associate the power level requirement with instrumentation error, and by adding a sentence immediately following the first sentence in the section. The new sentence indicates that licensees may assume a power level lower than 102 percent, but not less than 100 percent, provided that the proposed lower alternative value can be shown to account for core thermal power measurement instrumentation uncertainty.

Appendix K, Part II (1)(a) requires that the values of analysis parameters or their basis be sufficiently documented to allow NRC review. The requirement applies to all analysis input parameters, including those related to other plant instrumentation, such as temperature and



pressure. Changes to other inputs are documented in the same manner as the power measurement uncertainty would be documented under the proposed rule. NRC review and approval is not necessarily needed to change a parameter in an approved ECCS evaluation model. Estimated changes in ECCS performance due to revised analysis inputs are reported under § 50.46 (a)(3), at least annually. As discussed in the Statement of Considerations for Appendix K (53 FR 36001, September 16, 1988), the annual reports keep NRC apprised of changes. This should ensure that the NRC staff can judge a licensee's assessment of the significance of changes and maintain cognizance of modifications made to NRC-approved evaluation models. The licensee must include revised parameters and other changes in the ECCS evaluation as required by § 50.46 (a)(3) when a single change or an accumulation of changes is expected to affect peak cladding temperature by 50°F or more. The basis for the revised analysis parameter (i.e., the assumed power level) should be included in documentation of the evaluation model, as required by Appendix K, Part II (1)(a).

In most cases, the NRC expects that the analysis supporting the power measurement uncertainty, as well as the description of the relevant instrumentation and associated plant-specific parameters involved in the uncertainty analysis, would be submitted for NRC review and approval before being used. These requests are expected because most licensees have adopted Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications." The generic letter provided guidance for licensees to transfer cycle-specific parameters from their technical specifications to a Core Operating Limits Report (COLR). Licensees following the generic letter guidance added an administrative requirement to their technical specifications that specifically identifies NRC-reviewed and approved methods used to determine core operating limits (e.g., topical reports). Because a number of core operating

limits are based on LOCA analysis results, ECCS evaluation methods are included in the technical specification list. Therefore, most licensees opting to use the relaxation in the proposed rule would need to revise technical specifications to include a reference to an NRC-approved topical report that includes the uncertainty analysis justifying reduced power measurement uncertainty.

An additional technical specification consideration for licensees pursuing changes based on the proposed rule could involve nuclear instruments (NI) requirements. Existing plant technical specifications include surveillance requirements to calibrate the power range NIs based on the calorimetric measuring reactor thermal power. The NIs provide the indication of reactor power used as an input for safety systems. Licensees obtaining the relaxation offered in the proposed rule are expected to change some operating parameter of the plant, whether it be power level, required ECCS flow, etc. By incorporating the justification of reduced uncertainty in power measurement in the basis for their ECCS analysis, licensees would be placing a condition on an input to the calorimetric. The NI calibration required by the plant licensee would then be based on a calorimetric assuming the reduced power measurement uncertainty. If, for some reason, during the course of plant operation the reduced uncertainty did not apply (e.g., the new feedwater flow meter became inoperable), the calorimetric would no longer be a valid source of calibration for the NIs. Licensees would need to take action to maintain compliance with their technical specification, for example, by using an alternate input to the calorimetric. The power measurement uncertainties associated with the alternate input would then apply and the plant would need to adjust its operating condition (possibly lower its operating power level) to satisfy the proposed rule and to maintain the validity of applicable safety analyses.

### Referenced Documents

Copies of GL-88-16 and CLI-73-39 are available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street, NW. (Lower Level), Washington, D.C.

### Electronic Access

You may also submit comments via the NRC's interactive rulemaking Web site, "Rulemaking Forum," through the NRC home page (<http://ruleforum.llnl.gov>). This site enables people to transmit comments as files (in any format, but WordPerfect version 6.1 is preferred), if your Web browser supports that function. Information on the use of the Rulemaking Forum is available on the Web site. For additional assistance on the use of the interactive rulemaking site, contact Ms. Carol Gallagher, telephone: 301-415-5905; or by Internet electronic mail to [cag@nrc.gov](mailto:cag@nrc.gov).

### Plain Language

The Presidential memorandum dated June 1, 1998, entitled, "Plain Language in Government Writing," directed that 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.

### Voluntary Consensus Standards

The National Technology Transfer 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. In this proposed rule, the NRC is proposing to provide holders of operating licenses for nuclear power plants with the option of reducing the assumed reactor power level used in ECCS evaluations. This proposed action constitutes a modification to an existing government-unique standard, 10 CFR Part 50, Appendix K issued by the NRC on January 4, 1974. The NRC is not aware of any voluntary consensus standard that could be adopted instead of the proposed government-unique standard. The NRC will consider using a voluntary consensus standard if an appropriate standard is identified. If a voluntary consensus standard is identified for consideration, the submittal must explain how the voluntary consensus standard is comparable and why it should be used instead of the proposed government-unique standard.

#### Finding of No Significant Environmental Impact: Availability

The NRC has determined under the National Environmental Policy Act of 1969, as amended, and the NRC's regulations in Subpart A of 10 CFR Part 51, that this regulation, if adopted, would not be a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement is not required.

The proposed action is likely to result in relatively small changes to ECCS analyses or to the licensed power of nuclear reactor facilities. The NRC staff expects that no significant environmental impact would result from the proposed rule, because licensee actions based on

the proposed rule would not significantly increase the probability or consequences of accidents; no changes would be made in the types of any effluents that may be released off site; and there would be no significant increase in occupational or public radiation exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action. The proposed action does not involve non-radiological plant effluents and has no other environmental impact. Therefore, there are no significant non-radiological environmental impacts associated with the proposed action.

The determination of the environmental assessment is that there would be no significant offsite impact on the public from this action. However, the general public should note that the NRC welcomes public participation. Also, the NRC has committed itself to complying in all its actions with Executive Order (E.O.) 12898, "Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations " dated February 11, 1994. The NRC has determined that there are no disproportionately high and adverse impacts on minority and low-income populations. In the letter and spirit of E.O. 12898, the NRC is requesting public comments on any environmental justice considerations or questions that the public thinks may be related to this proposed rule, but that somehow were not addressed. The NRC uses the following working definition of environmental justice:

*Environmental justice* means the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, culture, income, or educational level with respect to the development, implementation and enforcement of environmental laws, regulations, and policies. Comments on any aspect of the environmental assessment, including environmental justice, may be submitted to the NRC as indicated under the ADDRESSES heading.

The draft environmental assessment is available for inspection at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, D.C. Single copies of the environmental assessment are available from Mr. Joseph Donoghue, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, telephone: 301-415-1131, or by Internet electronic mail to JED1@nrc.gov.

#### Paperwork Reduction Act Statement

This proposed rule increases the burden on licensees opting to use a reduced power level assumption for ECCS analysis (i.e., below 102%) to include the change in their annual report required under 10 CFR 50.46 (a)(3)(ii). The public burden for this information collection is estimated to average one-half hour per response. Because the burden for this information collection is insignificant, Office of Management and Budget (OMB) clearance is not required. Existing requirements were approved by the Office of Management and Budget, approval number 3150-0011.

#### Public Protection Notification

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

#### Regulatory Analysis

The Commission has prepared a regulatory analysis on this regulation. Interested persons may examine a copy of the regulatory analysis at the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, D.C. Single copies of the analysis are

available from Mr. Joseph Donoghue, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001, telephone: 301-415-1131, or by Internet electronic mail to JED1@NRC.GOV.

#### Regulatory Flexibility Certification

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. This proposed rule would affect only the licensing and operation of nuclear power plants. The companies that own these plants do not fall within the definition of "small entities" found in the Regulatory Flexibility Act or within the size standards established by the NRC in 10 CFR 2.810.

#### Backfit Analysis

The NRC has determined that the backfit rule in 10 CFR 50.109 does not apply to this proposed rule and that a backfit analysis is not required for this proposed rule because the change does not involve any provisions that would impose backfits as defined in 10 CFR 50.109(a)(1). The proposed rule would establish an alternative approach for ECCS performance evaluations that may be voluntarily adopted by licensees. Licensees may continue to comply with existing requirements in Appendix K. The proposed rule does not impose a new requirement on current licensees and therefore, does not constitute a backfit as defined in 10 CFR 50.109(a)(1).

List of Subjects in *10 CFR Part 50*

Antitrust, Classified Information, Criminal Penalties, Fire Protection, Intergovernmental Relations, Nuclear Power Plants and Reactors, Radiation Protection, Reactor Siting Criteria, Reporting and Recordkeeping Requirements.

PART 50 — DOMESTIC LICENSING OF PRODUCTION AND  
UTILIZATION FACILITIES

1. The authority citation for Part 50 continues to read as follows:

AUTHORITY: Sections 102, 103, 104, 105, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 938, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846).

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851). Section 50.10 also issued under secs. 101, 185, 68 Stat. 955, as amended (42 U.S.C. 2131, 2235), sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.13, 50.54(dd), and 50.103 also issued under sec. 108, 68 Stat. 939, as amended (42 U.S.C. 2138). Sections 50.23, 50.35, 50.55, and 50.56 also issued under sec. 185, 68 Stat. 955 (42 U.S.C. 2235). Sections 50.33a, 50.55a, and Appendix Q also issued under sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.34 and 50.54 also issued under sec. 204, 88 Stat. 1245 (42 U.S.C. 5844). Sections 50.58, 50.91, and 50.92 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80–50.81 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Appendix F also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).



2. Appendix K to Part 50 is amended by revising the beginning of paragraph I. A., "Sources of heat during the LOCA," to read as follows.

Appendix K to Part 50 — ECCS Evaluation Models


I. Required and Acceptable Features of the Evaluation Models

A. *Sources of heat during the LOCA.* For the heat sources listed in paragraphs I. A. 1 to 4 of this appendix it must be assumed that the reactor has been operating continuously at a power level at least 1.02 times the licensed power level (to allow for instrumentation error), with the maximum peaking factor allowed by the technical specifications. An assumed power level lower than the level specified in this paragraph (but not less than the licensed power level) may be used provided the proposed alternative value has been demonstrated to account for uncertainties due to power level instrumentation error. A range of power distribution shapes and peaking factors representing power distributions that may occur over the core lifetime must be studied. The selected combination of power distribution shape and peaking factor should be the one that results in the most severe calculated consequences for the spectrum of postulated breaks and single failures that are analyzed.

\* \* \* \* \*

Dated at Rockville, Maryland, this 27<sup>th</sup> day of September, 1999.

For the Nuclear Regulatory Commission.



\_\_\_\_\_  
Kenneth R. Hart, Acting  
Secretary of the Commission.