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October 14, 2005
L-05-157

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
License Amendment Request No. 202
Station Battery Charger Upgrade

Pursuant to 10 CFR 50.90, FirstEnergy Nuclear Operating Company (FENOC) requests an amendment to the license for Beaver Valley Power Station (BVPS) Unit No. 2 in the form of changes to the Technical Specifications. The proposed changes would revise Technical Specifications 3/4.8.2.3 and 3/4.8.2.4 to permit implementation of design changes associated with a battery charger upgrade. This amendment is requested to support modifications to be installed during the twelfth (12th) BVPS Unit No. 2 maintenance and refueling outage scheduled for October 2006.

The FENOC evaluation of the proposed changes is presented in the Enclosure. The proposed Technical Specification changes are presented in Attachment A of the Enclosure. Attachment B of the Enclosure provides the proposed information-only changes to the Technical Specification Bases related to the proposed license amendment.

The BVPS review committees have reviewed the changes. The changes were determined to be safe and do not involve a significant hazard consideration as defined in 10 CFR 50.92 based on the safety evaluation and no significant hazard evaluation presented in the Enclosure.

FENOC requests approval of the proposed amendment by September 2006, with a 90 day implementation period. A 90 day implementation period will permit the amendment to be implemented prior to startup from the BVPS Unit No. 2 maintenance and refueling outage scheduled for October 2006.

No new regulatory commitments are contained in this submittal. If there are any questions concerning this matter, please contact Mr. Henry L. Hegrat, Supervisor - Licensing, at 330-315-6944.

A001

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 14, 2005.

Sincerely,

L. William Pearce

Enclosure: FENOC Evaluation of the Proposed Change

c: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. P. C. Cataldo, NRC Sr. Resident Inspector
Mr. S. J. Collins, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

ENCLOSURE

FENOC Evaluation of the Proposed Changes

Beaver Valley Power Station
License Amendment Request 202 (Unit No. 2)

Subject: Station Battery Charger Upgrade

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Number	Title
A	Proposed Technical Specification Changes
B	Proposed Technical Specification Bases Changes

1.0 DESCRIPTION

The proposed changes would revise Technical Specifications 3/4.8.2.3 and 3/4.8.2.4 to permit implementation of design changes associated with Engineering Change Package ECP-05-0059, "Battery Charger Upgrade." This amendment is requested to support modifications to be installed during the twelfth (12th) BVPS Unit No. 2 maintenance and refueling outage scheduled for October 2006.

These modifications include:

1. Replacing battery chargers 2-1 and 2-2 with equivalent units due to obsolescence, and
2. Installing new battery chargers 2-3 and 2-4 to replace the battery charging function of number 2-3 and 2-4 Uninterruptible Power Supply (UPS) rectifiers.

2.0 PROPOSED CHANGES

The proposed Technical Specification changes, which are submitted for NRC review and approval, are provided in Attachment A. The changes proposed to the Technical Specification Bases are provided in Attachment B. The proposed Technical Specification Bases changes do not require NRC approval. The BVPS Technical Specification Bases Control Program controls the review, approval and implementation of Technical Specification Bases changes. The Technical Specification Bases changes are provided for information only.

The proposed changes to the Technical Specifications, and Technical Specification Bases have been prepared electronically. Deletions are shown with a strike-through and insertions are shown double-underlined. This presentation allows the reviewer to readily identify the information that has been deleted and added.

Changes to the following Technical Specifications (TS) and associated surveillance requirements are being proposed to permit implementation of changes associated with Engineering Change Package ECP-05-0059, "Battery Charger Upgrade."

Affected Technical Specifications	
Unit 2	**Title**
3/4.8.2.3	D. C. Distribution - Operating
3/4.8.2.4	D. C. Distribution - Shutdown

The following paragraphs provide a description of the proposed changes and a basis for the changes.

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1. Technical Specification Limiting Condition for Operation 3.8.2.3 is revised to replace references to rectifier 2-3 and 2-4 with references to chargers 2-3 and 2-4, respectively.
2. Technical Specification 3.8.2.3, Action "b" will be revised to delete reference to the rectifiers (chargers will continue to be referenced).
3. Technical Specification 3.8.2.3, Action "b" will be revised to refer to "a spare charger" instead of "spare charger 2-7."
4. Surveillance Requirement (SR) 4.8.2.3.2 will be revised to delete reference to "rectifier." The charger will continue to be referenced in SR 4.8.2.3.2.
5. Editorial changes will also be made to the Technical Specification Limiting Condition for Operation (LCO) 3.8.2.3 Train "A" and Train "B" equipment list wording as shown in Attachment A (and described below) to correct grammar and for consistency.
    a. The third occurrence of the ampersand ("&") symbol in the LCO 3.8.2.3 Train "A" equipment list will be changed to read "and" to be consistent with LCO 3.8.2.4 wording.
    b. The word "charger" in both the LCO 3.8.2.3 Train "A" and Train "B" equipment list will be changed to read "chargers" to be grammatically correct.
    c. The word "and" in the LCO 3.8.2.3 Train "A" equipment list will be changed to an ampersand symbol to be consistent with LCO 3.8.2.4 wording.
    d. The second occurrence of the word "and" in the LCO 3.8.2.3 Train "B" equipment list will be changed to an ampersand symbol to be consistent with LCO 3.8.2.4 wording.

Page 3/4 8-12 Changes

6. Technical Specification Limiting Condition for Operation (LCO) 3.8.2.4.a and b are revised to replace references to rectifier 2-3 and 2-4 with references to chargers 2-3 and 2-4, respectively.
7. The LCO 3.8.2.4 footnote associated with Spare Charger 2-7 will be revised to delete reference to "rectifier."
8. The LCO 3.8.2.4 footnote associated with Spare Charger 2-7 will be revised to refer to "A spare charger" instead of "Spare Charger 2-7," and change the words "one

charger or rectifier" to read "inoperable charger or charger removed from service for maintenance."

9. SR 4.8.2.4.2 will be revised to delete reference to "rectifier." The charger will continue to be referenced in SR 4.8.2.4.2.

10. Editorial changes will also be made to the LCO 3.8.2.4 Train "A" and Train "B" equipment list wording as shown in Attachment A (and described below) to correct grammar and for consistency.
    a. The word "Busses" in both the LCO 3.8.2.3 Train "A" and Train "B" equipment list will be changed to read "busses" to be consistent with LCO 3.8.2.3 wording.
    b. The words "Battery Banks" in both the LCO 3.8.2.3 Train "A" and Train "B" equipment list will be changed to read "battery banks" to be consistent with LCO 3.8.2.3 wording.
    c. The word "Charger" in both the LCO 3.8.2.3 Train "A" and Train "B" equipment list will be changed to read "chargers" to correct grammar and to be consistent with LCO 3.8.2.3 wording.

Basis for Changes

Changes 1, 2 and 6

Technical Specification LCO 3.8.2.3 and 3.8.2.4 are revised to reflect installation of new battery chargers (2-3 and 2-4). These new battery chargers will satisfy the battery charging function previously satisfied by rectifiers 2-3 and 2-4. Rectifiers 2-3 and 2-4 will no longer be used for this battery charger function. The rectifiers will continue to provide the primary source of DC power to the vital bus inverter assemblies. The new battery chargers are seismically and electrically equivalent to battery chargers 2-1 and 2-2, and satisfy the applicable Updated Final Safety Analysis Report design basis as discussed in the Technical Analysis and Regulatory Safety Analysis sections of this document.

The engineering change package documents the evaluation of the equivalency of the new and replacement battery chargers to perform their design function.

Changes 3 and 8

References to spare charger 2-7 in LCO 3.8.2.3, Action b and the footnote associated with LCO 3.8.2.4 are revised.

This detail was moved to the Technical Specification Bases. The removal of the descriptive text identifying the spare charger equipment designation from the Technical Specifications is acceptable because this type of information is not necessary to be included in the Technical Specifications to provide adequate protection of public health and safety. With the proposed change the Technical Specifications will continue to

require (in the case of LCO 3.8.2.3, Action b) and allow (in the case of the footnote associated with LCO 3.8.2.4) that a spare battery charger be placed in service when a charger is inoperable or removed from service for maintenance. Identifying the available spare battery charger in the Technical Specifications is not required in order for the LCO requirements to be applicable and enforced. Also, this change is acceptable because this type of descriptive information will be adequately controlled in the Technical Specification Bases. Changes to the Technical Specification Bases are controlled by the Technical Specification Bases Control Program specified in the Administrative Controls Section of the Technical Specifications. This program provides for the evaluation of changes to ensure the Technical Specification Bases are properly controlled and that prior NRC review and approval is requested when required.

The footnote for LCO 3.8.2.4 was also clarified to indicate that a spare battery charger may be substituted for an inoperable charger or charger removed from service for maintenance. This change is acceptable since the revised Technical Specification wording is clarified to ensure proper understanding of the requirement.

Changes 4, 7 and 9

References to "rectifier" in SR 4.8.2.3.2, in the footnote associated with LCO 3.8.2.4 and in SR 4.8.2.4.2 are to be deleted, since the rectifiers will no longer be used to satisfy the battery charger function. The rectifiers will continue to provide DC power to the inverter assemblies and this design function will continue to be verified by SR 4.8.2.1 and 4.8.2.2.

Changes 5 and 10

LCO 3.8.2.3 and 3.8.2.4, Train "A" and Train "B" equipment list wording is being changed to correct grammar and for consistency. These changes are acceptable because they clarify the revised Technical Specification wording to ensure proper understanding of the requirements.

Summary

In summary, the proposed amendment would revise Beaver Valley Power Station Unit No. 2 Technical Specifications 3/4.8.2.3 and 3/4.8.2.4. The changes would permit implementation of station battery charger upgrades, including installation of new battery chargers, during the next Beaver Valley Power Station Unit No. 2 maintenance and refueling outage. The changes also correct grammar and make the wording of the two specifications consistent. In addition, the Technical Specification Bases will be revised to indicate that the Technical Specifications permit the use of a spare battery charger in the event a battery charger is inoperable or removed from service for maintenance, since the spare battery charger is equivalent to a primary battery charger.

3.0 BACKGROUND

System Description

The following paragraphs provide a background discussion of the systems, components and parameters affected by the proposed changes. The discussion is provided for information and does not describe the changes being proposed.

The 120 Volt AC Vital Bus Uninterruptible Power Supply (UPS) System is described in BVPS Unit No. 2 Updated Final Safety Analysis Report (UFSAR) Section 8.3.1.1.17. A summary is provided below.

There are four independent Class 1E vital bus power supplies constituting the 120 Volt (V) alternating current (AC) vital bus UPS. Each bus provides 120 V AC power for ESF protection channel instrumentation and controls, and is uniquely identified by the assigned colors red, white, blue, or yellow corresponding respectively to vital buses UPS-VITBS2-1, 2-2, 2-3, and 2-4. Each vital bus UPS consists of an inverter, rectifier (systems 2-1 and 2-2), or rectifier/charger (systems 2-3 and 2-4), static switch/manual bypass switch, and alternate source line voltage regulator.

Each Class 1E 120VAC vital bus normally receives power from its UPS unit which in turn receives power from an emergency 480 V Motor Control Center (MCC). The UPS rectifier converts the 480 V AC to 125 V direct current (DC) and supplies it to the UPS inverter input. The interconnection with an emergency 480 V MCC provides the vital buses with the capability of an offsite (preferred) power source or an on-site (emergency) power source.

In the event that the rectifier source is lost, the inverter will receive 125 V DC directly from the 125 V DC battery input. This input is normally the battery charger. Each system is designed such that the battery will not supply current to the UPS while AC power (rectifier input) is available and within specified limits. In the event that both the rectifier and battery sources are unavailable or the inverter malfunctions, the system load is transferred within 1/4 cycle to the 480-120 V alternate source line voltage regulator by means of the static switch. This is true for all four vital bus UPS units.

The BVPS Unit No. 2 operator also has the option, by means of the manual bypass switch, of overriding the automatic transfer feature to allow for transfer.

Vital buses 2-3 (blue) and 2-4 (yellow) are associated with Class 1E batteries 2-3 and 2-4, respectively. The DC loads on these systems are limited by design to only blue and yellow channel 125 V DC circuits. For this reason, the

rectifier/chargers, in addition to being the primary source of DC power to the inverter assemblies, also serve as battery chargers for these batteries.

UPS units associated with vital buses 2-1 (red) and 2-2 (white) receive their DC inputs from Class 1E batteries 2-1 and 2-2, respectively, via DC switchboards. Several non-vital bus Class 1E DC loads not in this system are also powered from these two sources; consequently, batteries 2-1 and 2-2 are provided with separate battery chargers. Blocking diodes have been added to the input circuits of inverters 2-1 and 2-2, thus preventing back-feeding from rectifiers 2-1 and 2-2, and preventing the rectifier assemblies from providing DC input to the respective battery bus. (Two non-Class 1E DC systems are provided for the non-safety DC loads).

A spare mobile battery charger is also available to provide charging current to the Class 1E batteries during charger maintenance or in the event that a Class 1E battery charger fails. This spare charger and its associated connecting receptacles are qualified for Class 1E use.

The DC Power System Arrangement and Sizing is described in BVPS Unit No. 2 UFSAR Section 8.3.2.1.3. A summary is provided below.

Each DC subsystem has a charging component which is sized to supply all normal continuous loads and to simultaneously recharge the battery, after the design 2-hour duty cycle discharge, to the fully charged condition in 24 hours. The maximum equalizing voltage setting ensures that equipment connected to the batteries is not subjected to voltages greater than the voltage for which it was qualified.

The Class 1E batteries have the ability to supply normal loads for a minimum of 2 hours. The battery and battery charging system then perform any necessary switching operations without help from any other source. The capacity of each Class 1E battery with the charger inoperable is large enough to cope with Design Basis Accident (DBA) conditions.

Each battery system is sized in conformance with the principles set out in IEEE Standard 308-1974. The battery capacities for batteries 2-1 and 2-2 are 1,700 ampere hours (Ah) each. The capacities for batteries 2-3 and 2-4 are 1,140 Ah each (Reference UFSAR Figure 8.3-14). These capacities are sufficient to operate all connected DC loads under DBA conditions for a minimum of 2 hours. At no time during this period will a cell terminal voltage drop below 1.84 V.

Reason for the Change

The battery chargers are being upgraded for the following reasons:

1. Battery chargers 2-1 and 2-2 will be replaced with equivalent units due to obsolescence.

2. New battery chargers 2-3 and 2-4 will be installed. Currently the Nos. 2-3 and 2-4 UPS rectifiers perform two design functions, one to provide the normal source of DC to the Nos. 2-3 and 2-4 vital bus inverters, and another to provide charging current to the battery that supplies the inverter on loss of AC. After installation of the new chargers the Nos. 2-3 and 2-4 UPS rectifiers will retain their function of providing the normal source of DC to the Nos. 2-3 and 2-4 vital bus inverters. Battery chargers 2-3 and 2-4 will be used to perform the battery charging function of the UPS rectifiers. The number 2-3 and 2-4 UPS rectifiers will no longer perform this battery charging design function. This modification adds diversity to the system, since a single failure of a rectifier will no longer render the UPS and the DC bus inoperable.

4.0 TECHNICAL ANALYSIS

Purpose and Basis for Affected Specifications

The proposed license amendment request affects Technical Specification LCOs 3.8.2.3, 3.8.2.4, and associated surveillance requirements. These specifications ensure the appropriate number of DC bus trains are energized and operable in Modes 1 through 6, during movement of recently irradiated fuel assemblies, and during movement of fuel assemblies over recently irradiated fuel assemblies.

Technical Specification Bases for Specifications 3/4.8.1 and 3/4.8.2, "A. C. Sources and Onsite Power Distribution Systems," are provided in Attachment B. These Bases state that operability of the minimum specified AC and DC power sources and associated distribution systems ensures that sufficient power will be available to supply safety related equipment required for safe shutdown of the facility and mitigation and control of accident conditions within the facility.

The Technical Specifications affected by the proposed changes will continue to satisfy the purpose of the specifications (to ensure sufficient power is available to supply safety related equipment) as described in the relevant Technical Specification Bases.

The modification to the plant removes one of the dual functions of the existing vital bus Nos. 2-3 and 2-4 UPS rectifier units. They will no longer need to supply power to their associated DC buses. That function will be performed by the new battery chargers.

The modification adds diversity to the system, since a single failure of a rectifier will no longer render the UPS and the DC bus inoperable.

The new arrangement for DC buses 2-3 and 2-4 will match the existing arrangement of DC buses 2-1 and 2-2, insofar as the modification will result in all four instrument buses having a separate UPS rectifier assembly that provides the primary source of DC power to the UPS inverter assembly, and a battery charger device.

Impact on Plant Safety Analysis Assumptions

The design objective associated with this change is to bolster the reliability and add diversification to the 120 V AC Vital Bus Uninterruptible Power Supply System and Class 1E DC Power System by replacing aging, obsolete equipment and installing additional battery chargers to assume the battery charging design function. Battery chargers are sized for the capability to supply all normal continuous loads and to simultaneously recharge the battery, after the design 2-hour duty cycle discharge, to the fully charged condition in 24 hours.

The new battery chargers have been procured, and will be installed as Class 1E Static Battery Chargers, to meet the requirements of IEEE Standards: 344-1975 for Seismic Qualification of Class 1E Equipment; 323-1974 for Qualification of Class 1E Equipment; and 650-1979 for Qualification of Class 1E Static Battery Chargers and Inverters. The equipment is qualified to meet the most severe credible hostile environment in the equipment's location. As such, the system design basis will maintain compliance with applicable design criteria, (i.e., General Design Criteria 2, 4, 5, 17, 18, and Regulatory Guides 1.32 and 1.75) as stated in sections 8.3.1 and 8.3.2 of the BVPS Unit No. 2 UFSAR.

Equipment qualification (i.e., Seismic, Electrical, Environmental, etc.) and capacity per the equipment specifications are equal to or better than those of the original equipment. This Class 1E electrical equipment will be located as to minimize potential damage from any identified hazard in the area, as well as maintaining adequate separation from equipment from the redundant train or channel and from non-Class 1E equipment. Equipment location takes into account the ease of personnel access and the provision of adequate physical space for performing testing and maintenance as well as equipment removal.

Locations of new and replacement battery chargers will be local to the associated UPS units. Cable/conduit entries will be at the top of each unit. Electrical field cable terminations are accessible from the rear of the units. Internal (vendor) wiring is accessible from both the front and rear of the units. All operating controls and indicators are located and accessible on the front of each unit. This is consistent with current equipment location, operating, installation and maintenance standards.

The modification installs separate, dedicated, adequately sized battery chargers to support the design function in exactly the same manner and operate within the exact electrical parameters as those components being replaced.

The modification adds diversity to the system, since a single failure of a rectifier will no longer render the UPS and the DC bus inoperable. There is no adverse effect on the design function of the DC power system as a result of the modification.

There is no adverse impact on safety analyses. No design function is being changed. DC buses 2-3 and 2-4 will have qualified, and sufficiently sized, battery charger units installed to perform those functions previously performed by the associated UPS rectifiers.

A review of industry operating experience reveals that common failure mechanisms for battery chargers and UPS rectifiers typically involve failure of discrete components within the unit (that is capacitors, resistors, surge suppressors, and other components). Manufacturing defects in the equipment such as faulty wiring connections and conductor training are also credible failure mechanisms. Although the replacement battery chargers are not identical to the UPS rectifier being replaced, the overall technology of the devices are of a sufficiently similar nature as to conclude that no new failure mechanisms have been created.

Failure modes associated with the rectifiers are reduced by the addition of battery chargers. A rectifier failure in the original design would result in the loss of battery charging and vital bus load carrying functions. As a result of the modification, a dedicated battery charger will prevent the loss of battery charging design function upon failure of a rectifier. The battery charger failure mode will be only that previously associated with the rectifiers. No new failure modes are associated with the new battery chargers.

In summary, the proposed changes will continue to satisfy the purpose of the affected Technical Specifications to ensure sufficient power is available to supply safety related equipment. The modification improves reliability by upgrading equipment, and adds diversity to the system by adding battery chargers. Equipment qualification (i.e., Seismic, Electrical, Environmental, etc.) and capacity per the equipment specifications are equal to or better than those of the original equipment. No new failure modes are created with the addition of the new battery chargers, the capability to perform design functions is improved and there is no adverse impact on the safety analyses.

5.0 REGULATORY SAFETY ANALYSIS

The proposed changes would revise Technical Specifications 3/4.8.2.3 and 3/4.8.2.4, "D.C. Distribution - Operating" and "D.C. Distribution - Shutdown" respectively. The Technical Specification changes would permit implementation of battery charger upgrades that improve reliability by upgrading battery charger equipment, and add diversity to the system by adding battery chargers.

5.1 No Significant Hazards Consideration

FirstEnergy Nuclear Operating Company (FENOC) has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

Failure of the components associated with the proposed change (i.e., battery chargers and Uninterruptible Power Supply rectifiers) would not initiate any of the accidents described in the Updated Final Safety Anslysis Report. No design function is being changed, and there is no adverse impact on the probability or consequences of accidents described in the safety analyses. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

Failure modes associated with the rectifiers are reduced by the addition of battery chargers. A rectifier failure in the original design would result in the loss of battery charging and vital-bus load carrying functions. As a result of the modification, a dedicated battery charger will eliminate the battery charging design function loss upon failure of a rectifier. The failure mode for the new battery charger will be limited to the failure mode previously associated with the rectifiers. No new failure modes are associated with the new battery chargers.

No new failure modes are created by the proposed change; therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

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

Response: No.

The modification does not reduce the margin of safety. Vital and DC bus support functions are unaffected. The system will still consist of rectifier and inverter units to provide AC power to the associated vital buses and units that charge the bus batteries and carry the associated DC bus loads. The only difference is that the Nos. 2-3 and 2-4 UPS unit rectifiers will no longer perform both of these functions. Separate battery charger units will charge the bus batteries and carry the DC loads. The new arrangement for DC buses 2-3 and 2-4 will match the existing arrangement of DC buses 2-1 and 2-2, insofar as the modification will result in all four instrument buses having separate UPS rectifier assemblies and battery charger devices. Dedicated bus 2-3 and 2-4 chargers should increase system reliability.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, FENOC concludes that the proposed amendments present no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

5.2.1 Design Basis

The Class 1E, DC Power System is described in UFSAR Section 8.3.2.1.1. This system includes Class 1E batteries 2-1, battery charger 2-1, and distribution switchboard 2-1; Class 1E battery 2-2, battery charger 2-2, and distribution switchboard 2-2; Class 1E battery 2-3, vital bus rectifier/charger 2-3, and distribution panel 2-19; Class 1E battery 2-4, vital bus rectifier/charger 2-4, and distribution panel 2-20. Spare battery charger 2-7 provides a backup method for battery charging and bus supply if a primary charger is out of service.

UFSAR Section 8.1.1 Electric Power System Design Basis states that: "The guidance documents listed in Table 8.1-1 [Acceptance Criteria For Electric Power] were utilized in the design, construction, testing, and inspection of the electrical

systems. Table 8.1-1 designates the sections of Chapter 8 which have prime relevance to the indicated document."

Applicable design basis documents from UFSAR Table 8.1-1 related to UFSAR Section 8.3.2 are listed in the table below.

General Design Criteria (GDC), Appendix A to 10 CFR 50:
GDC-1, Quality Standards and Records
GDC-2, Design Bases for Protection Against Natural Phenomena
GDC-4, Environmental and Missile Design Bases
GDC-5, Sharing of Structures, Systems, and Components
GDC-17, Electric Power Systems
GDC-18, Inspection and Testing of Electric Power Systems
Institute of Electrical and Electronics Engineers (IEEE) Standards:
IEEE Std 279-1971 Criteria for Protection Systems for Nuclear Power Generating Stations (Refer to 10 CFR 50.55a (h) and Reg. Guide 1.62)
IEEE Std 308-1974 Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations (Refer to Reg. Guide 1.32)
IEEE Std 323-1971 Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations (Refer to Reg. Guide 1.89)
IEEE Std 323-1974 Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations
IEEE Std 344-1975 Seismic Qualification of Class 1E Equipment
IEEE Std 384-1974 (ANSI N41.14) Trial-Use Standard Criteria for Separation of Class 1E Equipment and Circuits (Refer to Reg. Guide 1.75)
IEEE Std 650-1979 Qualification of Class 1E Static Battery Chargers

Regulatory Guide (RG):
RG 1.6-March 1971 Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems
RG 1.29-Sept. 1978 Seismic Design Classification
RG 1.30-Aug. 1972 Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment
RG 1.32-Feb. 1977 Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants
RG 1.53-June 1973 Application of the Single-Failure Criterion to Nuclear Power Plant Protection Systems
RG 1.62-Oct. 1973 Manual Initiation of Protective Actions
RG 1.75-Sept 1978 Physical Independence of Electric Systems
RG 1.89-Nov. 1974 Qualification of Class 1E Equipment for Nuclear Power Plants
RG 1.93-Dec. 1974 Availability of Electric Power Sources
RG 1.100-Aug. 1977 Seismic Qualification of Electric Equipment for Nuclear Power Plants
RG 1.118-June 1978 Periodic Testing of Electric Power and Protection Systems
Branch Technical Positions (BTP) ICSB
BTP ICSB 10 Electrical and Mechanical Equipment Seismic Test Qualification Program

5.2.2 Discussion of Impact on Design Basis

The proposed change was reviewed for the potential impact on conformance to the design basis documents listed in the table above. The results of this review has concluded that the system and equipment design detail described in this license amendment request will continue to maintain compliance with these related design basis documents to the extent described in the UFSAR. No change to the UFSAR description of design conformance is necessary.

5.3 Conclusion

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. Since this change request is related to a plant-specific design change, no precedent for this request has been identified.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants."

2. UFSAR Section 8.1.1, [Electric Power System] Design Basis.

3. UFSAR Section 8.3.1.1.17, 120 V AC Vital Bus Uninterruptible Power Supply System.

4. UFSAR Section 8.3.2, DC Power Systems.

5. UFSAR Section 8.3.2.1.1, Class 1E DC Power System.

6. UFSAR Section 8.3.2.1.3, DC Power System Arrangement and Sizing.

Attachment A

Beaver Valley Power Station, Unit No. 2
Proposed Technical Specification Changes

License Amendment Request No. 202

The following is a list of the affected pages:

3/4 8-9
3/4 8-12

No changes are proposed for the following two pages. These pages are provided for information only.

3/4 8-10
3/4 8-11

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION - OPERATING

LIMITING CONDITION FOR OPERATION

3.8.2.3 The following D.C. bus trains shall be energized and OPERABLE:

TRAIN "A" (orange) consisting of 125-volt D.C. busses No. 2-1 & 2-3, 125-volt D.C. battery banks 2-1 & 2-3 ~~&~~and chargers 2-1 ~~and rectifier~~& 2-3.

TRAIN "B" (purple) consisting of 125-volt D.C. busses No. 2-2 & 2-4, 125-volt D.C. battery banks 2-2 & 2-4 and chargers 2-2 ~~and rectifier~~& 2-4.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With one of the required battery banks inoperable, restore the inoperable battery bank to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one of the required full capacity chargers ~~or rectifiers~~ inoperable, demonstrate the OPERABILITY of its associated battery bank by performing Surveillance Requirement 4.8.2.3.2.a.1 within one hour. Within 4 hours place in service a spare charger ~~2-7~~ or continue the Surveillance Requirement of 4.8.2.3.2.a.1 at least once per 8 hours thereafter. If any Category A limit in Table 3.8-1 is not met, declare the battery inoperable.

Detail being moved to the TS Bases

SURVEILLANCE REQUIREMENTS

4.8.2.3.1 Each D.C. bus train shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.3.2 Each 125-volt battery bank and charger~~/rectifier~~ shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

1. The parameters in Table 3.8-1 meet the Category A limits, and

2. The total battery terminal voltage is greater than or equal to 127.8 - volts on float charge.

b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 -volts, or battery overcharge with battery terminal voltage above 150 -volts, by verifying that:

SURVEILLANCE REQUIREMENTS

1. The parameters in Table 3.8-1 meet the Category B limits.

2. There is no visible corrosion at either terminals or connectors, or the connection resistance of these items is less than 150×10^{-6} ohms, and

3. The average electrolyte temperature of every tenth cell of connected cells is above 60°F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

2. The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material,

3. The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohms; and

4. The battery charger will supply at least 100 amperes at 140-volts for at least 4 hours.

d. At least once per 18 months*, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the 2-hour design duty cycle when the battery is subjected to a battery service test.

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. Once per 60 month interval, this performance discharge test may be performed in lieu of the battery service test.

f. At least once per 18 months, during shutdown, performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

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* The specified 18-month surveillance interval during the first fuel cycle may be extended to coincide with completion of the first refueling outage.

Provided for Information Only.

TABLE 3.8-1

BATTERY SURVEILLANCE REQUIREMENTS

	CATEGORY A[1]	CATEGORY B[2]	
Parameter	Limits for each designated pilot cell	Limits for each connected cell	Allowable[3] value for each connected cell
Electrolyte Level	> Minimum level indication mark, and ≤ ¼" above maximum level indication mark	> Minimum level indication mark, and ≤ ¼" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts[c]	> 2.07 volts
Specific Gravity[a]	≥ 1.200[b]	≥ 1.195	Not more than .020 below the average of all connected cells
		Average of all connected cells > 1.205	Average of all connected cells ≥ 1.195[b]

(a) Corrected for electrolyte temperature and level.

(b) Or battery charging current is less than (2) amps when on charge.

(c) Corrected for average electrolyte temperature.

(1) For any Category A parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that within 24 hours all the Category B measurements are taken and found to be within their allowable values, and provided all Category A and B parameter(s) are restored to within limits within the next 6 days.

(2) For any Category B parameter(s) outside the limit(s) shown, the battery may be considered OPERABLE provided that the Category B parameters are within their allowable values and provided the Category B parameter(s) are restored to within limits within 7 days.

(3) Any Category B parameter not within its allowable value indicates an inoperable battery.

ELECTRICAL POWER SYSTEMS

D.C. DISTRIBUTION - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.2.4 As a minimum, one of the following trains of D.C. electrical equipment and busses shall be OPERABLE and energized in the specified manner:

a. Train "A" (orange) consisting of the following:

1. 125-volt D.C. Bbusses No. 2-1 & 2-3, and
2. 125-volt D.C. Bbattery Bbanks 2-1 & 2-3 and Cchargers 2-1* & ~~Reetifier~~ 2-3*.

b. Train "B" (purple) consisting of the following:

1. 125-volt D.C. Bbusses No. 2-2 & 2-4, and
2. 125-volt D.C. Bbattery Bbanks 2-2 & 2-4 and Cchargers 2-2* & ~~Reetifier~~ 2-4*.

APPLICABILITY: MODES 5 and 6, and

During movement of recently irradiated fuel assemblies, and

During movement of fuel assemblies over recently irradiated fuel assemblies.

ACTION:

With the above required train of D.C. electrical equipment and busses not fully OPERABLE, immediately suspend all operation involving CORE ALTERATIONS, positive reactivity changes, movement of recently irradiated fuel assemblies and movement of fuel assemblies over recently irradiated fuel assemblies. Initiate corrective action to restore the required train of D.C. electrical equipment and busses to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.2.4.1 The above required 125-volt D.C. bus train shall be determined OPERABLE and energized at least once per 7 days by verifying correct breaker alignment and indicated power availability.

4.8.2.4.2 The above required 125-volt battery bank and chargers~~/rectifiers~~ shall be demonstrated OPERABLE per Surveillance Requirement 4.8.2.3.2.

Detail being moved to the TS Bases

* A Sspare Ccharger ~~2-7~~ may be substituted for any ~~one~~ inoperable charger or ~~reetifier~~charger removed from service for maintenance.

Attachment B

Beaver Valley Power Station, Unit No. 2
Proposed Technical Specification Bases Changes

License Amendment Request No. 202

The following page has been marked to show changes associated with the proposed Technical Specification changes.

B 3/4 8-3

The two pages listed below are provided for information only. No changes have been proposed for these pages.

B 3/4 8-1
B 3/4 8-2

Provided for Information Only.

BASES

3/4.8.1, 3/4.8.2 A.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source.

The ACTIONS of LCO 3.8.1.1 are modified by a General Note that prohibits the application of Specification 3.0.4.b to an inoperable diesel generator. There is increased risk associated with entering an OPERATIONAL MODE or other specified condition in the Applicability with an inoperable diesel generator and the provisions of Specification 3.0.4.b, which allow entry into an OPERATIONAL MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

The ACTION requirements specified in LCOs 3.8.1.2, 3.8.2.2, and 3.8.2.4 address the condition where sufficient power is unavailable to recover from postulated events, such as a fuel handling accident involving recently irradiated fuel. Due to radioactive decay, electrical power is only required to mitigate fuel handling accidents involving recently irradiated fuel (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours). Implementation of the ACTION requirements shall not preclude completion of actions to establish a safe conservative plant condition. Completion of the requirements will prevent the occurrence of postulated events for which mitigating actions would be required.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status, and 3) sufficient power is available for systems that may be necessary to recover from postulated events in these MODES, e.g., a fuel handling accident involving recently irradiated fuel.

Provided for Information Only.

3/4.8.1, 3/4.8.2 A.C.. SOURCES AND ONSITE POWER DISTRIBUTION
(Continued)

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are based on the recommendations of Regulatory Guides 1.9, Revision 2, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," December 1979; 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977; and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, Appendix A to Generic Letter 84-15 and Generic Letter 83-26, "Clarification of Surveillance Requirements for Diesel Fuel Impurity Level Tests."

The quantity of 350 usable gallons in the day tank represents the analytical value of fuel necessary to run the diesel for at least 60 minutes at a load of 100% of continuous rating plus a minimum margin of 10% in accordance with ANSI N195 - 1976 which is referenced in Regulatory Guide 1.137 Rev. 1. The total tank volume is greater due to the tank's physical characteristics.

The quantity of 53,225 usable gallons is the analytical value required in the fuel storage tank that, when added to the 350 gallons, makes up the fuel necessary to support a minimum of 7 days continuous EDG operation at its rated load. This is in compliance with Regulatory Guide 1.137, Rev. 1. The total volume in this tank is greater due to the tank's physical characteristics.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978; and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Provided for Information Only.

BASES

3/4.8.1, 3/4.8.2 A.C.. SOURCES AND ONSITE POWER DISTRIBUTION
(Continued)

Table 3.8-1 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 3.8-1 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; 3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and 4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

Note (1) provides clarification of Specification 3.8.1.1 Action requirements when the diesel generators are inoperable as a result of Surveillance Requirements 4.8.1.1.2.d.2 and 4.8.1.1.2.e in accordance with Regulatory Guide 1.137, Revision 1, Position C.2.a.

For the purposes of SR 4.8.1.1.2.a.5, 4.8.1.1.2.b.3.b and 4.8.1.1.2.f testing, the diesel generators are started from standby conditions. Standby conditions for a diesel generator mean that the diesel engine coolant and oil are being continuously circulated and temperatures are being maintained consistent with manufacturer recommendations.

The frequency of 64.4 Hz specified in Surveillance Requirement 4.8.1.1.2.b.2 corresponds to 552 rpm.

Specification 3.8.2.3 Action b, and the footnote for Specification 3.8.2.4 Limiting Condition for Operation provide for the use of spare Battery Charger 2-7 in the event a battery charger is inoperable or is removed from service for maintenance. Spare Battery Charger 2-7 is equivalent to a primary battery charger.