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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	
	)	
Northeast Nuclear Energy Company	)	Docket No. 50–423–LA–3
	)	
(Millstone Nuclear Power Station,	)	
Unit No. 3)	)	ASLBP No. 00–771–01–LA

NORTHEAST NUCLEAR ENERGY COMPANY'S SUPPLEMENTARY RESPONSE TO CONNECTICUT COALITION AGAINST MILLSTONE AND LONG ISLAND COALITION AGAINST MILLSTONE'S THIRD SET OF INTERROGATORIES

Northeast Nuclear Energy Company ("NNECO") hereby files its supplementary response to the Connecticut Coalition Against Millstone ("CCAM") and the Long Island Coalition Against Millstone's ("CAM") (collectively, "Intervenors") "Third Set of Interrogatories and Requests for Production" ("Intervenors' Third Discovery Requests"),[1] which was served on NNECO on May 19, 2000.

I. Discovery Requests

A(4) Calculations of k_{eff}

(1) Given the implementation of the proposed re-racking of the Millstone 3 pool, and assuming an absence of soluble boron, what would be the calculated k-effective in each of the regions of the pool if various combinations of fresh fuel assemblies were placed in the racks? For this purpose, various combinations of fresh fuel assemblies would include one assembly, two adjacent assemblies, four adjacent assemblies, and a full rack, where in each case the surrounding cells would be occupied by assemblies of the highest reactivity allowed by the Technical Specifications.

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[1] Although Intervenors refer to the subject request as their third, in reality it is their second.

Template = SECY-035

SECY-02

NNECO's Response: In accordance with Atomic Safety and Licensing Board's Memorandum and Order (Discovery Rulings, 5/26/00 Telephone Conference), dated June 8, 2000, and NNECO's June 2, 2000, responses to the Intervenors' Third Discovery Requests, attached to this response are the assumptions and results for beyond-design-basis criticality calculations performed by Dr. Turner of Holtec International that NNECO will rely on in its written filing for the Subpart K proceeding.

Respectfully submitted,

Donald P. Ferraro

David A. Repka
Donald P. Ferraro
WINSTON & STRAWN
1400 L Street, NW
Washington, D.C. 20005–3502

Lillian M. Cuoco
NORTHEAST UTILITIES SERVICE COMPANY
107 Selden Street
Berlin, Connecticut 06037

ATTORNEYS FOR NORTHEAST NUCLEAR ENERGY COMPANY

Dated in Washington, D.C.
this 21st day of June 2000

TABLE 1

Criticality Calculations for Region 1

ppm Boron	Fuel Array	k-effective*	Comment
2,600 Normal concentration	Completely filled with fresh fuel of 5% enrichment	0.7611	k_{eff} well below critical
800 Technical Specification limit	Completely filled with fresh fuel of 5% enrichment	0.8916	Remains subcritical at Technical Specification limit of 800 ppm
0 Highly unlikely Loss of all soluble boron	Completely filled with fresh fuel of 5% enrichment	0.9728	Remains subcritical with system filled with fuel of maximum reactivity and concurrent loss of all soluble boron

* The k-effective values do not include bias and manufacturing tolerances, which are usually about 0.015Δk in Region 1.

TABLE 2

Criticality Calculations for Region 2

ppm Boron	Fuel Array	k-effective*	Comment
2,600 Normal concentration	Completely filled with fresh fuel of 5% enrichment	0.9384	Multiple accident condition remains sub-critical
2,000 Boron dilution	Completely filled with fresh fuel of 5% enrichment	0.9842	Minimum Boron concentration of 2000 ppm Boron to assure sub-criticality for multiple accident scenario
800 Technical Specification limit	8 assemblies fresh fuel of 5% enrichment mis-loaded into otherwise empty Region 2 rack	0.9794	Multiple accident with 8 fresh fuel assemblies remains sub-critical at Technical Specification limit of 800 ppm Boron
800 Technical Specification limit	5 assemblies fresh fuel of 5% enrichment mis-loaded into Region 2 otherwise filled with spent fuel	0.9663	Multiple accident with 5 fresh fuel assemblies remains sub-critical at Technical Specification limit of 800 ppm Boron
0 Loss of all soluble Boron	3 assemblies fresh fuel of 5% enrichment mis-loaded into otherwise empty Region 2 rack	0.9241	Maximum number of concurrent accidents in otherwise empty Region 2 with loss of all soluble Boron
0 Loss of all soluble Boron	1 assembly fresh fuel of 5% enrichment accidentally mis-loaded into Region 2 otherwise filled with spent fuel	0.9450	Single misplaced assembly accident with concurrent loss of all soluble boron

* k-effective values do not include bias and manufacturing tolerances which are usually about 0.01Δk for fresh fuel (Cases 1, 2, 3, and 5 above). For Cases 4 and 6 above, with spent fuel assemblies present in the Region 2 racks, the bias and uncertainties could be as large as 0.019Δk.

TABLE 3

Criticality Calculations for Region 3

ppm Boron	Fuel Array	k-effective*	Comment
2,600 Normal concentration	Completely filled with fresh fuel of 5% enrichment	0.8503	Multiple accident condition – remains sub-critical
1,320 Boron dilution	Completely filled with fresh fuel of 5% enrichment	0.9811	Minimum soluble Boron concentration of 1,320 ppm to assure sub-criticality with multiple accident scenario
800 Technical Specification limit	8 assemblies fresh fuel of 5% enrichment mis-loaded into otherwise empty Region 3 rack	0.9752	Maximum number of concurrent accidents in Region 3 at the Technical Specification limit of 800 ppm Boron
800 Technical Specification limit	5 assemblies fresh fuel of 5% enrichment mis-loaded into Region 3 otherwise filled with spent fuel	0.9528	Maximum number of concurrent accidents in Region 3 at the Technical Specification limit of 800 ppm Boron
0 Loss of all soluble Boron	1 assembly of fresh fuel 5% enrichment mis-loaded into Region 3 otherwise filled with spent fuel	0.9707**	Single misplaced assembly of the maximum reactivity with concurrent loss of all soluble Boron

* k-effective values listed do not include bias and uncertainties which are about 0.018Δk for fresh fuel (Cases 1, 2, and 3 above) and 0.029% Δk when the racks are otherwise filled with spent fuel (Cases 4 and 5 above).

** A single misloaded assembly accident remains sub-critical at nominal spent fuel pool water temperatures, including bias and maximum uncertainties. However, because the temperature coefficient of reactivity is positive for Region 3, should a concurrent abnormal increase in pool temperatures occur, Region 3 could potentially reach a critical condition in the absence of all soluble boron. At 150°F, as little as 30 ppm of soluble boron would ensure sub-criticality, including bias and uncertainties.

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NORTHEAST NUCLEAR ENERGY COMPANY'S SUPPLEMENTARY RESPONSE TO CONNECTICUT COALITION AGAINST MILLSTONE AND LONG ISLAND COALITION AGAINST MILLSTONE'S THIRD SET OF INTERROGATORIES AND REQUEST FOR PRODUCTION" in the captioned proceeding, have been served on the following by deposit in the United States mail, first class, this 21st day of June 2000. Additional e-mail service has been made this same day as shown below.

Nancy Burton, Esq.
147 Cross Highway
Redding Ridge, CT 06876
(e-mail to: nancyburtonesq@hotmail.com)

Charles Bechhoefer
Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
(e-mail to: cxb2@nrc.gov)

Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Attn: Rulemakings and Adjudications Staff
(original + two copies)
(e-mail to: HEARINGDOCKET@nrc.gov)

Dr. Charles N. Kelber
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
(e-mail to: cnk@nrc.gov)

Adjudicatory File
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Richard F. Cole
Administrative Judge
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
(e-mail to: rfc1@nrc.gov)

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

Ann P. Hodgdon, Esq.
Office of the General Counsel
U.S. Nuclear Regulatory Commission
Washington, DC 20555
(e-mail to: aph@nrc.gov)

Donald P. Ferraro

Donald P. Ferraro
Attorney for NNECO