

**North
Atlantic**

North Atlantic Energy Service Corporation
P.O. Box 300
Seabrook, NH 03874
(603) 474-9521

The Northeast Utilities System

April 10, 1997

Docket No. 50-443
NYN-97035

United States Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D.C. 20555

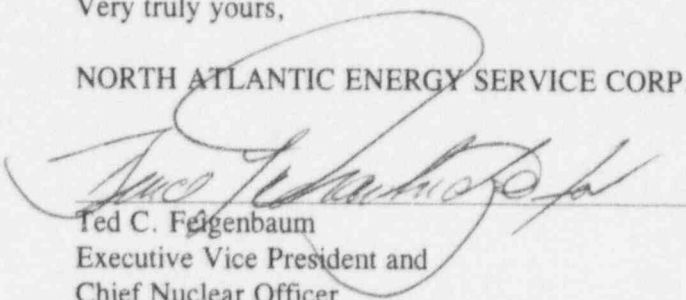
Seabrook Station
Licensee Event Report (LER) 96-007-01
Emergency Feedwater System (EFW) Flow Delivery Delays

Enclosed, please find Supplemental Licensee Event Report (LER) No. 96-007-01 for Seabrook Station which occurred on December 6, 1996. This event is being reported pursuant to 10 CFR 50.73(a)(2)(ii).

Should you require further information regarding this matter, please contact Mr. Terry L. Harpster, Director of Licensing, at (603) 773-7765.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.


Ted C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer

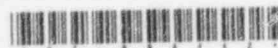
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cc: H. J. Miller, Regional Administrator
A. W. De Agazio, NRC Project Manager, Seabrook Station
J. B. Macdonald, Senior Resident Inspector, Seabrook Station

INPO
Records Center
700 Galleria Parkway
Atlanta, GA 30339

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LICENSEE EVENT REPORT (LER)(See reverse for required number of
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY
INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS
LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED
BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN
ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-
6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC
20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104),
OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Seabrook Station

DOCKET NUMBER (2)

05000443

PAGE (3)

1 of 3

TITLE (4)

Emergency Feedwater System (EFW) Flow Delivery Delays

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
12	06	96	96	007	01	04	10	97	FACILITY NAME	DOCKET NUMBER
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)								
POWER LEVEL (10)		20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)		50.73(a)(2)(viii)
		20.2203(a)(1)			20.2203(a)(3)(i)			<input checked="" type="checkbox"/> 50.73(a)(2)(iii)		50.73(a)(2)(x)
		20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(iii)		73.71
		20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)		OTHER
		20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)				

LICENSEE CONTACT FOR THIS LER (12)

NAME

Allen L. Legendre, Jr., Nuclear Licensing Supervisor

TELEPHONE NUMBER (Include Area Code)

(603) 773-7773

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On December 6, 1996, North Atlantic Energy Service Corporation (North Atlantic) determined that two of the design basis accidents analyzed in the Seabrook Station Updated Final Safety Analyses Report (UFSAR) did not account for a delay time associated with the initiation of Emergency Feedwater [BA] (EFW) to the intact Steam Generators (SG). Specifically, the Feedwater Line Break (FWLB) and Steam Line Rupture (SLR) accident analyses do not account for a twenty second delay time associated with the automatic isolation of the EFW Flow Control Valves (FCV) associated with the faulted SG. North Atlantic made a one hour non-emergency report pursuant to 10 CFR 50.72(b)(1)(ii)(B), to report this condition as being outside the design basis of the plant.

There are two safety related motor operated FCVs in each EFW line. These valves automatically close on a high flow condition sensed by the flow instruments in each EFW line. The required closure time for the FCVs is twenty seconds. The EFW system will not be capable of delivering the required EFW flow to the intact SGs until the faulted SG is isolated from the EFW system. Updated analyses have concluded that the additional time delay before EFW flow reaches the intact SGs has no significant impact on the accident analyses acceptance criteria results. The cause of the event is attributed to the Architect/Engineer in that they did not consider the twenty second valve closure time delay of the EFW FCVs in the design of the EFW system, thus the requirements of the Westinghouse accident analyses were not met. Completed corrective actions include, (1) an Operability Determination was completed, (2) accident analyses were revised and (3) a vertical slice review of the EFW System was performed as part of North Atlantic's response to the NRC's 10 CFR 50.54(f) letter on information pursuant to the adequacy and availability of design bases information. A future corrective action is to update the UFSAR Chapter 15 accident analyses.

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			--	007	--	01	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

I. Description of Event

On December 8, 1996, North Atlantic reported pursuant to 10 CFR 50.72(b)(1)(ii)(B) that two of the design basis accidents analyzed in the Seabrook Station Updated Final Safety Analyses Report (UFSAR) do not account for a delay time associated with the initiation of Emergency Feed Water (EFW) flow to the intact Steam Generators (SG). During a review of the EFW system to support the preparation of a design change, North Atlantic determined that the time assumed for EFW flow to reach the intact SGs in the Feed Water Line Break (FWLB) and Steam Line Rupture (SLR) analyses was incorrect. Both analyses did not account for the time required for the automatic isolation of the EFW Flow Control Valves (FCV) in the EFW line to the faulted SG. It is a design characteristic that the FCVs close within twenty seconds of receipt of an automatic signal actuated by high EFW flow in the EFW line to the faulted SG. Until isolation of the faulted SG is completed, the required EFW flow to the intact SGs is not provided. The original UFSAR Chapter 15 accident analyses did not consider this time delay for both the FWLB and SLR analyses.

II. Cause of Event

The Architect and Engineer (A&E) for Seabrook Station, failed to consider the twenty second valve closure time delay of the EFW FCVs. The Seabrook A&E was responsible for the design of the EFW system. Thus the system design was not consistent with the requirements of the Westinghouse accident analyses calculations. By failing to consider the time delay associated with the closure of the EFW FCVs to the faulted SG in the design of the EFW system, the original FWLB and SLR analyses had to be reevaluated to ensure acceptance criteria for the accidents were still achieved. The original analyses assumed that EFW flow to the intact SGs was immediate upon the EFW pump reaching rated speed. However the required flow to the intact SGs is not achieved until the ruptured SG EFW FCVs close.

These accident analyses were developed by the NSSS supplier approximately fifteen years ago. The design and construction of the EFW System by the A&E commenced after the completion of the analyses. North Atlantic has not conclusively determined why the designers of the EFW system failed to include this time delay as an input to their final design.

III. Analysis of Event

The accident analyses for the FWLB and the SLR does not include the delay time associated with closing the EFW FCVs to the faulted SG. When the error was discovered, North Atlantic reviewed the two analyses because the delay time must be accounted for in determining exactly when EFW flow to the intact SGs starts. The review determined that the impact on the FWLB analyses is inconsequential because the Reactor Coolant System [AB] (RCS) peak pressure occurs prior to the reactor trip and the minimum Departure From Nucleate Boiling (DNB) values occur well before EFW reaches the SGs. Those peak values are reached and start improving well before EFW reaches the SGs with or without accounting for the delay time for closing the EFW FCVs to the faulted SG. Acceptance criteria for these accidents is satisfied after including the delay time in the analyses. The EFW system's effectiveness for long term decay heat removal is not impacted by this delay time.

The updated accident analyses demonstrated that as long as EFW flow is initiated within ten minutes of the event, intact SG inventories remain above the minimum level necessary for effective decay heat removal with or without the Reactor Coolant Pumps running. A bubble is maintained in the Pressurizer assuring RCS inventory

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

and pressure is maintained throughout the event. An additional time delay of twenty seconds prior to establishing EFW is thus inconsequential in terms of the outcome of the FWLB accident.

The increased delay time for EFW isolation has no effect on the SLR analysis because that analysis assumes EFW flow reaches the SGs at the beginning of the transient. This assumption is conservative since early feedwater flow increases the cooldown capability of the secondary system and thus the primary system. This assumption is used because it leads to a higher reactivity insertion via the feedback from the negative Moderator Temperature Coefficient (MTC), and thus a higher final power level. Therefore, the effect of the delay is conservatively bounded by the assumed more rapid delivery of EFW and thus an additional twenty second delay has no effect on the analysis.

IV. Corrective Action

North Atlantic completed an Operability Determination upon the discovery of this condition. The Operability Determination concluded that the EFW system is OPERABLE in accordance with the definition of operability contained in the Seabrook Station Technical Specifications.

North Atlantic has also revised the accident analyses for the FWLB and SLR accidents to reflect the twenty second time delay associated with the EFW FCV closure. These revised analyses support the conclusion that this condition did not adversely affect the ability of the EFW system to perform its intended safety function.

Subsequent to the identification of this condition, North Atlantic completed a review of all of the UFSAR Chapter 15 accident analyses assumptions to support our response to the 10 CFR 50.54(f) letter on information pursuant to the adequacy and availability of design bases information. A vertical slice review of the EFW system was completed as part of this effort. The results of the entire 50.54(f) review were submitted to the NRC on February 7, 1997, via NYN-97012. The UFSAR Chapter 15 summary of accident analyses will be updated to reflect the additional twenty second time delay in establishing EFW flow.

V. Additional Information

None

Similar Events

This is the first LER at Seabrook Station associated with errors in UFSAR Chapter 15 accident analyses. However, as a result of a discrepancy identified during the EFW system 50.54(f) vertical slice, North Atlantic reported a similar EFW system design issue on December 11, 1996. LER 96-08 was submitted on January 10, 1997, detailing the circumstances of that event.

Manufacturer Data

Not Applicable