

# NORTHEAST UTILITIES



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

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270  
HARTFORD, CONNECTICUT 06141-0270  
(203) 665-5000

September 12, 1984

Docket No. 50-423  
B11295

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) D. G. Eisenhower letter to all Operating PWR Licensees, Construction Permit Holders and Applicants for Construction Permits (Generic Letter 84-04), dated February 1, 1984.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit No. 3  
Request for Exemption From General Design Criterion 4

In accordance with Reference (1), Northeast Nuclear Energy Company (NNECO) hereby requests an exemption, pursuant to 10CFR50.12(a), for Millstone 3 from those portions of General Design Criterion 4 which require protection of structures, systems and components from the dynamic effects (i.e. missiles, pipe whipping, and discharging fluids) associated with postulated breaks in the reactor coolant system (RCS) primary loop piping.

Scope of Exemption Request

Elimination of consideration of postulated circumferential and longitudinal breaks in the RCS primary loop piping would have the following effects on the Millstone 3 design:

- o Eliminate the need to design for pipe whip, jet impingement and the asymmetric effects of cavity pressurization due to primary loop pipe breaks.
- o Eliminate the need for pipe whip restraints and jet impingement shields on primary loop piping.
- o Eliminate primary loop LOCA load evaluation on primary loop piping, branch line piping and branch line supports (branch line LOCA loads would be retained in the design basis).
- o Eliminate the need to include primary loop LOCA loads in the design of the reactor coolant pump P1 snubber in loops 1 and 2 (2 out of 44 snubbers). Substantial modifications to the supporting structure for these snubbers

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would be required if it were necessary to accommodate postulated breaks in these loops. The proposed design basis for these supports is presented in Attachment (1).

Modification of existing hardware would add approximately one million dollars to total plant cost without a significant increase in plant safety. This conclusion is based on the work done by Westinghouse using fracture mechanics techniques and the studies performed by Lawrence Livermore National Laboratory, on behalf of the NRC, which demonstrate that breaks in the primary coolant loop piping in Westinghouse PWRs (similar to Millstone 3) are essentially incredible.

Granting of the requested exemption would not affect the following:

- o ECCS design bases
- o Containment and compartment design bases
- o Equipment qualification bases
- o ESF systems response
- o Design of RCS heavy component supports (except the P1 snubbers noted above) which will continue to assume a double ended primary loop pipe break with a break area equal to that which would occur if pipe whip restraints were installed.

#### Justification for Exemption

Enclosed are twenty copies each of Westinghouse reports entitled "Technical Bases for Eliminating Large Primary Loop Pipe Rupture as a Structural Design Basis for Millstone Unit 3", WCAP-10586 (Westinghouse Non-Proprietary) and WCAP-10587 (Westinghouse Proprietary).

These reports demonstrate that the specific parameters for Millstone 3 are bounded by the generic analysis performed by Westinghouse in WCAP-9558, Revision 2 and found acceptable by the NRC (Reference (1)).

It should also be noted that the Millstone 3 Reactor Coolant Pressure Boundary Leakage Detection System has been designed consistent with the guidance of Regulatory Guide 1.45, and has been found acceptable by the Staff (Millstone Unit 3 SER, dated July 1984). The Millstone 3 specific reports (WCAP-10586 and WCAP-10587) show that there is a large difference between the leakage resulting from a stable through-wall crack and the criteria of Regulatory Guide 1.45. Therefore, it is highly unlikely that a crack could develop into a large pipe break without prior detection.

In addition to the above information, NNECO has performed a value impact assessment consistent with the guidelines of Generic Letter 84-04 (Reference (1)). The bases for this assessment are presented in Attachment (2). The results of this assessment are as follows:

- o Periodic removal and reinstallation of primary loop pipe whip restraints is estimated to result in 192 man-rem of occupational radiation exposure over the life of the plant. The total probabilistic risk to the general public by not installing primary loop pipe whip restraints is estimated to be 0.21 man-rem (with an additional 0.05 man-rem occupational exposure). Thus, installation of these restraints, if the applicants' requested exemption is not granted, will result in significant additional radiation exposure over the life of the plant.
- o The exemption would result in a less congested containment (no jet shields) which would allow enhanced maintenance (permanent installation of neutron streaming shield) and improved in-service inspection access (less interference).
- o The potential for high pipe stresses due to thermal binding of pipe whip restraints would be eliminated.
- o Approximately two million dollars in direct capital costs and four million dollars in operational costs during hot functional testing are expected to be saved if the exemption is approved.

In conclusion, exemption to GDC 4 as it pertains to RCS primary loop pipe breaks will reduce total radiation exposures and reduce plant cost.

#### Request for Expedited Consideration

In order to realize the benefits outlined above, NNECO requests the Staff to review and approve this exemption request by November 1, 1984. We remain available to meet with the Staff to resolve any questions which may arise and provide any information necessary to implement this request promptly. The FSAR will be amended to reflect the revised design bases for the above mentioned items once the exemption is granted.

#### Proprietary Information

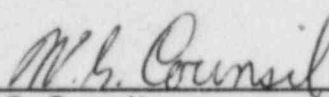
As WCAP-10587 contains information proprietary to Westinghouse Electric Corporation, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure in accordance with 10CFR2.790(b)(1) and addresses the specific considerations listed in 10CFR2.790(b)(4). Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10CFR2.790. Correspondence with respect to the proprietary aspects of the Application for Withholding or the supporting Westinghouse affidavit should reference CAW-84-59, and should be addressed to R. A. Wiesemann, Manager, Regulatory & Legislative Affairs, Westinghouse Electric Corporation, P. O. Box 355, Pittsburgh, Pennsylvania 15230.

If you have any questions or concerns regarding this submittal, please feel free to contact my licensing staff directly.

Very truly yours,

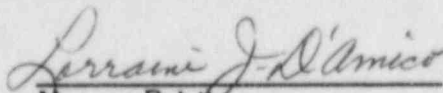
NORTHEAST NUCLEAR ENERGY COMPANY  
et. al.

BY NORTHEAST NUCLEAR ENERGY COMPANY

  
\_\_\_\_\_  
W. G. Council  
Senior Vice President

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

Then personally appeared before me W. G. Council, 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.

  
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Notary Public

My Commission Expires March 31, 1988



## Attachment 1

### Design Basis Loading Combination for P1 Snubber

(Loops 1 and 2)

To retain additional conservatism within the design of the reactor coolant pump supports in loops 1 and 2, we propose to use the following loading combination for the P1 snubber in the faulted condition:

$$SF \ D+T+E'+P \ (d+r+e'+a'+h+bl)$$

Where:

SF - Safety factor for additional margin to retain conservatism. A value of 1.25 is proposed to allow 25% additional margin.

D - Sustained mechanical loads; including deadweight of equipment and contents.

T - Loads on supports due to thermal expansion (constraint of free end displacement) of components.

E' - Inertia effects of the SSE.

P - Piping associated loads as follows:

d - Sustained deadweight of piping contents and insulation

r - Loads induced on component supports due to thermal and pressure growth of piping for appropriate plant condition

e' - Inertia effects of SSE

a' - Loads induced in component supports due to response of civil structure of SSE (SSE anchor movement)

h - Loads resulting from occasional loads other than seismic (water hammer, steam hammer, safety relief valve opening or closing, etc.) as appropriate for plant condition.

bl - Loads induced in Loop 1 and 2 P1 snubbers due to double ended branch line LOCA.

## Attachment 2

### VALUE-IMPACT FOR ELIMINATION OF REACTOR COOLANT SYSTEM PRIMARY LOOP BREAKS AT MILLSTONE 3

As additional justification for the exemption to GDC-4 as outlined previously for Millstone 3, a value-impact assessment was performed consistent with the guidance of Generic Letter 84-04. This assessment quantifies, specifically for Millstone 3, the safety gains attributable to implementation of the exemption request as previously outlined versus the accident risk associated with the same.

Assuming exemption to 10CFR50, Appendix A (GDC4) is granted, the following values and impacts are estimated.

#### REDUCTION IN EXPOSURE (SAFETY BALANCE)

Reduced Occupational Exposure to Remove and Reinstall Whip Restraints (estimated based on maintenance experience at Millstone 2 and ASME section XI requirements).

##### Assumptions:

.050 Rem/Hour effective dose rate  
80 Manhours to remove and reinstall a whip restraint  
3 Restraints/loops  
4 loops  
4 inspections/restraint

192 man-rem

Increased Occupational Exposure Due to Operating Without Whip Restraints

##### Assumptions:

Average of NRC probabilistic value-impact analysis (Generic Letter 84-04) is applicable to Millstone 3.

0.8 man-rem for 16 plants

0.05 man-rem

Increased General Public Exposure Due to Operating Without Primary Loop Whip Restraints

Same assumption as for occupational exposure  
3.4 man-rem for 16 plants

0.21 man-rem

Net Exposure Reduction  
(Safety Improvement)

192 Man-Rem

### REDUCTION IN COST

Design, Fabrication and Installation of pipe whip restraints	Approximately \$1 Million
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Modification of supporting structure for P1 snubber	Approximately \$1 Million
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Reduced Engineering and Construction Costs	<u>Approximately \$2 Million</u>
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Reduced Time to Start-up

No need to shim primary loop pipe whip restraints during hot functional testing (3 days)

\$3.5 billion @ 14% weighted average annual cost of capital

Approximately \$4 Million

Approximate Net Cost Reduction	<u>\$6 Million</u>
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### OTHER VALUES

- o Elimination of the potential for thermal binding of pipe whip restraints.
- o Less Congested Containment (No jet shields)
- o Improved In-Service Inspection (Less general interference)

### CONCLUSION

Elimination of Reactor Coolant Primary Loop Breaks would reduce total radiation exposure (by approximately 192 man-rem) and reduce costs (by approximately \$6 million). The exemption request should be approved due to a clearly positive value-impact.