North Atlantic

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

The Northeast Utilities System

July 18, 1997

Docket No. 50-443
NYN-97046

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

Seabrook Station
Licensee Event Report (LER) 96-008-01
Potential Loss of Automatic
Actuation of Emergency Feedwater System

Enclosed, please find Supplemental Licensee Event Report (LER) No. 96-008-01 for Seabrook Station. This submittal documents an event which occurred on December 12, 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

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

INPO
Records Center
700 Galleria Parkway
Atlanta, GA 30339

IE22

NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98

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.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Seabrook Station	05000443	1 of 6

TITLE (4)

POTENTIAL LOSS OF AUTOMATIC ACTUATION OF EMERGENCY FEEDWATER SYSTEM

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	12	96	96	008	01	07	18	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	100	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)	[X] 50.73(a)(2)(ii)	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	TELEPHONE NUMBER (Include Area Code)
James M. Peschel, Regulatory Compliance Manager	(603) 773-7194

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)		EXPECTED SUBMISSION	MONTH	DAY	YEAR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE).	[X] NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On December 12, 1996, North Atlantic Energy Service Corporation (North Atlantic) initiated a one hour non-emergency report, pursuant to 10CFR 50.72 (b)(1)(iii)(B), for a condition outside the design basis of the plant. This condition was discovered during a 10 CFR 50.54(f) review. North Atlantic reported that manual initiation of some portions of the Emergency Feedwater System [BA] (EFW) was necessary during certain low probability accident scenarios to ensure that the EFW system is capable of performing its intended safety function. The accident scenarios involve a Steam Line Rupture (SLR) or a Feedwater Line Break (FWLB) on the "A" Steam Generator (SG) in conjunction with a single failure of the "B" Train Solid State Protection System [JE] (SSPS). In this postulated scenario automatic EFW actuation will not fully occur. The faulted "A" SG will provide limited steam flow to the turbine driven EFW pump. However, steam flow to the EFW pump turbine will eventually cease, and the pump will stop. The motor-driven "B" EFW pump will not automatically start and the steam supply valve from the "B" SG, MS-V-394 to the turbine driven "A" EFW pump will not open during this postulated event due to the failure of the "B" Train SSPS.

North Atlantic performed sensitivity case analyses to determine the effect the above scenario would have on the Updated Final Safety Analysis Accident Report (UFSAR) Chapter 15 FWLB and SLR accidents. The analyses concluded that if EFW flow is established to the intact SGs within ten minutes, then the acceptance criteria established for the two accidents will be satisfied. An Operability Determination (OD) concluded that control room operators will diagnose the event and then take the actions necessary to manually initiate EFW flow. The EFW system was modified during the recent refueling outage to provide automatic EFW actuation in the event of a faulted "A" steam generator coincident with a "B" Train SSPS failure.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)					PAGE (3)
		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	
Seabrook Station	05000443	96	--	008	--	01	2 of 6

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

I. Description of Event

On December 12, 1996, with the unit at 100% power, during a 10 CFR 50.54(f) review, it was determined that manual initiation of some portions of the Emergency Feedwater System [BA] (EFW) was necessary during certain low probability accident scenarios to ensure that the EFW system was capable of performing its intended safety function. The accident scenarios involve a Steam Line Rupture (SLR) or a Feedwater Line Break (FWLB) on the "A" Steam Generator (SG) in conjunction with a single failure of the "B" Train Solid State Protection System [JE] (SSPS). This condition was reported pursuant to 10CFR 50.72 (b)(1)(iii)(B), as a condition outside the design basis of the plant.

Seabrook Station's EFW system is comprised of two 100% capacity pumps (one motor driven and one steam turbine driven) and a safety related water source (the Condensate Storage Tank). The steam driven "A" EFW pump can be supplied with steam from both the "A" SG and the "B" SG. Both EFW pumps feed a common discharge header which supplies the four SG EFW lines. Each emergency feed line has two normally open motor operated Flow Control Valves (FCV) in series. Attachments A and B on pages five and six of this LER contain simplified drawings of EFW system components.

In the event that the "A" SG is faulted during an SLR or FWLB and the "B" Train SSPS fails to actuate due to an assumed single failure, only the "A" SG steam supply valve to the "A" EFW Pump will open. Under these conditions the failure of the "B" Train SSPS will prevent the motor driven EFW pump from starting and prevent the opening of steam supply valve MS-V394 from the "B" SG to the "A" EFW Pump.

In this postulated scenario, when the "A" SG depressurizes due to the SLR or FWLB, steam flow from the "A" SG through steam supply valve MS-V-393 to the steam driven EFW pump will stop. The steam driven "A" EFW pump will no longer be able to supply EFW flow to the intact SGs and hence the EFW system will be incapable of maintaining flow to the intact SGs. Manual action to supply EFW will be necessary.

The Seabrook Station design basis for EFW is described in UFSAR Section 6.8.1.h. The UFSAR states that "The EFW system is capable of automatically initiating flow upon receipt of a system actuation signal." The UFSAR Chapter 15 analysis assumes that an EFW automatic actuation signal starts one or both of the EFW pumps and EFW flows to at least two SGs for the duration of the accidents. Also, the description of the FWLB event in UFSAR Section 15.2.8.2 credits EFW actuation on SG low-low level and development of EFW flow 96 seconds after the break. No credit is taken for operator actions to establish EFW flow.

An Operability Determination (OD) concluded that the EFW system remained OPERABLE in accordance with the definition of operability in the Seabrook Station Technical Specifications. The OD was supported by evaluations and supporting analyses which illustrate the sensitivity of the original UFSAR Chapter 15 analyses for the SLR and FWLB. These sensitivity case analyses concluded that in order to remain within the design basis, EFW flow must be established to the intact SGs in the two accident scenarios prior to the time SG level drops below that necessary for effective heat transfer. The evaluations concluded that a minimum of ten minutes was available prior to the loss of effective heat transfer capabilities in the SGs. The OD documents that operators will manually initiate EFW flow in less than four minutes utilizing Emergency Operating Procedure (EOP) E-0, "Reactor Trip Or Safety Injection" step 7, Response Not Obtained. The OD remained in effect until the Station was shutdown for the fifth refueling outage on May 10, 1997.

II. Cause of Event

The original Seabrook Station EFW design introduced a more limiting failure than that assumed by the Nuclear Steam Supply System (NSSS) vendor who completed the FWLB and SLR accident analysis. Thus, the system design was not consistent with the requirements of the Westinghouse accident analyses calculations. The limiting single failure of the "B" Train SSPS was not considered in the design of the EFW system. The original analyses assumed that the failure of one EFW pump was the limiting single failure. The original accident analyses were completed by the NSSS vendor and documented in Seabrook Station's Final Safety Analyses Report in 1981. North Atlantic has been unable to determine why the architect engineer and utility design personnel failed to recognize the "B" Train SSPS limiting single failure during the design of the EFW system.

III. Analysis of Event

This event is significant in that the original plant design for the EFW system did not match the assumptions used in the accident analysis regarding the most limiting single failure. The Operability Determination, performed subsequent to the identification of the condition, verified that the plant operators would establish EFW flow using the Emergency Operating Procedures in the event of a faulted "A" Steam generator occurring coincident with a failure of the "B" Train SSPS prior to the steam generator level falling below the level required for effective heat transfer.

As part of the normal EFW system design, additional feedwater pumping capability is available by use of the Start-Up Feedwater Pump (SUFP) in the feedwater system. The SUFP is connected to the EFW system through two normally closed motor operated valves in series. Since the SUFP is not normally aligned to the EFW header, manual actions are necessary to provide EFW flow via the SUFP. The process for providing this backup flow is contained in the Emergency Operating Procedures.

There were no safety consequences from this event in that the plant has not experienced an accident involving a faulted steam generator.

IV. Corrective Action

An Operability Determination was performed to verify that the EFW system was operable and that operators would start EFW flow utilizing Emergency Operating Procedure E-0, Reactor Trip or Safety Injection, in the event of a faulted "A" steam generator coincident with a "B" Train SSPS failure. The EFW system was modified during the recent refueling outage to provide automatic EFW actuation in the event of a faulted "A" steam generator coincident with a "B" Train SSPS failure.

V. Additional Information

Similar Events

This is the second event at Seabrook Station pertaining to errors in UFSAR Chapter 15 accident analyses. LER 96-007-00 submitted on January 6, 1997 and supplemented on April 9, 1997 described a similar event

involving the failure of accident analyses to account for the closure time of the EFW flow control valves in certain accident scenarios.

A 10 CFR 50.54(f) design basis review completed in February of 1997 included a vertical slice review of the EFW system. This review determined that the UFSAR Chapter 15 accident analyses assumptions were valid and accurate.

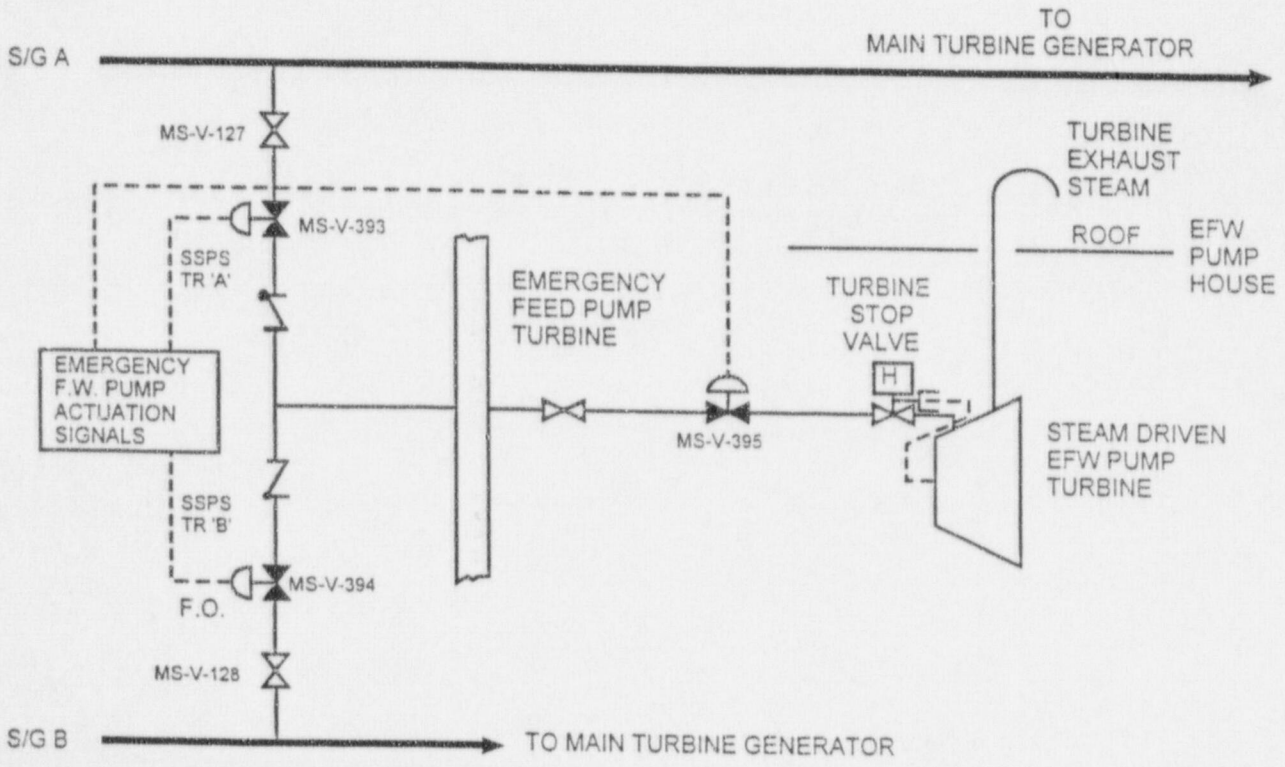
Manufacturer Data

Not Applicable

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Seabrook Station	05000443	96	--	008	--	01	5 of 6

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

ATTACHMENT A
STEAM SUPPLY TO TURBINE DRIVEN EFW PUMP



ATTACHMENT B
BASIC EFW SYSTEM