

# NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY  
WESTERN MASSACHUSETTS ELECTRIC COMPANY  
HOLYOKE WATER POWER COMPANY  
NORTHEAST UTILITIES SERVICE COMPANY  
NORTHEAST NUCLEAR ENERGY COMPANY

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July 31, 1985

Docket No. 50-423  
B11620

Director of Nuclear Reactor Regulation  
Mr. B. J. Youngblood, Chief  
Licensing Branch No. 1  
Division of Licensing  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Reference: (1) W. G. Council Letter to B. J. Youngblood "Environmental Qualification Report for Safety-Related Electrical Equipment," dated March 6, 1985.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3  
Environmental Qualification Report for Safety-Related Electrical Equipment

On March 6, 1985, Northeast Nuclear Energy Company (NNECO) submitted to the NRC the Environmental Qualification Report for safety-related electrical equipment (EQ Report) located in harsh environmental areas at Millstone Unit No. 3 (Reference 1). This report summarizes NNECO's compliance with 10CFR 50.49 and NUREG-0588, Revision 1, as endorsed by Regulatory Guide 1.89, Revision 1. Representatives from NNECO, Stone & Webster and Westinghouse met with the NRC - Equipment Qualification Branch Staff on July 2, 1985 to discuss the Staff's questions concerning the qualification program described in the EQ Report. NNECO committed to the following during the July 2, 1985 meeting:

- o Provide the Staff with the updated System Component Evaluation Worksheets (SCEW) for all safety-related electrical equipment located in a harsh environment.
- o Revise and submit specific sections of the EQ Report to provide better definition/clarification.

It was agreed that NNECO would provide the above information to the NRC prior to the NRC - EQ audit which is scheduled for August 13 through August 15, 1985. Attachment I provides responses to the NRC Staff's questions discussed at the July 2, 1985 meeting. The specific sections of the EQ Report have been revised and are attached.

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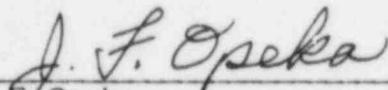
As requested by the NRC Project Manager for Millstone Unit No. 3, Ms. E. L. Doolittle, ten (10) copies of the revised sections of the EQ Report and the updated SCEW sheets are being forwarded directly to her. In addition, a copy of the above submittal has been forwarded to the NRC's consultant, Mr. M. Trojovsky of EG&G, Idaho.

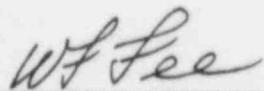
If there are any questions, please contact our licensing representative directly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY  
et. al.

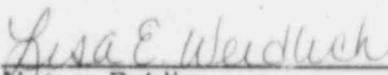
By NORTHEAST NUCLEAR ENERGY COMPANY  
Their Agent

  
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J. F. Opeka  
Senior Vice President

  
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By: W. F. Fee  
Executive Vice President

STATE OF CONNECTICUT    )  
                                  ) ss. Berlin  
COUNTY OF HARTFORD    )

Then personally appeared before me W. F. Fee, who being duly sworn, did state that he is Executive Vice President of Northeast Nuclear Energy Company, an Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

  
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Notary Public

My Commission Expires March 31, 1988

Re: EEQ - Responses to NRC Requests for Additional Information

The following responses are provided in response to the EQ Branch request for additional information discussed with representatives from NNECO, SWEC, and WNES at the July 2, 1985 meeting in Bethesda, MD. Responses are provided in the same order and numbering as the requests.

1. Table 1-1

- a. NRC Question: It appears that NSSS components are not listed in Table 1-1.
- a. NNECO Response: All NSSS components are listed on Table 1-1. Please refer to the column labelled SPEC on Table 1-1; NSSS components are labelled with the 001 designator.
- b. NRC Question: Provide the installation and qualification status of the equipment.
- b. NNECO Response: We have provided this information on qualification and installation status on an updated copy of Table 1-1, which was transmitted to the staff at the time of our pre-audit meeting.

2. NRC Question: Discuss the method or process used to identify the equipment under 10CFR 50.49(b)(2).

NNECO Response: The method used to identify Non-IE equipment under 10CFR 50.49 (b)(2) as reflected in Table 1-2 has been documented in the project procedure for Class IE Equipment Qualification. We have also revised Section 1.2 of our Equipment Qualification (EQ) report to reflect compliance with R.G. 1.75 and review of IE Notice 79-22.

Environmental Qualification (EQ) evaluation consists of a system review performed by system engineers cognizant of each system utilizing the following design basis documents:

- o FSK (Flow Diagrams) - Power
- o Electrical One Lines - Electrical
- o ESK (Elementary Diagrams) - Electrical
- o LSK (Logic Diagrams) - I&C
- o Loop Diagrams - I&C
- o KSK (Logics for Facilities HVAC, etc.) - I&C

This review provided an independent verification of the master list obtained from the Project Equipment System's data base which consolidates input from each design division. The Master List is further reviewed by NUSCO for completeness of equipment.

3. NRC Question: Provide the SCEW Sheets for all NSSS components located in the harsh environment.

NNECO Response: System Component Evaluation Work (SCEW) sheets for NSSS equipment will be provided prior to the EEQ Audit for both completed and incomplete qualification data packages (EQDP) provided by Westinghouse.

4. NRC Question: Provide sample sheet for EQS

NNECO Response: Environmental Qualification Sheet Database (EQS) is a field for Computer Data Entry. This file contains the demonstrated qualifications and status tracking information. This file is used for internal use and has been removed from Table 1-1.

5. NRC Question: Please provide assumptions and methodology used to extend the Post-LOCA environmental profile past approximately 5 hours.

NNECO Response: The basis for the long-term step profile for containment temperature is an extended containment integrity analysis. The design basis accident (DBA) for maintaining subatmospheric pressure, a pump suction double-ended rupture with loss of one ESF train, was reanalyzed to extend the duration from approximately 5 hours to 5 days. The specific accident is described in Chapter 6.2.1 of the FSAR, along with the LOCTIC computer program, which was used for the evaluation. This accident is listed on the second line of FSAR Table 6.2-9.

The containment temperature decreases to 114°F at the end of 2 days, so the qualification envelope was stepped down to 120°F at this time. The containment temperature continues to decrease to slightly above 100°F at 5 days. Based on the rate of temperature decrease up to 5 days and based on a cooling water temperature of 75°F, the containment temperature was extrapolated to be well below 100°F at 30 days. The qualification envelope was thus stepped down to 100°F at 30 days and assumed to be at 100°F for the rest of the qualification period.

An important assumption is continued operation of the containment recirculation sprays for the 5 days of the evaluation. Recirculation spray operation in the longer term is assumed as necessary to maintain the containment temperature below 100°F.

1. NRC Question:

Section 3.11 of Millstone III's FSAR is referencing WCAP-8587, Revision 2, "Methodology for Qualifying Westinghouse WRD Supplied NSS Safety Related Electrical Equipment", and WCAP-8587, Supplement 1, 1978, for describing the methods of meeting the general requirements for environmental design and qualification of NSSS supplied components. The latest approved version of WCAP-8587 is Revision 6. In the event it is necessary to use time margin evaluation techniques, the following information, as a minimum, must be documented.

- o Application of time margins less than one hour will be justified for each piece of equipment, including any judgements regarding the survivability limits of the equipment.
- o The required operability time will be justified with consideration for a spectrum of breaks and the potential need for the equipment later in an event or during recovery operations.
- o It will be demonstrated that failure of the equipment after the required operability time will neither mislead the operator to take an improper action nor further degrade the event by causing a failure in systems necessary for mitigation of the event.
- o The margin applied to the required operability time when combined with other test margins will account for uncertainties associated with the design, production tolerances, testing techniques and the number of units tested.

The omission of specific information with no commitment to the time margin positions of the staff is regarded as an open item.

NNECO Response: Westinghouse (NSSS) use of WCAP-8587, Revision 6; Time Margins:

- o The only equipment in the Westinghouse qualification program having an operability time less than one hour and used for trip functions are transmitters located inside containment and bypass line RTDs. In this case, the Westinghouse time specification of 5 minutes is established having considered a full spectrum of breaks. In addition:

- o Trip Function

The Westinghouse transmitter and RTD qualification tests demonstrate that the trip accuracy requirement is maintained for up to 5 minutes and that therefore the

NNECO Response: requisite trip signal will be generated. Once the signal is generated the signal is 'locked-in' by the protection system and will not reset should the transmitter fail to continue to generate the trip signal at some time after 5 minutes. Thus, all automatic protective actions will proceed irrespective of the performance of the transmitter after 5 minutes.

o Information to Operator

The transmitter qualification verifies that equipment failures do not occur in a period up to 1 hour and 5 minutes after initiation of the accident. In fact, the qualification verifies that the transmitters will continue to operate for at least 4 months post-accident while maintaining the accuracy requirement specified for post accident monitoring instrumentation.

The bypass line RTDs are qualified for 5 minutes post-accident since they only perform a trip function. All post-accident monitoring is via the wide-range (well-mounted) RTDs so any subsequent fault would not affect the operator. Additionally, no failure after 5 minutes would place the plant in a less than safe condition.

2. NRC Question: Referencing WCAP-8587 by itself, of course, does not necessarily qualify all components supplied by Westinghouse. The applicant must supply information that shows that the generic profiles presented in WCAP-8587 envelope the plant specific profiles, with margins where applicable.

NNECO Response: All Westinghouse qualification documentation supplied under WCAP-8587 is compared against plant specific profiles in order to determine equipment qualification acceptability. This information/review is evident on the MP3 SCEW sheet which demonstrates equipment qualification. If a problem arises between the W qualified parameter and plant specific requirements the vendor (W) is contacted for additional information/clarification for final resolution and closeout of data package (EQTR & EQDP). This closeout constitutes acceptance of the Westinghouse Qualification Report.

The SCEW sheets will be provided prior to the audit while supporting data will be provided for review during the EEQ Audit.

3. NRC Question: Provide the process that is used at Millstone III to ensure that pertinent IE bulletins and information notices are reviewed and incorporated in the the EQ program.

3. NNECO Response: The project has utilized a program that evaluates all IE Bulletin, Notices, and Circulars, determining applicability, and develops a response for those that require further action and 10CFR 50.55(e)/21 evaluation. This is maintained in an auditable file.
4. NRC Question: What requirements are the replacement parts being qualified to?
- NNECO Response: A program is being implemented on project that invokes equivalent requirements on all spare or replacement parts that are procured for this plant which satisfies the requirements described in 10CFR50.49(l).
5. NRC Question: Provide how the affects of humidity are addressed in the EQ program.
- NNECO Response: Relative humidity ranges for zones cooled by air-cooling units are based on internal moisture generation, sensible heat gains, and cooling coil moisture removal capability. The relative humidity ranges in zones cooled with outside air are based on outside relative humidity, internal moisture generation, sensible heat gains, and ventilation air flow rate. The relative humidity in zones subject to substantial moisture generation such as the fuel building and circulating and service water pumphouse is assumed to be 100 percent.
- These ranges are part of Appendix 3B of the FSAR (Environmental Design Conditions) which Environmental Qualification Reports are reviewed against.
6. NRC Question: Provide the chemical composition, duration and loading used to qualify components to simulate the affects of the containment recirculation and quench systems at Millstone III.
- NNECO Response: The chemical composition of the containment spray and the overall safety evaluation of its effect on safety related components is presented in FSAR Section 6.2.2, page 6.2-54 through 55 and Section 6.1.1.2, page 6.1-3 and 4. The EQ Report has been revised to reflect the chemical composition of the spray, as described in the FSAR.
- All components inside the containment structure are reviewed and are qualified to the LOCA/MSLB conditions as described in FSAR Section 6.1.1.2. The qualified values as well as the specified values appear on SCEW sheets (System Component Evaluation Worksheets).

7. NRC Question: Provide the process that is incorporated by Millstone III that ensures the EQ Reports have considered, evaluated, and achieved the applicable environmental operating conditions for each component and that deficiencies (if any) have been identified and resolved.

NNECO Response: The project implemented a program to qualify Class 1E equipment in 1980 and has continued to refine this program, as new information has been published in the industry. This program provides for a rigorous evaluation of all Class 1E equipment identified and utilizes checklists to ensure uniformity in the review process. Specific checklists have been developed for unique equipment to ensure that all significant engineering attributes have been identified and reviewed. The EQ report has been revised to outline the procedural steps used and a flowchart included for reference.

8. NRC Question: Part 2.3 of the Millstone III submittal describes the methodology for calculating the normal environmental conditions for structures outside the containment. Is this approach also used for the containment?

NNECO Response: Yes, The method used to evaluate the normal environment outside containment, as described in Section 2.3 of the Environmental Report was also utilized for evaluation of the normal operating conditions inside containment with consideration for modification of the assumptions to reflect a subatmospheric, reasonably steady state environment during normal operation. A complete description of the Containment Structure Ventilation System, as well as a safety evaluation of the several subsystems is found in FSAR Section 9.4.7, Volume 12.

9. NRC Question: Paragraph 2.4.2(7) of the EQ submittal requires clarification. Is this typically how component operability is being verified or the exception? (Note: Data used to demonstrate the qualification of a component must be pertinent to the application.)

NNECO Response: Paragraph 2.4.2 (7) of the Electrical Equipment Qualification Report will be revised to clarify the intent of our operability testing.

2.4.2(7)

Qualification documentation is reviewed to ensure that equipment operability can be demonstrated. Operability of equipment is verified before and after each testing sequence. Equipment performance characteristics are verified by continuous monitoring of equipment and comparing test data after each testing sequence to ensure performance characteristics fall within the specified ranges.

10. NRC Question: Appendix D, page 2 of 8, of Attachment 1, of Appendix 3B of the FSAR (description of zone ES-04) gives "later" for the submergence potential. When will this be provided? If any components are located in this zone and considered qualified by Millstone III, provide the component ID for these components.

NNECO Response: Amendment 13, dated April 1985 (Appendix 3B, Environmental Design Conditions -FSAR) now indicates the Submergence Potential. The submergence potential for zone ES-04 is (+) 7 ft - 3 in. from 4 ft - 6 in. elevation.

The component's IDs (equipment IDs) located in zone ES-04 will be supplied for review during the EEQ Audit from the Master List.

11. NRC Question: Provide supporting documentation for the conclusions reached by Millstone III where accident environmental parameters were determined not to be greater than normal environmental parameters.

NNECO Response: Supporting documentation for conclusions determined that accident environments were not greater than normal environments.

Calculation of accident environments utilized the methods listed in Appendix B of NUREG-0588, as discussed in Section 2.1 of the Electrical Equipment Qualification Report. Calculations that are in the Project's files to substantiate the environmental profiles that were developed for each unique zone of the plant, found in Appendix 3B of the FSAR, will be provided for review during the site audit.

12. NRC Question: Provide the process that is used at the Millstone III that ensures that any maintenance imposed by the EQ Reports are incorporated into the planned maintenance system at Millstone III.

NNECO Response: The process used at Millstone 3 that ensures EQ maintenance is incorporated into the planned maintenance system is a sequence of document reviews.

The sequence of document review consists of the following:

- a. Review the Qualification Test Report
- b. Review Vendor Technical Manual
- c. Review Vendor Correspondence

From reviewing items A, B, & C identified above, a Component Replacement Schedule is produced identifying replacement schedule (qualified life), torque values, component replacement (O-Rings) by part number and other appropriate information. All Component Replacement Schedule sheets are identified by equipment ID numbers.

12. NNECO Response: The Component Replacement Schedule Sheets are placed into a Maintenance Book which is used to interface with the Millstone 3 Production Maintenance Management System (PMMS) program.

13. NRC Question: Provide the results of the component specific calculations when such calculations are required to demonstrate qualification.

NNECO Response: Component (equipment) specific calculations required to demonstrate qualification are maintained in a Millstone 3 Calculation Book. All calculations have unique calculation numbers which are easily identifiable and are indicated on the SCEW sheets.