

Revised Technical Specifications for
125/250 Volt D-C Station Batteries

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A recent NRC inspection (84-26) focused on the 125/250 volt D-C station batteries resulted in the identification of Severity Level III violations and subsequent civil penalty. The NRC observed that the District had apparently failed to demonstrate the operability of the station batteries. A thorough study of this issue was conducted by the District in order to correct any departure from NRC requirements. The study included a review of pertinent NRC-endorsed and generated documents including, but not limited to, IEEE Standard 450-1980; IEEE Standard 308-1978; Regulatory Guides 1.129, 1.118, and 1.32; GE standard Technical Specifications for BWR/4 (NUREG-0123); and Standard Review Plan (NUREG-0800); as well as applicable sections of the CNS Technical Specifications, USAR, engineering procedures, and the battery manufacturer's recommendations.

Nebraska Public Power District requests a revision to the Technical Specifications which will incorporate changes to the station battery surveillance requirements and bases in order to: 1) improve the demonstration of the unit battery system operability, 2) incorporate appropriate guidance from the various aforementioned NRC endorsed industry standards, regulatory guides, etc., and battery manufacturer's recommendations.

In order to clarify the difference between existing and proposed Technical Specifications, a point-by-point explanation follows:

1. The absolute value for the total battery terminal voltage (≥ 105 volts for the 125-volt batteries, ≥ 212 volts for the 225-volt batteries) was specified for the weekly surveillance addressing the measurement and recording of total battery voltage. These voltage values were obtained as described in the final paragraph of revised bases page 198.
2. Measurement and logging of electrolyte level for each pilot cell and a specified acceptable level range was added to the weekly surveillance items.
3. Temperature and electrolyte level correction was added to the pilot cell voltage and specific gravity measurement surveillances, as well as the requirement that these parameters meet the manufacturer's recommendations.
4. The measurement tolerance of 0.1 volt was deleted since it was deemed to be more appropriately addressed in the revised CNS surveillance procedure.
5. Industry-accepted term "Battery Service Test" was used in lieu of "Rated Load Discharge Test" in describing the once-per-operating-cycle battery capacity surveillance.

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6. A tolerance band of $\pm 5^{\circ}\text{F}$ was specified for the acceptable temperature differential between a representative sample of battery cells.
7. A performance discharge test to verify the station battery capacity to be at least 85 percent of the manufacturer's rating was added as a five-year surveillance item.

Each of the above changes were introduced to improve the overall demonstration of battery operability and provide for improved assurance of verification that the CNS station batteries fully satisfy their design function, utilizing the aforementioned documents as guidance. It is the District's position that these changes will improve plant safety, hence there is no loss of safety function or any reduction in the degree of protection provided public health and safety.

Evaluation of this Revision with Respect to 10CFR50.92

A. The enclosed Technical Specification change is judged to involve no significant hazards based upon the following:

1. Does the proposed license amendment involve a significant increase in the probability or consequences of an accident previously evaluated.

Evaluation:

The proposed change will result in improved surveillance requirements and related surveillance procedures. No changes to existing equipment are being introduced and no changes are being made to surveillances or procedures which will affect the probability or consequences of an accident previously evaluated.

2. Does the proposed license amendment create the possibility for a new or different kind of accident from any accident previously evaluated?

Evaluation:

The proposed changes does not introduce any new mode of operation, and the possibility of an accident of a different type than analyzed in the FSAR would not result from the change.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Evaluation:

The proposed change does not change existing facility equipment. The proposed change will, however, change existing surveillances and procedures, making them more stringent than previously required. The additional surveillance requirements use NRC-endorsed or generated standards as acceptance criteria and are being introduced to increase demonstrated operability of the station batteries. This will not involve a significant reduction in the margin of safety.

B. Additional basis for proposed no significant hazards consideration determination:

The Commission has provided guidance concerning the application of the standards for making a no significant hazards consideration determination by providing certain examples (48FR14870). The examples include "(ii) A change that constitutes an additional limitation, restriction, or control not presently included in the Technical Specifications: for example, a more stringent surveillance requirement." It is the District's belief that the proposed change is encompassed by the above example.

LIMITING CONDITIONS FOR OPERATION

3.9.A

2. At least one diesel generator shall be operable during fuel handling operations. This one diesel shall be capable of supplying power to an operable Standby Gas Treatment System.

SURVEILLANCE REQUIREMENTS

4.9.A.2 (cont'd)

During the monthly generator test the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers. The operation of the diesel fuel oil transfer pumps and fuel oil day tank level switches shall be demonstrated, and the diesel starting time to reach rated voltage and frequency shall be logged.

- b. Once every 18 months the condition under which the diesel generator is required will be simulated and a test conducted to demonstrate that it will start and accept the emergency load within the specified time sequence. The results shall be logged.
- c. Specification 4.9.A.2.c deleted.
- d. Once a month the quantity of diesel fuel available shall be logged.
- e. Every three months and upon delivery a sample of diesel fuel shall be checked for quality. The quality shall be within the acceptable limits specified in Table 1 of ASTM D975-68 for Nos. 1D or 2D and logged.
- f. Each diesel generator shall be given an annual inspection in accordance with instructions based on the manufacturer's recommendations.

3. 125 VDC Unit Batteries

- a. Every week, the following parameters shall be verified. The actual values shall be measured and logged:
 1. The total battery terminal voltage is equal to or greater than 105 volts,
 2. The electrolyte level of each pilot cell is between the minimum and maximum level indication marks,

LIMITING CONDITIONS FOR OPERATION

3.9.A

B. Operation with Inoperable Equipment

1. Whenever the reactor is in Run Mode or Startup Mode with the reactor not in a Cold Condition, the availability of electric power shall be as specified in 3.9.A.1, except as specified in 3.9.B.1.

a. Incoming Power

1. From and after the date incoming power is not available from a startup or emergency transformer, continued reactor operation is permissible under this condition for seven days. At the end of this period, provided the second source of incoming power has not been made immediately available, the NRC must be notified of the event and the plan to restore this second source. During this period, the two diesel generators and associated critical buses must be demonstrated to be operable.
2. From and after the date that incoming power is not available from both startup and emergency transformers (i.e., both failed), continued operation is permissible, provided the two diesel generators and associated critical buses are demonstrated to be

SURVEILLANCE REQUIREMENTS

4.9.A (cont'd.)

3. The pilot cell voltage and specific gravity, corrected for 77°F and electrolyte level, are in accordance with the manufacturer's recommendations.
- b. Every quarter, the following parameters shall be verified. The actual values shall be measured and logged:
 1. The electrolyte level of each connected cell is between the minimum and maximum level indication marks.
 2. For each connected cell, the voltage and specific gravity, corrected for 77°F and electrolyte level, are in accordance with the manufacturer's recommendations.
 3. The electrolyte temperatures in a representative sample of cells, consisting of at least every sixth cell, are within $\pm 5^{\circ}\text{F}$.
- c. Once each operating cycle, the 125 VDC batteries shall be subjected to a battery service test.
- d. At least once each 5 years, the battery capacity shall be verified to be at least 85% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test shall be performed subsequent to the satisfactory completion of the required battery service test.

LIMITING CONDITIONS FOR OPERATION

3.9.B (cont'd.)

operable, all core and containment cooling systems are operable, reactor power level is reduced to 25% of the rated and NRC is notified within 24 hours of the situation, the precautions to be taken during this period and the plans for prompt restoration of incoming power.

b. Diesel Generators

1. From and after the date that one of the diesel generators or an associated critical bus is made or found to be inoperable for any reason, continued reactor operation is permissible in accordance with Specification 3.5.F.1 if Specification 3.9.A.1 is satisfied.
2. From and after the date that both diesel generators are made or found to be inoperable for any reason, continued reactor operation is permissible only during the succeeding 24 hours in accordance with Specification 3.5.F.2 if Specification 3.9.A.1 is satisfied.
3. From and after the date that one of the diesel generators or associated critical buses and either the emergency or startup transformer power source are made or found to be inoperable for any reason, continued reactor operation is permissible in accordance with Specification 3.5.F.1, provided the other off-site source, startup transformer or emergency transformer is available and capable of automatically supplying power to the 4160V critical buses and the NRC is notified within 24 hours of the occurrence and the plans for restoration of the inoperable components.

SURVEILLANCE REQUIREMENTS

4.9.A.4 250 VDC Unit Batteries

- a. Every week, the following parameters shall be verified. The actual values shall be measured and logged:
 1. The total battery terminal voltage shall be equal to or greater than 212 volts,
 2. The electrolyte level of each pilot cell is between the minimum and maximum level indication marks,
 3. The pilot cell voltage and specific gravity, corrected to 77°F and electrolyte level, are in accordance with the manufacturer's recommendations.
- b. Every quarter, the following parameters shall be verified. The actual values shall be measured and logged:
 1. The electrolyte level of each connected cell is between the minimum and maximum level indication marks.
 2. For each connected cell, the voltage and specific gravity, corrected for 77°F and electrolyte level, are in accordance with the manufacturer's recommendations.
 3. The electrolyte temperatures in a representative sample of cells, consisting of at least every sixth cell, are within ±5°F.
- c. Once each operating cycle, the 250 VDC batteries shall be subjected to a battery service test.

LIMITING CONDITIONS FOR OPERATION

3.9.B.5 (cont'd.)

c. DC Power

1. From and after the date that one of the 125 or 250 volt battery systems is made or found to be inoperable for any reason, continued reactor operation is permissible during the succeeding ten days within electrical safety considerations, provided repair work is initiated in the most expeditious manner to return the failed component to an operable state, and Specifications 3.5.A.5 and 3.5.F are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period and the plans to return the failed components to an operable state.

d. RPS/MG Sets

1. With one RPS electric power monitoring channel for an inservice RPS MG set or alternate power supply inoperable, restore the inoperable channel to operable status within 72 hours or remove the associated RPS MG set or alternate power supply from service.
2. With both RPS electric power monitoring channels for an inservice RPS MG set or alternate power supply inoperable, restore at least one to operable status within 30 minutes or remove the associated RPS MG set or alternate power supply from service.

SURVEILLANCE REQUIREMENTS

4.9.A.4 (cont'd)

- d. At least once each 5 years, the battery capacity shall be verified to be at least 85% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test shall be performed subsequent to the satisfactory completion of the required battery service test.

4. Power Monitoring System for RPS System

The above specified RPS power monitoring system instrumentation shall be determined operable:

- a. At least once per operating cycle by demonstrating the operability of over-voltage, under-voltage and under-frequency protective instrumentation by performance of a channel calibration including simulated automatic actuation of the protective relays, tripping logic and output circuit breakers and verifying the following set-points.
 1. Over-voltage < 132 VAC, with time delay ≤ 2 sec.
 2. Under-voltage ≥ 108 VAC, with time delay ≤ 2 sec.
 3. Under-frequency ≥ 57 Hz. with time delay ≤ 2 sec.

3.9 BASES

The general objective of this Specification is to assure an adequate source of electrical power to operate the auxiliaries during plant operation, to operate facilities to cool and lubricate the plant during shutdown and to operate the engineered safeguards following the accident. There are three sources of ac electrical energy available; namely, the startup transformer, the emergency transformer and two diesel generators. The dc supply is required for switch gear and engineered safety feature systems. This supply consists of two 125V DC and two 250V DC batteries and their related chargers. Specification 3.9.A states the required availability of ac and dc power; i.e., active off-site ac sources and the required amount of on-site ac and dc sources.

Auxiliary power for CNS is supplied from the startup transformer and the normal transformer. Both of these transformers are sized to carry 100% of the station auxiliary load. The emergency transformer is about one third the size of these two transformers and is equal in size to both emergency diesel generators.

The startup transformer and the emergency transformers are the offsite power sources. Their voltage is monitored by undervoltage relays which provide low voltage protection for the emergency buses. Whenever the voltage setpoint and time delay limit for the undervoltage relays have been exceeded, the emergency buses are automatically disconnected from the offsite power source.

If the startup or emergency transformer is lost, the unit can continue to operate since the unit auxiliary transformer is in service, and the emergency or startup transformer and the diesels are available.

If both the startup and emergency transformers become inoperable, the power level must be reduced to a value where by the unit can safely reject the load and continue to supply auxiliary electric power to the station.

In the normal mode of operation, the startup and emergency transformers are energized and two diesel generators are operable. One diesel generator may be allowed out of service based on the availability of power from the startup transformer and the fact that one diesel generator carries sufficient engineered safeguards equipment to cover all breakers. With the startup transformer and one diesel generator out of service, the off site transmission line corresponding to the emergency transformer must be available. Upon the loss of one on-site and one off-site power source, power would be available from the other immediate off-site power source and the two operable on-site diesels to carry sufficient engineered safeguards equipment to cover all breaks. In addition to these two power sources, removal of the Isolated Phase Bus "quick" disconnect links would allow backfeed of power through the main transformer to the unit auxiliary transformer and provide power to carry the full station auxiliary load. The time required to perform this operation is comparable to the time the reactor could remain on RCIC operation before controlled depressurization need be initiated.

A battery charger is supplied with each of the 125/250 Volt batteries. The 125 Volt battery system shall have a minimum of 105 Volts at the battery terminals to be considered operable. The 250 Volt battery system shall have a minimum of 212 Volts at the battery terminals to be considered operable. These values are based on a minimum of 1.75 Volts per cell (each 250 Volt battery has 121 cells and each 125 Volt battery has 60 cells).