

# NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY  
WESTERN MASSACHUSETTS ELECTRIC COMPANY  
HOLYOKE WATER POWER COMPANY  
NORTHEAST UTILITIES SERVICE COMPANY  
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February 24, 1992

Docket No. 50-423  
B14043

Mr. Thomas T. Martin  
Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Dear Mr. Martin:

Millstone Nuclear Power Station, Unit No. 3  
Erosion/Corrosion Program Update and Unit Restart

### Introduction

Northeast Nuclear Energy Company (NNECO), on behalf of Millstone Unit No. 3, hereby submits erosion/corrosion (E/C) program update information as committed in a letter dated January 3, 1992.<sup>(1)</sup> This letter will also confirm that NNECO has fulfilled its commitments at Millstone Unit No. 3, as stated in the November 18, 1991,<sup>(2)</sup> Northeast Utilities (NU) E/C program letter prior to returning the unit to service on February 6, 1992. Additionally, NNECO is hereby providing selected E/C program information, as appropriate, to clarify and support related topical discussions between various NRC Staff and NNECO personnel.

### Background

In a letter dated November 18, 1991,<sup>(3)</sup> NNECO provided a brief overview of our E/C program that evolved from the Millstone Unit No. 3 moisture separator drain line pipe rupture. As a result of the November 6, 1991, Millstone Unit No. 2 moisture separator reheater (MSR) drain line rupture event, the NU E/C program, then in the process of being upgraded, was accelerated and enhanced. We further stated that our units would not be returned to service until

- (1) J. F. Opeka letter to the U.S. Nuclear Regulatory Commission, "Haddam Neck Plant, Millstone Nuclear Power Station, Unit Nos. 1, 2, and 3, Erosion/Corrosion Program Update, Response to NRC Region I Augmented Inspection Team Report," dated January 3, 1992.
- (2) J. F. Opeka letter to the U.S. Nuclear Regulatory Commission, "Haddam Neck Plant, Millstone Nuclear Power Station, Unit Nos. 1, 2, and 3, Erosion/Corrosion Programs," dated November 18, 1991.
- (3) Ibid.

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comprehensive component inspections had been completed, all indications of observed degradation had been evaluated and dispositioned as required, and where necessary, component/piping would be repaired or replaced.

On November 22, 1991, a contingent of NU personnel presented the restart E/C program to the NRC Region I Staff. This comprehensive presentation included not only a discussion of the Millstone Unit No. 2 pipe rupture event, but more importantly, it focused on the enhanced E/C programmatic issues. A significant portion of the presentation covered NU's screening approach to identify locations susceptible to E/C. This was primarily based upon use of the CHECMATE computer program and broad industry experience. The explicit organizational structure delineating inspection, implementation, resolution/review, and acceptance responsibilities was presented. Programmatic documentation (program manual) and controls were also discussed.

Shortly following the presentation to Region I Staff, key NU corporate engineering management personnel relocated to the Millstone site to coordinate and assist in the restart E/C program. This organization provided focused and coordinated resource allocation during all phases of program implementation.

#### Current Millstone Unit No. 3 Status

At Millstone Unit No. 3, all actions necessary to return the unit to service have been completed. Comprehensive inspections of susceptible components identified utilizing CHECMATE, current industry experience, and unit specific history have been completed, or exempted where appropriate, as explained later in this section. The corrective actions, (4) listed in Section 4.2 of the NRC Region I Augmented Inspection Team Report, regarding numbers of inspections and analyses have either been met or exceeded. All indications of observed degradation have been evaluated and dispositioned per program requirements. The repair and replacement of components/piping have been completed.

The Millstone Unit No. 3 E/C restart program resulted in extensive inspections. The total number of inspection locations selected for the Millstone Unit No. 3 E/C restart program was 863. The number of required inspection locations based on industry experience consisted of 221 large bore (2" or greater) and 149 small bore (less than 2") locations. A total of 74 large bore inspection locations were established based on the CHECMATE analysis. In addition, 69 large and small bore inspection locations were identified by walkdowns as well as 22 additional inspection locations from the plant-specific experience data base. Lastly, as a result of the inspection findings, a total of 328 additional large and small bore piping inspection locations were included in the E/C restart program using the sample expansion criteria.

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(4) M. W. Hodges letter to J. F. Opeka, "NRC Region I Augmented Inspection Team Report (50-336/91-81)," dated December 12, 1991.

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The E/C restart program inspection requirements were implemented by completing 830 new inspections during the current outage and by taking exemptions for 33 locations. A summary of the exemptions taken is provided in Attachment 1. Exemptions were taken based on duplicate identified points (17 locations), credit for recent previous examinations (2 locations), and component inaccessibility and/or inconsequential damage considerations (14 locations). A total of 57 component repairs were accomplished, 55 of which were identified as requiring repair or replacement as part of the E/C restart inspection program. All repairs or replacements were completed prior to startup.

One finding was of particular note during the current E/C program inspections at Millstone Unit No. 3. A component in a 16-inch, extraction steam line, immediately downstream of the high pressure turbine, was found to be worn significantly enough to require immediate replacement. This finding occurred on December 17, 1991, approximately one day before a pipe rupture in a 14-inch, extraction steam line downstream from the high pressure turbine at a nuclear facility in Spain. Although the particular Millstone Unit No. 3 piping component was initially identified for inspection based on "industry experience," CHECMATE also correctly "flagged" the component for inspection. The wear rates predicted by CHECMATE and engineering predicted values for this particular component correlated favorably. The engineering predicted wear rate in this particular area was approximately 65 mils/year, and the CHECMATE initial prediction was approximately 58 mils/year. The actual inspection data were then fed back into CHECMATE, per the E/C program technical requirements, to further improve the wear rate correlation.

We believe that the E/C restart program was comprehensive and effective based on the scope of inspections, including the sample expansions, and the repairs and/or replacements completed prior to startup.

#### Additional E/C Program Information

The NU E/C program has already demonstrated itself to be comprehensive and effective, as all four NU units will be subjected to thorough and systematic piping/component inspections. A copy of the E/C Technical Requirements for Restart document, previously discussed (and requested by NRC Staff) during the November 22, 1991, Region I Staff meeting, was provided as Attachment 1 to the January 3, 1992, letter. This E/C technical requirements document, applicable for our four nuclear units, was developed in conjunction with industry standards and in collaboration with Electric Power Research Institute (EPRI) personnel. It has undergone not only internal review and approval, but has also been independently reviewed by EPRI.

Briefly, the component inspection locations, in susceptible systems, are identified from the following four sources:

- (1) CHECMATE--The computer code developed by EPRI to predict pipe wall thinning in systems without sufficient historical inspection data.

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- (2) Industry Experience Locations--Components which industry experience indicates are particularly susceptible to E/C (e.g., those downstream of flow control valves, orifices/flow meters, exit nozzles, and feed pumps).
- (3) Plant-Specific Experience Locations--Component locations within the specific plant where previous thinning has required repair or replacement.
- (4) Engineering Based/Walkdown Selections--Certain systems and pipe segments have usage and flow rates which cannot be accurately quantified because demand greatly varies or are controlled by a remote level, pressure, or temperature signal and will not be analyzed in CHECMATE.

The results of these inspections for Millstone Unit No. 1 and the Haddam Neck Plant will be reported to the NRC Staff in subsequent correspondence. As of this writing, we anticipate that approximately 488 and 865 inspections will be conducted at these units, respectively.

#### Information Sharing with Industry

Our recent E/C experience and findings have been and will continue to be shared with the industry utilizing the Nuclear Network System. On November 7, 1991, we communicated the Millstone Unit No. 2 MSR drain line rupture to the industry on the Nuclear Network System. On December 12, 1991, a supplemental notice was electronically transmitted as Technical Support Information Exchange, describing the NU E/C efforts to comprehensively enhance and accelerate completion of our E/C program. On December 16, 1991, that message was reclassified as Operating Plant Experience. We have since received several telephone follow up inquiries as a result of this information sharing. On December 30, 1991, another Nuclear Network electronic message was transmitted in which the Millstone Unit No. 3 extraction steam line inspection finding was discussed. We will continue to share information with the industry as appropriate.

#### Conclusion

We completed the NU E/C program manual technical requirements for restart, at Millstone Unit No. 3, with the previously noted exceptions, prior to returning the unit to service.

NNECO believes the E/C Restart Program provides a high degree of assurance that each unit will operate until the next refueling outage without experiencing an E/C related piping rupture.

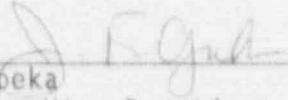
Our E/C program activities at the other two units are in various stages of completion. We will remain in periodic contact with the NRC Staff and provide

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additional program updates as more information becomes available. Please do not hesitate to contact us if you have any questions.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

  
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J. F. Opeka  
Executive Vice President

cc: V. L. Rooney, NRC Project Manager, Millstone Unit No. 3  
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2,  
and 3

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

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Attachment No. 1

Millstone Nuclear Power Station, Unit No. 3  
Erosion/Corrosion Program Update

Millstone Unit No. 3 Erosion/Corrosion Program Exemptions

February 1992

MILLSTONE UNIT NO. 3 - EXEMPTION REQUESTS

NO	TAG/ EQUIP	LINE NUMBER	EXEMPTION REQUEST	EXEMPTION DISPOSITION	COMMENT
1	BDG-TK1	12*	12/10/91	DUPLICATE	
2	ELBOW	3ASS-002-28	1/06/91	DUPLICATE	
3	ELBOW	3ASS-006-29	12/20/91	DUPLICATE	
4	ELBOW	3ASS-006-30	1/06/92	DUPLICATE	
5	TRP-7	3CNA-500-144	12/06/91	APPROVED	SYSTEM NOT IN USE
6	TRP-35	3CNA-750-253	12/06/91	APPROVED	SYSTEM NOT IN USE
7	CNM-35-20	3CNM-020-111	12/17/91	APPROVED	INACCESSIBLE
8	CNM-P1A	3CNM-024-6	12/06/91	ALTERNATE	INACCESSIBLE
9	P2A	3CNM-150-290	12/20/91	APPROVED	STAINLESS STEEL
10	LV-20A1	3DSM-006-39	12/06/91	APPROVED	PREVIOUS INSPECTION
11	LV-20B1	3DSM-006-40	12/06/91	APPROVED	PREVIOUS INSPECTION
12	DSM-70-3	3DSM-008-44	12/06/91	DUPLICATE	
13	ELBOW	3DSR-006-35	12/30/91	DUPLICATE	
14	DSR-67-34	3DSR-010-11	12/06/91	DUPLICATE	
15	DSR-67-35	3DSR-010-11	12/06/91	DUPLICATE	
16	DSR-69-10	3DSR-010-23	12/06/91	DUPLICATE	
17	DSR-69-11	3DSR-010-24	12/06/91	DUPLICATE	
18	MSS-T2A	3ESS-020-33	12/10/91	APPROVED	INSIDE CONDENSER
19	MSS-T2A	3ESS-020-34	12/10/91	APPROVED	INSIDE CONDENSER
20	MSS-T2B	3ESS-020-37	12/10/91	APPROVED	INSIDE CONDENSER
21	MSS-T2B	3ESS-020-38	12/10/91	APPROVED	INSIDE CONDENSER
22	MSS-T2A	3ESS-024-50	12/10/91	APPROVED	INSIDE CONDENSER
23	MSS-T2A	3ESS-024-55	12/10/91	APPROVED	INSIDE CONDENSER
24	MSS-T2B	3ESS-024-66	12/10/91	APPROVED	INSIDE CONDENSER
25	MSS-T2C	3ESS-024-75	12/10/91	APPROVED	INSIDE CONDENSER
26	HDL-23-04	3HDL-014-121	12/06/91	DUPLICATE	
27	HDL-23-07	3HDL-014-66	12/06/91	DUPLICATE	
28	HDL-16-21	3HDL-016-157	12/06/91	DUPLICATE	
29	HDL-16-22	3HDL-016-157	12/06/91	DUPLICATE	
30	HDL-19-33	3HDL-016-36	12/06/91	DUPLICATE	
31	HDL-22-52	3HDL-016-44	12/11/91	DUPLICATE	
32	HDL-20-14	3HDL-016-60	12/06/91	DUPLICATE	
33	SVH-83-10	3SVH-025-70	12/10/91	APPROVED	STAINLESS STEEL