

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

The Northeast Utilities System

December 7, 2001

Docket No. 50-443 <u>NYN-01097</u> CR# 01-11121

United States Nuclear Regulatory Commission Attention: Document Control Desk Washington, DC 20555-0001

> Seabrook Station Licensee Event Report (LER) 01-004-00 for Non-Compliance With The Technical Specifications Due To MSIV Stroke Time Calculation Human Error

Licensee Event Report (LER) 01-004-00 is provided in Enclosure 1. This LER reports an event that occurred at Seabrook Station on October 16, 2001. This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B). North Atlantic Energy Service Corporation commitments associated with this LER are contained in Enclosure 2.

Should you require further information regarding this matter, please contact Mr. James M. Peschel, Manager-Regulatory Programs at (603) 773-7194.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.

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Ted C. Feigenbaum Executive Vice President and Chief Nuclear Officer

cc: H. J. Miller, NRC Region I Administrator
G. Wunder, NRC Project Manager, Project Directorate I-2
NRC Senior Resident Inspector

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## ENCLOSURE 1 TO NYN-01097

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NRC FORM 366 (1-2001)

# **U.S. NUCLEAR REGULATORY**

LICENSEE EVENT REPORT (LER) (See reverse for required number of

#### APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001

COMMISSION

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the

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FACILITY NAM	E (1)						DOCK	ET NUMBE	R (2)	)		PAGE	(3)			
	S	eabroo	k Statio	on			05000443						1	of 4		
TITLE (4)																
Non-Compl	iance Wit	h The <sup>-</sup>	Technie	cal Specific	ation	ns Due	To M	SIV Stro	ke	Time Calcu	lation H	uma	n Err	or		
EVENT DATE (5) LER NUMBER (6) REF				PORT DA	OTHER FACILITIES INVOLVED (8)											
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10	16	01	01	- 004 -	00	12	07	01	FA	CILITY NAME		DOCKET NUMBER				
OPERA	mpliance With The Technical Specifications Due To MSIV Stroke Time Calculation Human Error       VENT DATE (5)     LER NUMBER (6)     REPORT DATE (7)     OTHER FACILITIES INVOLVED (6)       DAY     YEAR     YEAR     SEQUENTIAL NUMBER     REV NO     DAY     YEAR     FACILITY NAME N/A     DOCKET NUMBER       16     01     01     -004     -00     12     07     01     FACILITY NAME N/A     DOCKET NUMBER       ERATING ODE (9)     3     THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)     20.2201(a)     20.2203(a)(3)(ii)     50.73(a)(2)(ii)(B)     50.73(a)(2)(ix)(A)       OWER P(EL (10)     0     20.2203(a)(1)     50.36(c)(1)(i)(A)     50.73(a)(2)(iv)(A)     73.71(a)(4)       20.2203(a)(2)(i)     50.36(c)(1)(i)(A)     50.73(a)(2)(v)(A)     73.71(a)(A)     Specify in Abstract below or in NRC Form 366A       20.2203(a)(2)(iv)     50.73(a)(2)(i)(A)     50.73(a)(2)(v)(C)     Sn73(a)(2)(v)(C)     Sn73(a)(2)(v)(C)     Sn73(a)(2)(v)(D)     Specify in Abstract below or in NRC Form 366A       20.2203(a)(2)(v)     50.73(a)(2)(i)(A)     50.73(a)(2)(v)(D)     Sn73(a)(2)(v)(D)     Sn73(a)(2)(v)															
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POWER LEVEL (10)				2201(d)		20.220	)3(a)(4)		50.73(a)(2)(iii) 50.73(a)(2)			)(2)(x)	)(x)			
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			20.	2203(a)(2)(iii)						50.73(a)(2)(v						
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NAME									TE	LEPHONE NUM	IBER (Inclu	de Are	a Code	e)		
James M. Peschel										(603	3) 773	3-719	94			
		COMPL	ETE ON	E LINE FOR I	EACH	COMPO	ONENT	FAILURE	DE	SCRIBED IN T	HIS REP	ORT (	13)			
CAUSE	CAUSE SYSTEM COM		PONENT	MANU- FACTURER	REI	Portabli Fo Epix	TABLE CAUSE			SYSTEM	COMPONENT		MANU- FA CTURER		REPORTABLE TO EPIX	
А	SB	1	sv	E095		Y		N/A								
	SU	PPLEME	NTAL R	EPORT EXPE	CTEL	D (14)				EXPECT	ED	MO	ΝТΗ	DAY	YEAR	
YES (If	yes, compl	ete EXP	ECTED \$	SUBMISSION	DATE	Ξ).	XN	10		DATE (	15)					
ABSTRACT (	Limit to 140	0 spaces	s, i.e., ap	proximately 15	5 singl	le-space	d typew	ritten line:	s) ('	16)						
On October	19, 2001	at 110	0. with	the plant o	oerat	ina in l	Mode	3 (Hot S	tan	dby) at 0 pe	rcent po	wer.	Ope	rations	Department	
personnel v	vere notifi	ed that	an erro	r was disco	vere	dina	calcula	ation use	d to	o determine	the full-	strok	e clo	sure tin	ne of the "C"	
Main Stean	n [SB] Iso	lation V	alve (N	1SIV) (1-MS	S-V9	0). At	1226 d	on Octob	ber	16, 2001, 1	-MS-V9	0 wa	s full-	stroke	exercised to	
the closed	position a	s part o	of a sur	veillance te	est of	f the M	ISIVs t	to satisfy	/ th	e requireme	ents of T	Techi	nical	Specific	cations (TS)	

4.0.5 (Inservice Test Program), 4.6.3.3 (Containment Isolation Valves), and 4.7.1.5 (Main Steam Isolation Valves). The closure time for 1-MS-V90 was calculated and recorded as 4.09 seconds when closed utilizing a Train "A" Main Steam Isolation signal. The Repetitive Task Sheet (RTS) used to record the test data was completed by the Control Room Operator (CRO) and subsequently forwarded to the Unit Supervisor (US) for review and approval. The US reviewed the test data to ensure that the surveillance procedure acceptance criteria was met and approved the RTS at 1559 on October 16, 2001. However, there was no independent review of the calculations performed by the CRO.

A subsequent review by an Inservice Test (IST) program engineer on October 19, 2001 determined that "A" train stroke time of 1-MS-V90 had been erroneously calculated. The stroke closure time for 1-MS-V90 was determined to be 5.09 seconds instead of 4.09 seconds, which exceeded the Technical Specification limit of 5.0 seconds. Since this condition existed for a period longer than permitted by the TS action statements, this condition is reportable pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the Technical Specifications.

The cause of this event is human error. Immediate corrective actions were implemented and other corrective actions to prevent recurrence have been identified.

NRC FORM 366AU.S. NUCLEAR REGULATORY COMMI (1-2001) LICENSEE EVENT REPORT (LER)	SSION						
FACILITY NAME (1)	DOCKET (2)		LER NUMBER (6)			PAGE (3	3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Seabrook Station	05000443	01 -	_ 004	- 00	2	OF	4

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

#### I. Description of Event

On October 19, 2001 at 1100, with the plant operating in Mode 3 (Hot Standby) at 0 percent power, Operations Department personnel were notified that an error was discovered in a calculation used to determine the full-stroke closure time of the "C" Main Steam [SB] Isolation Valve (MSIV) (1-MS-V90). At 1226 on October 16, 2001, 1-MS-V90 was full-stroke exercised to the closed position as part of a surveillance test of the MSIVs to satisfy the requirements of Technical Specifications (TS) 4.0.5 (Inservice Test Program), 4.6.3.3 (Containment Isolation Valves), and 4.7.1.5 (Main Steam Isolation Valves). The closure time for 1-MS-V90 was calculated and recorded as 4.09 seconds when closed utilizing a Train "A" Main Steam Isolation signal. At 1328 on October 16, 2001, the closure time for 1-MS-V90 was calculated and recorded as 4.08 seconds, when initiated from a Train "B" Main Steam Isolation signal. The stroke time for each of the MSIVs was calculated by subtracting the Main Steam Isolation Alarm Time from the MSIV Full Closed time generated individually from digital computer points.

The Repetitive Task Sheet (RTS) used to record the test data was completed by the Control Room Operator (CRO) and subsequently forwarded to the Unit Supervisor (US) for review and approval. The US reviewed the test data to ensure that the surveillance procedure acceptance criteria was met and approved the RTS at 1559 on October 16, 2001. However, there was no independent review of the calculations performed by the CRO. A subsequent review by an Inservice Test (IST) program engineer on October 19, 2001 determined that "A" train stroke time of 1-MS-V90 had been erroneously calculated. The stroke closure time for 1-MS-V90 was determined to be 5.09 seconds. Upon discovery of this error, the IST program engineer promptly took the RTS to the control room. Control Room personnel verified the calculation and 1-MS-V90 was declared inoperable at 1100 on October 19, 2001. The appropriate action statements for Technical Specification sections 3.7.1.5 and 3.6.3 were entered. The valve timing setscrew was adjusted and 1-MS-V90 was declared operable at 1525 on October 19, 2001 after the completion of post-maintenance testing.

Since the MSIVs are containment isolation valves, they are stroke time tested pursuant to the requirements of TS Surveillance Requirement (SR) 4.0.5, TS 3.6.3 and TS 3.7.1.5. SR 4.0.5 requires that the valves be tested in accordance with the 1995 Edition (including 1996 Addenda) of the ASME OM Code. Section ISTC 4.2.9 of the OM Code requires that the tested valve to be immediately declared inoperable when its limiting value of full stroke time is exceeded. TS 3.6.3 requires that each containment isolation valve be operable during Modes 1, 2, 3, and 4. TS 3.7.1.5 requires that each MSIV shall be operable during Modes 1, 2 and 3. Contrary to these requirements, 1-MS-V90 should have been declared inoperable on October 16, 2001, when its closure time exceeded the 5.0-second limit identified in SR 4.0.5 and 4.7.1.5. Since this condition existed for a period longer than permitted by the Mode 2 and 3 action statement for TS 3.7.1.5 (6 hours), this condition is reportable pursuant to the requirements of 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by the Technical Specifications. The failure of the subject valve to stroke within its required time was evaluated as a Maintenance Rule Functional Failure.

#### II. Cause of Event

The cause of this event is human error. The CRO performing this surveillance made a mathematical calculation error, which he did not recognize due to inadequate self-checking practices. Additionally, there was a lack of a second person review of the mathematical calculations performed in the subject procedure and the lack of expectations to verify such calculations.

The failure of 1-MS-V90 to close within its required time when actuated from a Train "A" Main Steam Isolation signal was because the "A" Train coarse timing set-screw moved due to vibration resulting in an increased stroke time. This is considered a contributing cause that led to the non-compliance with the Technical Specifications. The valve vendor has recently enhanced the design of the subject setscrew locking mechanism to provide more positive locking of the adjusting setscrew. The modification provides a second setscrew that is applied onto the adjusting setscrew to prevent movement. This modification was implemented on two of the four MSIVs (1-MS-V86 and 1-MS-V92) during Refueling Outage 7(OR07). The subject valve (1-MS-V90) and 1-MS-V88 were scheduled to be upgraded to the new

NRC FORM 366AU.S. NUCLEAR REGULATORY CON (1-2001) LICENSEE EVENT REPORT (LEF	nmission R)						
FACILITY NAME (1)	DOCKET (2)		LER NUMBER (6)	PAGE (3)			
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Seabrook Station	05000443	01	_ 004	- 00	3	OF	4
design during OR09 In addition the Test	Data Sheet upon w	hich the da	ta was recorded	lacked adeo	uate	humar	า

design during OR09. In addition, the Test Data Sheet, upon which the data was recorded, lacked adequate human factors to minimize the potential for the calculation error. This condition was also considered a contributing cause.

#### III. Analysis of Event

The consequences of this event were minimal. The main steam system contains four identical MSIVs at the outlet of each steam generator outside containment. Each MSIV is a gate valve actuated by a single hydraulic/pneumatic actuator. These valves provide automatic isolation in the event of a main steam line break. The valves are designed to close within 5 seconds of receipt of a Main Steam Isolation Signal. Hydraulic fluid is pumped into the valve actuator to open the valve against a pressurized pneumatic system. The valve is closed by pneumatic pressure when the hydraulic fluid pressure is relieved. The pneumatic/hydraulic and control systems for each actuator are split into two trains for reliability and are powered from separate vital power supplies. The time required to close each MSIV depends upon the rate at which the hydraulic fluid is vented back to its hydraulic reservoir. The fast closure timing of the MSIVs may be adjusted by manipulating the coarse timing setscrew for each train.

The failure to detect that the subject MSIV exceeded the Technical Specification closure time by 0.09 seconds, when actuated from a Train "A" Main Steam Isolation Signal, was inconsequential. As stated above, the subject valve remained capable of closing within 4.08 seconds when actuated from a Train B signal and would have performed its intended safety functions, if required. The MSIVs are also containment isolation valves; however, the valve closure time is non-essential for their containment isolation function.

#### IV. Corrective Action

- 1. 1-MS-V90 was closed, declared inoperable and the appropriate action statements were entered.
- 2. The valve timing set screw was adjusted and 1-MS-V90 was declared operable after post-maintenance testing.
- 3. The CRO who made the calculation error was coached and counseled.
- 4. An Operations Department standing order was established to require that Technical Specification surveillance calculations be independently verified.
- 5. The Main Steam Isolation Valve Stroke Surveillance Test will be revised to improve human factor issues associated with data entry and calculation performance and to put a programmatic barrier in place to verify the calculations.
- 6. An evaluation of Operations Department surveillance procedures that contain calculations will be performed to assess issues associated with data entry and calculation performance.
- 7. The modification to install the vendor recommended setscrew locking mechanism to provide more positive locking of the adjusting setscrew for valves 1-MS-V88 and 1-MS-V90 will be implemented during OR08 in lieu of OR09.

NRC FORM 366A (1-2001)

	DOCKET (2)		LER NUMBER (6)		)		
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Seabrook Station	05000443	01 -	_ 004	- 00	4	OF	4
ARRATIVE (If more space is required, use addition	al copies of NRC Form 366A	) (17)					
V. Additional Information							
None							
None.							
<u>Similar Events</u>							
There have been no similar events prev	iously reported by Seat	orook Statio	on.				
Manufacturer Data							

### ENCLOSURE 2 TO NYN-01097

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#### NRC COMMITMENTS CONTAINED IN NYN-01097

#### **Description of Commitment**

- CR 01-12967 The Main Steam Isolation Valve Stroke Surveillance Test will be revised to improve human factor issues associated with data entry and calculation performance and to put a programmatic barrier in place to verify the calculations.
- CR 01-12967 An evaluation of Operations Department surveillance procedures that contain calculations will be performed to assess issues associated with data entry and calculation performance.
- CR 01-12967 The modification to install the vendor recommended setscrew locking mechanism to provide more positive locking of the adjusting setscrew for valves 1-MS-V88 and 1-MS-V90 will be implemented during OR08 in lieu of OR09.