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NYN- 92102

July 24, 1992

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

Attention: Document Control Desk

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

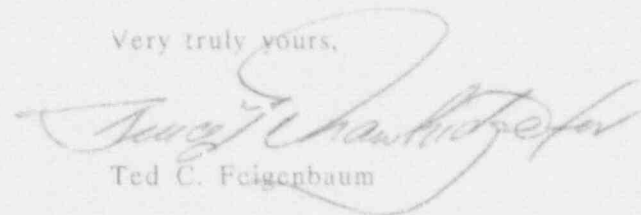
Subject: Licensee Event Report (LER) No. 92-008-00; Inadequate Testing of Emergency
Bus Undervoltage Logic Circuitry

Gentlemen:

Enclosed please find Licensee Event Report (LER) No. 92-008-00 for Seabrook Station. This submittal documents an event which was discovered on June 25, 1992 and is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B).

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

TCF:MJM/tad

Enclosures: NRC Forms 366, 366A

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a member of the Northeast Utilities system

Handwritten initials/signature

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July 24, 1992
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cc: Mr. Thomas T. Martin
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United States Nuclear Regulatory Commission
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July 24, 1992

NYN-

LICENSEE EVENT REPORT (LER) NO. 92-008-00:
INADEQUATE TESTING OF EMERGENCY BUS UNDERVOLTAGE LOGIC CIRCUITRY

Cady, J. P. Jr.	02-47
Carriere, D. E.	COMEC
DiProfio, W. A.	49-SS
Garfield, G.	DB&H
Grillo, J. M.	49-OP
Harpster, T. L.	01-48
Kacich, R. M.	NJSC
Kline, G. J.	02-08
McCabe, P. D.	49-SS
Opeka, J. F.	NUSC
Pucko, T. G.	49-CE
Richardson, P. M.	09-15
Sobotka, J. E.	01-48
Sovetsky, E. J.	49-SS
Sweeney, R. F.	Bethesda
Temple, W. J.	01-48
Tsouderos, G.	YAEC
Vargas, J. M.	01-62
Warnock, J. J.	02-07
Williams, R. O.	01-32
Ropes and Gray Executive Offices	Boston 01-40
LIC Routing Offices	01-48
File 0001	01-48
File 0040	01-48
LER Book/index (TLH)	01-48
RMD	02-06

LICENSEE EVENT REPORT (LER)

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TITLE (4)
Inadequate Testing of Emergency Bus Undervoltage Circuitry

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 NAMES		DOCKET NUMBER(S)
0	6	26	92	008	00	07	24	92			0 5 0 0 0
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check or more of the following) (11)											

OPERATING MODE (9)	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 1 0 0	20.405(a)(1)(i)	50.38(e)(1)	50.73(a)(2)(v)	73.71(c)
	20.405(a)(1)(ii)	50.38(e)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
	20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
	20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Mr. James M. Peschel, Regulatory Compliance Manager X3772	6 0 1 3 4 1 7 4 1 - 1 9 1 5 2 1

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)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On June 26, 1992, while analyzing NRC Information Notice 92-40, "Inadequate Testing of Emergency Bus Undervoltage Logic Circuitry", North Atlantic Energy Service Corporation (North Atlantic) determined that the 18 month surveillance testing program for the Seabrook Station Emergency Diesel Generators (EDG) has not adequately tested the capability of the emergency bus undervoltage circuitry to de-energize the emergency buses.

NRC Information Notice 92-40 "Inadequate Testing of Emergency Bus Undervoltage Logic Circuitry" describes a deficiency in the surveillance test method used at LaSalle Station for the loss of offsite power test in which the capability of the undervoltage logic circuitry to de-energize the emergency bus was not being tested. The undervoltage protection system for Seabrook Station is described in Section 8.3.1.1 b.4. (page 8.3-5) of the Updated Final Safety Analysis Report (UFSAR). For First Level Undervoltage Protection (loss of voltage on the 4160 V emergency bus E5 or E6) the Unit Auxiliary Transformer (UAT) and Reserve Auxiliary Transformer (RAT) breakers are automatically tripped to isolate the bus. This feature of the undervoltage protection system was not completely tested for the Bus E5 or E6 supply breakers during the loss of offsite power test which was last performed during the first refueling outage per Technical Specification Surveillance Requirement 4.8.1.1.2 f.4).

A request for a Temporary Waiver of Compliance Supported by a Justification for Continued Operation (JCO) of Seabrook Station was submitted to the NRC on June 26, 1992 which documents North Atlantic's determination that the Seabrook Station EDG's are fully capable of performing their design function. A Temporary Waiver of Compliance was granted by the NRC on June 26, 1992. North Atlantic will revise the surveillance procedures for the 18 month loss-of-offsite power test to include the testing of the emergency bus undervoltage logic circuitry.

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TEXT (If more space is required, use additional NRC Form 3054's) (17)

BACKGROUND

NRC Information Notice 92-40 "Inadequate Testing of Emergency Bus Undervoltage Logic Circuitry" describes a deficiency in the surveillance test method used at LaSalle Station for the loss of offsite power test in which the capability of the undervoltage logic circuitry to de-energize the emergency bus was not being tested. As described in Information Notice 92-40, "The undervoltage circuitry automatically opens the emergency bus feed breakers from the offsite power system to isolate the emergency bus when a loss of voltage is sensed. This circuitry also initiates load shedding, starts the emergency diesel generator, re-energizes the emergency bus and sequences the necessary emergency loads onto the emergency bus. The test deficiency is significant because the failure of the normally closed feed breaker to open automatically in response to a loss of offsite power would prevent the EDG's from automatically re-energizing the emergency bus and also would result in the emergency bus remaining connected to a degraded offsite power source".

The undervoltage protection system for Seabrook Station is described in Section 8.3.1.1 b.4. (page 8.3-5) of the Updated Final Safety Analysis Report (UFSAR). For First Level Undervoltage Protection (loss of voltage on the 4160 V emergency bus E5 or E6) the Unit Auxiliary Transformer (UAT) and Reserve Auxiliary Transformer (RAT) breakers are automatically tripped to isolate the bus. This feature of the undervoltage protection system was not tested for the Bus E5 supply breakers from the UAT (A51), and RAT (A52) or the Bus E6 supply breaker from the UAT (A71), and RAT (A72) during the loss of offsite power test which was last performed during the first refueling outage pursuant to Technical Specification Surveillance Requirement 4.8.1.1.2 f.4).

Technical Specification Surveillance Requirement 4.8.1.1.2 f.4) requires that "each diesel generator shall be demonstrated OPERABLE at least once per 18 months during shutdown, by simulating a loss-of-offsite power by itself and: a) Verifying deenergization of the emergency busses and load shedding from the emergency buses, and b) Verifying the diesel starts on the loss-of-offsite power signal, energizes the emergency busses with permanently connected loads within 12 seconds, energizes the auto-connected shutdown loads through the emergency power sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the shutdown loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test."

At Seabrook Station this surveillance test was periodically performed, per procedure EX1804.001 "Diesel Generator 1A 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance" and EX1804.015 "Diesel Generator 1B 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance". During these tests the supply breakers from the UATs were opened manually and not automatically via the undervoltage protection system. The RAT supply breakers were placed in pull-to-lock and therefore the automatic trip and lockout contacts from the emergency power sequencer were not tested. All other attributes of the surveillance requirement were verified during this testing. Although the Technical Specifications do not explicitly require the automatic tripping of the supply breakers from the UATs or the RATs,

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

the intent is that this automatic feature of the undervoltage protection system should be exercised.

North Atlantic Energy Service Corporation (North Atlantic) has verified that the undervoltage logic circuitry which automatically opens the closed UAT breaker and locks out the open breaker has been tested appropriately and satisfactorily on three occasions. During the Preoperational Test Program, the EDG undervoltage logic circuitry was appropriately tested twice during the performance of preoperational tests. During the period of March 3 - 8, 1986, Preoperational Test Procedure 1-PT(I)-39.1, "Loss of Offsite Power Tests" was satisfactorily performed and during the period of March 24 - 28, 1986, Preoperational Test Procedure 1-PT(I)-39.2, "Loss of Offsite Power With Engineered Safeguard Features Actuation" was satisfactorily performed. During the Power Ascension Test Program on August 1, 1990, procedure ST-39, "Loss of Offsite Power" was successfully performed.

Each of these tests initiated the loss-of-offsite power condition by removing the 345kV supply from the plant busses, thereby requiring the circuitry to recognize an undervoltage condition. In each case the emergency bus undervoltage logic circuitry properly sensed the undervoltage condition and tripped the appropriate supply breakers.

In addition, North Atlantic has the experience of an operating event that verified that the undervoltage logic circuitry will function properly. On June 27, 1991, a turbine generator trip with a subsequent reactor trip occurred while the plant was at 100% power. The event occurred during the performance of a preventive maintenance activity on a breaker failure relay for 345kV circuit breaker 11. As the relay was being returned to service (closure of two knife blade switches), momentary arcing occurred across the contacts. The arcing caused a high speed tripping relay to pick up without picking up an associated lockout relay. This relay actuation resulted in 345kV circuit breakers 11 and 163 opening without generating a signal to open the UAT supply breakers to unit busses 1 through 6. Because of this, the automatic transfer to the RAT was prevented. This condition isolated the unit from the grid, resulting in the automatic starting of both EDG's. The EDG's started per their design requirements and energized the 4kV busses E5 and E6. This starting of the EDG's during an actual loss of the grid, due to breaker isolation, verified the proper operation of the undervoltage logic circuitry including the undervoltage relay contacts which trip the normal bus feed breakers from the UAT's. This event was previously reported to the NRC in Licensee Event Report (LER) 91-008.

SAFETY CONSEQUENCES

There were no adverse safety consequences as a result of this event. The loss-of-offsite power tests that were last performed in October 1991 during the refueling outage verified all of the required attributes of the emergency bus undervoltage logic circuitry other than the automatic opening/lockout of the UAT/RAT breakers. The emergency bus undervoltage logic circuitry was tested on three occasions including the required response to an event on June 27, 1991. This testing provides a significant level of confidence that the EDG's will be capable of performing their design function if called upon to do so. Although the

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undervoltage tripping feature of the RAT supply breaker has not been tested, North Atlantic has visually verified that the cables between the Emergency Power Sequencer and the RAT breaker compartments were installed as designed. In addition, the trip coil on the RATs is tested and verified to be operable every 18 months. The continuity between the Emergency Power Sequencer and the supply breaker from the RATs was verified during the Startup Test Program.

ROOT CAUSE

The root cause of this event was determined to be an isolated incident involving the interpretation of testing requirements during the development of the surveillance procedures. The surveillance procedures were developed utilizing the guidance of Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units at Nuclear Power Plants" and NUREG/CR-4557, "A Review of Issues Related to Improving Nuclear Power Plant Diesel Generator Reliability" with the intent of complying with all regulatory requirements while minimizing the number of EDG starts and perturbations in the electrical distribution system. During the review, there were no specific requirements identified which would require testing of the emergency power sequencer circuitry.

CORRECTIVE ACTIONS

On June 26, 1992, upon discovery of the inadequate testing of the automatic opening/lockout of the UAT/RAT supply breakers upon an emergency bus undervoltage condition, North Atlantic requested a Temporary Waiver of Compliance from the requirements of Surveillance Requirement 4.8.1.1.2f.4 to allow plant operation until the next time the plant enters Mode 5. North Atlantic developed and submitted to the NRC a Justification for Continued Operation of Seabrook Station which documented North Atlantic's determination that the EDG's are fully functional and capable of performing their design function.

As corrective action to prevent recurrence of this event North Atlantic will revise Procedures EX1804.001, "Diesel Generator 1A 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance" and EX1804.015, "Diesel Generator 1B 18 Month Operability and Engineered Safeguards Pump and Valve Response Time Testing Surveillance" to require that the appropriate test of the automatic opening/lockout of the UAT/RAT supply breakers be performed as part of the loss-of-offsite power test. North Atlantic will perform the loss-of-offsite power test for both EDG's during the refueling outage which is currently scheduled to begin on September 7, 1992, or sooner if a MODE 5 outage occurs prior to the refueling outage.

North Atlantic has determined that the following compensatory measures will be in place until the plant enters Mode 5.

- no electrical distribution equipment, either normal or standby, will be unnecessarily taken out of service,

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- no switchyard activities which could perturb the offsite power sources will be allowed,
- Shift Management will review all surveillances and tagging orders for impact on the electrical distribution system prior to authorizing the initiation of the activity,
- PSNH switchyard maintenance will be notified to refrain from work activities in the switchyard without authorization from the Operations Manager,
- Operations Department personnel have been notified by a Nightorder to ensure that these measures remain in effect.

PLANT CONDITIONS

At the time of this event, the plant was in MODE 1, Power Operation, at 100% power, with a Reactor Coolant System [AB] temperature of 588° Fahrenheit and with pressure at 2235 psig.

This is the first event of this type at Seabrook Station.