



July 27, 1982

## RULEMAKING ISSUE

SECY-82-207C

(Affirmation)

For: The Commissioners

From: William J. Dircks  
Executive Director for Operations

Subject: FINAL RULE, "ENVIRONMENTAL QUALIFICATION OF ELECTRIC EQUIPMENT IMPORTANT TO SAFETY FOR NUCLEAR POWER PLANTS"

Purpose: To revise the Final Rule based on the Commission directives [Staff Requirement Memorandum (SRM)] dated June 25, 1982 from Mr. Chilk to Mr. Dircks.

Discussion: Based on the SRM dated June 25, 1982, Enclosure 1, Notice of Final Rulemaking, SECY-82-207A dated June 9, 1982, has been modified as follows:

1. The title of the final rule has been changed to read "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants." The statement of considerations has been appropriately modified (page 5 of Enclosure 1).
2. The scope has been explicitly stated in the rule. The staff believes that inclusion of two definitions of safety-related equipment in the codified portion of the rule, as suggested in the SRM, is not desirable. In order to meet the intent of the SRM in this regard, a footnote has been added (see page 14 of Enclosure 1).
3. Two options in the area of replacement parts have been included (see paragraph 50.49(1) - page 20 of Enclosure 1).
4. A new paragraph has been added to page 5 of Enclosure 1 to indicate that there is no relaxation of the technical requirements of CLI-80-21, except as noted.
5. Category I requirements of NUREG-0588 will apply to nuclear power plants for which the construction permit safety evaluation report was issued after July 1, 1974 (Comanche Peak and later plants). (See page 4 of Enclosure 1.)

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The final rule does not make any distinction between Category I and Category II requirements of NUREG-0588. Methods of implementation (too detailed to be placed in the rule itself) are contained in the Standard Review Plan and Regulatory Guide 1.89.

6. The requirement to qualify equipment which is needed to complete one path of achieving and maintaining a cold shutdown condition following design basis events has been added to the final rule, as an option (see page 14 of Enclosure 1).

Supplement No. 3 to IE Bulletin 79-01B requested that all licensees submit qualification information for equipment located in a harsh environment required to achieve and maintain a cold shutdown condition following a design basis accident such as LOCA or HELB. In response to this request, licensees for 11 out of 71 plants provided a detailed description of the path and equipment needed to achieve cold shutdown. Licensees for the remaining 60 plants either did not provide the information requested or provided information insufficient to begin a review.

The eleven plants for which sufficient information was provided are Indian Point 3, Hatch 1 and 2, Beaver Valley 1, TMI 1, Ft. Calhoun, Point Beach 1 and 2, Farley 1, Robinson 2, and ANO 2. However, none of the licensees indicated that they have environmentally qualified all the equipment required to achieve cold shutdown.

A very brief review by our contractor, the Franklin Research Institute, of the information submitted for the eleven plants identified above indicates that (1) few, if any, additional equipment is required to achieve cold shutdown beyond that required for hot shutdown, (2) a large percentage of the equipment required to achieve cold shutdown is the same type required to be qualified to reach hot shutdown, and (3) a large percentage of the equipment required to achieve cold shutdown is located in mild environment areas. The staff is in general agreement with these conclusions.

7. The enclosure incorporates all comments received at the June 1, 1982 Commission meeting on this subject.

In addition, for clarity, the paragraphs on aging [§50.49(e)(5)] and on margins [§50.49(e)(8)] have been modified.

The staff suggests that Analysis of Public Comments (Enclosure 2 to SECY-82-207A) be revised after the Commission has voted on this rule and made decisions on (1) replacement parts and (2) qualification of equipment needed for cold shutdown. The analysis of public comments

can be revised and resubmitted to the Commission within a few days subsequent to its decision.

Recommendation: That the Commission:

1. APPROVE

- a. Publication of the final rule §50.49, "Environmental Qualification of Safety-Related Electric Equipment for Nuclear Power Plants," as an amendment to 10 CFR Part 50 to be effective 30 days following publication in the Federal Register (Enclosure 1).
- b. In order to satisfy the requirements of the Regulatory Flexibility Act 5 U.S.C. 605(b), certify that this rule will not have a significant economic impact on a substantial number of small entities. This final rule affects only the licensing and operation of nuclear power plants. This finding is made in the enclosed Federal Register notice.

2. NOTE

- a. That the information collection requirements in this final rule were submitted to the Office of Management and Budget and clearance has been obtained.
- b. That, pursuant to paragraph 51.5(d) of Part 51 of the Commission's regulations, neither an environmental impact statement nor a negative declaration need be prepared in connection with the amendment since the amendment is non-substantive and insignificant from the standpoint of environmental impact.
- c. That the Subcommittee on Energy and the Environment of the House Committee on Interior and Insular Affairs, the Subcommittee on Energy Conservation and Power of the House Committee on Energy and Commerce, the Subcommittee on Environment, Energy and Natural Resources of the House Committee on Government Operations, and the Subcommittee on Nuclear Regulation of the Senate Committee on Environment and Public Works will be informed.
- d. That the Federal Register Notice of final rulemaking will be distributed by the Office of Administration to power reactor licensees/permit holders, applicants for a construction permit for a power reactor, public interest groups, and nuclear steam system suppliers, and all other interested persons.

- e. That a public announcement will be issued.
- f. That the Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification and the reasons for it as required by the Regulatory Flexibility Act.

Scheduling: Affirmation of this rule as early as possible.



William J. Dircks  
Executive Director for Operations

Enclosure:  
Federal Register Notice (Final Rule)

Commissioners' comments should be provided directly to the Office of the Secretary by c.o.b. Thursday, August 12, 1982.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Thursday, August 5, 1982, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

This paper is tentatively scheduled for affirmation at an Open Meeting during the Week of August 30, 1982. Please refer to the appropriate Weekly Commission Schedule, when published, for a specific date and time.

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NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

Environmental Qualification of Electric Equipment  
Important to Safety for Nuclear Power Plants

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Commission is amending its regulations applicable to nuclear power plants to clarify and strengthen the criteria for environmental qualification of electric equipment important to safety. 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 codifies the environmental qualification methods and criteria that meet the Commission's requirements in this area.

EFFECTIVE DATE: [30 days after publication in the Federal Register]

FOR FURTHER INFORMATION CONTACT: Satish K. Aggarwal, Office of Nuclear Regulatory Research, 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 its 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,<sup>1</sup> "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 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

<sup>1</sup>Incorporation by reference approved by the Director of the Office of Federal Register on January 1, 1982. Copies may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, N.Y. 10017.

plants whose Safety Evaluation Reports for construction permits 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,<sup>2</sup> "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 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 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-related 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 rule

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

is based on the DOR Guidelines and NUREG-0588. The Commission recognizes the qualification efforts of the industry as a result of CLI-80-21. Therefore, the rule provides relief to operating nuclear power plants (see paragraph (k) of the final rule). Requalification of electric equipment in accordance with this rule will not be required for nuclear power plants licensed prior to the effective date of this rule which have existing licensing conditions or technical specifications that require electric equipment to be qualified in accordance with DOR Guidelines or NUREG-0588, provided the qualification of a specific piece or type of electric equipment was commenced prior to [insert effective date of this amendment]. Those nuclear power plants that are currently under licensing review and are qualifying electric equipment in accordance with NUREG-0588 (Category I or II) will satisfy the requirements of this rule. Category I requirements which supplement the recommendations of and apply to equipment qualified in accordance with IEEE 323-1974, apply to nuclear power plants for which the construction permit safety evaluation report was issued after July 1, 1974. Category II requirements, which supplement the recommendations of and apply to equipment qualified in accordance with IEEE 323-1971, apply to nuclear power plants for which the construction permit safety evaluation report was issued prior to July 1, 1974.

The dates specified in this rule for completion of environmental qualification of electric equipment important to safety 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 final rule provides no relaxation of technical requirements contained in Commission Memorandum and Order CLI-80-21, [except upgrading the qualification of replacement parts.]\*

The scope of the final rule covers that portion of equipment important to safety commonly referred to as "safety-related" (which the Commission interprets as essentially "Class 1E" equipment defined in IEEE 323-1974) and nonsafety-related electric equipment whose failure could prevent the satisfactory accomplishment of required safety functions by safety-related equipment. Safety-related structures, systems, and components are those that are relied upon to remain functional during and following design basis events to ensure (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe shutdown condition, and (iii) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guidelines of 10 CFR Part 100. Design basis events are defined as conditions of normal operation, including anticipated operational occurrences; design basis accidents; external events; and natural phenomena for which the plant must be designed to ensure functions (i) through (iii) above. Also covered in the scope of the final rule is certain postaccident monitoring equipment specified as "Category 1 and 2," in Revision 2 of Regulatory Guide 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," [and equipment needed to complete one path of achieving and maintaining a cold shutdown condition.]\*

\*Appropriate corrections must be made after the Commission has made a decision.

Included in the 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 in combination with partial type test data or operating experience. The final rule requires that the qualification program include synergistic effects, aging, radiation, environmental conditions and margin considerations. Also, a record of qualification must be maintained. Proposed Revision 1 to Regulatory Guide 1.89, which has been issued for public comment, describes methods acceptable to the NRC for meeting the provisions of this rule and includes a list of typical equipment covered by it. Revision 1 to Regulatory Guide 1.89 will be issued after resolution of public comments.

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. Paragraph 50.49(f) provides four methods for qualification. Testing will be preferred. To ensure integrity of a testing program, the Commission expects that the same piece of equipment will be used throughout the complete test sequence.

The final rule requires that each holder of an operating license provide a list of electric equipment important to safety within the scope of this rule 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 qualification of electric equipment

must be submitted by [Insert a date 90 days after the effective date of this amendment].

The general requirements for seismic and dynamic qualification for electric equipment are contained in the General Design Criteria. Further guidance is provided in Regulatory Guide 1.100, "Seismic Qualification of Electric Equipment for Nuclear Power Plants," (Revision 1) and NUREG-0800, "Standard Review Plan." NRC is considering future rulemaking concerning requirements for the environmental qualification of all electric equipment important to safety and the requirements for seismic and dynamic qualification of electric equipment.

#### 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.

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

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

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

Response: 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 the issue of seismic and dynamic qualification at a future date

through the issuance of an advance notice of proposed rulemaking. A future seismic rule may not require retesting for environmental stresses because a single prototype was not used during the original qualification.

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

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: [To be developed after Commission decisions on alternatives.]

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

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 electric equipment as a result of other Commission regulations, including 10 CFR Part 50, Appendix B (see for example, Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 3) are sufficient to ensure adequate performance of electric equipment important to safety 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 electric equipment important to safety 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(b)

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. See Paragraph 50.49(k).

(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. Humidity variations during normal operation are difficult to predict. It has not been demonstrated that the time-dependent variation in humidity will produce any differences in degradation of electric equipment. 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: Preconditioning by accelerated aging is technically feasible for simple electric equipment for plant life and for complex electric equipment for a shorter designated life. The Commission recognizes that

state-of-art technology will be utilized in any aging program. Reference to qualified life has been deleted from paragraph 50.49(e)(5).

(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.

Response: The Commission agrees. This requirement could have caused excessive margins. The paragraph has been modified to recognize conservatisms that can be quantified.

(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. This requirement has been subject to different interpretations. A record of qualification must be maintained in an "auditable form" but not necessarily in a central file for the entire period during which the covered item is installed in a nuclear power plant. Recordkeeping requirement of 10 CFR Part 50 Appendix B must be met. Certain records can be kept at the vendor's shop.

(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 replaces the "interim rule" published in the FEDERAL REGISTER on June 30, 1982 (47 FR 28363). The "interim rule" suspended environmental qualification deadlines contained in license conditions or technical specifications of operating plants. On the effective date of this rule (see above), the "interim rule" is superseded and the schedule for environmental qualification contained in this rule takes effect for all plants.

Paperwork Reduction Act

The final rule contains information collection requirements that are subject to review by the Office of Management and Budget (OMB). As required by P.L. 96-511, the final rule was submitted to OMB, and clearance of the information collection requirements was obtained. (OMB clearance number is 3150-0011.)

## 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 will not have a significant economic impact on a substantial number of small entities. This 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 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, the following amendment to Title 10, Chapter I, Code of Federal Regulations, Part 50, is published as a document subject to codification.

\*Delete if qualification requirement for cold shutdown equipment is included in the final rule.



## 10 CFR Part 50

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

AUTHORITY: Secs. 103, 104, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 948, 953, 954, 955, 956, as amended (42 U.S.C. 2133, 2134, 2201, 2232, 2233, 2236, 2239); secs. 201, 202, 206, 88 Stat. 1242, 1244, 1246 as amended (42 U.S.C. 5841, 5842, 5846), unless otherwise noted.

Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5851).

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. § 50.49 is revised to read as follows:

§ 50.49 Environmental qualification of electric equipment important to safety for nuclear power plants.

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

(b) Electric equipment important to safety covered by this section is:

(1) Safety-related electric equipment:<sup>2</sup> this equipment is that relied upon to remain functional during and following design basis events to ensure (i) the integrity of the reactor coolant pressure boundary, (ii) the capability to shut down the reactor and maintain it in a safe shutdown condition, and (iii) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the 10 CFR Part 100 guidelines. Design basis events are defined as conditions of normal operation, including anticipated operational occurrences, design basis accidents; external events; and natural phenomena for which the plant must be designed to ensure functions (i) through (iii) of this paragraph.

(2) Nonsafety-related electric equipment whose failure could prevent satisfactory accomplishment of required safety functions by the safety-related equipment.

(3) Certain post-accident monitoring equipment.<sup>3</sup>

(4) [Equipment needed to complete one path of achieving and maintaining a cold shutdown condition following design basis events.]\*

(c) Requirements for seismic and dynamic qualification of electric equipment important to safety are not included in this rule. Also not included are the requirements for electric equipment important to safety

<sup>2</sup>Safety-related electric equipment is referred to as "Class 1E" equipment in IEEE 323-1974. Copies of this standard may be obtained from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017.

<sup>3</sup>Specific guidance is provided in Revision 2 of Regulatory Guide 1.97, "Instrumentation for Light-Water Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident." Copies of the Regulatory Guide can be obtained from Nuclear Regulatory Commission, Document Management Branch, Washington, DC 20555.

\*Delete, if appropriate, after the Commission has made a decision.

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, including anticipated operational occurrences.

(d) The applicant or licensee shall prepare a list of electric equipment important to safety covered by this section. In addition, the applicant or licensee shall include the following information for this electric equipment important to safety in a qualification file:

(1) The performance specifications under conditions existing during and following design basis events.

(2) 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 at the location where the equipment must perform as specified in accordance with paragraphs (d)(1) and (2) of this section.

(e) The electric equipment qualification program must include and be based on the following:

(1) Temperature and Pressure. The time-dependent temperature and pressure at the location of the electric equipment important to safety must be established for the most severe design basis event during or following which this equipment is required to remain functional.

(2) Humidity. Humidity during 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

in test instruments. These margins are in addition to any conservatisms applied during the derivation of local environmental conditions of the equipment unless these conservatisms can be quantified and shown to contain appropriate margins.

(f) Each item of electric equipment important to safety 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 combination with partial type test data that supports the analytical assumptions and conclusions.

(g) Each holder of an operating license issued prior to (insert the effective date of this amendment) shall, by (insert a date 90 days after the effective date of this amendment), identify the electric equipment important to safety within the scope of this rule already qualified and submit a schedule for either the qualification to the provisions of this rule or for the replacement of the remaining electric equipment important to safety within the scope of this rule. This schedule must establish a goal of final environmental qualification of electric equipment by the end of the second refueling outage after March 31, 1982. The Director of the Office of Nuclear Reactor Regulation may grant requests for extensions of this deadline to a date no later than November 30, 1985,

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 expected during normal operation over the installed life of the equipment, 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 be preconditioned by natural or artificial (accelerated) aging to its end-of-installed life condition. Consideration must be given to all types of degradation which can have an effect on the functional capability of the equipment. If preconditioning to an end-of-installed life condition is not practicable, the equipment may be preconditioned to a shorter designated life. The equipment must be replaced or refurbished at the end of this designated life unless ongoing qualification demonstrates that the item has additional life.

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

(7) Synergistic Effects. Synergistic effects must be considered when these effects are believed to have a significant effect on equipment performance.

(8) Margins. Margins must be applied to account for unqualified uncertainty, such as the effects of production variations and inaccuracies

for specific pieces of equipment if 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.

(h) Each licensee shall notify the Commission of any significant equipment qualification problem that may require extension of the completion date provided in accordance with paragraph (g) within 60 days of its discovery.

(i) The applicant for an operating license that is to be granted on or after [insert the effective date of this amendment] but prior to November 30, 1985, shall perform an analysis to ensure that the plant can be safely operated pending completion of environmental qualification. This analysis must be submitted to the Director of the Office 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 accident environment resulting from a design basis event and ensuring that 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 information to the operator as a result of failure of equipment under the accident environment resulting from a design basis event.

(j) A record of the qualification, including documentation in paragraph (d) of this section, must be maintained in 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 electric equipment important to safety 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 requalify a specific piece or type of electric equipment important to safety in accordance with the requirements of this rule provided the following conditions are met:

(1) The operating license for the nuclear power plant was issued prior to [Insert effective date of this rule] and has existing license conditions or technical specifications that require electric 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," and

(2) Qualification of the specific piece or type of electric equipment important to safety commenced prior to [insert effective date of this rule].

(1) In kind (identical) replacement parts shall be qualified either in accordance with the DOR Guidelines or NUREG-0588, provided the qualification program for each such part commenced prior to (insert effective date of this rule), or in accordance with this section. Other replacement parts shall be qualified in accordance with the provisions of this section.

OR\*

(1) In kind (identical) replacement parts installed prior to November 30, 1985, shall be qualified either in accordance with the DOR Guidelines or NUREG-0588, provided the qualification program for each such part commenced prior to (insert effective date of this rule), or in accordance with the provisions of this section. Other replacement parts shall be qualified in accordance with the provisions of this section.

Dated at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 1982.

For the Nuclear Regulatory Commission

\_\_\_\_\_  
Samuel J. Chilk  
Secretary of the Commission

\*Delete the option not approved by the Commission.