



UNITED STATES
NUCLEAR REGULATORY COMMISSION

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September 16, 1998

50-334

Mr. Martin L. Bowling, Jr.
Recovery Officer - Technical Services
Northeast Nuclear Energy Company
c/o Ms. Patricia A. Loftus
Director - Regulatory Affairs
P.O. Box 128
Waterford, CT 06385

SUBJECT: GENERIC LETTER (GL) 97-01, "DEGRADATION OF CRDM/CEDM NOZZLE AND OTHER VESSEL CLOSURE HEAD PENETRATIONS" RESPONSES FOR MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2, AND RELATIONSHIP OF THE RESPONSES TO TOPICAL REPORT NO. CE NPSD-1085

Dear Mr. Bowling:

On April 1, 1997, the staff issued Generic Letter (GL) 97-01, "Degradation of CRDM/CEDM [Control Rod Drive Mechanism/Control Element Drive Mechanism] Nozzle and Other Vessel Closure Head Penetrations," to the industry requesting, in part, that addressees provide a description of the plans to inspect the vessel head penetration (VHP) nozzles at their respective pressurized water reactor (PWR) designed plants. With respect to the issuance of the GL, the staff required the addressees to submit an initial response within 30 days of issuance informing the staff of the intent to comply with the requested information and a follow-up response within 120 days of issuance containing the technical details to the staff's information requests. In the discussion section of the GL, the staff stated that "individual licensees may wish to determine their inspection activities based on an integrated industry inspection program..." and indicated that it did not object to individual PWR licensees basing their inspection activities on an integrated industry inspection program.

As a result, the Combustion Engineering Owners Group (CEOG) determined that it was appropriate for its members to develop a cooperative integrated inspection program in response to GL 97-01. The CEOG program is documented in Topical Report No. CE NPSD-1085, "CEOG Response to NRC Generic Letter 97-01, Degradation of CEDM Nozzle and Other Vessel Closure Head Penetrations," which was prepared by ABB Combustion Engineering Nuclear Operations (ABB-CE) on behalf of the CEOG and the following CEOG member utilities and plants:

Arizona Public Service - Palo Verde Units 1, 2, and 3
Baltimore Gas and Electric Company - Calvert Cliffs Units 1 and 2
Consumers Energy - Palisades
Entergy Operations, Inc. - Arkansas Nuclear One Unit 2 and Waterford Unit 3
Florida Power and Light Company - St. Lucie Units 1 and 2
Northeast Utilities - Millstone Unit 2
Maine Yankee Atomic Power Company - Maine Yankee Nuclear Plant
Omaha Public Power District - Fort Calhoun Unit 1
Southern California Edison Company - San Onofre Units 2 and 3

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The CEOG submitted its integrated program and Topical Report No. CE NPSD-1085 to the staff on July 25, 1997.

By letters dated April 4 and July 30, 1997, you provided Northeast Nuclear Energy Company's (NNECO's) 30-day and 120-day responses to the GL. In the July 30, 1997, letter, you indicated that NNECO is a member of the CEOG and a participant in the CEOG integrated program that was developed to address the staff's requests in GL 97-01. By letter dated February 12, 1998, you provided the information requested by the GL on inspection activities of CEDM nozzle and other vessel head closure penetrations and also indicated that the information in Topical Report No. CE NPSD-1085 is applicable with respect to the assessment of VHP nozzles for the Millstone Nuclear Power Station, Unit No. 2.

The staff has reviewed your responses to GL 97-01 and requires further information to complete its review of the responses as they relate to the CEOG's integrated program for assessing VHP nozzles at CEOG member plants, and to the contents of Topical Report No. CE NPSD-1085. The enclosure to this letter forwards the staff's inquiries in the form of a request for additional information (RAI). The staff requests a response to this RAI within 90 days of receipt. It should be noted that similar staff requests have been issued to other CEOG member utilities. As was the staff's position before, the staff encourages you to address these inquiries in integrated fashion with the CEOG; however, the staff also requests that you identify any deviations from the CEOG's integrated program that may be specific to your facility. The staff appreciates the efforts expended with respect to this matter.

Sincerely,

Original signed by:

Daniel G. McDonald Jr., Senior Project Manager
Millstone Project Directorate
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-336

Enclosure: Request for Additional Information

cc w/encl: See next page

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M. L. Bowling

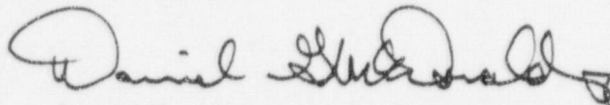
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Sincerely,



Daniel G. McDonald Jr., Senior Project Manager
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Division of Reactor Projects - I/II
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Docket No. 50-336

Enclosure: Request for Additional
Information

cc w/encl: See next page

Request for Additional Information

Combustion Engineering Owners Group (CEOG)

Response to Generic Letter (GL) 97-01

"Degradation of CEDM Nozzle and Other

Vessel Closure Head Penetrations"

Topical Report No. CE NPSD-1085, Revision 0

The ABB - Combustion Engineering Corporation's (ABB-CE's) methodology for predicting the susceptibility of vessel head penetration nozzles in the Combustion Engineering Owners Group (CEOG) plant designs is provided in Section 2.4 of CE Topical Report No. CE NPSD-1085, which was submitted to the staff on July 25, 1997. ABB-CE's methodology applies a probabilistic inspection timing model (PITM) to predict the probability of having a given Control Element Drive Mechanism (CEDM) penetration nozzle or in-core instrumentation (ICI) nozzle fail in service. With respect to the PITM model, the term "failure" does not refer to a compromise of the structural integrity of the reactor coolant pressure boundary, but rather that the presence of a non-throughwall flaw may require attention or repair.

Since that time, the staff has learned, informally, that the CEOG has decided to change the methodology for evaluating the Control Rod Drive Mechanism penetration nozzles in ABB-CE designed plants, and lately has adopted a CEDM penetration nozzle crack initiation and growth susceptibility model that has been developed by the Dominion Engineering Company. However, the CEOG has not submitted an addendum to its response of July 25, 1997, informing the staff of its decision to change the susceptibility model being adopted by the CEOG member utilities.

The staff requests that the following information be provided with respect to the content of your plant-specific response to GL 97-01, and its relationship to the CEOG integrated program for assessing the potential for CEDM penetration nozzles to undergo primary stress corrosion cracking (PWSCC) or intergranular attack (IGA):

Designate which crack susceptibility model is being endorsed for the assessment of CEDM penetration nozzles at your plant. Indicate how the susceptibility model being endorsed relates to the CEOG's integrated program for assessing the CEDM penetration nozzles at ABB-CE designed plants, and whether or not the design of the susceptibility model is consistent with the contents of Topical Report No. CE NPSD-1085. If the ABB-CE's PITM model is being endorsed for the assessment of CEDM penetration nozzles at your plant, address the items a. - e. that follow. If the Dominion Engineering susceptibility model is being endorsed for the assessment of CEDM penetration nozzles at your plant, address the items f. - i. that follow.

Enclosure

If the PITM models are being endorsed for the assessment of your CEDM penetration nozzles:

- a. Provide an expanded discussion and additional details describing how the time-to-failure model in the PITM relates to the PITM's time-to-initiation model. In particular, include an expanded discussion of how the PITM model relates growth of postulated flaws to the time-to-initiation model, and how the two aspects relate to each other and to the probability of failure methodology.
- b. Provide the latest PITM susceptibility ranking of CEDM penetration nozzles, and if applicable, the vessel head instrumentation nozzles at your plant relative to the rankings of those at the other CEOG member plants.
- c. Provide a description of how the PITM model for assessing postulated flaws in vessel head penetration nozzles was benchmarked, and list and discuss the standards the models were benchmarked against.
- d. Provide any additional information regarding how the model will be refined to allow the input of plant-specific inspection data into the model's analysis methodology.
- e. Describe how the variability in the product forms, material specifications, and heat treatments used to fabricate each CEDM penetration nozzle at the CEOG member utilities are addressed in the PITM model.

If the susceptibility model developed by Dominion Engineering is being endorsed for the assessment of your CEDM penetration nozzles:

- f. Provide a description of how the various product forms, material specifications, and heat treatments used to fabricate each CEDM penetration nozzle at the CEOG member utilities are handled in the Dominion Engineering susceptibility model.
- g. Provide any additional information, if available, regarding how the model will be refined to allow the input of plant-specific inspection data into the model's analysis methodology.
- h. Describe how the Dominion Engineering crack initiation and crack growth models for assessing postulated flaws in vessel head penetration nozzles were benchmarked, and provide a listing and discussion of the standards the models were benchmarked against.
- i. Provide the latest model susceptibility rankings of CEDM penetration nozzles in CEOG member plants based on the results of the Dominion Engineering susceptibility model analyses of these CEDM and ICI nozzles.

Millstone Nuclear Power Station
Unit 2

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