



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

January 17, 1983

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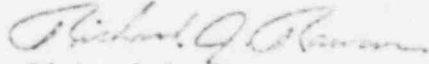
In the Matter of
LONG ISLAND LIGHTING COMPANY
(Shoreham Nuclear Power Station, Unit 1)
Docket No. 50-322 (OL)

Dear Administrative Judges:

Enclosed for your information and that of the parties is a copy of the Final Rule on Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants. This information is supplied as new information which may be relevant and material to matters in litigation before the Board.

While this final rule and its accompanying notice have not yet appeared in the Federal Register, the Secretary of the Commission has approved the release and distribution of this information in the present form. Markings which appear on these materials are those of the office of the Secretary.

Sincerely,


Richard J. Rawson
Counsel for NRC Staff

Enclosure: As stated

cc: Matthew J. Kelly, Esq.
Ralph Shapiro, Esq.
Howard L. Blau, Esq.
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DESIGNATED ORIGINAL

Controlled By DSO-7pl

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555
January 7, 1983

OFFICE OF THE
SECRETARY

MEMORANDUM FOR: William J. Dircks, Executive
Director for Operations

FROM: Samuel J. Chilk, Secretary

SUBJECT: STAFF REQUIREMENTS - AFFIRMATION/DISCUSSION
AND VOTE, 3:30 P.M., THURSDAY, JANUARY 6,
1983, COMMISSIONERS CONFERENCE ROOM
(OPEN TO PUBLIC ATTENDANCE)

- I. SECY 82-207C/D - Final Rule on Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power plants.

The Commission, by a vote of 5-0, approved for publication in the Federal Register a final rule (as attached) to codify the methods and criteria for the environmental qualification of electric equipment important to safety. Commissioner Gilinsky, while approving the rule, would have preferred to include a requirement to qualify equipment for one path to cold shutdown.

Accordingly:

1. The Federal Register notice should be revised to include the modifications as attached, typed in final and forwarded for publication.
(EDØ) (SECY Suspense: 1/14/83)
RES
2. A Public Announcement should be issued.
(OPA/EDØ) (SECY Suspense: 1/21/83)
RES
3. The Federal Register should be sent to affected licensees and interested persons.
(EDØ) (SECY Suspense: 1/28/83)
Adm
4. The appropriate Congressional Committees should be informed.
(OCA/EDØ) (SECY Suspense: 1/21/83)
RES

The Commission, during discussion of the rule and a January 5, 1983 letter from the Union of Concerned Scientists, indicated that it would like to be kept informed of staff actions

Rec'd Off. EDØ
Date..... 1-10-83
Time..... 2:10 p.m.

related to assuring that the environment produced by inadvertant actuation of fire suppression systems not cause the failure of equipment important to safety. (Copies of the IE Bulletin (Circular) on this subject should be provided to the Commission when issued).

(~~EDO~~/IE) (SECY Suspense: To be determined)

NRR

Commissioners Ahearne, and Asselstine also believe qualification of equipment needed to achieve cold shutdown is an important issue. Recognizing that the staff is addressing this issue as a part of Unresolved Safety Issue A-45, now scheduled for completion by January 1985, they support devoting additional staff resources to addressing A-45 if this would lead to an earlier resolution.

cc: Chairman Palladino
Commissioner Gilinsky
Commissioner Ahearne
Commissioner Roberts
Commissioner Asselstine
OPE
OGC
ACRS
ASLAB
ASLAP
PDR - (Advance Copy)
DCS - Phillips 016

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 279-1971,¹ "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

¹Incorporation 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 323-1974,² "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 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

²Copies 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 that 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 by applicants for and holders of operating licenses for nuclear power plants licensed-prior-to-the effective-date-of-this-rule-which-have-existing-licensing-conditions-or technical-specifications-that-require-electric previously required by NRC to qualify 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 of NUREG-0588, 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.

In CLI-80-21, the Commission stated that unless there were sound reasons to the contrary, replacement parts should be qualified to the

standards set forth in Category I of NUREG-0588 or IEEE 323-1974. The Commission reaffirms that position in this rulemaking. Such qualification constitutes compliance with the provisions of paragraph 50.49(1). The Commission's position is designed to promote the policy of upgrading the environmental qualification and reliability of installed electric equipment. Situations may arise, however, in which such upgrading will not be feasible or compatible with overall plant safety. Licensees must review each situation on a case-by-case basis to determine that "sound reasons to the contrary" do exist to justify an exception from upgrading. Examples of acceptable "sound reasons to the contrary" will be included in Regulatory Guide 1.89.

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 under postulated environmental conditions 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

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

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.~~*

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

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

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 and are not included within the scope of this rule. 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 ^{SEPARATELY} 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.

ALSO, THE COMMISSION HAS CONCLUDED THAT PROTECTION OF ELECTRICAL EQUIPMENT IMPORTANT TO SAFETY AGAINST OTHER NATURAL PHENOMENA AND EXTERNAL EVENTS SHOULD NOT BE WITHIN THE SCOPE OF THIS RULE.

:Enclosure 2

Response: Regulatory requirements in effect at the time of licensing of the majority of operating reactors did not require that all electric equipment and systems necessary to bring the reactor to cold shutdown be classified as safety related. [Therefore, at this time 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.] However, electric equipment and systems necessary to shut down the reactor and maintain it in a safe shutdown condition are required to be classified as safety related and therefore are 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 is being developed. The final technical 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(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).*

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

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.

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. 1610, 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:² 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 under postulated environmental conditions could prevent satisfactory accomplishment

²Safety-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.

of required safety functions specified in paragraph (b)(1) of this section
by the safety-related equipment. ^{(i) through (iii) of}

(3) Certain post-accident monitoring equipment.³

(4)--[Equipment-needed-to-complete-one-path-of-achieving-and-main-
taining-a-cold-shutdown-condition-following-design-basis-events:]*

(c) Requirements for (i) seismic and dynamic and seismic qualifica-
tion of electric equipment important to safety are not included in this
rule--Also not included are the requirements for (ii) protection of
electric equipment important to safety against other natural phenomena
and external events, and (iii) environmental qualification of electric
equipment important to safety located in a mild environment are not
included within the scope of this section. located in a mild environment:

A mild environment is an environment that would at no time be signifi-
cantly 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: accidents.

³Specific guidance concerning the types of variables to be monitored 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.

(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 accident during or following which this equipment is required to remain functional.

(2) Humidity. Humidity during design basis events accidents 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 expected during normal operation over the installed life of the equipment, and the radiation environment associated with the most severe design basis event accident 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 significant 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 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 section already qualified and submit a schedule for either the qualification to the provisions of this rule section or for the replacement of the remaining electric equipment important to safety within the scope of this rule: section. This schedule must establish a goal of final environmental qualification of the electric equipment within the scope of this section by the end of the second refueling outage after March 31, 1982 or by March 31, 1985, whichever is earlier. 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, 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 Applicants for an operating licenses that is are 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 equipment qualification required by this section. 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) Applicants for and holders of operating licenses are not required to requalify ~~a specific piece or type of~~ electric equipment important to safety in accordance with the provisions requirements of this section if the Nuclear Regulatory Commission has previously required qualification of that equipment ~~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~~ in accordance with "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors," November 1979 (DOR Guidelines), 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 equipment 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 unless there are sound reasons to the contrary. 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 _____, 1983.

For the Nuclear Regulatory Commission.

Samuel J. Chilk
Secretary of the Commission

*Delete the option not approved by the Commission: