



**North  
Atlantic**

North Atlantic Energy Service Corporation  
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The Northeast Utilities System

December 7, 2001

Docket No. 50-443

NYN-01097

CR# 01-11121

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

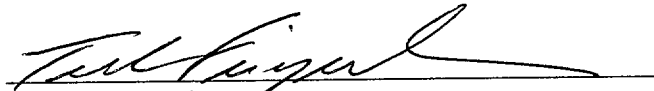
Seabrook Station  
Licensee Event Report (LER) 01-004-00 for  
Non-Compliance With The Technical Specifications  
Due To MSIV Stroke Time Calculation Human Error

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.

  
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

IE22

**ENCLOSURE 1 TO NYN-01097**

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 information collection.

**LICENSEE EVENT REPORT (LER)**

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

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**TITLE (4)**

Non-Compliance With The Technical Specifications Due To MSIV Stroke Time Calculation Human Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	16	01	01	- 004 - 00		12	07	01	N/A	
<b>OPERATING MODE (9)</b>			<b>THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)</b>							
3			20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
<b>POWER LEVEL (10)</b>			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
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)(ii)(A)			50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)	
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)		X	50.73(a)(2)(i)(B)			50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)	

**LICENSEE CONTACT FOR THIS LER (12)**

<b>NAME</b> James M. Peschel	<b>TELEPHONE NUMBER (Include Area Code)</b> (603) 773-7194
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**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANU-FACTORER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTORER	REPORTABLE TO EPIX
A	SB	ISV	E095	Y	N/A				

**SUPPLEMENTAL REPORT EXPECTED (14)**

<b>YES</b> (If yes, complete EXPECTED SUBMISSION DATE).	<b>X</b>	<b>NO</b>	<b>EXPECTED SUBMISSION DATE (15)</b>	<b>MONTH</b>	<b>DAY</b>	<b>YEAR</b>
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**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)**

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. 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.

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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

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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-MS-V90 was closed, declared inoperable and the appropriate action statements were entered.
- The valve timing set screw was adjusted and 1-MS-V90 was declared operable after post-maintenance testing.
- The CRO who made the calculation error was coached and counseled.
- An Operations Department standing order was established to require that Technical Specification surveillance calculations be independently verified.
- 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.
- An evaluation of Operations Department surveillance procedures that contain calculations will be performed to assess issues associated with data entry and calculation performance.
- 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.

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

V. Additional Information

None.

Similar Events

There have been no similar events previously reported by Seabrook Station.

Manufacturer Data

Edward Valves Inc., Size 30 X 24 X 30 Equiwedge Gate Valve, A-260 Actuator

**ENCLOSURE 2 TO NYN-01097**

## **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.           |