April 20, 1982

TO ALL POWER REACTOR LICENSEES, APPLICANTS FOR AN OPERATING LICENSE, NSSS VENDORS AND REACTOR VENDORS

Gentlemen:

Subject: Environmental Qualification of Safety-Related Electrical Equipment (Generic Letter No. 82-09 )

On January 20, 1982 the NRC published a proposed rule on the subject in the Federal Register. This proposed rule codifies the current NRC requirements on this issue. In addition, Regulatory Guide 1.89, which relates to the proposed rule, was issued for public comment on February 18, 1982. Comment period on the rule expired in March 22, 1982. Comments on the regulatory guide are due by April 23, 1982.

Over the past six months, the NRC staff has worked with a number of licensees, at their requests, to respond to their technical questions and clarify certain aspects of the qualification requirements. These discussions involved nine topics which are addressed in a question/answer form in the Enclosure. The answers in the Enclosure represent the NRC staff position concerning these topics. These positions will be used in the review of licensee submittals and will be incorporated into the proposed regulatory guide.

Sincerely,

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
Division of Licensing

Enclosure: See Jacket
Question/Answer Form

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Division of Licensing

Enclosure:
Question/Answer Form

*SEE PREVIOUS PAGE FOR CONCURRENCE

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Darrell G. Eisenhut, Director
Division of Licensing

Enclosure:
Question/Answer Form

This letter is misleading and confusing! Under no circumstances should it be issued in its present form! For details see memo from Z.R. Rosztoczy to R.H. Vollmer and W.V. Johnston dated 3/3/82.

Zoltan R Rosztoczy

DE:EQB
ZRRosztoczy
3/3/82

WVJ 2/26/82

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# Clarification Questions and Answers on Environmental Qualification Requirements

## 1. OPERATOR DISPLAY INSTRUMENTATION

Q. Given the interrelated activities associated with display instrumentation (e.g., NUREG-0700, NUREG-0799, proposed Regulatory Guide 1.97 and Equipment Qualification efforts), what display instrumentation referenced in emergency operating procedures must be identified in licensee submittal to the NRC?

A. All display instrumentation referenced in the emergency procedures need not be identified. The NRC requires that licensees need only identify and have available qualification documentation on those operator display instruments which are safety-related (see Question 2). If licensees have previously supplied a listing of all display instrumentation referenced in emergency procedures, licensees may identify (such as by the use of an *) which of those instruments are safety-related. The staff will defer review of the basis for this safety-related classification until other NRC activities[1] have been implemented. When these other activities are implemented, additional instruments presently not requiring qualification may require upgrading to a safety-related status and/or may require qualification. Licensees will be required at that time to qualify this instrumentation in accordance with the following criteria:

- For new or upgraded instrumentation with a required operation date prior to the equipment qualification deadline, qualification must be accomplished by the equipment qualification deadline.

- For new or upgraded instrumentation with a required operation date after the equipment qualification deadline, qualification must be accomplished prior to equipment operation and plant acceptance.

## 2. SAFETY-RELATED EQUIPMENT

Q. For Equipment Qualification purposes, what constitutes <u>all</u> safety-related electrical equipment?

A. The Commission, in CLI-80-21, required the environmental qualification of only safety-related electrical equipment. Identification of the safety-related equipment installed at specific plants can be obtained from FSARs, Technical Specifications and other docketed correspondence

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[1]Such activities include preparation of new emergency procedures (NUREG-0799), control room design reviews (NUREG-0700), and upgrading of accident monitoring instrumentation (Reg. Guide 1.97 and NUREG-0737).

setting forth NRC requirements or licensee commitments. Identification of safety-related equipment installed in harsh environments at specific plants must be supplied by the licensee. The necessity for upgrading nonsafety-related system to safety-related status will be the subject of other NRC reviews.

3. REPLACEMENT PARTS

Q. Please clarify the NRC requirements on replacement parts.

A. In CLI-80-21, the Commission stated that unless there were sound reasons to the contrary, replacement equipment should be qualified to the standards set forth in Category I of NUREG-0588. The Commission's position was designed to promote the policy of upgrading the environmental qualification and reliability of installed safety-related electrical equipment. To meet this overall goal, licensees must institute internal policy practices consistent with the Commission's statement.

Situations may arise in which upgrading to NUREG-0588, Category I of replacement equipment qualified to NUREG-0588, Category II or the DOR Guidelines will not be compatible with overall station safety and performance goals. Licensees must review such situations on a case-by-case basis and determine that "sound reasons to the contrary" do, in fact, exist which warrant the use of replacement equipment (not necessarily in-kind) qualified to the DOR Guidelines or NUREG-0588, Category II. For equipment located in a harsh environment, licensees' procedures must provide for documentation and substantiation of such determinations.

Conditions which reflect sound reasons why qualification standards for replacement of equipment in a harsh environment need not be upgraded to NUREG-0588, Category I include the following:

1. The licensee has replacement equipment in stock that meets the DOR Guidelines or NUREG-0588, Category II, and procurement actions regarding such replacement equipment had commenced prior to May 23, 1980.

2. Replacement equipment qualified to the NUREG-0588, Category I standards does not exist.

3. Replacement equipment qualified to the NUREG-0588, Category I standards is not available to meet installation and operation schedules. Equipment qualified to the DOR Guidelines or NUREG-0588, Category II may be used for an interim period until Category I equipment is obtained and an outage of sufficient duration is available for replacement. Justification for use of the non-Category I qualified replacement equipment beyond this interim period must be submitted to the NRC for approval prior to the end of the interim period and in sufficient time for reasonable NRC review.

4. Replacement equipment qualified to NUREG-0588, Category I standards would require significant plant modifications to accommodate its use.

5. Operating performance and reliability data for the Category I equipment indicates poor overall equipment performance. For example, mean time to failure is significantly shorter for the Category I replacement equipment.

6. The use of replacement equipment qualified to NUREG-0588, Category I standards has a significant probability of creating human factor problems that will negatively affect plant safety and performance, e.g., (1) knowledge, skills and ability of existing plant staff require significant upgrading to operate or maintain the specific Category I replacement equipment; (2) the use of equipment qualified to Category I standards creates a one-of-a-kind application; or (3) maintenance, surveillance or calibration activities are unnecessarily complex.

4. MILD ENVIRONMENT

Q. Can periodic surveillance, testing and maintenance programs adequately demonstrate qualification of electrical equipment in mild environments?

A. For existing equipment located in mild environments, equipment environmental qualification can be adequately demonstrated and maintained by the use of the following three programs:

1. A periodic maintenance, inspection, and/or replacement program based on sound engineering practice and recommendations of the equipment manufacturer which is updated as required by the results of an equipment surveillance program;

2. A periodic testing program to verify operability of safety-related equipment within its performance specification requirements (system level testing of the type typically required by the plant technical specifications may be used); and

3. An equipment surveillance program which includes periodic inspections, analysis of equipment and component failures, and a review of the results of preventive maintenance and periodic testing programs.

For replacement and new equipment, the licensee must also establish and document the environmental design basis for the equipment locations. The purchase specifications must reflect those design basis environmental conditions that are bounding for all applicable equipment locations.

5. SUBMERGENCE OUTSIDE CONTAINMENT

Q. For equipment qualifications purposes, what are the staff requirements concerning submergence of equipment outside containment?

A. The Staff requires that the licensee submit documentation on the qualification of safety-related equipment that could be submerged due to a high energy line break outside containment.

6. RADIATION

Q. Is the staff screening value of $4 \times 10^7$ rads applicable to all operating reactors?

A. No. This screening value is applicable only to PWRs with dry type containments. However, for PWRs with dry type containments, the licensee may choose to use plant specific analysis instead of the screening value. For plants with other containment types, the licensee must use plant specific analysis.

Acceptable to the Staff for equipment qualification purposes are radiation values developed as part of the plant licensing process provided that they are based on the TID14844 source terms and are conservatively performed. In order to assure that the methodologies are appropriate, the Staff requests two component specific sample calculations (one for inside and one for outside containment), and a brief written description of each of the methodologies used, their application and associated conservatisms. Such sample calculations and a statement by the licensee that the values of radiation exposure of components so derived are appropriate for environmental qualification of equipment will satisfy the Staff's concern on the "Radiation Specification Value" used during the qualification reviews.

7. CONTAINMENT SERVICE CONDITIONS

Q. Must the Staff value (identified in the SERs) of $T_{SAT}$ for PWRs and $T_{SAT}$ + 20°F for BWRs be used as the maximum in-containment temperature for the purpose of equipment qualification?

A. No. The Staff will accept the use of these values. However, an acceptable alternative to the NRC staff's temperature criterion used for the service conditions must base that service condition on the FSAR analysis or other NRC approved analysis, provided that the specific analysis, or a summary of that analysis, together with reference to the previous NRC acceptance of that analysis is submitted by the licensee. In addition, some of the information in the associated safety evaluation may require clarification.

8. ONE HOUR MINIMUM OPERATING TIME

Q. The Staff has previously indicated that certain exceptions to the one hour minimum operating time rule are permitted. Can further clarification be provided?

A. With regard to plants subject to the qualification requirements of the DOR Guidelines or Category II of NUREG-0588, for those pieces of equipment tested prior to May 23, 1980, the test data and analysis may be used to qualify the equipment to the required operating time plus an appropriate margin. The one hour margin requirement need not be applied. However, subsequent failures should be shown not to be detrimental to plant safety.

The one hour time margin rule is not applicable to equipment whose safety function is performed prior to significant changes in the environment at the equipment location.

9. AGING

Q. Must a qualified life be developed for all safety-related electrical equipment located in harsh environments?

A. Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments. A qualified life, in accordance with the provisions in IEEE 323-1974, is required for equipment, including replacement parts, qualified to Category I of NUREG-0588 that is located in a harsh environment.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs, and that information should be incorporated into the system component evaluation worksheets (SCEWS). For other equipment, the aging column in the SCEWS should be marked "No Known Susceptibility."