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SUBJECT: Forwards response to Generic Ltr 91-06, "Resolution of Generic Issue A-30, 'Adequacy of Safety-Related DC Power Supplies.'"

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CP&L
Carolina Power & Light Company
P.O. Box 1551 • Raleigh, N.C. 27602

SERIAL: NLS-91-275

OCT 25 1991

G. E. VAUGHN
Vice President
Nuclear Services Department

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT No. 2
DOCKET NOS. 50-261/LICENSE NOS. DPR-23
RESPONSE TO GENERIC LETTER 91-06
ADEQUACY OF SAFETY-RELATED DC POWER SUPPLIES

Gentlemen:

The purpose of this letter is to submit Carolina Power & Light Company's response to NRC Generic Letter 91-06, "Resolution of Generic Issue A-30, 'Adequacy of Safety-Related DC Power Supplies', Pursuant to 10 CFR 50.54(f)" for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2). The Staff requested written responses to questions provided in Enclosure 1 of the Generic Letter within 180 days of the date of the generic letter, which was issued on April 29, 1991.

Please refer any questions regarding this submittal to Mr. S. D. Chaplin at (919) 546-6623.

Yours very truly,

G. E. Vaughn

GEV/SDC (GL91-06.rnp)

Enclosure
cc: Mr. S. D. Ebneter
Mr. L. Garner (NRC-HBR)
Mr. R. Lo

G. E. Vaughn, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Eleanor C. Chappell
Notary (Seal)

ELEANOR C. CHAPPELL NOTARY PUBLIC WAKE COUNTY, N.C.

My commission expires: 2/6/96

A001

ENCLOSURE 1

H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT No. 2
NRC DOCKET NOS. 50-261
OPERATING LICENSE NOS. DPR-23
RESPONSE TO GENERIC LETTER 91-06
ADEQUACY OF SAFETY-RELATED DC POWER SUPPLIES

Enclosed is Carolina Power & Light Company's (CP&L) responses to the NRC questions contained in Generic Letter 91-06 for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBR2). The NRC questions have been repeated with the necessary information provided in the blanks left by the NRC Staff. In addition, CP&L has provided comments and clarifications to the NRC questions, where appropriate.

NRC QUESTION 1:

Unit 2

NRC QUESTION 2:

a. The number of independent redundant divisions of Class 1E or safety-related dc power for this plant is two. (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 one.

CP&L COMMENT AND CLARIFICATION:

No comments.

NRC QUESTION 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? n/a

2. Battery charger disconnect or circuit breaker open (both input ac and output dc)? No

3. dc system ground? No

4. dc bus undervoltage? No

5. dc bus overvoltage? No

6. Battery charger failure? No

7. Battery discharge? No

b. Indications

1. Battery float charge current? No

2. Battery circuit output current? No

3. Battery discharge? No

4. Bus voltage? No

c. Does the unit have written procedures for response to the above alarms and indications? Yes

CP&L COMMENTS AND CLARIFICATIONS:

H. B. Robinson, Unit 2 has two redundant trains of 125 Volt DC Power. Each train has one battery (Battery-A & Battery-B) and two battery chargers (A & A1 and B & B1). The original facility design had only one battery charger (A and B) in each train. The new chargers, A1 and B1, have more annunciation/alarm features than the original battery chargers. Only one battery charger for each train is required to be in service. The annunciation/alarms are effective only for the battery charger in service.

The original battery chargers (A and B) have an internal fuse on the DC output side and no output disconnect device. Battery chargers (A1 and B1) have a breaker on the DC output side. Each of the four battery chargers is equipped with an AC input circuit breaker.

There are three annunciation alarm windows in the Main Control Room for the two trains of DC power. These three windows are as follows:

i. "BATTERY CHARGER A/A1 TROUBLE"
ii. "BATTERY CHARGER B/B1 TROUBLE"
iii. "A-B BATTERY LOW VOLTS"

A common control room annunciator serves the alarms and alarm windows for both divisions of the DC power at H.B. Robinson 2. The power supply to the annunciator is from two redundant sources.

QUESTION 3.a.1

The 125 Volt DC Emergency System design does not incorporate a circuit opening device or disconnect means (breaker, fuse or switch) between

each battery and its associated DC bus, therefore, an alarm for such a device is not applicable.

QUESTION 3.a.2.

Each of the four chargers is equipped with an AC power failure alarm relay which actuates the Battery Charger Trouble alarm in the control room. This will monitor loss of AC input to the charger including an open battery charger input AC breaker.

Battery chargers A and B do not have an output DC breaker. Blowing of the internal DC output fuse actuates the Battery Charger Trouble alarm in the control room via the Charger Lockout.

An open DC output breaker on Battery Charger A1 or B1 actuates the Battery Charger trouble alarm in the control room.

Therefore existing provisions cover this requirement.

QUESTION 3.a.3.

Each battery charger is equipped with a ground detector, which actuates the Battery Charger trouble alarm in the control room in the event of a DC system ground, therefore existing provisions cover this requirement.

QUESTION 3.a.4.

A common undervoltage alarm, " A-B Battery Low Volts" serves both trains. With Annunciator Panel Procedure (APP-009) and voltage indication available at the ERFIS computer (on demand) in the control room, the operator will be able to identify the Train experiencing 'undervoltage'. The undervoltage relay is set relatively high (at 123 Volts) to afford an operator the earliest notification of an off-normal voltage condition to facilitate corrective actions, therefore, existing provisions cover this requirement.

QUESTION 3.a.5.

An overvoltage condition can only be caused by malfunction of the charger. The chargers shut down automatically due to DC overvoltage per internal control circuitry. This condition actuates the Battery Charger Trouble Alarm in the control room via the Charger Lock Out for chargers A & B and the AC power failure for chargers A1 & B1. Therefore the existing provisions cover this requirement.

QUESTION 3.a.6.

Battery charger A or B failure (based on low charger current) is indirectly annunciated in control room through DC bus undervoltage.

Battery charger A1 or B1 failure (based on low charger current) actuates the Battery Charger Trouble alarm in the control room.

The existing provisions cover this requirement.

QUESTION 3.a.7.

In the case of a battery discharging, the DC bus voltage will start to drop. This will actuate a bus undervoltage alarm in the control room. The undervoltage relay is set relatively high (at 123 Volts) to afford an operator the earliest notification of an off-normal voltage condition to facilitate corrective actions. Both Divisions of the DC system are covered by a surveillance inspection 5 days a week which monitors the charge status of the batteries.

These provisions cover this requirement.

QUESTION 3.b.1.

The undervoltage alarm and the surveillance inspection 5 days a week, which includes measurement of 'Bank Float Voltage' to be within specified limits, ensures that float voltage is maintained. With the float voltage, maintained the battery will not discharge and will have the normal float charge current, therefore existing provisions cover this requirement.

QUESTION 3.b.2.

Battery circuit output current is available on demand through the ERFIS computer in the control room. With the availability of the battery charger failure alarm, an operator can monitor the battery circuit current through the ERFIS computer, therefore, the existing provisions cover this requirement.

QUESTION 3.b.3.

In case of a battery discharging, the battery voltage will start to drop from the float voltage. This will actuate the bus undervoltage alarm in the control room. The undervoltage alarm relay is set relatively high (at 123 Volts) to afford an operator the earliest notification of an off-normal voltage condition to facilitate corrective actions. Battery voltage and current indication is available via the ERFIS computer. Maintenance & Surveillance Tests, at a frequency of 5 days/week, monitor the operable status of the batteries.

The existing provisions cover this requirement.

QUESTION 3.b.4.

Battery (Bus) Voltage is available on demand through the ERFIS computer in the control room. With the availability of battery charger failure and bus undervoltage alarms, an operator can monitor the battery/bus voltage through the ERFIS computer.

Therefore the existing provisions cover this requirement.

NRC QUESTION 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? No

CP&L COMMENTS AND CLARIFICATIONS:

As noted in Section 3.a.1, the DC battery cannot be disconnected from its associated DC bus. Therefore bypassed or inoperable indication is not applicable.

When maintenance or testing of a battery charger or its associated input and/or output breakers is necessary, that charger is taken offline and the alternate charger is placed in service. As noted in Section 3.a.2, the existing alarms in the control room will alert the operator if the battery charger in service becomes inoperable.

NRC QUESTION 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.

CP&L COMMENTS AND CLARIFICATIONS:

See justification for each question answered "No" in the Question Comments and Clarifications section of this response.

NRC QUESTION 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? No and (2) do plant procedures prohibit maintenance or testing on redundant DC divisions at the same time? Yes

CP&L COMMENT AND CLARIFICATION:

(1) Carolina Power & Light Company has underway a maintenance procedure upgrade program at HBR2, one aspect of which addresses human factors concerns.

(2) The HBR2 maintenance and testing procedures do not explicitly prohibit work on both trains of the DC power system simultaneously. However, the procedures structural controls do provide an equivalent restriction in that the trains and/or components are worked serially. The only procedures that do not provide the above described level of control are the daily and monthly battery test procedures which perform specific gravity and voltage measurements. These activities are not likely to create a situation which may result in inoperability of the DC power system.

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 the effect may be inserted here. NO.

NRC QUESTION 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? Yes, 5 days/week

   2. Specific gravity or charging current? Yes, 5 days/week

   3. Float voltage? Yes, 5 days/week

   4. Total bus voltage on float charge? Yes, 5 days/week

   5. Physical condition of all cells? Yes, 5 days/week

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 acceptance limits:

   1. Electrolyte level of each cell? Yes

   2. The average specific gravity of all cells? No

   3. The specific gravity of each cell? Yes

   4. The average electrolyte temperature of a representative number of cells? Yes

capability is indirectly demonstrated. The battery charger goes to its current limit (higher than the nominal rating of battery charger) in the initial recharging of the batteries. This demonstrates the capability of the battery charger.

NRC QUESTION 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 required to maintain adequate core cooling? Yes

CP&L COMMENTS AND CLARIFICATIONS:

No additional comments.

NRC QUESTION 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 his 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."

CP&L COMMENTS AND CLARIFICATIONS:

The supporting information is provided for each item. * note is the same as shown for question 5.

6. Visually inspect or measure resistance of terminals and connectors (including the connectors at the dc bus)? Yes

c. At least every 18 months are the following verified:

1. Low resistance of each connection (by test)? Yes

2. Physical condition of the battery? Yes

3. Battery charger capability to deliver rated ampere output to the dc bus? No

4. The capability of the battery to deliver its design duty cycle to the dc bus? Yes

5. Each individual cell voltage is within acceptable limits during the service test? Yes

d. At least every 60 months, is capacity of each battery verified by performance of a discharge test? Yes

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? Yes

CP&L COMMENTS AND CLARIFICATIONS:

QUESTION 7.b.

At present there is no specific guidance for conducting a special maintenance surveillance procedure within 7 days of a discharge/overcharge, however, maintenance surveillance daily (5 days/week) will detect any abnormal condition of the battery. The plant operating procedures will be revised to incorporate this specific guidance.

An overcharge can occur if the batteries are kept on equalizing charge unattended for an excessively long period. Since the equalizing charge is attended up to completion, an overcharge condition will not occur.

QUESTION 7.b.2

On a monthly basis, the specific gravity for each cell is measured and corrective action, such as Extended Equalize Charge based on lowest specific gravity of any cell, is taken. The existing provision therefore, provides adequate monitoring and corrective actions.

QUESTION 7.c.3.

Pursuant to existing procedures, there is no formal battery charger loading capability test. However, per the service test procedure, when the battery is reconnected to its bus the system battery charger