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

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In the Matter of
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al.
(Seabrook Station, Units 1 and 2)
Docket Nos. 50-443 OL and 50-444 OL

Dear Administrative Judges:

In the Staff's Fifth Monthly Status Report submitted to the Board on June 4, 1986, the Staff notified the Board that it would be providing its review of Applicants' environmental qualification program as soon as that review was complete. The Staff review of this area is now final; that review will be published in Supplement 5 to the Staff's Safety Evaluation Report for the Seabrook facility. I have enclosed a copy of the completed environmental qualification review as it will appear in Supplement 5.

Sincerely,

Robert G. Perlis

Robert G. Perlis
Counsel for NRC Staff

Enc: As stated
cc w/enc: see next page

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Safety Evaluation Report
Office of Nuclear Reactor Regulation
Electrical Instrumentation and Control Systems Branch
Docket No. 50-443

3.11 Environmental Qualification of Electrical Equipment Important to Safety and Safety-Related Mechanical Equipment

3.11.1 Introduction

Equipment that is used to perform a necessary safety function must be demonstrated capable of maintaining functional operability under all service conditions postulated to occur during its installed life for the time it is required to operate. This requirement--which is embodied in General Design Criteria (GDC) 1 and 4 of Appendix A and Sections III, XI, and XVII of Appendix B to 10 CFR 50--is applicable to equipment located inside as well as outside containment. More detailed requirements and guidance relating to the methods and procedures for demonstrating this capability for electrical equipment have been set forth in 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants"; NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," which supplements the Institute of Electrical and Electronics Engineers (IEEE) Standard 323; and various NRC regulatory guides (RGs) and industry standards.

3.11.2 Background

NUREG-0588 was issued in December 1979 to promote a more orderly and systematic implementation of equipment qualification programs by industry and to provide guidance to the NRC staff for its use in ongoing licensing reviews.

The positions contained in that report provide guidance on (1) how to establish environmental service conditions, (2) how to select methods that are considered appropriate for qualifying equipment in different areas of the plant, and (3) other areas such as margin, aging, and documentation. In February 1980, the NRC asked certain near-term operating license (OL) applicants to review

and evaluate the environmental qualification documentation for each item of safety-related electrical equipment and to identify the degree to which their qualification programs were in compliance with the staff positions discussed in NUREG-0588.

IE Bulletin 79-01B, "Environmental Qualification of Class 1E Equipment," issued by the NRC Office of Inspection and Enforcement (IE) on January 14, 1980, established environmental qualification requirements for operating reactors. This bulletin and its supplements were provided to applicants for consideration in their reviews.

A final rule on environmental qualification of electrical equipment important to safety for nuclear power plants became effective on February 22, 1983. This rule, 10 CFR 50.49, specifies the requirements to be met for demonstrating the environmental qualification of electrical equipment important to safety located in a harsh environment. In conformance with 10 CFR 50.49, electrical equipment for Seabrook Unit 1 may be qualified according to the criteria specified in Category I of NUREG-0588.

The qualification requirements for mechanical equipment are principally contained in Appendices A and B to 10 CFR 50. The qualification methods defined in NUREG-0588 can also be applied to mechanical equipment.

To document the degree to which the environmental qualification program complies with the NRC environmental qualification requirements and criteria, the applicant provided equipment qualification information by letters dated August 12, 1983, September 7, 1984, October 31, 1985, April 3, 1986, April 10, 1986, April 16, 1986, April 30, 1986, May 6, 1986, May 7, 1986, June 5, 1986, and June 6, 1986 to supplement the information in FSAR Section 3.11.

The staff has reviewed the adequacy of the Seabrook environmental qualification program for electrical equipment important to safety as defined in 10 CFR 50.49 and the program for safety-related mechanical equipment. The scope of this report includes an evaluation of (1) the completeness of the list of systems and equipment to be qualified, (2) the criteria they must meet, (3) the environments in which they must function, and (4) the qualification documentation

and evaluate the environmental qualification documentation for each item of safety-related electrical equipment and to identify the degree to which their qualification programs were in compliance with the staff positions discussed in NUREG-0588.

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The qualification requirements for mechanical equipment are principally contained in Appendices A and B to 10 CFR 50. The qualification methods defined in NUREG-0588 can also be applied to mechanical equipment.

To document the degree to which the environmental qualification program complies with the NRC environmental qualification requirements and criteria, the applicant provided equipment qualification information by letters dated August 12, 1983, September 7, 1984, October 31, 1985, and April 3, 1986, to supplement the information in FSAR Section 3.11.

The staff has reviewed the adequacy of the Seabrook environmental qualification program for electrical equipment important to safety as defined in 10 CFR 50.49 and the program for safety-related mechanical equipment. The scope of this report includes an evaluation of (1) the completeness of the list of systems and equipment to be qualified, (2) the criteria they must meet, (3) the environments in which they must function, and (4) the qualification documentation

for the equipment. It is limited to electrical equipment important to safety within the scope of 10 CFR 50.49 and safety-related mechanical equipment.

3.11.3 Staff Evaluation

The staff evaluation included an onsite examination of some equipment, an audit of qualification documentation, and a review of the applicant's submittals for completeness and acceptability of systems and components, qualification methods, and accident environments. The criteria in SRP Section 3.11 (NUREG-0800), Revision 2, and in NUREG-0588, Category I, and the requirements in 10 CFR 50.49 form the bases for the staff evaluation.

The staff performed an audit of the applicant's qualification documentation and installed electrical equipment on February 25, February 26, and February 27, 1986. The audit consisted of a review of 12 files containing information regarding equipment qualification. The staff's findings from the audit are discussed in Section 3.11.4 of this supplement.

3.11.3.1 Completeness of Equipment Important to Safety

10 CFR 50.49 identifies three categories of electrical equipment that must be qualified in accordance with the provisions of the rule:

(1) safety-related electrical equipment whose failure under the postulated environmental conditions could prevent satisfactory accomplishment of the safety functions by the safety-related equipment

(2) non-safety-related electrical equipment whose failure under the postulated environmental conditions could prevent satisfactory accomplishment of the safety functions by the safety-related equipment

(3) certain postaccident monitoring equipment (RG 1.97, Category 1 and 2 postaccident monitoring equipment).

The applicant has provided information addressing compliance with this requirement of 10 CFR 50.49.

To demonstrate compliance with 10 CFR 50.49(b)(1), the applicant provided a list of systems and their components required to mitigate the consequences of loss-of-coolant accidents (LOCAs) or high-energy line breaks (HELBs). The systems identified by the applicant for the environmental qualification program as being required to function to mitigate the consequences of LOCAs or HELBs that have components located in a harsh environment are listed below. This list was reviewed and found acceptable by the staff.

System

(1) auxiliary steam
(2) containment air handling
(3) containment air purge
(4) control building air handling
(5) containment building spray
(6) component cooling water-primary
(7) combustible gas control
(8) containment on-line purge
(9) rod control and position
(10) chemical and volume control
(11) diesel generator air handling
(12) drains--floor
(13) diesel generator
(14) containment enclosure air handling
(15) electrical distribution
(16) electrical distribution--emergency
(17) emergency feedwater pump house air handling
(18) fuel storage building air handling
(19) feedwater
(20) heat tracing
(21) in-core instruments
(22) miscellaneous equipment
(23) main steam
(24) main steam drain
(25) nitrogen gas
(26) nuclear instrumentation
(27) primary auxiliary building air handling
(28) reactor coolant
(29) residual heat removal
(30) radiation monitoring
(31) reactor makeup water
(32) steam generator blowdown
(33) spent fuel pool cooling
(34) safety injection

(35) sampling
(36) service water
(37) service water pumphouse air handling
(38) vibration monitoring
(39) vents
(40) waste processing--liquid Drains

To demonstrate compliance with 10 CFR 50.49(b)(2) concerning non-safety-related equipment whose failure under postulated accident conditions could prevent the satisfactory accomplishment of safety functions, the applicant included all such equipment in the equipment qualification program. In addition, the applicant has committed to conform with RG 1.75 and will submit his analysis supporting conformance for staff review. The staff will confirm that the applicant conforms to RG 1.75 prior to fuel load. The applicant also performed a review in response to the concerns addressed by the staff in IE Information Notice 79-22, "Qualification of Control Systems," dated September 14, 1979. The staff found the applicant's response to the concerns in IE Information Notice 79-22 acceptable. On the basis of the above, the staff concludes that the applicant's compliance with 10 CFR 50.49(b)(2) is acceptable.

10 CFR 50.49(b)(3) requires that certain post accident monitoring instrumentation that is located in a harsh environment be included in the equipment environmental qualification program. Guidance as to the matters to be covered is contained in R.G. 1.97. R.G. 1.97 identifies parameters to be provided unless adequate justification is given. The applicant has indicated that 10 CFR 50.49(b)(3) equipment is included in the qualification program; however, in addressing conformance with RG 1.97, the applicant identified 10 variables listed in Category 1 or 2 (which specify environmental qualification) of the guide as not requiring monitoring during an accident. That is, the emergency response procedures do not require the plant operating crew to monitor these variables in order to provide a basis for operator actions for mitigating the consequences of an accident.

The staff evaluation of all identified deviations from RG 1.97 is included in Section 7.5.2.4 of this supplement. From the evaluation the staff concludes that sufficient justification has been provided to support the classification of these 10 variables as not being required for accident monitoring. Therefore, these 10 variables, given below, do not fall within the scope of 10 CFR 50.49(b)(3).

(1) primary coolant radiation level
(2) narrow range sump water level
(3) heat removal by containment fan heat removal system
(4) containment sump water temperature
(5) makeup flow-in
(6) makeup flow-out
(7) volume control tank level
(8) boric acid charging flow
(9) accumulator tank pressure
(10) accumulator tank level

Instruments for monitoring variables (1) through (4) are not being installed at Seabrook; although instruments for monitoring variables (5) through (10) are being installed, they will not be qualified for the harsh environment. The staff position is that an instrument to monitor the containment sump water temperature (variable 4) should be provided and that it should be environmentally qualified. In addition, an environmentally qualified instrument should be provided for monitoring either accumulator tank pressure (variable 9) or accumulator tank level (variable 10) although implementation of this position can be deferred to the first refueling without jeopardizing the public health and safety. The basis for this staff position is provided below.

The requirements for accident monitoring instrumentation were issued as Item II.F of NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident." (Revision 2 was issued in August 1980.) NUREG-0737, Supplement 1, "Clarification of TMI Action Plan Requirements," which was issued in January 1983, provides detailed implementation guidance. This supplement, which invokes RG 1.97 as well as other emergency response capabilities, states that it is not intended that the guidance documents referred to (in this instance, RG 1.97) are to be used as requirements, but rather that they are to be used as sources of guidance for NRC staff and licensees regarding acceptable means for meeting the basic requirements. Similarly, footnote 4 to 10 CFR 50.49(b)(3) states that specific guidance concerning the types of variables to be monitored is provided in Revision 2 of RG 1.97. Engineering judgment is required in the application of this guidance. Equipment qualification for instrumentation identified on a plant-specific basis as not required for accident monitoring would not fall under the provisions of 10 CFR 50.49(b)(3) but rather under the provisisons of RG 1.97 relating to other instrumentation.

Revision 2 of RG 1.97 identifies three basic types of equipment: accident monitoring instrumentation, systems operation monitoring instrumentation, and effluent release monitoring instrumentation. Additionally, the guide identifies variables, types A through E, to distinguish the types of parameters and to provide a general ranking of their importance. Accident monitoring instrumentation provides information on vital parameters classified as type A, B, and C variables in Table 2 of the regulatory guide.

Type D variables provide information to (1) indicate operation of individual safety systems and other systems important to safety and (2) help the operator make appropriate decisions in mitigating the consequences of an accident. Of the 10 variables identified above, 9 are Type D. The staff's position is that these 9 variables are not required to perform either of these functions. The remaining variable, narrow range sump water level, is type B. However, a fully qualified wide range sump level instrument is installed to provide this variable; therefore, a narrow range instrument is not considered necessary and need not be provided.

However, sump water temperature is a parameter, along with sump level and containment pressure, that influences net positive suction head (NPSH) for safety system pumps during the recirculation mode. Furthermore, knowledge of sump water temperature is useful in performing postaccident energy balance calculations. RG 1.97 identifies containment sump water temperature instrumentation as equipment that should be environmentally qualified. Thus, even though this variable is not required for the performance of the two function attributes of type D variables, the information it provides is deemed of sufficient usefulness following an accident that a fully qualified instrument should be provided.

The accumulator tank level and pressure provide direct indication of functioning of the accumulators (first-line safety equipment) during an accident. Either pressure or level indication would be sufficient to indicate discharge of the accumulators. It is recognized that the accumulators are passive systems; that the operator could take no meaningful action to restore an inoperable accumulator other than to open a closed (inadvertently) isolation valve for which qualified status information is provided; and that other variables

(e.g., reactor system pressure, reactor vessel level and core temperature) are available from which operation of the accumulators can be inferred. However, even though accumulator pressure or level are not required for performance of the function attributes of type D variables, the direct indication of accumulator operation is deemed of sufficient usefulness that a fully qualified pressure or level instrument should be provided.

In summary, the staff's position is that environmentally qualified instrumentation for monitoring accumulator pressure (or level) and containment sump water temperature should be installed before startup from the first refueling since this is not a required post accident monitoring instrumentation. This is not inconsistent with 10 CFR 50.49(b)(3). The staff discussed this position with the applicant. The applicant agrees with the staff position and, by letter dated June 6, 1986, the applicant committed to meet it.

3.11.3.2 Qualification Methods

3.11.3.2.1 Electrical Equipment in a Harsh Environment

Detailed criteria for qualifying safety-related electrical equipment in a harsh environment are defined in NUREG-0588. The criteria in NUREG-0588 are also applicable to the other equipment important to safety defined in 10 CFR 50.49.

The staff has reviewed the methods used by the applicant to demonstrate qualification and concluded that they are in compliance with the requirements of NUREG-0588, Category I.

3.11.3.2.2 Safety-Related Mechanical Equipment in a Harsh Environment

Although there are no detailed requirements for mechanical equipment, GDC 1, "Quality Standards and Records," and 4, "Environmental and Missile Design Bases," and Appendix B to 10 CFR 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" (Section III, "Design Control," and XVII,

"Quality Assurance Records"), contain the following requirements related to equipment qualification:

- Components shall be designed to be compatible with the postulated environmental conditions, including those associated with LOCAs.

- Measures shall be established for the selection and review for suitability of application of materials, parts, and equipment that are essential to safety-related functions.

- Design control measures shall be established for verifying the adequacy of design.

- Equipment qualification records shall be maintained and shall include the results of tests and materials analyses.

The results of the safety-related mechanical equipment qualification program have been submitted to the staff for review. In addition, qualification documentation for three items of safety-related mechanical equipment has been submitted by the applicant and has been reviewed by the staff. The staff review has verified that the requirements for environmental qualification of safety-related mechanical equipment have been adequately addressed.

3.11.3.3 Service Conditions

NUREG-0588 defines the methods to be used for determining the environmental conditions associated with LOCAs or HELBs, inside or outside of containment. The review and evaluation of the adequacy of these environmental conditions are described below. The staff has reviewed the qualification documentation to ensure that the qualification conditions envelop the environmental conditions established by the applicant.

In December 1984, the NRC issued IE Information Notice 84-90 regarding a potential problem pertaining to plant analysis and equipment qualification with respect to a postulated main steamline break (MSLB) with release of superheated

steam. It was discovered during the NRC staff's review of the Westinghouse methodology for computing mass and energy releases for a postulated MSLB that the heat transfer from the uncovered portion of the steam generator tube bundle was not included. In the FSAR, the applicant used this Westinghouse steam generator blowdown model (i.e., the Westinghouse methodology of computing mass and energy releases) for calculating equipment qualification temperature inside containment. By letter of April 10, 1986, the applicant reported its evaluation of the impact of the superheated steam blowdown on the equipment qualification temperature previously calculated for both inside and outside containment.

The applicant's evaluation for equipment inside containment was based on Westinghouse Topical Report WCAP-8822, Supplement 2, in which it was found that the impact of steam superheating is not significant for large dry containments. In Supplement 2 of WCAP-8822, a modified LOFTRAN code, accounting for heat transfer to the steam during steam generator tube uncovery, was used to calculate mass and energy release rates following an MSLB. The modification was described in Supplement 1 of WCAP-8822. The staff has reviewed both Supplements 1 and 2 of WCAP-8822 and found them acceptable.

Furthermore, the applicant stated that the results of WCAP-8822, Supplement 2, are applicable to the Seabrook Model F steam generator. On the basis of the above evaluation, the staff concludes that the environmental qualification pressure and temperature inside containment, established previously in the FSAR, are still valid.

3.11.3.3.1 Temperature, Pressure, and Humidity Conditions Inside Containment

The applicant provided the LOCA/MSLB profiles used for equipment qualification program submittals. The peak values resulting from these profiles are as follows:

	Maximum Temperature	Maximum Pressure	Humidity
LOCA/MSLB	370.0°F	34.5 psig	100%

The staff has reviewed these profiles and finds them acceptable for use in equipment qualification; that is, there is reasonable assurance that the actual pressures and temperatures will not exceed these profiles anywhere within the specified environmental zone (except in the break zone).

3.11.3.3.2 Temperature, Pressure, and Humidity Conditions Outside Primary Containment

The applicant has provided, in the FSAR, the temperature, pressure, and humidity conditions resulting from HELBs in various compartments outside containment. The criteria used to define the location of the HELBs are described in the FSAR Section 3.6. As a result of the superheated steam issue described in Section 3.11.3.3, the applicant determined that the new mass and energy releases into the two main steam and feedwater pipe chase areas are greater than the previously postulated releases. Therefore, the maximum temperature in the faulted pipe chase is expected to be higher than the previously prescribed temperature for environmental qualification of equipment in the pipe chase.

In letters dated April 10, 1986, and June 5, 1986, the applicant stated that despite any postulated superheated temperature in the faulted pipe chase, the Seabrook plant can achieve a safe shutdown. Seabrook has two separated main steam and feedwater pipe chase areas on the east and west sides of containment. Each pipe chase houses the feedwater and main steam piping for two of the four steam generators. The pipe chase also houses the main steam and feedwater isolation valves, steam safety relief valves, atmospheric dump valves, and main steam supply valves to the emergency feed pump turbine.

Given an HELB in one of the pipe chase areas, the applicant stated that the main steam isolation valves and the other electrical equipment in the faulted pipe chase will perform the intended safety functions before the tubes in the faulted steam generator are uncovered and superheated steam is generated. The applicant also evaluated all of the electrical equipment in the faulted pipe chase and determined that its consequential failure could not affect the ability to safely shut down Seabrook with the equipment in the other pipe chase. The

staff finds this approach acceptable because only two steam generators are required to safely shut down the Seabrook plant.

However, if the superheated steam should cause the main steam isolation valves to fail in the faulted pipe chase, two steam generators would blow down. This event was not previously evaluated in FSAR Chapter 15. The applicant provided the results of a scoping analysis for a two-steam-generator blowdown event.

The FSAR Chapter 15 steamline break analysis is based on a minimum assumed shutdown margin of 1.3% and is performed at conditions representative of end of life (EOL). A Westinghouse steamline break topical report (WCAP-9226, Rev. 1) provides sensitivity studies as a function of the moderator coefficient for the steamline break event which demonstrate that as the temperature coefficient becomes less negative, the accident becomes much less limiting. Since at beginning of life (BOL) the temperature coefficient is less negative, the BOL case is significantly less limiting than the point at which the analyses are performed. The amount of reactivity added by the consequential opening of both main steam isolation valves (MSIVs) is very small and would have a negligible effect on the BOL transient as compared with the FSAR (EOL) transient. On this basis, it is Westinghouse's conclusion that the departure from nucleate boiling (DNB) design basis for the plant would be maintained at BOL assuming a shutdown margin of 1.3%.

At EOL, the consequential opening of both MSIVs could potentially result in a transient more severe than that in the present FSAR analysis. However, the Seabrook Cycle 1 nuclear design calculated shutdown margin at EOL is greater than 3.8% after taking into account uncertainties. This value includes the assumption that all rods are fully inserted except for the stuck rod. WCAP-8226 presents the results of sensitivity studies that show that the transient is less limiting as the initial shutdown margin increases. Representative calculations incorporating consequential MSIV failures due to superheated steam show that the amount of reactivity added by the consequential opening of the MSIVs is negligible when compared with the negative reactivity available by the inclusion of the Cycle 1 shutdown margin of more than 3.8% in the analysis.

Therefore, the DNB design basis would be met at EOL when credit is taken for the Cycle 1 specific value of shutdown margin.

In Section 15.6.4 of the SER, the staff reviewed the radiological consequences of a main steamline failure outside containment. This analysis was based on the blowdown of one steam generator. The staff has performed an independent calculation of the radiological consequences of a main steamline failure as described in Section 15.6.4 of the SER, assuming a second steam generator also blows down outside containment with an additional iodine inventory loss to the atmosphere of about 5 curies within the first 2 hours of the accident. This release will increase the exclusion areas boundary dose to the thyroid by about 0.6 rem with no noticeable increase in the whole-body dose. Even with this increase, the calculated dose for a two-steam-generator blowdown accident would be a small fraction of the 10 CFR 100.11 dose guidelines.

Therefore, on the basis of the above discussion, the staff concludes that the Seabrook plant can safely shut down following an HELB in either pipe chase. In addition, the Seabrook plant meets the requirements of GDC 28 of Appendix A to 10 CFR 50 and the guidelines of 10 CFR 100.11 provided that the Seabrook Technical Specifications require a 3.8% $\Delta K/k$ shutdown margin for operating modes 1, 2, and 3. In a letter dated June 5, 1986, the applicant committed to modify the Seabrook Technical Specifications to require a 3.8% $\Delta K/k$ shutdown margin in operating modes 1, 2, and 3. The staff finds this acceptable.

3.11.3.3.3 Submergence

The submergence potential has been determined by the applicant to be below (-)20 ft 8 in. inside the containment and at various elevations in buildings outside the containment building. The applicant has taken appropriate corrective actions to either justify submerged operation, or to relocate or qualify the affected equipment.

3.11.3.3.4 Chemical Spray

A chemical spray inside containment may be used to mitigate the effects of an accident. The applicant has appropriately included this parameter in the evaluation of equipment located inside containment.

3.11.3.3.5 Aging

The aging program requirements for Seabrook electrical equipment are defined in Category I of NUREG-0588. All degrading influences must be considered and included in the aging program. Justification for excluding preaging of equipment in type testing must be established on the basis of equipment design and application, or on state-of-the-art aging techniques. A qualified life is to be established for each equipment item.

In addition to the above, a maintenance/surveillance program must be implemented to identify and prevent significant age-related degradation of electrical and mechanical equipment. The applicant committed to follow the recommendations in RG 1.33, Revision 2, "Quality Assurance Program Requirements (Operation)," which endorses American Nuclear Society/American National Standards Institute Standard ANS-3.2/ANSI N18.1976, "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants." This standard defines the scope and content of a maintenance/surveillance program for safety-related equipment. Provisions for preventing or detecting age-related degradation in safety-grade equipment are specified and include (1) utilizing experience with similar equipment, (2) revising and updating the program as experience is gained with the equipment during the life of the plant, (3) reviewing and evaluating malfunctioning equipment and obtaining adequate replacement components, and (4) establishing surveillance tests and inspections based on reliability analyses, frequency and type of service, or age of the items, as appropriate.

The staff found that the applicant has adequately described a program that incorporates the above guidelines. In addition, the applicant has stated that the maintenance/surveillance program is in effect at Seabrook.

3.11.3.3.6 Radiation (Inside and Outside Containment)

The applicant has provided values for the radiation levels postulated to exist following a LOCA. The application and methodology to determine these values were presented to the applicant in NUREG-0588 and NUREG-0737. The staff review determined that the values to which equipment was qualified enveloped the requirements identified by the applicant.

The maximum value specified by the applicant for use in equipment qualification inside containment, and in areas outside containment exposed to post-LOCA recirculating fluid environments, is 2.0×10^8 rads (gamma plus beta). This value is acceptable for use in the qualification of equipment.

3.11.3.4 Outstanding Equipment

The Seabrook qualification program has a total of 112 item groups. The applicant originally committed to qualify all equipment for a postaccident operability time of 1 year. Subsequently, the applicant discovered that there are 12 item types (i.e., 12 item types out of the 112 item groups) that cannot be qualified for a postaccident operating time of 1 year. The staff typically requires qualification for a period of 100 days after an accident, and in some instances the regulations allow for postaccident qualification periods substantially less than 100 days. Table 3.1 lists the 12 item types and their postaccident qualification periods as provided by the applicant.

The staff reviewed the qualification information provided by the applicant for the 12 item types listed in Table 3.1 in which the applicant indicated that 5 of the 12 item types met the staff requirement of 100 days and the remaining 7 meet the postaccident time margin requirements specified in Position C.4 of Revision 1 of RG 1.89. Therefore, the staff finds this acceptable.

3.11.4 Environmental Qualification Audit

On February 25, February 26, and February 27, 1986, the staff, with assistance from EG&G Idaho, Inc., conducted an audit of the applicant's qualification files and equipment installed at the plant. Twelve files were audited to determine

if the documents in the qualification files supported the qualification status determined by the applicant.

The files selected for audit were

(1) Okonite Cable (File No. 113-03-01)
(2) Transamerica Level Transmitter (File No. 174-15-01)
(3) Brandrex Cable (File No. 113-06-01)
(4) Reliance Motor (File No. 236-11-06)
(5) Limitorque Motor Operator (File No. 248-37-01)
(6) ASCO Solenoid Valve (File No. NSSS-220-02)
(7) ITT-Suprenoit Cable (File No. 113-19-01)
(8) Conax Conduit Seal Assembly (File No. 118-03-01)
(9) Rotork Motor Operator (File No. 173-05-02)
(10) Barton Transmitter (File No. 252-16-02)
(11) Endevco Accelerometer and Charge Converter (File No. 252-30-01)
(12) Weidmiller Terminal Block (File No. 600-02-01)

Several deficiencies were noted and discussed with the applicant at the time of the audit and transmitted to the applicant by letter dated April 10, 1986. The applicant proposed acceptable corrective measures in the form of additional information and file revision to eliminate the deficiencies cited.

As part of the audit, the equipment as actually installed was inspected during a plant walkdown. The purpose of the walkdown was to verify that the manufacturer, model number, location, and installation are consistent with qualification documents. The applicant proposed acceptable corrective measures for the deficiencies that were found and committed to correct all deficiencies by fuel load.

3.11.5 Conclusions

The staff has reviewed the Seabrook program for the environmental qualification of electrical equipment important to safety and safety-related mechanical equipment. The purpose of the review was to determine the adequacy and scope

of the qualification program and to verify that the methods used to demonstrate qualification are in compliance with applicable regulations and standards.

On the basis of the results of its review and subject to confirmation that all audit deficiencies have been corrected, the staff concludes that the applicant has demonstrated compliance with the requirements for environmental qualification as outlined in 10 CFR 50.49, the relevant parts of GDC 1 and 4, and Sections III, XI, and XVII of Appendix B to 10 CFR 50, and with the criteria as specified in NUREG-0588.

Table 3.1 Equipment item types and thier postaccident qualification periods

EQ file number	Description	Qualified post-accident operating time	Time required to perform safety function	Number of items
174-00-01	Foxboro transmitters	100 days	90 days	13
252-38-01	ASCO temperature switches	160 days	30 days	4
600-01-04	Raychem 8-kV motor connector kits	100 days	30 days	13
173-05-03	Maisoneilan E/P converter	204 days	100 days	4
248-36-01	Borg-Warner feedwater isolation valves	4 hours	Approximately 1 minute	4
600-06-01	NAMCO EC 210 series conduit seals	318 days	30 days	16
113-03-01	Okonite 600-V power cable*	30 days	24 hours	
113-17-01	Anaconda 600-V control cable*	30 days	24 hours	
113-18-01	Anaconda 300-V instrumentation cable*	30 days	24 hours	
113-20-01	ITT Suprenant 300-V instrumentation cable*	30 days	24 hours	
172-01-01	General Atomic Radiation Monitors and Detectors (annulus)	2 hours	Approximately 2 minutes	1
172-01-01	General Atomic Radiation Monitors and Detectors (inside containment)	7 hours	Approximately 2 minutes	2

*Only the cable that is subject to submergence is limited to 30 days' qualification. This applies to all cable listed here.