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Power
Company

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Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-155-LICENSE DPR-6-
BIG ROCK POINT PLANT - SEP TOPIC VIII-3.B "DC POWER SYSTEM BUS VOLTAGE
MONITORING AND ANNUNCIATION" - RESPONSE TO NRC SAFETY EVALUATION REPORT

By letter¹ dated February 22, 1982, the NRC issued its safety evaluation report (SER) for SEP Topic VIII-3.B "DC Power System Bus Voltage Monitoring and Annunciation". As stated in the SER, the NRC continued to propose modifications to the instrumentation associated with the safety related DC systems because the present designs do not satisfy the requirements of Section 4.20 of IEEE Standard 279-1971. However, the letter¹ also stated that the need to actually implement these changes will be determined during the integrated assessment.

During the integrated assessment meetings held at Big Rock Point Plant during the week of November 15 through 19, 1982, the NRC staff indicated that the monitoring and annunciation systems in use at Big Rock Point are generally adequate. The staff stated, however, that it was concerned since the plant staff does not have an adequate means to verify at frequent intervals that the 125 VDC station battery output terminals and cell-to-cell connections are free of corrosion. According to the staff, corrosion could conceivably result in significant resistance and cause voltage drops and current reduction to occur in the system when the battery is called upon to carry plant load (normal plant load is carried by the in-service charger with only a trickle charge supplied to the battery). Further discussion on this topic during the integrated assessment meetings indicated that if a method were implemented to monitor the battery connections on a routine basis, the staff's concern would be satisfied. The purpose of this letter is to describe the procedural changes to be implemented and the monitoring activities already in effect that will provide adequate assurance that the system is ready to perform its intended function.

Each month the station battery chargers are transferred prior to applying the equalizing charge to the station battery. This activity is a routine operation performed in accordance with Standard Operating Procedure SOP-28. The charger that is placed in service is utilized to provide the battery's equalizing charge. Following completion of the equalizing charge, the station battery is released to the plant maintenance group for performance of

Surveillance Procedure T30-20 which requires the recording of charging voltage, charging current, pilot cell temperature, room temperature, electrolyte level and temperature correction. Also, Procedure T30-20 requires the recording of specific gravity (≥ 1.2 @ 77°F) and cell voltage (≥ 2.0 VDC) for each cell in accordance with Technical Specification 11.4.5.3.A.2. In addition, a new pilot cell is selected at this time.

Procedural changes to be implemented consist of revisions to SOP-28 and T30-20 to control the charger transfer such that information regarding the condition of battery connections can be observed and recorded. The revision to SOP-28 consists of directing the operator to perform the charger transfer in accordance with Procedure T30-20. Procedure T30-20 has been revised to require the completion of an attachment to T30-20 prior to releasing the battery to the maintenance group for obtaining the battery data. (A copy of the procedural attachment is attached to this letter.)

The procedural attachment accomplishes the desired results in the following manner:

1. Battery voltage, charger current and 125 VDC system current is recorded prior to removing the charger from service.
2. The in-service charger is removed and the same parameters are recorded. Acceptance criteria specifies that the 125 VDC load current should remain essentially the same (at this time, the battery is carrying station load).
3. The alternate charger is placed in service and the same parameters are again recorded. Acceptance criteria specifies that the charging current must be equal to or greater than the load current thereby verifying that the charger-to-battery connections are good and the battery charge is being replenished.
4. Additional requirements on the attachment provide instructions for placing the battery on equalizing charge and require appropriate signoffs to ensure proper release of the battery to the maintenance group.

The procedural revisions have already been reviewed by the Plant Review Committee and the Quality Assurance Group at the plant site. The implementation date is scheduled for this month.

The battery monitoring activities presently implemented at the plant site are significant. In addition to the daily routine surveillance performed by operations personnel which was described in pages 5 and 6 of Consumers Power Company letter² dated January 7, 1982 and Surveillance Procedure T30-20 which was described above, additional surveillance and maintenance activities are as follows:

1. Weekly - Procedure T7-24, "Battery Pilot Cell Readings" - This activity records battery charging voltage, pilot cell number, room temperature and

pilot cell temperature. In addition, the procedure requires recording of electrolyte level, specific gravity (≥ 1.2 @ 77°F) and cell voltage (≥ 2.0 VDC) for each pilot cell in accordance with Technical Specification 11.4.5.3.A.3.

2. Annually - Procedure T365-05, "Battery Verification" - A visual check of the battery is performed. Cell plates and battery racks must show no visual indication of physical damage or abnormal deterioration. Cell-to-cell and terminal connections must be clean, tight, free of corrosion and coated with anti-corrosion material in accordance with Technical Specifications 11.4.5.3.A.1.(e) and (f).
3. Refueling - TR-65(S), "Station Battery Service Test" - A service test is performed on the battery in accordance with Technical Specification 11.4.5.3.A.1(h) and IEEE-450.

TR-62(1) and TR-62(S), "Battery Charger Capacity Test" - Each battery charger is tested to verify that the charger can supply at least 30 amperes at a minimum of 135 VDC for a four hour interval in accordance with Technical Specification 11.4.5.3.A.1(g).

4. Five Years - TV-16(S), "Station Battery Discharge Test" - The station battery is discharge tested to verify that the battery has a capacity of at least 80% of the manufacturer's rating in accordance with Technical Specification 11.4.5.3.A.5 and IEEE-450.
5. Miscellaneous - MEPS-9, "Change Out of a Defective Station Battery Cell" - This is a maintenance procedure to direct the activities required to replace defective batteries. Specific actions address the use of anti-corrosive agents in reassembly of cell connections with a final voltage check of less than 0.01 VDC on the reassembled connections.

As stated previously, Consumers Power Company believes that with implementation of the procedural changes described above, in addition to the existing monitoring activities, adequate assurance that the station battery is ready to perform its intended function is provided. Consumers Power Company, therefore, concludes that the NRC concern is satisfied and SEP Topic VIII-3.B is resolved.

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CC: Administrator, Region III, USNRC
NRC Resident Inspector - Big Rock Point

Attachment - 2 pages

References:

1. NRC letter (DMCrutchfield) to Consumers Power Company (DJVandeWalle) dated February 22, 1982.
2. Consumers Power Company (DPHoffman) to NRC (DMCrutchfield) dated January 7, 1982.

Consumers Power Company

Big Rock Point Plant

Docket 50-155 - License DPR-06

SEP TOPIC VIII-3.B

"DC POWER SYSTEM BUS VOLTAGE MONITORING AND ANNUNCIATION"
RESPONSE TO NRC SAFETY EVALUATION REPORT

ATTACHMENT

March 10, 1983

2 Pages

ATTACHMENT 1

STATION BATTERY CHARGER TRANSFER AND EQUALIZING CHARGE
(To be completed by Operations Personnel)

NOTE: Two chargers are available for service; however, only one will be in service at a time as they share the same 480 vac input. Charger in service: No. _____

1. Record the following data:

	Charger No. 1	Charger No. 1A	125 VDC System
Battery Voltage	_____ VDC	_____ VDC	N/A
Output Current	_____ AMPERES	_____ AMPERES	(AM-123) _____ AMPERES

Acceptance Criteria:

Voltage: 129 VDC (Meter Tolerance = ± 3.8 VDC).

Charger Current: Variable with station loads (nominally 10 to 20 amperes for charger in service, zero for alternate charger).

125 VDC System Load Current: Equal to or less than charger output current.

2. Open the A-C breaker to the charger in service.

NOTE: This will cause a "125 VDC System Trouble" alarm to be received due to loss of A-C power to both chargers.

3. Open the D-C breaker to the same charger. Record the following data:

	Charger No. 1	Charger No. 1A	125 VDC System
Battery Voltage	_____ VDC	_____ VDC	N/A
Output Current	_____ AMPERES	_____ AMPERES	(AM-123) _____ AMPERES

Acceptance Criteria:

Voltage: Equal to or less than 129 VDC with gradual reduction in effect, as load is now discharging the station battery.

CAUTION: A rapid or sudden decrease in voltage indication is cause for concern requiring return of the charger to service and prompt notification to the Shift Supervisor.

Charger Current: Output of each charger should be zero.

125 VDC System Load Current: Should remain essentially the same as that recorded in Step 1, above. A minor reduction may occur as the gradual reduction in battery voltage occurs.

CAUTION: A sudden drop in System Load Current indicates the battery is incapable of supplying the load current and requires return of the charger to service and prompt notification to the Shift Supervisor.

4. Close the D-C breaker to the alternate charger.
5. Close the A-C breaker to the alternate charger. The alarm received in Step 2 should clear. After a short time delay, charger output current will increase above the normal load current to replenish the charge lost in Step 3, above. When charger output current is equal to or less than 35 amperes record the following data:

	Charger No. 1	Charger No. 1A	125 VDC System
Battery Voltage	_____ VDC	_____ VDC	N/A
Output Current	_____ AMPERES	_____ AMPERES	(AM-123) _____ AMPERES

Acceptance Criteria:

- Voltage: Equal to or less than 129 VDC (Meter Tolerance = ± 3.8 VDC).
- Charger Current: Equal to or greater than the 125 VDC System Load Current for charger now in service, zero for other charger.
- 125 VDC System Load Current: Equal to or less than charger current.

NOTE: Charger current now includes 125 VDC System Load Current plus battery charging current.

6. Check battery water level "Normal" before placing batteries on overcharge.
7. Turn the "Equalizing Charge Time" clockwise to the desired time of equalizing charge. Normally, this will be for a 24 hour period.
8. Check the charger voltmeters reading 140 VDC (Meter Tolerance = ± 4.2 VDC).

Charger No. 1 = _____ VDC

Charger No. 1A = _____ VDC

Initial Date

Completed by (OPER) _____

Reviewed by (SS) _____

9. At the end of the preset time established in Step 7, above, the charger will automatically transfer back to the float voltage. Check the charger voltmeters reading 129 VDC. (Meter tolerance = ± 3.8 VDC)

Charger No. 1 = _____ VDC

Charger No. 1A = _____ VDC

10. Equalizing charge completed and station battery released for specific gravity and voltage readings.

Initial Date

Completed by (OPER) _____

Reviewed by (SS) _____