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March 23, 2011

L-11-072

ATTN: Document Control Desk  
United States Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT:**

Davis-Besse Nuclear Power Station, Unit 1  
Docket Number 50-346, License Number NPF-3  
Response to Request for Additional Information Regarding Safety-Related Batteries  
Separation Design and Licensing Bases (TAC No. ME4867)

On November 30, 2007, the Nuclear Regulatory Commission (NRC) completed a component design basis baseline inspection at the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). Results of the inspection were documented in Inspection Report 05000346-2007-007 dated January 14, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080140333). As part of this inspection, an unresolved issue (05000346/2007007-05) was identified related to the safety-related battery design basis. The inspectors expressed a concern that under potentially harsh environments, the non-safety-related loads could become grounded and impose added loads on the safety-related buses. By letter dated February 8, 2011 (ADAMS Accession No. ML110320434), the NRC requested additional information to fully assess the regulatory and safety implication of this issue. Attachment 1 to this letter contains the response to the requested information.

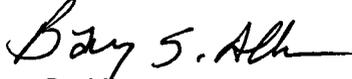
During the development of the response, it was identified that a non-safety-related load had been omitted from the drawing the NRC used to develop the Request for Additional Information. This load has been included in Attachment 1, and the drawing error entered into the Corrective Action Program.

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There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Patrick J. McCloskey, Manager, Site Regulatory Compliance, at (419) 321-7274.

Sincerely,



Barry S. Allen

GMW

Attachment: Response to Request for Additional Information Regarding Safety-Related Batteries Separation Design and Licensing Bases

cc: NRC Region III Administrator  
DB-1 NRC/NRR Project Manager  
DB-1 Senior Resident Inspector  
Utility Radiological Safety Board

Attachment  
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Response to Request for Additional Information Regarding Safety-Related Batteries  
Separation Design and Licensing Bases

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On November 30, 2007, the Nuclear Regulatory Commission (NRC) completed a component design basis baseline inspection at the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). Results of the inspection were documented in Inspection Report 05000346-2007-007 dated January 14, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080140333). As part of this inspection, an unresolved issue (05000346/2007007-05) was identified related to the safety-related battery design basis. The inspectors expressed a concern that under potentially harsh environments, the non-safety-related loads could become grounded and impose added loads on the safety-related buses. By letter dated February 8, 2011 (ADAMS Accession No. ML110320434), the NRC requested additional information to fully assess the regulatory and safety implication of this issue. The NRC staff request is provided below in bold type followed by the FirstEnergy Nuclear Operating Company (FENOC) response for the DBNPS. During the development of the response, it was identified that a non-safety-related load had been omitted from the drawing the NRC used to develop the Request for Additional Information. This load has been included the response below, and the drawing error entered into the FENOC Corrective Action Program.

1. **Provide the ampere rating of the following fuses:**
  - a. **Fuses installed between the 250 Volt direct current non safety-related bus and the safety-related bus powered from the safety-related station batteries and Motor Control Centers E11D and F11D shown on drawing OS-060, Sheet 1.**
  - b. **Fuses for the protection of non safety-related Reactor Coolant Pump Back up Oil Lift pump motors shown on drawing OS-060, Sheet 1.**
  - c. **Fuses shown in Typical Detail "1" for each of the load shown in Table 1 of the drawing OS-060, Sheet 1.**

Response

- a. The fuses installed between the 250 Volt direct current non safety-related buses and the safety-related buses, powered from the safety-related station batteries and Motor Control Centers (MCCs) E11D and F11D are 500 ampere fuses.
- b. The fuses for the Reactor Coolant Pump Backup Oil Lift Pump motors are 60 ampere fuses.

- c. The fuses for the loads shown in Table 1 of drawing OS-0060 Sheet 1 are as follows:
    - i. The fuses associated with Station Overhead Annunciator Switch YSW1 are 30 ampere fuses.
    - ii. The fuses associated with Non-Nuclear Instrumentation (NNI) Channel X Switch YSW2 are 30 ampere fuses.
    - iii. The fuses associated with NNI Channel Y Switch YSW3 are 30 ampere fuses.
    - iv. The fuses associated with Integrated Control System Switch YSW4 are 30 ampere fuses.
    - v. The fuses associated with Plant Computer Multiplexer Switch YSW5 are 100 ampere fuses.
    - vi. The fuses associated with Plant Computer Automatic Transfer Switch in Cabinet YATS5701 (identified as missing from OS-060, Sheet 1) are 20 ampere fuses.
- 2. Provide the postulated environmental conditions the following non safety-related equipment will experience during their installed life and the locations of these equipment:**
- a. **Reactor Coolant Pump Backup Oil Lift pumps powered from the safety-related batteries.**
  - b. **Emergency Lighting Panel L49E1.**
  - c. **Station Overhead Annunciator (Switch YSW1).**
  - d. **Non-Nuclear Instrumentation (NNI) Channel X (Switch YSW2).**
  - e. **NNI Channel Y (Switch YSW3).**
  - f. **Integrated Control System (Switch YSW4)**
  - g. **Plant Computer (Switch YSW5)**

Response

- a. The Reactor Coolant Pump Backup Oil Lift pumps are located inside the containment above the 585 foot elevation (rooms 216 and 218). Table 1

below gives the conditions inside containment in the area of this equipment.

Table 1, Environmental Conditions  
for Reactor Coolant Pump Backup Oil Lift pumps

Normal Operating Conditions:	
Temperature (°F)	46-159
Pressure (psia)	15.3 (maximum)
Humidity (%)	80 (maximum)
Radiation (rads): 40 year dose	4.16E6
Radiation (rads): 60 year dose	6.24E6
Peak Design Basis Event Conditions	
Temperature (°F)	318
Pressure (psia)	52.7
Humidity (%)	100
Radiation (rads): 1 year dose	4.47E6
Submergence (Flood Level)	572'-2"
Chemical Spray	2800 ppm, 5.0 pH

- b. Emergency Lighting Panel L49E1 is located inside the containment at the 603 foot elevation (Room 410). Table 2 below gives the conditions inside of containment in the area of this equipment:

Table 2, Environmental Conditions  
for Emergency Lighting Panel L49E1

Normal Operating Conditions:	
Temperature (°F)	52-144
Pressure (psia)	15.3 (maximum)
Humidity (%)	80 (maximum)
Radiation (rads): 40 year dose	3.20E4
Radiation (rads): 60 year dose	4.80E4
Peak Design Basis Event Conditions	
Temperature (°F)	318
Pressure (psia)	52.7
Humidity (%)	100
Radiation (rads): 1 year dose	9.11E6
Submergence (Flood Level)	572'-2"
Chemical Spray	2800 ppm, 5.0 pH

- c. The Station Overhead Annunciator Switch YSW1 is located in Cabinet C5754F which is located in the Control Room Cabinet Room (Room 502). This room is considered a mild environment, with the normal temperature maintained at approximately 75°F and 50 percent relative humidity in the summer, 30 percent relative humidity in the winter. The maximum expected temperature of the control room cabinet room is 110°F and 80 percent relative humidity.
- d. NNI Channel X Switch YSW2 is located in Cabinet C5759D which is located in the Control Room Cabinet Room (Room 502).
- e. NNI Channel Y Switch YSW3 is located in Cabinet C5760E which is located in the Control Room Cabinet Room (Room 502).
- f. Integrated Control System Switch YSW4 is located in Cabinet C5761C which is located in the Control Room Cabinet Room (Room 502).
- g. Plant Computer Multiplexer Switch YSW5 is located in Cabinet YATS4601 which is located in Electrical Penetration Room 2 (Room 427). Table 3 below gives the conditions for Electrical Penetration Room 2 in the area of this equipment:

Table 3, Environmental Conditions  
for Plant Computer Multiplexer Switch YSW5

Normal Operating Conditions:	
Temperature (°F)	100 (maximum)
Pressure (psia)	14.7
Humidity (%)	80 (maximum)
Radiation (rads): 40 year dose	3.5E2
Radiation (rads): 60 year dose	5.25E2
Peak Design Basis Event Conditions	
Temperature (°F)	100 ( <i>See note below</i> )
Pressure (psia)	14.7 ( <i>See note below</i> )
Humidity (%)	100
Radiation (rads): 1 year dose	3.74E5

Note: The temperature and pressure in Room 427 are not affected by any postulated Design Basis Events.

- h. Plant Computer Automatic Transfer Switch is located in Cabinet YATS5701 which is located in the Computer Room (Room 510). This room, which is part of the Control Room envelope, is considered a mild environment.

3. **Davis-Besse Updated Final Safety Analysis Report (UFSAR) Section 3.11.1.2 states:**

**Non-safety related electrical equipment, whose failure under postulated environmental conditions could prevent satisfactory accomplishment of the specified safety-related electrical equipment required safety functions or mislead an operator, is qualified as required.**

**Explain in detail for the equipment listed in Item 2 above and installed in the postulated environmental conditions, how these non safety-related equipment are qualified per UFSAR Section 3.11.1.2.**

Response

- a. The only portions of the Reactor Coolant Pump Backup Oil Lift Pumps located inside containment are the motors and associated power cables. The 60 ampere supply fuses for the motors, which are located outside containment in a mild environment, are Class 1E fuses and provide proper protection for the penetration assemblies and short circuit conditions. The Backup Oil Lift Pump motors and associated cables are not included in the station Environmental Qualification Program, and therefore are not considered as qualified for postulated environmental conditions that may exist following a design basis event. However, any fault that may occur as a result of the post-accident environment is expected to be cleared by the 60 ampere Class 1E supply fuses to ensure the associated safety-related equipment can continue to perform its required safety functions.

The control circuits for the Reactor Coolant Pump Backup Oil Lift Pump motors are separately fused with 10 ampere fuses. If a fault only cleared the negative 125 Vdc fuse associated with the Backup Oil Lift Pump motor, there is a potential that the control circuit would indicate the Backup Oil Lift Pump motor is running when it is de-energized. However, a Backup Oil Lift Pump motor is only manually operated for a brief period when starting a Reactor Coolant Pump or following routine shutdown of all Reactor Coolant Pumps when the respective AC Oil Lift Pump is unavailable. Since the Backup Oil Lift Pump motors are not expected to be operating during a design basis event, any indication received would not mislead the operators.

Because associated safety-related equipment will continue to perform its required safety functions and no misleading indications would exist, the non-safety related Reactor Coolant Pump Backup Oil Lift Pump motors are not required to be qualified for all postulated environmental conditions per UFSAR Section 3.11.1.2.

- b. Emergency Lighting Panel L49E1 is located inside containment. The 80 ampere supply fuses for this panel, which are located outside containment in a mild environment, are Class 1E fuses and provide proper protection for the penetration assemblies and short circuit conditions. The panel is not included in the station Environmental Qualification Program, and therefore is not considered as qualified for postulated environmental conditions that may exist following a design basis event. However, any fault that may occur as a result of the post-accident environment is expected to be cleared by the 80 ampere Class 1E supply fuses to ensure the associated safety-related equipment can continue to perform its required safety functions. There are no indication circuits associated with this lighting panel so there is no potential to mislead the operators. Therefore this panel is not required to be qualified for all postulated environmental conditions per UFSAR Section 3.11.1.2.
- c. The Station Overhead Annunciator Switch YSW1 is located in a mild environment and no failure is postulated due to environmental conditions.
- d. NNI Channel X Switch YSW2 is located in a mild environment and no failure is postulated due to environmental conditions.
- e. NNI Channel Y Switch YSW3 is located in a mild environment and no failure is postulated due to environmental conditions.
- f. Integrated Control System Switch YSW4 is located in a mild environment and no failure is postulated due to environmental conditions.
- g. Plant Computer Switch YSW5 is located in Electrical Penetration Room 2 and is only expected to experience maximum temperatures of 100°F with a normal relative humidity at 80 percent and a peak design basis event relative humidity of 100 percent. Relative Humidity following a Loss of Coolant Accident or High Energy Line Break (HELB) was not calculated outside containment, but instead assumed to be 100 percent. The temperature and pressure in Electrical Penetration Room 2 are not affected by any HELB. The fuses that supply switch YSW5 are located in the Low Voltage Switchgear Rooms (Rooms 428 and 429), which are considered mild environments. If a fault would occur due to postulated environmental conditions that may exist following a design basis event, proper coordination exists such that the fault would be isolated by the fuses located in the Low Voltage Switchgear Rooms prior to losing all of the loads associated with distribution panel YAU or YBU. Calculations account for the potential failure of the automatic transfer switches with all the loads transferred to a single battery; therefore, failure of the electronics resulting in transferred loads without a fault are accounted for and would not impact the station batteries or the DC system.

Site procedures identify the potential impact of losing the normal and alternate power source to cabinet YATS4601. Because associated safety-related equipment will continue to perform its required safety functions and no misleading indications would exist, the non-safety related switch YSW5 is not required to be qualified for all postulated environmental conditions per UFSAR Section 3.11.1.2.

- h. Plant Computer Automatic Transfer Switch located in Cabinet YATS5701 is located in a mild environment and no failure is postulated due to environmental conditions.