

**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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June 3, 1985

Docket No. 50-423  
B11554

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, Transmittal of Responses to the SER Open Items.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3  
Transmittal of Responses to SER Confirmatory Items

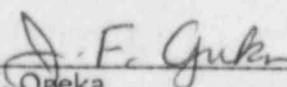
In Reference (1), Northeast Nuclear Energy Company (NNECO) transmitted responses to SER open items (13) concerning the seismic and dynamic qualification program for Millstone Unit No. 3. At the Seismic Qualification Review Team and Pump and Valve Operability Review Team site audits, the representatives from NNECO met with the NRC Staff to discuss the above responses to SER open items. Attachment I provides a status of those SER open items. Enclosed are NNECO's revised responses to SER open items (7.1.2, 7.1.4, 7.1.7, 7.2.2, and 7.2.4). These revised responses should fully resolve the Staff's concerns regarding the open items.

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

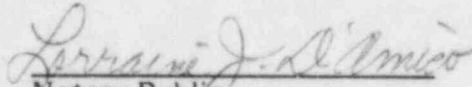
  
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J. F. Opeka  
Senior Vice President

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

Then personally appeared before me J. F. Opeka, who being duly sworn, did state that he is Senior 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.

  
Notary Public

My Commission Expires March 31, 1988

Attachment i

Responses to SER Open Items

<u>Item No.</u>	<u>Description</u>	<u>Status</u>
SER 7.1-1	Description of Seismic Qualification Program in FSAR	Closed
SER 7.1-2	As-Built Mounting Condition	Open*
SER 7.1-3	Piping Loads Transmitted to Pump and Valve Bodies	Closed
SER 7.1-4	Aging and Sequential Testing	Open*
SER 7.1-5	Westinghouse Generically Qualified Equipment	Closed
SER 7.1-6	Qualification Using Single Axis and/or Frequency Test	Closed
SER 7.1-7	Master Equipment List	Open*
SER 7.2-1	Design Criteria for Pump and Valve Internal Parts	Closed
SER 7.2-2	Equipment to be Tested in Operational Condition	Open*
SER 7.2-3	Pump and Valve Operability Review Team Audit	Closed
SER 7.2-4	Master Equipment List	Open*
SER 7.2-5	Aging	Closed
SER 7.2-6	Independent Qualification Versus Assembly Qualification	Closed

\*The revised responses to these open items are attached.

Millstone Unit No. 3  
SER OPEN ITEMS  
EQUIPMENT QUALIFICATION BRANCH

SER 7.1-2 As-Built Mounting Condition (SER Section 3.10.1)

The applicant needs to clarify how the as-built mounting condition is determined to be equivalent to that used in qualification and how the RRS at the mounting location is determined to equal or exceed that used in qualification.

Response (2/85)

The applicant's policy is to provide equipment anchorage in accordance with that delineated on the vendor's production drawings. It is the vendor's responsibility to assure consistency of anchorage details between these production drawings and the seismic qualification report. Exceptions to the requirements of the production drawing are reconciled with the seismic qualification report by SWEC and/or the vendor in accordance with project procedures. As described in WCAP-8587 Section 6.2, all NSSS equipment is seismically qualified in accordance with the suppliers installation instructions.

Equipment location is specified prior to seismic qualification. RRS applicable to each piece of equipment or an enveloping RRS for equipment types with multiple locations is provided for the qualification test or analysis. The final report for site-specific qualification is reviewed for compliance with the input requirements. Generically qualified equipment is reviewed against RRS applicable to the location specified for the equipment.

Modifications and addition (or deletion) of components to seismically qualified equipment are controlled by written project procedures and implemented through the Engineering and Design Coordination Report (E&DCR) process. Proposed modifications are evaluated based on sound engineering practice with specific considerations as outlined below.

Internal modifications to equipment typically involve the addition of components to existing electrical equipment. The proposed modification is evaluated by:

- o Reviewing the response of the local point of attachment to determine the appropriate RRS for the seismic qualification of the component. Specific RRS are prepared if necessary or local stiffening required. Seismic qualification of the component at its local attachment point is demonstrated.
- o Considering the mass and stiffness effects on the local structure (e.g., subpanel response for an electrical cabinet), and ensuring local structural adequacy for the component attachment.
- o Evaluating the gross effects of the additional mass/modification on the overall response of the structure including anchorage.

Equipment anchorage changes fall into two categories:

- o An indirect attachment to the building structure uses intervening structural members with an anchorage method qualified by the vendor. The intervening structure is designed rigidly to assure that the structural RRS remains appropriate for equipment qualification and that adequate load carrying capacity exists.
- o For direct attachments to the structure changes to the vendor qualified anchorage method although rarely utilized, usually involve replacement by equivalent strength (i.e., welds replacing bolts at the original bolt locations). All modifications are evaluated to assure that adequate systems stiffness is maintained and stress levels are within allowable values.

Modifications for which vendor qualification reports and data are insufficient to allow a precise evaluation of the effects of the modification are referred back to the equipment vendor for resolution.

The Staff requested examples of how changes in mounting detail or changes in RRS are controlled to ensure proper equipment qualification. Attachment 2 provides two E&DCRs as examples of how modifications to equipment are reconciled with the original seismic qualification reports.

E&DCR F-S-35353 provides alternative mounting details for HVAC panels. The referenced calculation on Page 1 of 6 provides the verification that the seismic qualification is maintained.

E&DCR F-E-33323 adds a junction box to a panel in order to facilitate the conduit installation. The justification that the seismic qualification is maintained is provided in the E&DCR.

Changes in RRS are controlled through project procedures. An example of this is the Emergency Generator Enclosure Building (EGE). A change in the acceleration response spectra (ARS) was identified; consequently, all seismic equipment in the building was reviewed for acceptability to the revised ARS. In cases where the architect/engineer was unable to make a positive determination, the revised ARS was submitted to the equipment vendor for requalification of the equipment. All seismic Category I equipment affected by the ARS change will be documented as acceptable.

#### Additional Questions (3/85)

- a. The Staff questioned whether the vendors responsibility to verify that the anchorage details provided on his production drawings are consistent with the seismic qualification report is adequate to ensure satisfactory equipment qualification.
- b. The Staff requested an explanation of how changes to equipment are accounted for and retrieved for future modifications.

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Response (5/85)

- a. The SWEC equipment specification provides the vendor with the requisite information to develop a seismic qualification report. The SWEC specification requires that the vendor be responsible for ensuring consistency between the vendors production drawing and the testing configuration and/or analytical model. Since the vendor has an approved QA program, a review of the anchorage detail by SWEC is considered redundant and is therefore not required.
- b. The E&DCR process is utilized to control changes to equipment. Each E&DCR is tracked against its respective equipment specification. SWEC procedure requires a review of previous modifications to equipment via this E&DCR review prior to approving any proposed modification to a piece of qualified equipment. NNECO intends to establish a similar procedure upon turnover of design control.

Millstone Unit No. 3  
SER OPEN ITEMS  
EQUIPMENT QUALIFICATION BRANCH

SER 7.1-4 Aging and Sequential Testing (SER Section 3.10.1)

Although the applicant has committed to follow the requirements and recommendations of IEEE 344-1975 and Regulatory Guide 1.100, the methods for handling aging and sequential testing in the seismic qualification of both electrical and mechanical equipment should be clarified. In addition, the applicant should commit to establish a maintenance and surveillance program to maintain equipment in a qualified status throughout the life of the plant.

Response (2/85)

The methods used in handling aging and sequential testing in the seismic qualification for both electrical and mechanical equipment are addressed in EEQ and MEQ programs.

Both types of equipment (electrical and mechanical) are included in a maintenance and surveillance program called Plant Maintenance Management System (PMMS). The object of the program (PMMS) is to maintain the equipment in accordance to the manufacturer's requirements, qualification requirements and operating experience. This program ensures that the appropriate refurbishment is performed during the qualified life of the equipment.

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For Class IE electric equipment, the vendor is required to evaluate the equipment for the effects of mild environment and identify any subcomponent which would degrade in such an environment. If the vendor identifies such a component, an effort is made to modify the equipment by substituting the limited life component with a full-life qualified component. Alternatively, a qualified design life will be established by Engineering (EEQ) for the component and input into the PMMS program which requires maintenance at established intervals in order to maintain the equipment in a qualified status. This information is supplied to appropriate maintenance groups via the component replacement schedule data sheets.

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Millstone Unit No. 3  
SER OPEN ITEMS  
EQUIPMENT QUALIFICATION BRANCH

SER 7.1-7 Master Equipment List (SER Section 3.10.1)

There should be a list of types of equipment that clearly shows the method used for qualification. The list also should address which standards are met, particularly those sited in SRP Section 3.10.

Revised Response (5/85)

The final master equipment list for the Seismic Qualification Review Team audit was provided in a letter from W. G. Counsil to B. J. Youngblood dated April 3, 1985.

Rev. 1



Millstone Unit No. 3  
SER OPEN ITEMS  
EQUIPMENT QUALIFICATION BRANCH

SER 7.2-2 Equipment to be Tested in Operational Condition (SER Section 3.10.2)

SRP 3.10, Paragraph II.1.a(2) indicates that equipment should be tested in the operational condition, that is, normal plant loadings should be superimposed on seismic and dynamic loads, including thermal, flow induced loads and degraded flow conditions. The FSAR should clearly indicate how this requirement is met.

Response (2/85)

Pumps are qualified per FSAR Section 3.9B.3.2.1 considering all loading conditions. Qualification is performed by analysis rather than test and analysis includes pump operating and seismic loads plus system loads from attached piping which includes thermal and flow induced loads. Rev. 1

Degraded flow conditions per SRP 3.10 Section II.1.a(2) are considered inapplicable by maintenance of system cleanliness. Trash racks and a series of screens with increasing fineness are provided for the containment sumps in accordance with Regulatory Guide 1.82. The service water pumps employ traveling screens to remove debris from the pump intake area. These devices are considered to provide a level of system cleanliness sufficient to ensure pump operability.

Safety-related motors are designed with the capability of accelerating the driven equipment to its rated speed when starting with minimum specified motor voltage applied at the motor terminals. Except where otherwise justified, the minimum starting voltage for safety-related motors is 70 percent of rated voltage. Motor safe locked rotor time at rated locked rotor current is equal to, or greater than, the maximum accelerating time at minimum specified starting voltage. Starting currents for each motor are specified to be as low as possible without unduly sacrificing other desirable features such as high efficiency, power factor and torque characteristics.

Each emergency 4.16 kV bus is furnished with two undervoltage detection schemes:

- (1) Loss of voltage scheme with two out-of-four logic is provided to detect voltage drop below acceptable level. After sufficient time delay to coordinate with overcurrent fault protection, this scheme will start the diesel generator, trip motors through the sequencer and load the emergency generator as required.
- (2) Degraded voltage scheme with two out-of-four logic is provided to detect prolonged voltage drop to the level which could be detrimental to operation of the emergency equipment if allowed to continue. Under accident conditions when the emergency generator

is ready to accept load, the scheme will trip motors through the sequencer and load the emergency generator as required. Under normal conditions this scheme will start the emergency generator and, when it is ready to accept load, will trip motors through the sequencer and load the emergency generator as required.

Valves are qualified per FSAR Section 3.9B.3.2.2. Active safety-related valves are installed in ASME III piping systems designed for all loading conditions, including fluid dynamic events. These systems are designed to maintain valve accelerations under all dynamic events (seismic and fluid transient) within qualified levels. (Refer to SER 7.1-3.)

Millstone Unit No. 3  
SER OPEN ITEMS  
EQUIPMENT QUALIFICATION BRANCH

SER 7.2-4 Master Equipment List (SER Section 3.10.2)

There should be a list of types of equipment that clearly shows the methods used for qualification. This list should also address which standards are met, in particular those sited in SRP Section 3.10.

Revised Response (5/85)

The final master equipment list for the Pump and Valve Operability Review Team audit was provided in a letter from W. G. Council to B. J. Youngblood dated April 3, 1985.

Rev-1