

**North  
Atlantic**

North Atlantic Energy Service Corporation  
P.O. Box 300  
Seabrook, NH 03874  
(603) 474-9521, Fax (603) 474-2987

The Northeast Utilities System

Ted C. Feigenbaum  
Senior Vice President &  
Chief Nuclear Officer

NYN- 94102

September 12, 1994

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

Attention: Document Control Desk

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

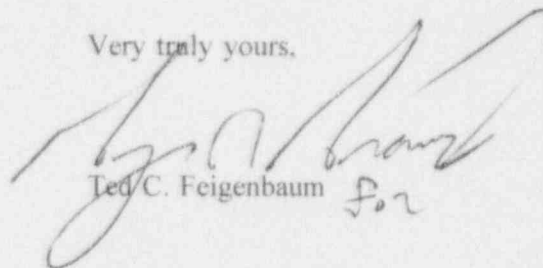
Subject: Licensee Event Report (LER) 94-008-01, "Non Compliance with Technical Specification 3.8.4.2 Action Requirements"

Gentlemen:

Enclosed is supplemental Licensee Event Report (LER) 94-008-01 for Seabrook Station. This submittal discusses additional circuit interactions and documents the root cause of the event and previous event occurrences.

Should you require further information regarding this matter, please contact Mr. James M. Peschel, Regulatory Compliance Manager at (603)474-9521 extension 3772.

Very truly yours,



Ted C. Feigenbaum *for*

TCF:MDO/act

Enclosures: NRC Forms 366/366A

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United States Nuclear Regulatory Commission  
Attention: Document Control Desk

September 12, 1994  
Page two

cc: Mr. Thomas T. Martin  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406

Mr. Albert W. De Agazio, Sr. Project Manager  
Project Directorate I-4  
Division of Reactor Projects  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Mr. Antone C. Cerne  
NRC Senior Resident Inspector  
P.O. Box 1149  
Seabrook, NH 03874

INPO  
Records Center  
700 Galleria Parkway  
Atlanta, GA 30339-5957

## LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH  
THIS INFORMATION COLLECTION REQUEST: 50.0 HRS.  
FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO  
THE INFORMATION AND RECORDS MANAGEMENT BRANCH  
(MNNB 7714), 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)<br>Seabrook Station  |        |           |   |                        |                    | DOCKET NUMBER (2)<br>05000443 |        |   | PAGE (3)<br>1 OF 4                            |                        |     |
| TITLE (4)<br>Non-compliance with Technical Specification 3.8.4.2 Action Requirements   |        |           |   |                        |                    |                               |        |   |   |                        |     |
| EVENT DATE (5)   |        |           | LER NUMBER (6)  |                        |                    | REPORT DATE (7)               |        |   | OTHER FACILITIES INVOLVED (8)                 |                        |     |
| MONTH  | DAY    | YEAR      | YEAR  | SEQUENTIAL<br>NUMBER   | REVISION<br>NUMBER | MONTH                         | DAY    | YEAR  | FACILITY NAME                                 | DOCKET NUMBER          |     |
| 04   | 25     | 94        | 94  | -- 08 --               | 01                 | 09                            | 12     | 94  | FACILITY NAME                                 | DOCKET NUMBER          |     |
|  |        |           |   |                        |                    |                               |        |   |   |                        |     |
| OPERATING<br>MODE (9)  |        |           | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) |                        |                    |                               |        |   |   |                        |     |
| 6  |        |           | 20.402(b)   |                        |                    | 20.405(c)                     |        |   | 50.73(a)(2)(iv) 73.71(b)                      |                        |     |
| POWER<br>LEVEL (10)  |        |           | 20.405(a)(1)(i)   |                        |                    | 50.36(c)(1)                   |        |   | X 50.73(a)(2)(v) 73.71(c)                     |                        |     |
| 0  |        |           | 20.405(a)(1)(ii)  |                        |                    | 50.36(c)(2)                   |        |   | 50.73(a)(2)(vii) OTHER                        |                        |     |
|  |        |           | 20.405(a)(1)(iii)   |                        |                    | X 50.73(a)(2)(i)              |        |   | 50.73(a)(2)(viii)(A) (Specify in              |                        |     |
|  |        |           | 20.405(a)(1)(iv)  |                        |                    | X 50.73(a)(2)(ii)             |        |   | 50.73(a)(2)(viii)(B) Abstract below           |                        |     |
|  |        |           | 20.405(a)(1)(v)   |                        |                    | 50.73(a)(2)(iii)              |        |   | 50.73(a)(2)(x) and in Text,<br>NRC Form 366A) |                        |     |
| LICENSEE CONTACT FOR THIS LER (12)   |        |           |   |                        |                    |                               |        |   |   |                        |     |
| NAME<br>Mr. James M. Peschel, Regulatory Compliance Mngr.  |        |           |   |                        |                    |                               |        | TELEPHONE NUMBER (Include Area Code)<br>(603)474-9521 ext. 3772 |   |                        |     |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)   |        |           |   |                        |                    |                               |        |   |   |                        |     |
| CAUSE  | SYSTEM | COMPONENT | MANUFACTURER  | REPORTABLE<br>TO NPRDS |                    | CAUSE                         | SYSTEM | COMPONENT   | MANUFACTURER                                  | REPORTABLE<br>TO NPRDS |     |
|  |        |           |   |                        |                    |                               |        |   |   |                        |     |
|  |        |           |   |                        |                    |                               |        |   |   |                        |     |
| SUPPLEMENTAL REPORT EXPECTED (14)  |        |           |   |                        |                    |                               |        |   |   |                        |     |
| YES<br>(If yes, complete EXPECTED SUBMISSION DATE).  |        |           |   |                        |                    | NO                            |        | EXPECTED<br>SUBMISSION<br>DATE (15)                             |   | MONTH                  | DAY |
|  |        |           |   |                        |                    |                               |        |   |   | YEAR                   |     |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)   |        |           |   |                        |                    |                               |        |   |   |                        |     |
| <p>During replacement of the Nuclear Instrumentation Audio Count Rate/Timer-Scaler, North Atlantic Energy Service Corporation (North Atlantic) discovered that non-safety related Nuclear Instrumentation (NI) drawers were connected to a safety related Class 1E power panel without a Class 1E protective device. In addition, the drawers did not have the required seismic and associated circuit interaction analysis. On May 18, 1994, North Atlantic determined that this was a condition prohibited by Technical Specification 3.8.4.2, Containment Penetration Conductor Overcurrent Protective Devices and Protective Devices for Class 1E Power Sources Connected to Non-Class 1E Circuits.</p> <p>After reviewing similar circuit interactions during refueling outage 3, North Atlantic determined that during a design basis seismic event with the postulated simultaneous failure of all non-qualified non-Class 1E loads, the resultant interaction would cause a loss of power to safety related power panels. Because of the potential loss of safety related equipment, on August 25, 1994, North Atlantic reported this event pursuant to 10CFR50.72(b)(2)(i).</p> <p>The non-conforming conditions were corrected prior to plant startup from refueling outage 3. There were no actual adverse safety consequences as a result of this event.</p> |        |           |   |                        |                    |                               |        |   |   |                        |     |

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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) | DOCKET NUMBER (2) | LER NUMBER (6) |                   |                 | PAGE (3) |
|-------------------|-------------------|----------------|-------------------|-----------------|----------|
| Seabrook Station  | C5000443          | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER | 2 OF 4   |
|                   |                   | 94             | -- 08 --          | 01              |          |

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

Background

Technical Specification 3.8.4.2, "Containment Penetration Conductor Overcurrent Protective Devices and Overcurrent Protective Devices for Class 1E Power Sources Connected to Non-Class 1E Circuits requires in part that each protective device for Class 1E power sources connected to non-Class 1E circuits shall be operable.

During plant modification preparations North Atlantic Energy Service Corporation (North Atlantic) discovered that 3 non-safety related and non-qualified Nuclear Instrumentation (NI) drawers were connected to a safety related Class 1E power panel without a Class 1E protective device (i.e. fuse), to separate the non-safety and non-qualified components from the safety related power supply. Within the non-safety related drawers, Separation Group D power was supplied to an instrument whose output signal is a Separation Group A associated circuit. In addition, the existing design mounted the non-safety related drawers above safety related equipment without a seismic evaluation.

The subject NI drawers are the comparator and rate drawer, the flux deviation drawer, and the miscellaneous control and indication drawer. These nonqualified NI drawers are located in the same control panel (NI-CP-16) as Power Range NI Channel IV. The power supply to NI-CP-16 is from safety related power panel EDE-PP-1D because the power range drawers are safety related. EDE-PP-1D was evaluated to include the effects of failure of the non-safety NI drawers. The evaluation showed a coordination curve overlap which could have resulted in the loss of the power panel.

Since there were no Class 1E protective devices for the non-class 1E loads connected to the Class 1E power source, the requirement for Technical Specification 3.8.4.2 could not be met. Technical Specification 3.8.4.2, Action a.1). requires inoperable circuit protective devices to be restored to operable status within 72 hours or to deenergize the affected circuit. These requirements were not met for: the audio count rate and scaler timer drawer, the flux deviation drawer, and the comparator and rate drawer.

On May 18, 1994, during evaluation of this event, North Atlantic determined that this was a condition prohibited by Technical Specification 3.8.4.2, Containment Penetration Conductor Overcurrent Protective Devices and Protective Devices for Class 1E Power Sources Connected to Non-Class 1E Circuits.

During refueling outage 3, North Atlantic reviewed similar circuits and evaluated the potential results of circuit interactions that had not been previously analyzed. On August 25, 1994 North Atlantic determined that during a design basis seismic event with the postulated simultaneous failure of all non-qualified non-Class 1E loads, the resultant interaction would cause a loss of power to power panels [EF] supplying Centrifugal Charging Pump [BQ] minimum flow valve instrumentation. This could result in the valves not closing during a safety injection. The Seabrook Station Updated Final Safety Analysis Report (UFSAR) states that these valves will close during a safety injection. Therefore, this event was reported to the NRC on August 25, 1994 pursuant to 10CFR50.72 (b)(2)(i) as an event found while the reactor was shutdown that had it been found while the reactor was in operation would have resulted in the nuclear power plant being in an unanalyzed condition which significantly compromised plant safety.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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|                   |                   |                |                   |                 |          |
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| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) |                   |                 | PAGE (3) |
| Seabrook Station  | 05000443          | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER | 3 OF 4   |
|                   |                   | 94             | -- 08 --          | 01              |          |

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

At Seabrook Station, the simultaneous failure of all non-qualified non-class 1E electrical loads is assumed to occur during an initiating event. Analysis was performed to determine the affects of the previously unidentified electrical circuit interaction on the ability of the Class 1E power supplies to supply power. The analysis showed that assuming the simultaneous failure of the non-qualified non-Class 1E loads, that electrical power would be lost to power panels EDE-PP-1D, 1E, 1F, 11E, and 11F.

The loss of the power panels would cause the following equipment deficiencies: the capability for the Emergency Feedwater [BA] flow control valves to automatically close on high flow would be lost as a result of the loss of power to EDE-PP-1E and 1F; Train A and B High Energy Line Break isolation capability would be lost as a result of the loss of EDE-PP-11E and 11F; Train A and B Containment Post Accident [IP] radiation monitors would be lost as a result of the loss of EDE-PP-11E and 11F; Train A and B Hydrogen Analyzers [IK] would be lost as a result of the loss of EDE-PP-11E and 11F.

The unanalyzed circuit interactions were inadequate separation distance between Associated Circuits, non-Class 1E/Class 1E interactions which were not analyzed, and non-Class 1E loads connected to Class 1E power supplies without a Class 1E protective device installed between the circuits. These interactions were internal to components and were not identified by the methodologies used during the original plant design to evaluate the interaction between separation groups within equipment and to evaluate the failure of non-Class 1E loads connected to Class 1E power supplies.

#### Safety Consequences

There were no actual adverse safety consequences as a result of this event. The non-conforming conditions were corrected prior to the plant starting up from refueling outage 3. However, during a postulated design basis seismic event with the postulated simultaneous failure of all non-qualified non Class 1E loads, the loss of the power panels would have resulted in the unavailability of equipment which the Seabrook Station UFSAR and Technical Specification Bases assume to be available for accident mitigation.

#### Root Cause

The root cause of the event is that the methodologies used during the initial plant design phase to evaluate the interaction between separation groups within equipment and evaluate non-Class 1E loads connected to Class 1E power supplies, did not identify and evaluate interfaces internal to components. A contributing cause is that the instrumentation vendor did not adequately document analysis of the safety/non-safety related circuit interaction and the seismic analysis for mounting non-safety related equipment above safety related equipment.

#### Corrective Actions

1. Qualified fuses were installed to separate the power connections to the non-safety related drawers from the safety related power supply.



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| Seabrook Station  |  | 05000443          |  | YEAR           | SEQUENTIAL NUMBER | REVISION NUMBER | 4 OF 4   |
|                   |  |                   |  | 94             | -- 08 --          | 01              |          |

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

2. A seismic evaluation was performed. The evaluation concluded that the non-safety related drawers would not adversely affect the safety related drawer because they are mounted the same as the safety related drawers and there is a metal barrier provided between the safety and non-safety related drawers which would further limit seismic interactions.
3. Analysis was performed to accept the Separation Group D/ Separation Group A associated circuit interaction. This analysis demonstrated that a fault occurring on either separation Group D or Separation Group A associated circuit would not degrade either group.
4. Plant modifications were made and/or additional evaluation done to resolve the additional circuit interaction concerns.
5. The methodologies used to evaluate the interaction between separation groups within equipment and evaluate the interaction of non-Class 1E loads connected to Class 1E power supplies, have been revised to identify and evaluate interfaces internal to components.

Previous Occurrences

North Atlantic reported similar occurrences in LER 93-07-01 and LER 88-02-01. At the time of the event the plant was in Mode 6.