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WINSTON & STRAWN
DOCKETED
USNRC

FREDERICK H. WINSTON (1853-1886)
SILAS H. STRAWN (1891-1948)

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92 JUL 16 P3:27

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NICHOLAS S. REYNOLDS
(202) 371-5717

July 8, 1992

Ivan W. Smith
Chairman, Atomic Safety
and Licensing Board
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Jerry R. Kline
Atomic Safety and Licensing
Board
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Charles N. Kelber
Atomic Safety and Licensing
Board
U.S. Nuclear Regulatory
Commission
Washington, D.C. 20555

Subj: Northeast Nuclear Energy Company
(Millstone Nuclear Power Station,
Unit No. 2) Docket No. 50-336-OLA

Gentlemen:

In response to the Licensing Board's June 30, 1992,
Memorandum and Order, Licensee Northeast Nuclear Energy Company
is providing a copy of Licensee Event Report 92-003-00.

Also, Northeast Nuclear Energy Company requests that:

Richard M. Kacich
Director, Nuclear Licensing
Northeast Utilities
P.O. Box 270
Hartford, CT 06101

be added to the service list for this proceeding, and that all

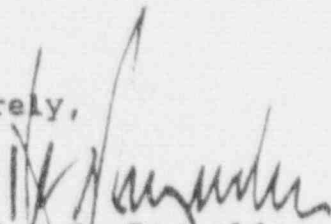
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July 8, 1992
Page 2

documents served by the parties and the Board also be served on
Mr. Kacich.

Sincerely,



Nicholas S. Reynolds
WINSTON & STRAWN,
ATTORNEYS FOR NORTHEAST NUCLEAR
ENERGY COMPANY

cc: Service List

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

NORTHEAST NUCLEAR ENERGY CO.

(Millstone Unit 2)

Docket No. 50-336-OLA

CERTIFICATE OF SERVICE

I hereby certify that a copy of Licensee Event Report 92-003-00 has been served by U.S. Mail, first class, on this 8th day of July, 1992, as follows:

Office of Commission Appellate
Adjudication
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Administrative Judge
Charles N. Kelber
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

John T. Hull, Esq
Office of the General Counsel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mary Ellen Marucci
104 Brownell Street
New Haven, CT 06511

Administrative Judge
Ivan W. Smith, Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

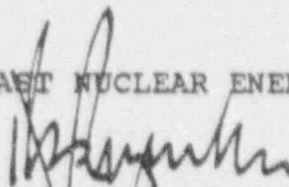
Administrative Judge
Jerry R. Kline
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Richard M. Kacich
Director, Nuclear Licensing
Northeast Utilities
P.O. Box 270
Hartford, CT 06101

Michael J. Pray, AIA
87 Blinman Street
New London, CT 06320

Patricia R. Nowicki
Associate Director
EARTHVISION, Inc.
42 Highland Drive
South Windsor, CT 06074

NORTHEAST NUCLEAR ENERGY CO.



Nicholas E. Reynolds
WINSTON & STRAWN,
ATTORNEYS FOR NORTHEAST NUCLEAR
ENERGY CO.

July 8, 1992

NORTHEAST UTILITIES



The Connecticut Light and Power Company
Western Massachusetts Electric Company
Lake Water Power Company
Northeast Utilities Service Company
East Nuclear Energy Company

General Offices · Seiden Street · Berlin Connecticut

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

Re: 10CFR50.73(a)(2)(ii)

March 13, 1992

MP-92-268

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

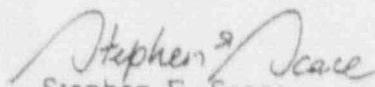
Reference: Facility Operating License No. DPR-65
Docket No. 50-336
Licensee Event Report 92-003-00

Gentlemen:

This letter forwards Licensee Event Report 92-003-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(ii).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY


Stephen E. Scace
Director, Millstone Station

SES/RAB:ljs

Attachment: LER 92-003-00

cc: T. T. Martin, Region I Administrator
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2 and 3
G. S. Vissing, NRC Project Manager, Millstone Unit No. 2

~~92032002084pp~~

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this information collection request: 50 0 hrs. Forward comments regarding burden estimates to the Records and Reports Management Branch (10-530), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503.

FACILITY NAME (1): Millstone Nuclear Power Station Unit 2
 DCKET NUMBER (2): 0 5 | 0 | 0 | 0 | 3 | 3 | 6 | 1 | OR | 1 | 3

TITLE (4): Spent Fuel Pool Criticality Analysis Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)												
MONTH	DAY	YEAR	YEAR	REGISTRATION NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES												
0	2	1	4	9	2	9	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0

OPERATING MODE (9): 1
 THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 4 (Check one or more of the following):
 POWER LEVEL (10): 0 | 3 | 1 | 0

20.402(d)	20.402(i)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(i)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(i)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
20.405(a)(1)(iv)	X 50.73(a)(2)(iii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(ii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)
 NAME: Robert A. Borchert, Unit 2 Reactor Engineer, Ext. 4416
 TELEPHONE NUMBER: AREA CODE 2 | 0 | 3 | 4 | 4 | 7 | - | 1 | 7 | 9 | 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	DB	RK	C49	N					

SUPPLEMENTAL REPORT EXPECTED (14):
 YES (If yes, complete EXPECTED SUBMISSION DATE) NO
 EXPECTED SUBMISSION DATE (15): MONTH 0 | DAY 6 | YEAR 3 | 0 | 9 | 2

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On February 14, 1992, at 1415 hours, with the plant in Mode 1 at 30% power, Northeast Nuclear Energy Company (NNECO) was notified by ABB-Combustion Engineering (ABB-CE) that a calculational error existed in the criticality analysis for the Region 1 spent fuel storage racks. NNECO determined that this condition was reportable as a condition outside of the design basis of the plant. An immediate report was made to the NRC, and the existing reactivity condition of the spent fuel pool was verified to be in compliance with the plant Technical Specifications.

The original effective multiplication factor (K_{eff}) calculated by ABB-CE for the Region 1 fuel storage racks for nominal dimensions, nominal spent fuel pool temperature and 4.5 weight percent enriched fuel assemblies was 0.9224 (without uncertainties). The discovered error results in an underprediction of approximately 0.04 delta K_{eff} . Revised calculations by ABB-CE indicate that K_{eff} is actually 0.963 for the same conditions. An investigation by ABB-CE has traced the error to two approximations used in their calculation.

NNECO is currently evaluating spent fuel storage rack design changes, additional criticality analyses (including the effects of observed boron degradation), and changes to the plant Technical Specifications to allow use of the Region 1 fuel storage racks.

NRC Form 368A (6-89)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED CMB NO. 2150-0106 EXPIRES 4/30/92							
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				Estimated burden per response to comply with this information collection request: 50 0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-530), U.S. Nuclear Regulatory Commission, Washington, DC 20555, and to the Paperwork Reduction Project (3150-0106), Office of Management and Budget, Washington, DC 20503.							
FACILITY NAME (1):		DOCKET NUMBER (2):		LER NUMBER (3):							
Millstone Nuclear Power Station Unit 2		0 5 0 0 0 3 3 6 9 2		<table border="1"> <thead> <tr> <th>YEAR</th> <th>SEQUENTIAL NUMBER</th> <th>REVISION NUMBER</th> </tr> </thead> <tbody> <tr> <td></td> <td>0 0 3</td> <td>0 0</td> </tr> </tbody> </table>		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		0 0 3	0 0
YEAR	SEQUENTIAL NUMBER	REVISION NUMBER									
	0 0 3	0 0									
PAGE 3											
0 2 OF 0 3											

TEXT (if more space is required, use additional NRC Form 368A (1-17))

I. Description of Event

On February 10, 1992, at approximately 1130 hours, Northeast Utilities (NU) was notified by an independent contractor that a higher than expected effective multiplication factor (K_{eff}) was calculated for the Region 1 fuel storage racks. On February 11, 1992, NU notified ABB-Combustion Engineering (ABB-CE) of the potential error in the spent fuel pool criticality analysis. On February 14, 1992, at 1415 hours, with the plant in Mode 1 at 30% power, Northeast Nuclear Energy Company (NNECO) was notified by ABB-CE that a calculational error existed in the criticality analysis for the Region 1 spent fuel storage racks.

The Millstone 2 spent fuel storage racks were modified in May 1986, and consist of two regions:

- (a) Region 1 is designed to store up to 384 fuel assemblies with an initial enrichment of up to 4.5 weight percent U-235. Region 1 was designed to allow fuel assembly storage in every location. The Region 1 storage racks contain a neutron poison material (Boroflex), and have a nominal center-to-center pitch of 9.8 inches.
- (b) Region 2 is designed to store up to 728 fuel assemblies which have sustained at least 85% of their design burnup. Fuel assemblies are stored in a three-out-of-four array, with blocking devices installed to prevent inadvertent placement of a fuel assembly in the fourth location. The Region 2 storage racks have a nominal center-to-center pitch of 9 inches.

The original effective multiplication factor (K_{eff}) calculated by ABB-CE for the Region 1 fuel storage racks for nominal dimensions, nominal spent fuel pool temperature and 4.5 w/o enriched fuel assemblies is 0.9224 (without uncertainties). The discovered error results in an underprediction of approximately 0.04 delta K_{eff} . Revised calculations by ABB-CE indicate that K_{eff} is actually 0.963 for the same conditions. Evaluations by ABB-CE have confirmed that the Region 2 fuel storage racks are not affected by the error.

NNECO determined that this condition was reportable as a condition outside of the design basis of the plant. An immediate report was made to the NRC, and the existing reactivity condition of the spent fuel pool was verified to be in compliance with the plant Technical Specifications. All fuel movement in the spent fuel pool had previously been restricted due to the observed degradation of the neutron poison material in the Region 1 fuel storage racks. No automatic or manual safety systems were required to respond to this event.

II. Cause of Event

An investigation by ABB-CE has traced the error to two approximations used in their calculation.

First, ABB-CE used the transport cross-sections as an approximation for the total cross-sections. This resulted in an overestimation of the neutron absorption in Region 1 and thus a lower calculated K_{eff} .

Second, ABB-CE used a geometric buckling term corresponding to a sparsely populated and unpoisoned array as an approximation of buckling in the poisoned configuration. This approximation also contributed to a lower calculated K_{eff} in Region 1.

III. Analysis of Event

This event is being reported in accordance with 10CFR50.73(a)(2)(ii)(B), which requires the reporting of any event or condition that results in the nuclear power plant being in a condition outside the design basis of the plant.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

Estimated burden per response to comply with this information collection request: 50 0 hrs. Forward comments regarding burden estimate to the Records and Reports Management Branch (p-530) U.S. Nuclear Regulatory Commission, Washington, DC 20555 and to the Paperwork Reduction Project (3150-0104) Office of Management and Budget, Washington, DC 20503

FACILITY NAME (1) Millstone Nuclear Power Station Unit 2	DOCKET NUMBER (2) 01500033692	LER NUMBER (6)		PAGE (3) 013 OF 013
		YEAR	REVISION NUMBER	
		92	0103	

TEXT (If more space is required, use additional NRC Form 368A (1/7))

The safety consequence of this event is a potential uncontrolled criticality event in the spent fuel pool. Upon consideration of the following factors, a significant margin to a critical condition was always maintained and, therefore, the safety consequences of this event were minimal:

- (a) The boron concentration of the spent fuel pool is procedurally controlled at greater than 1720 ppm, and is typically maintained at greater than 2000 ppm.
- (b) All new fuel assemblies previously stored in the Region 1 fuel storage racks had been arranged in a 2 out of 4 checkerboard array.
- (c) The maximum initial enrichment of any fuel assemblies previously stored in the Region 1 fuel storage racks was less than 4 weight percent U-235, which is less than the design enrichment of 4.5 weight percent U-235.
- (d) All discharged fuel assemblies previously stored in the Region 1 fuel storage racks have sustained at least one cycle of burnup.

IV. Corrective Action

NECO is currently evaluating spent fuel storage rack design changes, additional criticality analyses (including the effects of observed boroflex degradation), and changes to the plant Technical Specifications in order to allow use of the Region 1 fuel storage racks. Proposed changes to the Technical Specifications are expected to be submitted to the NRC about April 1, 1992.

V. Additional Information

There were no failed components during this event.
Similar LERs: 77-23, 80-05, 83-07, 85-01, 86-10 and 91-10

Spent Fuel Storage Racks

Manufacturer: Combustion Engineering
Model: Hi-Cap Spent Fuel Storage Module
EIS Code: DB-RK-C490