



**North  
Atlantic**

Energy Service Corporation

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NYN- 93097

June 30, 1993

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

Attention: Document Control Desk

- References:
- (a) Facility Operating License No. NPF-86, Docket No. 50-443
  - (b) NHY Letter NYN-91172 dated October 25, 1991, "Response to Generic Letter 91-06," T. C. Feigenbaum to USNRC
  - (c) USNRC Generic Letter 91-06 dated April 29, 1991, "Resolution of Generic Issue A-30, 'Adequacy of Safety-Related DC Power Supplies,' Pursuant to 10 CFR 50.54(f)"
  - (d) USNRC Letter Serial No. SEA-93-006 dated April 26, 1993, "Generic Issue A-30-North Atlantic Energy Service Corporation Confirmation Related to Actions Required by NRC Generic Letter 91-06 (TAC M81494)," A. W. De Agazio to T. C. Feigenbaum

Subject: Revised Response to Generic Letter 91-06 (TAC M81494)

Gentlemen:

Generic Letter (GL) 91-06 requested information pursuant to 10 CFR 50.54(f) regarding safety-related DC power systems. In Reference (b), New Hampshire Yankee, the predecessor company to North Atlantic Energy Service Company (North Atlantic) provided the response to GL 91-06 for Seabrook Station. In Reference (d), the NRC acknowledged receipt of the initial response. During recent inspection activities at Seabrook Station, a minor error was discovered in the technical information provided by Reference (b).

In the response to Question 3.a.2, Reference (b) indicated that Control Room alarms monitored loss of battery charger output current. These particular alarms had been eliminated in March 1991. Output current from each battery charger is monitored by an electronic circuit internal to the charger. A relay contact driven by this circuit provides a signal to the Main Plant Computer System (MPCS) when battery charger output current decreases below a preset level. As-designed, this signal would trigger a printout on the MPCS Control Room data logger and an alarm on the Video Annunciator System (VAS). Since two of the four DC buses are lightly loaded, the relay monitoring these buses would frequently trigger alarms which were not indicative of battery charger failure. Therefore, the alarm function driven by this relay was eliminated for each battery charger by an approved revision to the MPCS data base. The Station battery current digital ammeters also provide Control Room alarms. These digital ammeters reliably monitor battery charger output current, and are therefore suitable indicators of battery charger failure.

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a member of the Northeast Utilities system

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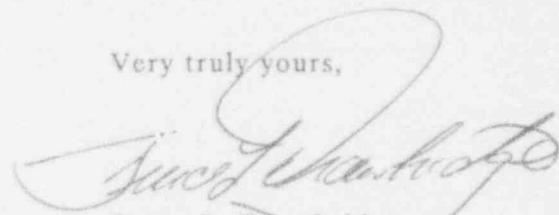
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Based on the above information, North Atlantic concludes that the error in Reference (b) was minor and did not affect the overall conclusion of Reference (b) that safety-related systems at Seabrook Station are provided with a highly-reliable source of DC power.

The purpose of this letter is to correct the error and clarify other information submitted in Reference (b). Enclosure 1 to this letter provides corrected and clarified information for Seabrook Station in the format requested by Generic Letter 91-06. Enclosure 1 of this letter supersedes that of Reference (b). Substantive additions or revisions to the information contained in the original Enclosure 1 are indicated by vertical lines in the margin.

Should you have any questions on the above information or the specific information provided in Enclosure 1, please contact Mr. Terry L. Harpster, Director of Licensing Services at (603) 474-9521 extension 2765.

Very truly yours,



Bruce L. Drawbridge  
Executive Director -  
Nuclear Production

Enclosure

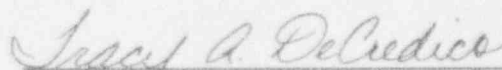
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STATE OF NEW HAMPSHIRE

Rockingham, ss.

June 30, 1993

Then personally appeared before me, the above-named Bruce L. Drawbridge, being duly sworn, did state that he is Executive Director - Nuclear Production of the North Atlantic Energy Service Corporation and that he is duly authorized to execute and file the foregoing information in the name and on the behalf of North Atlantic Energy Service Corporation and that the statements therein are true to the best of his knowledge and belief.



Tracy A. DeCredico, Notary Public  
My Commission Expires: October 3, 1995

United States Nuclear Regulatory Commission  
Attention: Document Control Desk

June 30, 1993  
Page three

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. Noel Dudley  
NRC Senior Resident Inspector  
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Seabrook, NH 03874

North Atlantic  
June 30, 1993

ENCLOSURE 1 TO NYN-93097

REVISED RESPONSE TO THE QUESTIONS OF ENCLOSURE 1  
TO GENERIC LETTER 91-06

GENERIC LETTER 91-06 QUESTIONS: (NHY's answers are in bold typeface)

The following information is provided for the following unit and site:

1. **Unit 1, Seabrook Station.**
2. a. The number of independent redundant divisions of Class 1E or safety-related dc power for this plant is **2**. (Include any separate Class 1E or safety-related dc, such as any dc dedicated to the diesel generators).
- b. The number of functional safety-related divisions of dc power necessary to attain safe shutdown for this unit is **1**.
3. Does the control room at this unit have the following separate, independently annunciated alarms and indications for each division of dc power?
  - a. alarms
    1. Battery disconnect or circuit breaker open? (See Note 3.a.1).
    2. Battery charger disconnect or circuit breaker open (both input ac and output dc)? (See Note 3.a.2).
    3. dc system ground? **Yes**.
    4. dc bus undervoltage? **Yes**.
    5. dc bus overvoltage? (See Note 3.a.5).
    6. Battery charger failure? (See Note 3.a.6).
    7. Battery discharge? (See Note 3.a.7).
  - b. indications
    1. Battery float charge current? (See Note 3.b.1).
    2. Battery circuit output current? (See Note 3.b.2).
    3. Battery discharge? **Yes**.
    4. Bus voltage? **Yes**.
  - c. Does the unit have written procedures for response to the above alarms and indications? **Yes**.

4. Does this unit have indication of bypassed and inoperable status of circuit breakers or other devices that can be used to disconnect the battery and battery charger from its dc bus and the battery charger from its ac power source during maintenance or testing? (See Note 4).
5. If the answer to any part of question 3 or 4 is no, then provide information justifying the existing design features of the facility's safety-related dc systems. \*See note below.
6. (1) Have you conducted a review of maintenance and testing activities to minimize the potential for human error causing more than one dc division to be unavailable? See Note 6 and (2) do plant procedures prohibit maintenance on redundant dc divisions at the same time? (See Note 6).

If the facility Technical Specifications have provisions equivalent to those found in the Westinghouse and Combustion Engineering Standard Technical Specifications for maintenance and surveillance, then question 7 may be skipped and a statement to that effect may be inserted here. (See Note 7).

7. Are maintenance, surveillance and test procedures regarding station batteries conducted routinely at this plant? Specifically:
  - a. At least once per 7 days are the following verified to be within acceptable limits:
    1. Pilot cell electrolyte level?
    2. Specific gravity or charging current?
    3. Float voltage?
    4. Total bus voltage on float charge?
    5. Physical condition of all cells?
  - b. At least once per 92 days, or within 7 days after a battery discharge, overcharge, or if the pilot cell readings are outside the 7-day surveillance requirements are the following verified to be within acceptable limits:
    1. Electrolyte level of each cell?
    2. The average specific gravity of all cells?
    3. The specific gravity of each cell?
    4. The average electrolyte temperature of a representative number of cells?
    5. The float voltage of each cell?
    6. Visually inspect or measure resistance of terminals and connectors (including the connectors at the dc bus)?

- c. At least every 18 months are the following verified:
    - 1. Low resistance of each connection (by test)?
    - 2. Physical condition of the battery?
    - 3. Battery charger capability to deliver rated ampere output to the dc bus?
    - 4. The capability of the battery to deliver its design duty cycle to the dc bus?
    - 5. Each individual cell voltage is within acceptable limits during the service test?
  - d. At least every 60 months, is capacity of each battery verified by performance of a discharge test?
  - e. At least annually, is the battery capacity verified by performance discharge test, if the battery shows signs of degradation or has reached 85% of the expected service life?
8. Does this plant have operational features such that following loss of one safety-related dc power supply or bus:
- a. Capability is maintained for ensuring continued and adequate reactor cooling? **Yes.**
  - b. Reactor coolant system integrity and isolation capability are maintained? **Yes.**
  - c. Operating procedures, instrumentation (including indicators and annunciators), and control functions are adequate to initiate systems as required to maintain adequate core cooling? **Yes.**
9. If the answer to any part of question 6, 7 or 8 is no, then provide your basis for not performing the maintenance, surveillance and test procedures described and/or the bases for not including the operational features cited. \*See note below.

Note: For questions involving supporting type information (question numbers 5 and 9) instead of developing and supplying the information in response to this letter, you may commit to further evaluate the need for such provisions during the performance of your individual plant examination for severe accident vulnerabilities (IPE). If you select this option, you are required to:

- (1) So state in response to these questions, and
- (2) Commit to explicitly address questions 5 and 9 in your IPE submittal per the guidelines outlined in NUREG-1335 (Section 2.1.6, Subitem 7), "Individual Plant Examination: Submittal Guidance."

REVISED RESPONSE TO GENERIC LETTER 91-06

NOTES

- 3.a.1. The Station batteries supply the vital, 125 VDC buses through fuses and circuit breakers. The open position of each battery output circuit breaker is monitored by an alarm. The status of the battery output fuses is monitored by the "Battery Charge Amps Trouble" alarm.
- 3.a.2. Each battery charger has four circuit breakers: two AC input circuit breakers (one internal and one external) and two DC output circuit breakers (one internal and one external). The positions of the *external* DC output circuit breakers are monitored by alarms. The position of the remaining three circuit breakers is not directly monitored by an alarm. However, UFSAR Section 8.3.2.1.f. describes two alarms. The "Battery Charger AC Supply Lost" alarm indicates loss of AC input voltage to the charger. The "Battery Charge Amps Trouble" alarm indicates loss of charging current. These alarms effectively monitor battery charger circuit breaker position.
- 3.a.5. As described in UFSAR Section 8.3.2.1.f.5., the DC bus overvoltage alarm is provided by an overvoltage relay at the charger.
- 3.a.6. There is no alarm entitled "Battery Charger Failure." Battery charger failure is effectively monitored by the "Battery Charger AC Supply Lost" and "Battery Charge Amps Trouble" alarms.
- 3.a.7. Battery discharge current will initiate the "Battery Charge Amps Trouble" alarm.
- 3.b.1. UFSAR Section 8.3.2.1.f.1 indicates that an ammeter is located in the Control Room and at the DC switchgear to indicate battery charge and discharge. The Control Room ammeter does not have sufficient resolution to read battery float current because it is scaled to display discharge current which can be much higher than float current. A local, digital ammeter is provided with sufficient resolution to read normal float charging current. A loss-of-charging current alarm derived from this digital ammeter is available in the Control Room. Technical Specifications require verification of battery float charge at least every seven days during Operational Modes 1 through 4. The NRC has reviewed the Seabrook design as described in UFSAR Section 8.3.2.1 and found it acceptable as discussed in NUREG-0896, the Safety Evaluation Report for Seabrook Station.
- 3.b.2. Battery charge/discharge current is indicated locally and in the Control Room. As described in UFSAR Section 8.3.2.1.f.2., an ammeter located at the charger provides indication of battery charger output current. Battery charger current indication is not available in the Control Room. However, the two alarms described in Note 3.a.2 above provide effective Control Room monitoring of battery charger operability. The NRC has reviewed the Seabrook design as described in UFSAR Section 8.3.2.1 and found it acceptable as discussed in NUREG-0896, the Safety Evaluation Report for Seabrook Station.



4. The position of the station battery output fuses and circuit breakers and the charger AC input and DC output circuit breakers are not direct inputs to the Bypass Indication System described in UFSAR Section 7.1.2.6. These components are not included in the "bypassed and inoperable status" logic because maintenance and testing affecting operability of the batteries and chargers are not expected to be performed more than once per year. However, the Bypass Indication System does monitor the availability of DC control power to the systems listed in UFSAR Section 7.1.2.6. These systems are required to operate under accident conditions. Loss of DC control power to a Train of any of these systems will actuate the bypass alarm for that particular Train.
  
6. An evaluation performed in response to IE Bulletin No. 79-27 was described in the UFSAR in the response to RAI 420.50. This review focused on the manner in which electrical power systems could effect the ability to achieve cold shutdown. With respect to Class 1E DC power systems, the review concluded that failure of any single bus will not affect the ability to achieve a cold shutdown condition. This review did not assess the potential for human error causing more than one Train of the DC power system to be unavailable.

Potential failure modes of the DC power system were evaluated as part of the Individual Plant Examination for Severe Accident Vulnerability (IPE). The evaluation concluded that there was no credible, internal, common-cause failure mode affecting the Station batteries and bus work of the DC distribution system.

Technical Specifications require the operability of both Trains of the DC power system in Operational Modes 1 through 4 and one Train in Modes 5 and 6. The concept that redundant Trains of safety-related equipment should not be simultaneously out of service (unless permitted by Technical Specifications) is so axiomatic that plant procedures do not specifically prohibit such action. The responsibility to ensure that equipment operability status meets Technical Specifications requirements rests with the Shift Superintendent. Control Room indications and alarms provide equipment status information and reminders of out-of-service conditions. Procedures provide guidance, specific instructions, notes and cautions supporting the goal of meeting Technical Specifications requirements. For example, procedures for planning and scheduling establish a "system week" concept under which preventive maintenance and surveillance testing is performed on one designated Train of safety-related equipment during a calendar week. Under this concept, if a given week were designated for Train A work, the Shift Superintendent would question any request to perform work on Train B equipment. As another example, a procedure defines a tracking system to be used upon entering a Technical Specifications action statement. This tracking system can assist the Shift Superintendent in maintaining cognizance of inoperable equipment and avoiding action to render the redundant train inoperable. As a final example, procedures for performing vital battery discharge tests include cautions referring to Technical Specifications to remind involved personnel to maintain the required number of operable DC power sources.

7. Seabrook Station Technical Specifications are based on the Westinghouse Standard Technical Specifications. Therefore, as permitted by Generic Letter 91-06, the specific responses to Question No. 7 have been omitted.