REQUEST FOR OMB REVIEW

(Under the Paperwork Reduction Act and Executive Order 12291)

Important — Read instructions (SF-83A) before completing this form. *Submit the required number of copies of SF-83, together with the material for which review is requested to:*

Office of Information and Regulatory Affairs
Office of Management and Budget
Washington, D.C. 20503

1. Department/Agency and Bureau/Office originating request

U.S. Nuclear Regulatory Commission

3. Name(s) and telephone number(s) of person(s) who can best answer questions regarding request

S. Aggarwal (301) 443-5946

2. 6-digit Agency/Bureau number *(first part of 11-digit Treasury Account No.)*

3 1 0 2 0 0

4. 3-digit functional code *(last part of 11-digit Treasury Account No.)*

2 7 6

5. Title of Information Collection or Rulemaking

Environmental Qualification of Electrical Equipment, 10 CFR 50.49 amendment

C. *Is this a rulemaking submission under Section 3504(h) of P.L. 96-511? (Check one)*

1 [X] No (Section 3507 submission)
2 [ ] Yes, NPRM. Expected date of publication: _____
3 [ ] Yes, final rule. Expected date of publication: _____
Effective date: _____

6. A. *Is any information collection (reporting or recordkeeping) involved? (Check one)*

1 [X] Yes and proposal is attached for review
2 [ ] Yes but proposal is not attached — skip to question D.
3 [ ] No — skip to question D.

B. *Are the respondents primarily educational agencies or institutions or is the purpose related to Federal education programs?*

[ ] Yes [X] No

D. At what phase of rulemaking is this submission made? *(Check one)*

1 [ ] Not applicable
2 [ ] Major rule, at NPRM stage
3 [ ] Major Final rule for which no NPRM was published
4 [XX] Major Final rule, after publication of NPRM
5 [ ] Nonmajor rule, at NPRM stage
6 [ ] Nonmajor rule, at Final stage

COMPLETE SHADED PORTION IF INFORMATION COLLECTION PROPOSAL IS ATTACHED

7. Current (or former) OMB Number

3150-0011

Expiration Date

4/30/85

8. Requested Expiration Date

4/30/85

12. Agency report form number(s)

N/A

13. Are respondents only Federal agencies?

[ ] Yes [X] No

9. Is proposed information collection listed in the information collection budget? [X] Yes [ ] No

10. Will this proposed information collection cause the agency to exceed its information collection budget allowance? *(If yes, attach amendment request from agency head.)* [ ] Yes [X] No

11. Number of report forms submitted for approval

None

14. Type of request *(Check one)*

1 [ ] preliminary plan
2 [ ] new *(not previously approved or expired more than 6 months ago)*
3 [X] revision
4 [ ] extension *(adjustment to burden only)*
5 [ ] extension *(no change)*
6 [ ] reinstatement *(expired within 6 months)*

15.

a. Approximate size of universe *(if sample)*	N/A
b. Size of sample	N/A
c. Estimated number of respondents or record keepers per year	34
d. Reports annually by each respondent *(item 25)*	10
e. Total annual responses *(item 15c x 15d)*	340
f. Estimated average number of hours per response	82
g. Estimated total hours of annual burden in Fiscal Year *(item 15e x 15f)*	27,920

16. Classification of Change in Burden *(explain in supporting statement)*

	No. of Responses	No. of Reporting Hours	Cost to the Public
a. In inventory	8,103	5,777,500	$
b. As proposed	8,443	5,805,420	$
c. Difference (b-a)	340	27,920	$

Explanation of difference (indicate as many as apply)

Adjustments

d. Correction-error	±	±	± $
e. Correction-reestimate	±	±	± $
f. Change in use	±	±	± $

Program changes

g. Increase	+ 340	+ 27,920	+ $
h. Decrease	—	—	— $

17. Abstract—Needs and Uses *(50 words or less)*

Licensees are required to qualify essential electrical equipment to assure that the equipment will perform its accident mitigation functions.

18. Related report form(s) *(give OMB number(s), IRCN(s), internal agency report form number(s) or symbol(s))*

Regulatory Guide 1.89 Proposed, Revision 1
NUREG-0588

20. Catalog of Federal Domestic Assistance Program Number

N/A

21. Small business or organization ☐ Yes ☒ No

19. Type of affected public *(Check as many as apply)*

1 ☐ *individuals or households*
2 ☐ *state or local governments*
3 ☐ *farms*
4 ☒ *businesses or other institutions (except farms)*

22. Type of activity of affected public—indicate 3-digit Standard Industrial Classification (SIC) code(s) (up to 10) — if over 10, check ☐ Multiple or ☐ All

4 8 3 ___ ___ ___ ___ ___ ___ ___

23. Brief description of affected public *(e.g., "retail grocery stores," "State education agencies," "households in 50 largest SMSAs")*

NRC Power Plant Licensees

24. Purpose *(Check as many as apply. If more than one, indicate predominant by an asterisk)*

1 ☐ application for benefits
2 ☐ program evaluation
3 ☐ general purpose statistics
4 ☒ regulatory or compliance
5 ☐ program planning or management
6 ☐ research

26. Collection method *(Check as many as apply)*

1 ☒ mail self-administered
2 ☐ other self-administered
3 ☐ telephone interview
4 ☐ personal interview
5 ☒ recordkeeping requirement:
Required retention period: 40 years
6 ☐ other—describe:

25. Frequency of Use

1 ☐ Nonrecurring

Recurring *(check as many as apply)*

2 ☒ on occasion
3 ☐ weekly
4 ☐ monthly
5 ☐ quarterly
6 ☐ semiannually
7 ☐ annually
8 ☐ biennially
9 ☐ other—describe:

27. Collection agent *(Check one)*

1 ☒ requesting Department/Agency
2 ☐ other Federal Department/Agency
3 ☐ private contractor
4 ☐ recordkeeping requirement
5 ☐ other—describe:

28. Authority for agency for information collection or rulemaking—indicate statute, regulation, judicial decree, etc.

Atomic Energy Act of 1954
Energy Reorganization Act of 1974

30. Do you promise confidentiality? *(If yes, explain basis for pledge in supporting statement.)* ☐ Yes ☒ No

31. Will the proposed information collection create a new or become part of an existing Privacy Act system of records? *(If yes, attach Federal Register notice or proposed draft of notice.)* ☐ Yes ☒ No

29. Respondent's obligation to reply *(Check as many as apply)*

1 ☐ voluntary
2 ☐ required to obtain or retain benefit
3 ☒ mandatory—cite statute, not CFR (attach copy of statutory authority)

32. Cost to Federal Government of information collection or rulemaking $411,520

COMPLETE ITEMS 33 THRU 35 ONLY IF RULEMAKING SUBMISSION

33. Compliance costs to the public

$_____

34. Is there a regulatory impact analysis attached?

☐ Yes ☐ No

35. Is there a statutory or judicial deadline affecting issuance?

☐ Yes. Enter date _____
☐ No

CERTIFICATION BY AUTHORIZED OFFICIALS SUBMITTING REQUEST—We certify that the information collection or rulemaking submitted for review is necessary for the proper performance of the agency's functions, that the proposal represents the minimum public burden and Federal cost consistent with need, and is consistent with applicable OMB and agency policy directives. Signature and title of:

APPROVING POLICY OFFICIAL FOR AGENCY	DATE	SUBMITTING OFFICIAL	DATE
Patricia G. Norry	6-1-82	R. Stephen Scott	6-1-82

SUPPORTING STATEMENT

FOR

10 CFR 50 Section 50.49
Environmental Qualification of Electrical Equipment
for Nuclear Power Plants

Justification

Nuclear power plant equipment must be able to perform the safety functions throughout its installed life. The final rule is designed to assure the NRC that the electrical equipment will be able to perform its accident mitigation functions under the postulated environmental conditions. To accomplish this objective, the proposed rule requires licensees to qualify the essential electrical equipment. Although testing is to be the primary method of qualification, analysis in lieu of testing will be permitted if the testing of equipment is impractical because of limitation due to the state of the art.

By its Memorandum and Order CLI-80-21, dated May 23, 1980, the Commission directed that the DOR Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors and NUREG-0588, "Interim Staff Position of Environmental Qualification of Safety-Related Electrical Equipment," form the basis for the requirements licensees and applicants must meet for environmental qualification of electrical equipment. This Memorandum and Order also included certain reporting and recordkeeping requirements which licensees of the operating nuclear power plants are required to comply with. The recordkeeping requirements in general terms are contained in Sections XI and XVII of 10 CFR 50, Appendix B. The rule will codify the Commission's current requirements for the qualification of electrical equipment and explicitly state the reporting and recordkeeping requirements. In addition to the proposed rule, a revised Regulatory Guide 1.89 is being issued to describe acceptable methods of implementing the rule.

The information collection requirements and acceptable methods of compliance contained in the rule and Regulatory Guide 1.89, respectively, consist of the following:

A. 50.49(d): establishment of records listing all electrical equipment covered by the rule, its performance characteristics, its electrical characteristics, and the environmental conditions in which it must operate.

B. 50.49(g): submission of a report which identifies the electrical equipment already qualified prior to the effective date of the rule and a schedule for testing or replacing the remaining electrical equipment.

C. 50.49(h): notification of any significant equipment qualification problem that may require extension of the completion date within 60 days of its discovery.

D. 50.49(i): submission of an analysis by an applicant for an operating license to ensure that the plant can be safely operated pending completion of the environmental qualification of electrical equipment.

E. 50.49(j): maintenance of records of electrical equipment qualified under the proposed regulations, retained for the life of the plant.

Regulatory Guide 1.89 does not impose additional reporting and/or recordkeeping requirements beyond what is covered by the rule. These records and reporting requirements are all necessary to ensure that electrical equipment covered by the rule are qualified to provide adequate assurance of public safety.

Description

The rule applies to all operating nuclear power plants and the plants which will be licensed after the effective date of this rule. Qualification testing is performed on prototype equipment. Analysis in lieu of testing is allowed if type testing is precluded by the state of the art.

Time Schedule

The electrical equipment covered by the rule for the operating nuclear power plants must be qualified by the second refueling outage beyond March 1982.

Information under provisions of Section 50.49(d) is not required to be submitted to NRC. Submission of schedule under Section 50.49(i) is required on a one-time-only basis within 90 days after the effective date of the final rule. Information under Section 50.49(h) shall be submitted only when a problem occurs. The reports will be reviewed by the NRC staff within 15 days after receipt. Submission of analysis under Section 50.49(i) is required on a one-time basis only upon publication of the final rule. These analyses will be reviewed by the NRC staff within 90 days after receipt. Recordkeeping requirements under Section 50.49(j) must be completed no later than November 1985 for all operating nuclear power plants.

Consultations Outside the Agency

NRC staff participates in the development of national IEEE standards. Since 1975, these IEEE standards require maintenance of qualification records of essential electrical equipment.

Estimate of Burden

Requirement		Compliance Burden* For 72 Operating Nuclear Power Plants (mh/plant)		For 30 Nuc. Pwr. Plts., 10 to be licensed each year (mh/plant)	
		To Licensees	To Govt.	To Applicants	To Govt.
50.49(d)	Development of list of essential electrical equipment and its characteristics (one time only)		Previously Accomplished		
50.49(g)	Submission of a schedule for testing and replacement (one time only)	160	8	160	8
	Sub Total	3,840	192	1,600	80
50.49(h)	Reporting of significant qualification problem (Average 4 responses, 8 annually per plant)	40	8	40	8
	Sub Total	2,880(A)	576(A)	800(A)	160(A)
50.49(i)	Submission of a safety analysis report	N/A	N/A	40	8
	Sub Total			400	80
50.49(j)	Maintenance of Qualification file (Average 4 responses annually per plant)	200	100	200	100
	Sub Total	14,400(A)	7,200(A)	4,000	2,000
	Sub Total Licensee/Applicant Burden	21,120		6,800	
	Total Licensee/Applicant Burden	27,920			
	Sub Total Cost to Government		7,968		2,320
	Total Cost to Government	10,288			

*(A) = Annual. All other burdens are one-time and are annualized over the three year period of the 3150-0011 clearance.

Estimates of Cost to Federal Government

Estimated cost per plant is included in paragraph entitled "Estimate of Compliance Burden." The total cost to the Government is estimated to be $411,520 (10,288 hours x $40/hr.).

MAY 24 1982 [7590-01]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

Environmental Qualification of Safety-Related Electric Equipment for Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: [Proposed] Final rule.

SUMMARY: The [Nuclear Regulatory] Commission is [proposing to] amending its regulations applicable to nuclear power plants to clarify and strengthen the criteria for environmental qualification of safety-related electric equipment. Specific qualification methods currently contained in national standards, regulatory guides, and certain NRC publications for equipment qualification have been given different interpretations and have not had the legal force of an agency regulation. This amendment [The proposed rule would] codifyies the[se] environmental qualification methods and criteria that meet the [and clarify the] Commission's requirements in this area.

EFFECTIVE DATE: [UPON publication in the Federal Register]

[DATES: Comment period expires (60 days after publication in the Federal Register). Comments received after ---------- will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments received on or before this date.

ADDRESSES: Written comments and suggestions may be mailed to the

Secretary of the Commission; Attention: Docketing and Service Branch; U.S. Nuclear Regulatory Commission; Washington; D.C. 20555; or hand-delivered to the Commission's Public Document Room at 1717 H Street NW.; Washington; D.C.; between the hours of 8:30 a.m. and 4:45 p.m. on normal work days.]

FOR FURTHER INFORMATION CONTACT: Satish K. Aggarwal, Office of Nuclear Regulatory Research, [Electrical Engineering Branch;] U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Telephone (301)443-5946.

SUPPLEMENTARY INFORMATION:

Previous Notice

On January 20, 1982, NRC published in the Federal Register a notice of proposed rulemaking on environmental qualification of electric equipment for nuclear power plants (47 FR 2876). The comment period expired March 22, 1982. A total of 69 comment letters raising 10 major issues were received by April 6, 1982. An additional 10 comment letters were received by April 21, 1982, but no new issues were raised. The major issues are discussed below.

Nature and Scope of the Rulemaking

Nuclear power plant equipment important to safety must be able to perform the safety functions throughout its installed life. This requirement is embodied in General Design Criteria 1, 2, 4, and 23 of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"; in Criterion III, "Design Control," and Criterion XI, "Test Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel

Reprocessing Plants," to 10 CFR Part 50; and in paragraph 50.55a(h) of 10 CFR Part 50, which incorporates by reference IEEE 279-1971,[1,2] "Criteria for Protection Systems for Nuclear Power Generating Stations." This requirement is applicable to equipment located inside as well as outside the containment.

The NRC has used a variety of methods to ensure that these general requirements are met for safety-related electric equipment [important-to safety]. Prior to 1971, qualification was based on the fact that the electric components were of high industrial quality. For nuclear plants licensed to operate after 1971, qualification was judged on the basis of IEEE 323-1971. For plants whose Safety Evaluation Reports were issued since July 1, 1974, the Commission has used Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Light-Water-Cooled Nuclear Power Plants," which endorses IEEE 323-1974,[2] "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," subject to supplementary provisions.

Currently, the Commission has under way a program to reevaluate the qualification of electric equipment in all operating nuclear power plants. As a part of this program, more definitive criteria for environmental qualification of safety-related electric equipment [important-to-safety] have been developed by the NRC. A document entitled "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" (DOR Guidelines) was issued in November 1979. In addition, the NRC has issued NUREG-0588, "Interim Staff Position on

[1]Incorporation by reference approved by the Director of the Office of Federal Register on January 1, 1981.

[2]Copies may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017.

Environmental Qualification of Safety-Related Electrical Equipment," which contains two sets of criteria: the first for plants originally reviewed in accordance with IEEE 323-1971 and the second for plants reviewed in accordance with IEEE 323-1974.

By its Memorandum and Order CLI-80-21 dated May 23, 1980, the Commission directed the staff to proceed with a rulemaking on environmental qualification of safety-grade equipment and to address the question of backfit. The Commission also directed that the DOR Guidelines and NUREG-0588 form the basis for the requirements licensees and applicants must meet until the rulemaking has been completed. This proposed rule is ~~generally~~ based on the requirements of the Division of Operating Reactors (DOR) Guidelines and NUREG-0588. Requalification of electric equipment in accordance with this rule will not be required for equipment qualified or being qualified in accordance with DOR Guidelines or NUREG-0588 provided the qualification of electric equipment has commenced prior to [Insert a date 90 days after the effective date of this amendment].

The dates specified in this rule for completion of environmental qualification of safety-related electric equipment apply to all licensees and applicants and supersede any date previously imposed. No changes to licenses or technical specifications are necessary to reflect these new completion dates.

~~[The Commission's Memorandum and Order CLI-80-21 directed that the environmental qualification of electric equipment in operating nuclear power plants be completed by June 30, 1982. However, on September 23, 1981, the Commission considered the petition (SECY-81-486) to extend this~~

deadline: The proposed rule covers the same electric equipment as ECI-80-21 and implements SECY-81-486 by incorporating the extension dates recommended by the Chairman in his memorandum dated September 30, 1981. Included in the proposed rule is a requirement that each holder of or each applicant for a license to operate a nuclear power plant identify and qualify the electric equipment needed to complete one path of achieving and maintaining a cold shutdown condition. The Commission specifically requests comment on this proposed additional requirement.]

The scope of the [proposed] final rule does not include all electric equipment important to safety in its various gradations of importance. It [includes] covers that portion of equipment important to safety commonly referred to as "safety-related." [or "Class 1E" equipment in IEEE national standards and some additional non-Class 1E equipment and systems whose failure under extreme environmental conditions could prevent the satisfactory accomplishment of safety functions by accident mitigating equipment.] Safety-related electric equipment is essentially "Class 1E" equipment as defined in IEEE 323-1974.

Included in the [proposed] final rule are specific technical requirements pertaining to (a) qualification parameters, (b) qualification methods, and (c) documentation. Qualification parameters include temperature, pressure, humidity, radiation, chemicals, and submergence. Qualification methods include (a) testing as the principal means of qualification and (b) analysis and operating experience in lieu of testing. The [proposed] final rule would requires that the qualification program include synergistic effects, aging, margins, radiation, and environmental conditions. Also, a record of qualification must be maintained. Proposed Revision 1 to Regulatory Guide 1.89, [is being revised to] which has been issued for

public comment, will describe methods acceptable to the NRC for meeting the provisions of this [proposed] rule and [to] will include a list of typical equipment covered by it [a-draft-of-the-proposed]. Revision 1 [is-being-published-for-public-comment-concurrently with-the-proposed-rule: to Regulatory Guide 1.89 will be issued after resolution of public comments. Specific guidance on replacement parts will be included in Regulatory Guide 1.89. The Commission expects that licensees and applicants will utilize the replacement process to upgrade the quality of electric equipment to the provisions of this rule.

[Also-included-in-the-proposed-rule-is-a-requirement;-which-is-consistent-with-Commission-Memorandum-and-Order;-CLI-80-21;-for-submission---of-an-analysis-by-licensees-to-ensure-that-the-plant-can-be-safely-operated pending-completion-of-the-environmental-qualification-of-electric-equipment:--The-Commission-expects-that;-for-each-of-the-currently-operating power-plants;-this-analysis-and-its-evaluation-by-the-NRC-staff-will-be completed-well-in-advance-of-the-effective-date-of-this-rule:--If-the licensees-of-operating-power-plants-fail-to-provide-these-analyses-in-a timely-manner;-the-Commission-expects-the-NRC-staff-to-take-the-appropriate-steps-to-require-that-the-information-be-provided-and-to-enforce compliance-with-this-requirement:--This-requirement-has-been-included-in this-proposed-rule-to-provide-a-regulatory-basis-for-enforcement:]

NRC will generally not accept analysis alone in lieu of testing. Experience has shown that qualification of equipment without test data may not be adequate to demonstrate functional operability during design basis event conditions. To ensure integrity of a testing program, the same piece of equipment must be used throughout the complete test sequence.

~~[Analysis may be acceptable if testing of the equipment is impractical because of size; or limitation due to the state of the art. The proposed rule takes into consideration the prior qualification history of the operating power plants. For example, the proposed rule recognizes that for those plants which are not committed to either IEEE 323 1971 or IEEE 323 1974 for equipment qualification, and have been tested only for high temperature pressure, and steam, some equipment may not need to be tested again to include other service conditions such as radiation and chemical sprays. The qualification of equipment for these service conditions may be established by analysis.]~~

The [proposed] final rule would requires that each holder of an operating license provide a list of safety-related electric equipment previously qualified based on testing, analysis, or a combination thereof and a list of equipment that has not been qualified. These lists and the schedule for completion of equipment qualification ~~would have to~~ must be submitted ~~written~~ by [Insert a date 90 days after the effective date of this amendment]. ~~rule. [However, this time period will be adjusted during the final rule making process to allow reasonable time for licensees to evaluate NRC's safety reviews that are currently underway.~~

~~The proposed rule will codify the Commission's current requirements for the environmental qualification of electric equipment. Upon publication of a final rule, the BGR guidelines and NUREG 0588 will be withdrawn.]~~

The general requirements for seismic and dynamic qualification for electric equipment are contained in the General Design Criteria. Pending development of specific requirements in this area, the general requirements will continue to apply. NRC is considering expansion of the scope

of this rule to include additional electric equipment important to safety. This matter will be the subject of a future rulemaking.

[Additional views of Commissioner Bradford: Commissioner Bradford believes that the proposed deadline (second refueling outage after March 31, 1982) for qualification is much too relaxed, given the fact that licensees and the NRC have been aware of the problems in this area since 1978. The proposed deadline extends as much as two and one half years beyond the June 30, 1983 date by which the Atomic Industrial Forum concluded that nearly all electrical equipment could be qualified. Given the more generous deadline, he also believes that the rule should have contained requirements for seismic and dynamic qualification. While the general design criteria contain requirements in this area, clarification now would ensure that equipment to be replaced in the near term will not have to be ripped out in a few years because it was not properly seismically qualified.

Commissioner Gilinsky has agreed with these views.]

Comments On The Proposed Rule

The Commission received and considered the comments on the proposed rule contained in the 69 letters received from the public by April 6, 1982. Copies of those letters and a staff response to each comment are available for public inspection and copying for a fee at the Commission's Public Document Room at 1717 H Street NW., Washington, D.C. Single copies of the analysis of the comments may be obtained through written request to the Office of Administration, Document Management Branch, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

The major issues raised by the comments and NRC staff responses are as follows:

(1) Seismic and Dynamic Qualification - Paragraph 50.49(a)

Issue: Seismic and dynamic qualifications are an integral part of environmental qualification. It is therefore inappropriate to codify these requirements separately.

Response: Safety-related electric equipment at operating nuclear power plants was generally qualified for environmental and seismic stresses separately, i.e., by using separate prototypes for environmental and seismic qualification tests. The Commission has decided, after considerable deliberation, to pursue this issue at a future date through the issuance of an advance notice of proposed rulemaking. Any seismic qualification testing of equipment in operating plants that may be required by future rulemaking will not require retesting for environmental stresses solely because a single prototype was not used during the original qualification.

(2) Scope - Cold Shutdown Requirement - Paragraph 50.49(c)

Issue: The rule introduces a new requirement to qualify "equipment needed to complete one path of achieving and maintaining a cold shutdown condition." A change of this magnitude, at this advanced stage of the industry's qualification effort, most certainly introduces significant new costs and obligations with no demonstrated improvement in safety.

Response: The Commission agrees that this is a new requirement that may introduce significant costs. The licensing basis of the majority of operating reactors does not require that all electric equipment and systems necessary to bring the reactor from normal operating conditions to cold shutdown be designed to Class 1E standards. Therefore, to require that all plants environmentally qualify the electric equipment and systems needed to complete one path of achieving and maintaining

a cold shutdown condition may require the upgrading of a significant amount of equipment and systems that do not currently meet Class 1E standards for operating reactors. However, electric equipment and systems necessary to mitigate the consequences of design basis accidents should be required to meet Class 1E standards for all reactors and therefore, would be covered by the rule.

The Commission is currently studying the requirements for shutdown decay heat removal under Unresolved Safety Issue (USI) A-45. The overall purpose of A-45 is to evaluate the adequacy of current licensing requirements to ensure that failure to remove shutdown decay heat does not pose an unacceptable risk. Under A-45 a comprehensive and consistent set of shutdown cooling requirements for existing and future plants are being developed. The final resolution of A-45 is presently scheduled for October 1984.

The Commission believes it would be premature at this time to impose the requirement to environmentally qualify electric equipment and systems necessary to achieve and maintain cold shutdown prior to the final resolution of A-45. Therefore, this requirement is not included in the final rule.

(3) Scope - Equipment in a Mild Environment - Paragraph 50.49(c)

Issue: The rule makes no distinction between equipment located in a harsh or mild environment. The stresses for equipment in a mild environment are less severe than for those in a harsh environment.

Response: The final rule does not cover the electric equipment located in a mild environment. The Commission has concluded that the general quality and surveillance requirements applicable to safety-related electric equipment as a result of other Commission regulations,

including 10 CFR Part 50, Appendix B (see for example, Regulatory Guide 1.33) are sufficient to ensure adequate performance of safety-related electric equipment located in mild environments. Since it has been concluded that no further environmental qualification requirements are needed for such equipment provided they fully satisfy all other applicable regulations, the Commission has determined that no additional requirements are necessary with respect to safety-related equipment located in mild environments in order for licensees to satisfy, with respect to such equipment, existing license conditions or technical specifications calling for qualification of safety-related electric equipment in accordance with DOR Guidelines or NUREG-0588.

(4) Scope - Previous Qualification Efforts - Paragraph 50.49(c)

Issue: The rule does not recognize that operating plants have just completed qualification of equipment to the DOR Guidelines or NUREG-0588. Without such recognition, industry efforts, manpower, and billions of dollars will go down the drain.

Response: The final rule has been expanded to alleviate this concern.

(5) Humidity - Paragraph 50.49(e)(2)

Issue: The effects of time-dependent variations of relative humidity during normal operation cannot be considered for all equipment. There are no detailed standards for how this type of testing should be performed.

Response: The Commission agrees. The words "Time-dependent variation of relative" have been deleted from Paragraph 50.49(e)(2).

(6) Aging - Paragraph 50.49(e)(5)

Issue: The requirement that ongoing qualifications be done using "prototype equipment naturally aged" is overly restrictive. Use of

accelerated aging to define a qualified life is not technically feasible.

Response: Paragraph 50.49(e)(5) has been modified to alleviate this concern.

(7) Margins - Paragraph 50.49(e)(8)

Issue: The margins applied in addition to known conservatisms lead to excessive stress that could lead to failures of equipment in unrealistic qualification tests. This paragraph is in conflict with Regulatory Guide 1.89.

Response: The Commission agrees. The paragraph has been modified accordingly.

(8) Analysis and partial test data - Paragraph 50.49(f)(4)

Issue: If partial type test data that adequately support the analytical assumptions and conclusions are available, their analysis should be allowed to extrapolate or interpolate these results for equipment, regardless of purchase date.

Response: The Commission agrees. Reference to "purchase date" has been deleted.

(9) Requirement for a central file - Paragraph 50.49(j)

Issue: The requirement for a central file should be deleted since it is not cost effective and has no safety benefit.

Response: The Commission agrees. The requirement for a central file has been deleted.

(10) Justification of continued operation for operating plants.

Issue: The requirement to submit justification for the continued operation of operating plants should be deleted since this information has been previously submitted to NRC.

Response: This requirement has been satisfactorily met and Paragraph 50.49(j) of the proposed rule has been deleted in its entirety from the final rule.

In addition, Paragraph 50.49(g) of the proposed rule has been deleted from the final rule since it is too prescriptive. It will be included in Regulatory Guide 1.89.

Effective Date:

This rule is effective upon publication in the Federal Register. The Commission has determined that the final rule should take immediate effect upon publication because it relieves a restriction under subsection (d)(1) of Section 553 of the Administrative Procedure Act. This is so because all operating reactor licensees are currently under a June 30, 1982, deadline to complete environmental qualification of safety-related electric equipment. The final rule's implementation schedule, as explained above, supplants this date and thus gives licensees additional time to complete environmental qualification of safety-related electric equipment. In addition, the Commission finds that there is good cause--pursuant to subsection (d)(3) of Section 553--to make the rule's requirements effective upon publication. The first licensee actions under the rule are not required until 90 days after the effective date of the rule. This 90-day period is intended to include the statutory 30 days and allow 60 additional days to make the submittal required by Paragraph 50.49(g) of the rule. The overall effect of making the rule effective on publication is to relieve licensees of the June 30, 1982, deadline and to provide a sufficient period after the effective date of the rule for licensees to achieve compliance with the near-term requirements of the rule.

Paperwork Reduction Act

The [proposed] final rule contains recordkeeping requirements that are subject to review by the Office of Management and Budget (OMB). As required by P.L. 96-511, this proposed rule [~~will be~~] was submitted to OMB for clearance of the recordkeeping requirements.

Regulatory Flexibility Statement

In accordance with the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission hereby certifies that this rule[~~, if promulgated,~~] will not have a significant economic impact on a substantial number of small entities. This [proposed] final rule affects the method of qualification of electric equipment by utilities. Utilities do not fall within the definition of a small business found in Section 3 of the Small Business Act, 15 U.S.C. 632. In addition, utilities are required by the Commission's Memorandum and Order CLI-80-21, dated May 23, 1980, to meet the requirements contained in the DOR "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors," (November 1979) and NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," which form the basis of this [proposed] rule. Consequently, this rule codifies existing requirements and imposes no new costs or obligations on utilities.

List of Subjects in 10 CFR Part 50

Antitrust, Classified information, Fire prevention, Intergovernmental relations, Nuclear power plants and reactors, Penalty, Radiation protection, Reactor siting criteria, Reporting requirements.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and section 553 of title 5 of the United States Code, ~~notice-is-hereby-given-that-adoption-of-the~~the following amendment to Title 10, Chapter I, Code of Federal Regulations, Part 50, ~~10-CFR-Part-50-is-contemplated~~ is published as a document subject to codification.

10 CFR Part 50

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

AUTHORITY: Secs. 103, 104, 161, 182, 183, 189, 68 Stat. 936, 937, 948, 953, 954, 955, 956, as amended (42 U.S.C. 2133, 2134, 2201, 2232, 2233, 2239); secs. 201, 202, 206, 88 Stat. 1243, 1244, 1246 (42 U.S.C. 5841, 5842, 5846), unless otherwise noted.

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). Sections 50.100-50.102 issued under sec. 186, 68 Stat. 955 (42 U.S.C. 2236).

For the purposes of sec. 223, 68 Stat 958, as amended (42 U.S.C. 2273), §§50.10(a), (b), and (c), 50.44, 50.46, 50.48, 50.54, and 50.80(a) are issued under sec. 161b, 68 Stat. 948, as amended (42 U.S.C. 2201(b)); §§50.10(b) and (c) and 50.54 are issued under sec. 161i, 68 Stat. 949, as amended (42 U.S.C. 2201(i)); and §§50.55(e), 50.59(b), 50.70, 50.71, 50.72, and 50.78 are issued under sec. 161o, 68 Stat. 950, as amended (42 U.S.C 2201(o)).

2. A new § 50.49 is added to read as follows:

§ 50.49 Environmental qualification of safety-related electric equipment for nuclear power plants.

(a) Requirements for seismic and dynamic qualification of safety-related electric equipment are not included in this section. Also not included are the requirements for safety-related electric equipment located in a mild environment. A mild environment is an environment that would at no time be significantly more severe than the environment that would occur during normal plant operation or during anticipated operational occurrences.

(b) Each holder of or each applicant for a license to operate a nuclear power plant shall establish a program for qualifying the electric equipment as defined in paragraph (c) of this section.

(c) Safety-related electric equipment and systems covered by this section include electric equipment and systems that are [~~essential to emergency reactor shutdown; containment isolation; reactor core cooling; and containment and reactor heat removal or that are otherwise essential in preventing significant release of radioactive material to the environment. Included is equipment (1) that performs the above functions automatically; (2) that is used by the operator to perform these functions manually; and (3) whose failure can prevent the satisfactory accomplishment of one or more of the above safety functions. Also included is equipment needed to complete one path of achieving and maintaining a cold shutdown condition.~~] designed to remain functional for postulated accidents and are necessary to assure (1) the integrity of the reactor coolant pressure boundary, (2) the capability to shut down the reactor and maintain it in a safe condition, and (3) the capability to prevent

or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the 10 CFR Part 50 guidelines.

(d) The applicant or licensee shall prepare a list of ~~all~~ safety-related electric equipment covered by this section. [~~and maintain it in an auditable form. This list of equipment must, as a minimum, include:~~] In addition, the applicant or licensee shall include the following information for safety-related electric equipment in a qualification file:

(1) The performance specifications [~~and structural integrity requirements~~] under conditions existing during normal and abnormal operation and during design basis events and afterwards. [~~and the lengths of the periods during which the integrity must be maintained:~~]

(2) [~~The range of~~] The voltage, frequency, load, and other electrical characteristics for which the performance specified in accordance with paragraph (d)(1) of this section can be ensured.

(3) The environmental conditions, including temperature, pressure, humidity, radiation, chemicals, and submergence [~~and the predicted variations of these environmental conditions with time~~] at the location where the equipment must perform as specified in accordance with paragraphs (d)(1) and (2) of this section.

(e) The electrical equipment qualification program must include the following:

(1) Temperature and Pressure. The time-dependent temperature and pressure at the location of the equipment must be established for the most [~~limiting~~] severe of the applicable [~~postulated accidents~~] design basis events and must be used as the basis for the environmental qualification of safety-related electric equipment.

(2) Humidity. [~~Time-dependent-variations-of-relative~~] Humidity during normal operation and design basis events must be considered.

(3) Chemical Effects. The composition of chemicals used must be at least as severe as that resulting from the most limiting mode of plant operation (e.g., containment spray, emergency core cooling, or recirculation from containment sump). If the composition of the chemical spray can be affected by equipment malfunctions, the most severe chemical spray environment that results from a single failure in the spray system must be assumed.

(4) Radiation. The radiation environment must be based on the type of radiation, the total dose [~~and-dose-rate-of-the-radiation-environment~~] expected during normal operation over the installed life of the equipment, [~~plus~~] and the radiation environment associated with the most severe design basis event during or following which the equipment is required to remain functional, including the radiation resulting from recirculating fluids for equipment located near the recirculating lines and including dose-rate effects.

(5) Aging. Equipment qualified by test must [~~practicable~~] be preconditioned by natural or artificial (accelerated) aging to its installed end-of-life condition. [~~Electromechanical-equipment-must-be operated-to-the-mechanical-wear-and-electrical-degradation-expected-during its-installed-life.~~] If Where preconditioning to an installed end-of-life condition [~~a-qualified-life-equal-to-the-installed-life~~] is not [~~possible~~] practicable and technically meaningful, the equipment may be preconditioned to a shorter [~~qualified~~] designated life. The equipment must be replaced or refurbished at the end of [~~its-qualified~~] this designated life unless ongoing qualification [~~of~~] demonstrates [~~prototype-equipment-naturally-aged~~

~~in-plant service show; by artificial aging and type testing~~] that the item has additional [~~qualified~~] life.

(6) Submergence (if subject to being submerged).

(7) Synergistic Effects. [~~The preconditioning and testing of equipment must consider known~~] Synergistic effects must be considered when these effects are [~~known~~] believed to have a significant effect on equipment performance.

(8) Margins. Margins must be applied to account for production variations and inaccuracies in test instruments. These margins are in addition to [~~margins applied during the derivation of the environmental conditions;~~] any conservatisms applied during the derivation of environmental conditions unless these conservatisms can be quantified and shown to contain appropriate margins.

(f) Each item of safety-related electric equipment must be qualified by one of the following methods:

(1) Testing an identical item of equipment under identical conditions or under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.

(2) Testing a similar item of equipment with a supporting analysis to show that the equipment to be qualified is acceptable.

(3) Experience with identical or similar equipment under similar conditions with a supporting analysis to show that the equipment to be qualified is acceptable.

[~~(4) Analysis in lieu of testing in the following cases:~~

~~(i) if type testing is precluded by the physical size of the equipment or by the state of the art;~~]

(4) ~~(iii)~~ [By] Analysis in combination with partial type test data [which] that supports the analytical assumptions and conclusions. [~~;-if-the equipment-purchase-order-was-executed-prior-to-May-23,-1980.~~

~~(g)--If-an-item-of-electric-equipment-is-to-be-qualified-by-test--~~

~~(1)--The-acceptance-criteria-must-be-established-prior-to-testing;~~

~~(2)--The-tests-must-be-designed-and-conducted-to-demonstrate-that the-equipment-can-perform-its-required-function-as-specified-in-accordance-with-paragraph-(d)(1)-of-this-section-for-all-conditions-as-specified-in-accordance-with-paragraphs-(d)(2)-and-(3)-of-this-section;--The test-profile-(e.g.,-pressure,-temperature,-radiation-vs.-time)-must include-margins-as-set-forth-in-paragraph-(e)(8)-of-this-section;~~

~~(3)--The-test-profile-must-be-either-(i)-a-single-profile-that envelops-the-environmental-conditions-resulting-from-any-design-basis event-during-any-mode-of-plant-operation-(e.g.,-a-profile-that-envelops the-conditions-produced-by-the-postulated-spectrum-of-main-steamline break-(MSLB)-and-loss-of-coolant-accidents-(LOCA))-or-(ii)-separate-profiles-for-each-type-of-event-(e.g.,-separate-profiles-for-the-MSLB-accidents-and-for-LOCAs);~~

~~(4)--The-same-piece-of-equipment-must-be-used-throughout-the-complete test-sequence-under-any-given-profile;~~]

[~~(h)~~] (g) Each holder of an operating license issued prior to (insert the effective date of this amendment) must, shall, by (insert a date 90 days after the effective date of this amendment), identify the safety-related electric equipment already qualified to the provisions of this rule and submit a schedule for the qualification [testing] or replacement of the remaining safety-related electric equipment. This schedule must establish a goal of final environmental qualification by the end of the second

refueling outage after March 31, 1982. The Director of Nuclear Reactor Regulation may grant requests for extensions of this deadline to a date no later than November 30, 1985, for specific pieces of equipment if [such] these requests are filed on a timely basis and demonstrate good cause for the extension, such as procurement lead time, test complications, and installation problems. In exceptional cases, the Commission itself may consider and grant extensions beyond November 30, 1985, for completion of environmental qualification.

[(i)] (h) Each licensee shall notify the Commission of any significant equipment qualification problem that may require extension of the completion date within [30] 60 days of its discovery.

[(j)--For-the-continued-operation-of-a-nuclear-plant,-each-holder-of an-operating-license-issued-prior-to-the-effective-date-of-this-rule-shall perform-an-analysis-to-ensure-that-the-plant-can-be-safely-operated-pending completion-of-the-environmental-qualification.--The-detailed-analysis-for each-equipment-type-with-appropriate-justification-must-be-submitted-to Director-of-Nuclear-Reactor-Regulatory-by-(insert-the-effective-date-of the-rule)-and-must-include,-where-appropriate,-consideration-of:

(1)--Accomplishing-the-safety-function-by-some-designated-alternative equipment-that-has-been-adequately-qualified-and-satisfies-the-single failure-criterion-if-the-principal-equipment-has-not-been-demonstrated-to be-fully-qualified;

(2)--The-validity-of-partial-test-data-in-support-of-the-original qualification;

(3)--Limited-use-of-administrative-controls-over-equipment-that-has not-been-demonstrated-to-be-fully-qualified;

~~(4)--Completion-of-the-safety-function-prior-to-exposure-to-the-ensuing-accident-environment-and-the-subsequent-failure-of-the-equipment-does not-degrade-any-safety-function-or-mislead-the-operator;~~

~~(5)--No-significant-degradation-of-any-safety-function-or-misleading of-the-operator-as-a-result-of-failure-of-equipment-under-the-accident environment;~~]

[~~(k)~~] (i) The applicant for an operating license that is granted on or after [insert the effective date of this amendment] but prior to November 30, 1985, must shall perform an analysis to ensure that the plant can be safely operated pending completion of environmental qualification. [~~in-accordance-with-paragraph-(j)-of-this-section-except-that-this-analysis~~] This analysis must be submitted to the Director of Nuclear Reactor Regulation for consideration prior to the granting of an operating license and must include, where appropriate, consideration of:

(1) Accomplishing the safety function by some designated alternative equipment if the principal equipment has not been demonstrated to be fully qualified.

(2) The validity of partial test data in support of the original qualification.

(3) Limited use of administrative controls over equipment that has not been demonstrated to be fully qualified.

(4) Completion of the safety function prior to exposure to the ensuing accident environment and the subsequent failure of the equipment does not degrade any safety function or mislead the operator.

(5) No significant degradation of any safety function or misleading of the operator as a result of failure of equipment under the accident environment.

[~~(i)~~] (j) A record of the qualification including documentation in paragraph (d) of this section must be maintained in [~~a central file~~] an auditable form for the entire period during which the covered item is installed in the nuclear power plant or is stored for future use to permit verification that each item of safety-related electric equipment covered by this section (1) is qualified for its application and

(2) meets its specified performance requirements when it is subjected to the conditions predicted to be present when it must perform its safety function up to the end of its qualified life.

(k) Licensees are not required to qualify electric equipment in accordance with the requirements of this rule provided the following conditions are met:

(1) Qualification of safety-related electric equipment commenced prior to [insert date 90 days after effective date of this rule], and

(2) Qualification of electric equipment was done in accordance with the existing license conditions or technical specifications requiring such equipment to be qualified according to "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors," November 1979, or NUREG-0588 (For Comment version), "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."

Dated at _____ this _____ day of _____, 1982.

For the Nuclear Regulatory Commission.

_____

Samuel J. Chilk
Secretary of the Commission

VALUE/IMPACT STATEMENT

1. PROPOSED ACTION

1.1 Description

The applicant (licensee) of a nuclear power plant is required by the Commission's regulations to verify that structures, systems, and components important to safety will perform their intended functions in spite of the environments that may result from anticipated operational occurrences or postulated accidents. This verification includes environmental qualification by test, operating experience, and analysis, or a combination of these. The proposed rule sets forth the Commission's requirements for the environmental qualification of safety-related electric equipment by test and analysis.

1.2 Need for Proposed Action

The current general requirements for qualification of electric equipment important to safety are found in General Design Criteria 1, 2, 4, and 23 of Appendix A to Part 50; Sections III and XI of Appendix B to Part 50; and Paragraph 50.55a(h) of Part 50, which incorporates by reference IEEE 279-1971,* "Criteria for Protection Systems for Nuclear Power Generating Stations." The NRC has used several methods to ensure that these general requirements are met for safety-related electric equipment. Prior to 1971, qualification was based on the fact that the electric components were of high industrial quality. For nuclear plants licensed to operate after 1971, qualification was judged on the basis of IEEE 323-1971. However, no regulatory guide was ever issued endorsing IEEE 323-1971, although some of the plants referenced the standard in their licensing submissions to the Commission. For the plants whose safety evaluation reports were issued after July 1, 1974, the Commission has issued Regulatory Guide 1.89, which endorses IEEE 323-1974* subject to supplementary provisions.

*Copies may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017.

Currently, the Commission has under way a program to reevaluate the qualification of safety-related electric equipment in all operating reactors. As part of this program, the staff has developed more definitive criteria for the environmental qualification. The Division of Operating Reactors (DOR) issued "Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors" in November 1979. In addition, for reactors under licensing review, the staff has issued NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."

In its Memorandum and Order CLI-80-21 issued on May 23, 1980, the Commission endorsed the staff's actions to use the DOR Guidelines to review operating plants and NUREG-0588 to review plants under licensing review. Further, the Commission ordered that these two documents form the basis for requirements that licensees and applicants must meet in order to satisfy those aspects of Appendix A to 10 CFR Part 50 that relate to the environmental qualification of electric equipment. The Commission also ordered that licensees of operating reactors must comply with these requirements so that the applicable equipment in all operating plants will meet the DOR Guidelines or NUREG-0588.

1.3 Value/Impact of Proposed Action

1.3.1 NRC Operations

Since regulations specifically setting forth requirements for the qualification of safety-related electric equipment in new and operating plants have never been issued, the proposed action should result in more effective effort by the staff in reviewing applications for construction permits and operating licenses and in the backfitting of these requirements to operating plants. The proposed action will codify an NRC position by taking advantage of previous staff effort (1) in completion of a generic activity (A-24), "Qualification of Class 1E Safety-Related Equipment," (2) in the preparation of the DOR Guidelines and NUREG-0588, (3) in IEEE standards committee work, and (4) in the development, funding, and monitoring of related research programs.

There should be little impact on the staff at the time the rule is approved. Approximately two man-years of effort have been spent in preparation of the rule.

1.3.2 Other Government Agencies

Not applicable, unless a government agency is the applicant.

1.3.3 Industry

The licensees and applicants currently must meet the requirements for qualification of safety-related electric equipment in accordance with the Commission's Memorandum and Order CLI-80-21. If the final rule is published as now presented, the rule will not have significant impact on industry because of backfit.

The value of this rule is that the industry will have clearly specified requirements to follow with respect to the qualification of safety-related electric equipment for new and existing plants. This, in turn, should ease the licensing process for industry by eliminating delays resulting from misinterpretation of NRC's requirements.

1.3.4 Public

The proposed action will improve public safety by further ensuring that electric equipment will perform its safety functions in spite of environments that may result from design basis events. These is no perceived impact on the public.

1.4 Decision on Proposed Action

The proposed action has been mandated by the Commission in its Memorandum and Order CLI-80-21 dated May 23, 1980.

2. TECHNICAL APPROACH

The technical approach will be to codify the programs of the DOR Guidelines and NUREG-0588.

3. PROCEDURAL APPROACH

Rulemaking has been mandated by the Commission in its Memorandum and Order cited above.

4. STATUTORY CONSIDERATIONS

4.1 NRC Authority

Authority for this rulemaking is derived from the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended.

4.2 Need for NEPA Assessment

The proposed action does not require an environmental impact statement in accordance with 51.5(d)(3) of 10 CFR Part 51.

5. RELATIONSHIP TO OTHER EXISTING OR PROPOSED REGULATIONS OR POLICIES

No conflicts or overlaps with requirements promulgated by other agencies are foreseen.

6. SUMMARY AND CONCLUSIONS

This rule mandated by the Commission will be effective upon publication, which is expected prior to June 30, 1982.