North Atlantic

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The Northeast Utilities System

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United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

References: (a) Facility Operating License NPF-86, Docket No. 50-443

(b) North Atlantic Letter NYN-92021, dated February 21, 1992, "Steam Generator Tube Rupture Operator Response Times", T.C. Feigenbaum to USNRC

(c) North Atlantic Letter NYN-91061, dated April 16, 1991, "Analysis of a Postulated Design Basis Steam Generator Tube Rupture for Seabrook Station", T.C. Feigenbaum to USNRC

Subject: Steam Generator Tube Rupture Operator Response Times

Gentlemen:

North Atlantic Energy Service Corporation (North Atlantic) submitted a report entitled "Analysis of a Postulated Design Basis Steam Generator Tube Rupture for Seabrook Station" on April 16, 1991 [Reference (c)]. The operator response times assumed in the Steam Generator Tube Rupture Analysis (SGTR) were derived from times observed during SGTR simulation runs on the Seabrook Station plant-specific training simulator and by plant walkdowns. The simulations were performed by two operating crews using plant-specific emergency operating procedures and design basis SGTR scenario assumptions.

The NRC subsequently requested that North Atlantic provide further validation of the operator response times assumed in the plant specific SGTR analysis by conducting additional operating crew design basis SGTR simulations to ensure that at least five of the six operating crews have participated. North Atlantic committed to the NRC on February 21, 1992, [Reference (b)], that at least three additional operating crews would perform a design basis SGTR simulation during their March 1993 requalification training. North Atlantic also committed [Reference (b)] that in the event that the observed operator action times do not support the times assumed in the current design basis SGTR analysis, that the analysis would be revised and resubmitted to the NRC.

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Three operating crews participated in SGTR simulator scenarios in March 1993. The response times of the crews in mitigating the SGTR were evaluated and compared to the response times assumed in the design basis SGTR analysis. Some operator response times were within the SGTR analysis assumptions while others were not. Overall, the operator response time required to isolate primary to secondary leakage was observed to be less expeditious than observed in the same scenario when performed in late 1988/early 1989. The design basis SGTR analysis submitted on April 16, 1991, [Reference (c)], credits operator response times observed in the late 1988/early 1989 simulations

The safety significance of the observed March 1993 SGTR operator response times was evaluated by North Atlantic to determine their effect on the conclusions in Reference (c) regarding margin to Steam Generator overfill and offsite radiological doses. The Reference (c) conclusion that Steam Generator overfill will not occur for a postulated design basis SGTR at Seabrook Station remains valid. Additionally, the March 1993 SGTR operator response times were determined to cause no additional steam releases for the case of limiting offsite doses, therefore the limiting offsite doses in Reference (c) are not affected. The evaluation of the March 1993 SGTR operator response times and their effect on the design basis SGTR analysis is enclosed.

North Atlantic has reviewed changes which have been made to Emergency Operating Procedure E-3 "Steam Generator Tube Rupture" and has determined that there have been no changes that can be attributed to the increased operator response times. North Atlantic believes that the increased operator response times are due to an increased emphasis placed on communications and self checking.

Should you have any questions regarding this letter, please contact Mr. James M. Peschel, Regulatory Compliance Manager at (603) 474-9521 extension 3772.

Very truly yours,

Ted C. Feigenbaum

TCF:MDO

Enclosure

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North Atlantic
May 12, 1994

ENCLOSURE TO NYN-94056

ENCLOSURE 1

EVALUATION OF STEAM GENERATOR TUBE RUPTURE OPERATOR RESPONSE TIMES

BACKGROUND INFORMATION

Three operating crews participated in Steam Generator Tube Rupture (SGTR) simulator scenarios in March 1993. The response times of the crews in mitigating the SGTR were evaluated and compared to the response times assumed in the design basis SGTR analysis. Some operator response times were within the SGTR analysis assumptions while others were not. Overall, the operator response time required to isolate primary to secondary leakage was observed to be less expeditious than observed in the same scenario when performed in late 1988/early 1989. The design basis SGTR analysis submitted on April 16, 1991, [Reference (c)], credits operator response times observed in the late 1988/early 1989 simulations.

The safety significance of the observed March 1993 SGTR operator response times was evaluated by North Atlantic to determine the effect on the conclusions in Reference (c) regarding margin to steam generator (SG) overfill and offsite radiological doses. The results of the evaluation are enclosed herein.

SUMMARY

Some operator response times were within the assumptions of Yankee Atomic Electric company (YAEC) Report 1698, "Analysis of a Postulated Design Basis Steam Generator Tube Rupture For The Seabrook Nuclear Power Plant" (YAEC-1698) while others were not. Overall, progress in Emergency Procedure E-3, "Steam Generator Tube Rupture", towards stopping the primary to secondary leakage was observed to be less expeditious than observed in videotapes of the same scenario taken in late 1988/early 1989. Analysis of the design basis SGTR documented in YAEC-1698 credits operator actions using response times based on 1988/1989 videotapes.

The safety significance of the observed operator response times has been evaluated and the conclusions of YAEC-1698 regarding no steam generator overfill and acceptable offsite doses remain valid.

DISCUSSION

In March 1993, three operating crews were videotaped responding to the same SGTR scenario:

a) A double-ended tube rupture in the "C" steam generator;

b) Initiated from full power;

c) With loss of offsite power occurring at the time of reactor trip;

d) The Radiation Data Monitoring System is inoperative; and;

e) One control rod remains stuck out.

The videotaped scenarios are nearly identical to the limiting design basis SGTR for SG overfill identified in YAEC-1698. The scenarios did not include the limiting single failure, i.e., one intact SG Atmospheric Steam Dump Valve (ASDV) fails to open and plant cooldown proceeds with only two ASDVs. The

omission of this single failure did not affect the value of the scenarios for evaluating operator response times.

Each crew succeeded in early identification of a rupture in the "C" SG. Transition to Emergency Operating Procedure E-3 was prompt. Once in E-3, progress towards stopping the primary to secondary leakage was to be less expeditious than observed in videotapes of the same scenario taken in late 1988/early 1989. Analysis of the design basis SGTR documented in YAEC-1698 credits operator actions using response times based on the 1988/1989 videotapes. The operator response times taken from the data plots and videotapes made in March 1993 are shown in the table below:

Action/Interval Description*	Scenario No./Date			YAEC-1698 Analysis Assumption
	1 3/11/93	2 3/18/93	3 3/25/93	
Ruptured SG Narrow Range Level @ time of isolation	~25%	~24%	~29%	33%
Interval between MSIV closure and start of RCS cooldown	12:07	5:02	9:26	5:00
Ruptured SG NR level at the start of RCS cooldown	~76%	~46%	~49%	~64%
Interval between end of RCS cooldown and start of RCS depressurization	2:26	2:15	2:44	2:00
Interval between end of depressurization and Safety Injection termination	2:18	2:11	2:47	5:00
Interval between end of RCS depressurization and a second attempt if required	5:07	3:53	___**	15:00**
Maximum ruptured SG NR level during the scenario	~98%	~68%	~83%	Off-scale

* Time intervals are in minutes and seconds.
** A second depressurization was not required.

These results confirm the observation that progress towards stopping the primary to secondary leakage was observed to be less expeditious than observed in videotapes of the same scenario taken in late 1988/early 1989. Two operator action intervals are seen to be inconsistent with the YAEC-1698 analysis assumption.

SAFETY EVALUATION

The safety significance of the observed response times on the SGTR analysis in YAEC-1698 was evaluated for both margin to SG overfill and limiting offsite radiological doses. The bounding evaluation is documented in Calculation SBC-619, "Verification of Operator Response Times During a SGTR Scenario" and assumes the slowest response times between the three crews and YAEC-1698 analysis value for each response interval shown in the table above. YAEC-1698 and SBC-619 are available for NRC review at Seabrook Station.

These changes to the assumed operator response times in YAEC-1698 cause a reduction in the calculated margin to SG overfill. The YAEC-1698 conclusion that SG overfill will not occur for a postulated design basis SGTR at Seabrook Station remains valid. These changes to the assumed operator response times in YAEC-1698 cause no additional steam releases for the case of limiting offsite doses. The limiting offsite doses in YAEC-1698 are not affected.

The conclusion of YAEC-1698 regarding no SG overfill and acceptable offsite doses remains valid with the observed operator response times.