Northeast
Utilities System

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October 3, 1996

Docket Nos. 50-245
50-336

B15925

Re: 10CFR2.201

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Millstone Unit Nos. 1 and 2
Response to Request For Additional Information
Regarding TAC Nos. M85570 and M85571
Thermo-Lag Related Ampacity Derating Issues

The purpose of this letter is for Northeast Nuclear Energy Company (NNECO) to provide additional information concerning Thermo-Lag Related Ampacity Derating Issues as requested by the Staff in the letter of August 12, 1996.[1]

The responses to each of the three questions presented by the Staff are contained in Attachment 1 to this letter as well as any additional information requested by the Staff in the teleconference held between the Staff and NNECO on September 5, 1996. As explained in Attachment 1, the final ampacity derating calculation, will not be complete until November 29, 1996. NNECO, therefore cannot provide complete answers to certain of the Staff questions until that time.

The following are NNECO's commitments identified within this letter. All other statements contained within this letter are for information only.

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[1] Phillip F. McKee to Ted Feigenbaum, "Request for Additional Information Regarding Thermo-Lag Related Ampacity Derating Issues For Millstone Units 1 and 2 (TAC Nos. M85570 and M85571)", dated August 21, 1996.

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B15925-01 The analysis of a comparison of the installation procedures and barrier construction geometry and the final derating calculation, will be complete by November 29, 1996.

B15925-02 NNECO will submit and updated response to the questions asked by the Staff in the letter of August 12, 1996 and the tele-conference of September 5, 1996, by December 13, 1996.

If you have any additional questions concerning this submittal, please contact Mr. Michael D. Ehredt at (860) 440-2142.

Very truly yours
NORTHEAST NUCLEAR ENERGY COMPANY

T. C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer

Attachment

cc: H. J. Miller, Region I Administrator
J. W. Andersen., NRC Project Manager, Millstone Unit No. 1
D. G. McDonald, Jr., NRC Project Manager, Millstone Unit No. 2
T. A. Easlick, Senior Resident Inspector, Millstone Unit No. 1
P. D. Swetland, Senior Resident Inspector, Millstone Unit No. 2

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Attachment 1

Millstone Unit Nos. 1 and 2

Response to Request For Additional Information

Regarding TAC Nos. M85570 and M85571

Thermo-Lag Related Ampacity Derating Issues

October 1996

The Staff, in conjunction with its contractor, Sandia National Laboratories (SNL), has completed the preliminary NNECO's submittal and the following questions require clarification by NNECO:

Question 1:

NNECO should confirm that all fire barrier construction for the subject configuration(s) are representative of the barrier construction used in the Comanche Peak Steam Electric Station (CPSES), Unit 2 ampacity derating tests.

Answer 1:

This request was further clarified in the conference call of September 5, 1996, to include a comparison of the installation procedures and barrier construction geometry. In our previous submittal dated November 3, 1995, NNECO had proposed to base the derating on "thickness scaling." This scaling relationship was applied to the general configuration applicable to each cable, i.e., tray, conduit, or air drop. The installation procedure and exact geometry of the installation was not previously considered to have a significant affect on the derating value since all installations would have been in accordance with the manufacturer's guidance. To assist in performing this comparison analysis, NNECO has retained the consulting services of Mr. Keith A. Petty of Stone and Webster, starting October 1, 1996. Mr. Petty was involved in the CPSES Thermo-Lag tests and is an industry recognized expert on electric cable and ampacity derating issues. This analysis, and the final derating calculation, will be complete by November 29, 1996.

Question 2:

NNECO should verify whether the installed Thermo-Lag fire barriers are single (one 1" thick) or double (two 1/2" thick) layer systems. The Thermo-Lag fire barrier system tested at CPSES 2 was a single layer system If a double layer system is used at Millstone Units 1 and 2, then the scaling methodology used on the TU test results is invalid and may prove to be non-conservative for application. If the above case proves true, NNECO should provide additional justification for the extrapolation of the single layer test results to a double layer system or provide an alternative basis for ampacity derating determination and analysis of the installed Thermo-Lag configuration.

Answer 2:

Based on the information contained in references 1, 2, and 3,[2] the installed Thermo-Lag fire barriers at Millstone Unit Nos. 1 and 2 are single layer systems with a 1" nominal thickness. Therefore, the scaling methodology used on the Texas Utilities (TU) test results is also valid for the configurations at Millstone Unit Nos. 1 and 2.

Question 3:

For the air drop example calculation provided in the NNECO submittal dated November 3, 1995, NNECO identified that the subject cable is nominally overloaded and based its acceptability on emergency overload temperature ratings. The staff requests that NNECO address the following points and provide specific quantitative assessments of ampacity derating acceptability for the Thermo-Lag installed fire barrier:

- The basis for the assumed temperature limits must be documented. That is, the licensee should cite the source of these overload ratings and establish the applicability of those values to the cables in use at Millstone Units 1 and 2. (Note that NEC does not address overload ratings but that various ICEA documents do.)

- If NNECO argues that non-continuous operation above the rated temperature of the insulation is acceptable, then one critical aspect of this argument, which must be addressed, is the impact of such operation on the anticipated cable operating life. This aspect should be addressed through Quantitative life impact assessments in a context similar to that applied to the Equipment Qualification Program. Even relatively short periods of operation above the nominal rated temperature can lead to significant loss of cable life. (Note that this type of analysis must consider the full range of temperature cycling behavior, including normal

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[2] 1) Haddam Neck Millstone, Nuclear Power Station Unit Nos. 1, 2, and 3, Response to Request for Additional Information Regarding Generic Letter 92-08, "Thermo-Lag 330-1 Fire Barriers Pursuant to 10 CFR 50.54(f)", dated February 11, 1994.

2) Northeast Utilities Thermal Lag Installation Specifications SP-ME-596 Rev. 1 and SP-ME-641 Rev 0.

3) Northeast Utilities Purchase Order 853690 dated August 21, 1986.

aging at the prevailing ambient condition of 40°C and the effects of mutual heating from other nearby cables where applicable.) At the least, an aging analysis should be provided, which conservatively bounds the worst case anticipated operating conditions.

- By their very nature, emergency overload ratings are intended to provide for rarely occurring and unexpected events in which a circuit might be overloaded. For example, the IPCEA P-46-246 tables state that "Operation at the overload temperatures...shall not exceed 100 hours per year. Such 100-hour overload periods shall not exceed five." The use of emergency temperature overload ratings as the basis for acceptance of normal anticipated cable operating conditions may be inappropriate. At the least, this represents a fundamental departure from accepted ampacity assessment approaches, and therefore, further justification of this treatment is required.

Answer 3:

NOTE: This question is only applicable to Millstone Unit No. 2 because the configuration in question does not pertain to Millstone Unit No. 1.

- If, in the final calculation, NNECO does credit the cable's emergency overload temperature rating, the identified concerns will be addressed. NNECO recognizes that this would represent a fundamental departure from accepted ampacity assessment approaches and will consider all viable alternatives before taking credit for a cable overload rating.

Additional Questions:

The Request for Additional Information was further clarified in the conference call of September 5, 1996, to include the following additional items: (1)consideration of the total number of conductors in derating cables in conduit, (2) recognizing the impact of service factor of motors on cable ampacity, (3) derating cable ampacity of cables in overfilled conduits, and (4) alloy coating of copper conductors effect on ampacity.

Answer:

These issues will be addressed as appropriate in the final calculation.