

January 27, 1988

Docket Nos. STN 50-456  
and STN 50-457

Mr. L. D. Butterfield, Jr.  
Nuclear Licensing Manager  
Commonwealth Edison Company  
Post Office Box 767  
Chicago, Illinois 60690

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Dear Mr. Butterfield:

The Commission has issued the enclosed Amendment No. 5 to Facility Operating License No. NPF-72 and Amendment No. 5 to Facility Operating License No. NPF-75 for the Braidwood Station, Units 1 and 2, respectively. Braidwood Station, Unit Nos. 1 and 2, have common Technical Specifications. The amendments consist of changes to the Technical Specifications in response to your application transmitted by letter dated December 3, 1987.

These amendments approve changes to the Technical Specifications that modify the D.C. system to address operation of the D.C. crosstie between units for the following two situations:

- (1) With both units operating and one battery charger fails, the D.C. crosstie may be used for up to 24 hours to maintain the D.C. bus in an operable status while the battery charger is being repaired.
- (2) With one unit operating and the other unit shutdown with a battery and its associated battery charger out of service, the D.C. crosstie may be used for up to 7 days to maintain the D.C. bus in an operable status.

A copy of the related Safety Evaluation is enclosed. A notice of Issuance will be included in the Commission's next regular biweekly Federal Register notice.

Sincerely,

*151*

Stephen P. Sands, Project Manager  
Project Directorate III-2  
Division of Reactor Projects - III  
IV, V and Special Projects

Enclosures:

1. Ammendment No. 5 to NPF-72
2. Ammendment No. 5 to NPF-75
3. Safety Evaluation

cc: w/enclosures  
See next page

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

COMMONWEALTH EDISON COMPANY

DOCKET NO. STN 50-456

BRAIDWOOD STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 5  
License No. NPF-72

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Commonwealth Edison Company (the licensee) dated December 3, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the licensee is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-72 is hereby amended to read as follows:

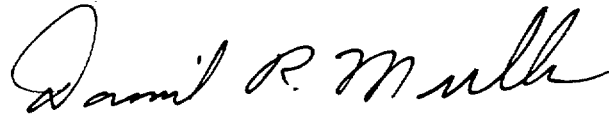
(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 5 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

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3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in cursive script, appearing to read "Daniel R. Muller".

Daniel R. Muller, Director  
Project Directorate III-2  
Division of Reactor Projects - III  
IV, V and Special Projects

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: January 27, 1988



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

COMMONWEALTH EDISON COMPANY

DOCKET NO. STN 50-457

BRAIDWOOD STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 5  
License No. NPF-75

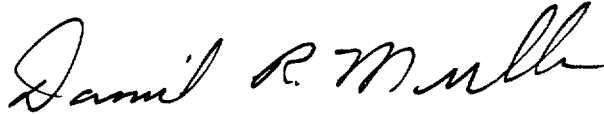
1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Commonwealth Edison Company (the licensee) dated December 3, 1987, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the licensee is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-75 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A as revised through Amendment No. 5 and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read "Daniel R. Muller". The signature is written in a cursive style with a large initial 'D' and 'M'.

Daniel R. Muller, Director  
Project Directorate III-2  
Division of Reactor Projects - III  
IV, V and Special Projects

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: January 27, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 5

FACILITY OPERATING LICENSE NO. NPF-72

DOCKET NO. STN-50-456

Revise Appendix A as follows:

Remove Pages

3/4 8-10  
3/4 8-11  
3/4 8-12\*  
3/4 8-13  
3/4 8-14\*

Insert Pages

3/4 8-10  
3/4 8-11  
3/4 8-12\*  
3/4 8-13  
3/4 8-14\*

\* Overleaf pages added for convenience

## ELECTRICAL POWER SYSTEMS

### 3/4.8.2 D.C. SOURCES

#### OPERATING

#### LIMITING CONDITION FOR OPERATION

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3.8.2.1 As a minimum the following D.C. electrical sources shall be OPERABLE:

- a. 125-Volt D.C. Bus 111 fed from Battery 111 for Unit 1 (Bus 211 fed from Battery 211 for Unit 2), and its associated full capacity charger, and
- b. 125-Volt D.C. Bus 112 fed from Battery 112 for Unit 1 (Bus 212 fed from Battery 212 for Unit 2), and its associated full capacity charger.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTION:

- a. With one of the required battery banks and/or chargers inoperable, restore the inoperable battery bank and/or battery bus 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 the normal full capacity charger inoperable: 1) restore the affected battery and/or battery bus to operable status with the opposite units full capacity charger within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and 2) restore the normal full capacity charger to operable status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. Use of the D.C. crosstie breakers between opposite unit D.C. buses (bus 111 and 211, or bus 112 and 212) shall be limited to the following:
  - (1) With a normal full capacity charger inoperable, comply with action statement (b) above.
  - (2) With a D.C. bus inoperable or not energized on a shutdown unit (Mode 5 or 6), the affected D.C. bus may be energized from the operating unit (Mode 1, 2, 3 or 4) opposite D.C. bus via the crosstie breakers after limiting the D.C. loads on the affected D.C. bus; operation may then continue for up to 7 days or open the crosstie breakers.

#### SURVEILLANCE REQUIREMENTS

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4.8.2.1.1 Each D.C. bus shall be determined OPERABLE and energized from its battery at least once per 7 days by verifying correct breaker alignment.

4.8.2.1.2 Each 125-volt battery bank and its associated charger shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
  - 1) The parameters in Table 4.8-2 meet the Category A limits, and
  - 2) The total battery terminal voltage is greater than or equal to 126 volts on float charge.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- 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 145 volts, by verifying that:
- 1) The parameters in Table 4.8-2 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  $150 \times 10^{-6}$  ohm\*, and
  - 3) The average electrolyte temperature of all 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 anticorrosion material,
  - 3) The resistance of each cell-to-cell and terminal connection is less than or equal to  $150 \times 10^{-6}$  ohm\*, and
  - 4) The battery charger will supply a load equal to the manufacturer's rating for at least 8 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 240 minutes when the battery is subject 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. This performance discharge test may be performed in lieu of the battery service test required by Specification 4.8.2.1.2d.;
- f. At least once per 18 months during shutdown, by giving performance discharge tests of battery capacity 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.

4.8.2.1.3 At least once per 12 hours, when in specification 3.8.2.1.c.(2), verify the total crosstie loading will not exceed 63 amps.

\*Obtained by subtracting the normal resistance of: 1) the cross room rack connector ( $400 \times 10^{-6}$  ohm, typical) and 2) the bi-level rack connector ( $50 \times 10^{-6}$  ohm, typical); from the measured cell-to-cell connection resistance.



TABLE 4.8-2

BATTERY SURVEILLANCE REQUIREMENTS

PARAMETER	CATEGORY A <sup>(1)</sup>		CATEGORY B <sup>(2)</sup>
	LIMITS FOR EACH DESIGNATED PILOT CELL	LIMITS FOR EACH CONNECTED CELL	ALLOWABLE <sup>(3)</sup> VALUE FOR EACH CONNECTED CELL
Electrolyte Level	>Minimum level indication mark, and < 1/4" above maximum level indication mark	>Minimum level indication mark, and < 1/4" above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 volts	≥ 2.13 volts <sup>(6)</sup>	> 2.07 volts
Specific Gravity <sup>(4)</sup>	≥ 1.200 <sup>(5)</sup>	≥ 1.195 Average of all connected cells > 1.205	Not more than 0.020 below the average of all connected cells Average of all connected cells ≥ 1.195 <sup>(5)</sup>

TABLE NOTATIONS

- (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.
- (4) Corrected for electrolyte temperature and level.
- (5) Or battery charging current is less than 2 amps when on charge.
- (6) Corrected for average electrolyte temperature.

## ELECTRICAL POWER SYSTEMS

### D.C. SOURCES

#### SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

---

3.8.2.2 As a minimum, one 125-volt D.C. bus fed from its battery and its associated full-capacity charger shall be OPERABLE.\*

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With the required battery bank and/or full-capacity charger inoperable, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes or movement of irradiated fuel; initiate corrective action to restore the required battery bank and full-capacity charger to OPERABLE status as soon as possible, and within 8 hours, depressurize and vent the Reactor Coolant System through at least a 2 square inch vent.

#### SURVEILLANCE REQUIREMENTS

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4.8.2.2 The above required 125-volt D.C. bus fed from its battery and its associated charger shall be demonstrated OPERABLE per Specifications 4.8.2.1.1 and 4.8.2.1.2.

\*Use of the D.C. crosstie breakers is covered in Technical Specification 3.8.2.1, Action Statement c.

ELECTRICAL POWER SYSTEMS

3/4.8.3 ONSITE POWER DISTRIBUTION

OPERATING

LIMITING CONDITION FOR OPERATION

---

3.8.3.1 The following electrical busses shall be energized in the specified manner for the applicable unit:

- a. A.C. ESF Busses consisting of:

<u>UNIT 1</u>	<u>UNIT 2</u>
Division 11	Division 21
1) 4160-Volt Bus 141,	1) 4160-Volt Bus 241
2) 480-Volt Bus 131X.	2) 480-Volt Bus 231X.

- b. A.C. ESF Busses consisting of:

<u>UNIT 1</u>	<u>UNIT 2</u>
Division 12	Division 22
1) 4160-Volt Bus 142	1) 4160-Volt Bus 242
2) 480-Volt Bus 132X.	2) 480-Volt Bus 232X.

- c. 120-Volt A.C. Instrument Bus 111 for Unit 1 (Bus 211 for Unit 2) energized from its associated inverter connected to D.C. Bus 111 for Unit 1 (Bus 211 for Unit 2),
- d. 120-Volt A.C. Instrument Bus 113 for Unit 1 (Bus 213 for Unit 2) energized from its associated inverter connected to D.C. Bus 111 for Unit 1 (Bus 211 for Unit 2),
- e. 120-Volt A.C. Instrument Bus 112 for Unit 1 (Bus 212 for Unit 2) energized from its associated inverter connected to D.C. Bus 112 for Unit 1 (Bus 212 for Unit 2), and
- f. 120-Volt A.C. Instrument Bus 114 for Unit 1 (Bus 214 for Unit 2) energized from its associated inverter connected to D.C. Bus 112 for Unit 1 (Bus 212 for Unit 2).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With one of the required divisions of A.C. ESF busses not fully energized, reenergize the division within 8 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 A.C. instrument bus either not energized from its associated inverter, or with the inverter not connected to its associated D.C. bus: 1) reenergize the A.C. instrument bus within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and 2) reenergize the A.C. instrument bus from its associated inverter connected to its associated D.C. bus within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ATTACHMENT TO LICENSE AMENDMENT NO. 5

FACILITY OPERATING LICENSE NO. NPF-75

DOCKET NO. STN-50-457

Revise Appendix A as follows:

Remove Pages

3/4 8-10  
3/4 8-11  
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3/4 8-12\*  
3/4 8-13  
3/4 8-14\*

\* Overleaf pages added for convenience

## ELECTRICAL POWER SYSTEMS

### 3/4.8.2 D.C. SOURCES

#### OPERATING

#### LIMITING CONDITION FOR OPERATION

---

3.8.2.1 As a minimum the following D.C. electrical sources shall be OPERABLE:

- a. 125-Volt D.C. Bus 111 fed from Battery 111 for Unit 1 (Bus 211 fed from Battery 211 for Unit 2), and its associated full capacity charger, and
- b. 125-Volt D.C. Bus 112 fed from Battery 112 for Unit 1 (Bus 212 fed from Battery 212 for Unit 2), and its associated full capacity charger.

APPLICABILITY: MODES 1, 2, 3, and 4.

#### ACTION:

- a. With one of the required battery banks and/or chargers inoperable, restore the inoperable battery bank and/or battery bus 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 the normal full capacity charger inoperable: 1) restore the affected battery and/or battery bus to operable status with the opposite units full capacity charger within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and 2) restore the normal full capacity charger to operable status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- c. Use of the D.C. crosstie breakers between opposite unit D.C. buses (bus 111 and 211, or bus 112 and 212) shall be limited to the following:
  - (1) With a normal full capacity charger inoperable, comply with action statement (b) above.
  - (2) With a D.C. bus inoperable or not energized on a shutdown unit (Mode 5 or 6), the affected D.C. bus may be energized from the operating unit (Mode 1, 2, 3 or 4) opposite D.C. bus via the crosstie breakers after limiting the D.C. loads on the affected D.C. bus; operation may then continue for up to 7 days or open the crosstie breakers.

#### SURVEILLANCE REQUIREMENTS

---

4.8.2.1.1 Each D.C. bus shall be determined OPERABLE and energized from its battery at least once per 7 days by verifying correct breaker alignment.

4.8.2.1.2 Each 125-volt battery bank and its associated charger shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
  - 1) The parameters in Table 4.8-2 meet the Category A limits, and
  - 2) The total battery terminal voltage is greater than or equal to 126 volts on float charge.

## ELECTRICAL POWER SYSTEMS

### SURVEILLANCE REQUIREMENTS (Continued)

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- 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 145 volts, by verifying that:
  - 1) The parameters in Table 4.8-2 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  $150 \times 10^{-6}$  ohm\*, and
  - 3) The average electrolyte temperature of all 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 anticorrosion material,
  - 3) The resistance of each cell-to-cell and terminal connection is less than or equal to  $150 \times 10^{-6}$  ohm\*, and
  - 4) The battery charger will supply a load equal to the manufacturer's rating for at least 8 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 240 minutes when the battery is subject 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. This performance discharge test may be performed in lieu of the battery service test required by Specification 4.8.2.1.2d.;
- f. At least once per 18 months during shutdown, by giving performance discharge tests of battery capacity 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.

4.8.2.1.3 At least once per 12 hours, when in specification 3.8.2.1.c.(2), verify the total crosstie loading will not exceed 63 amps.

\*Obtained by subtracting the normal resistance of: 1) the cross room rack connector ( $400 \times 10^{-6}$  ohm, typical) and 2) the bi-level rack connector ( $50 \times 10^{-6}$  ohm, typical); from the measured cell-to-cell connection resistance.

TABLE 4.8-2

BATTERY SURVEILLANCE REQUIREMENTS

PARAMETER	CATEGORY A <sup>(1)</sup>		CATEGORY B <sup>(2)</sup>
	LIMITS FOR EACH DESIGNATED PILOT CELL	LIMITS FOR EACH CONNECTED CELL	ALLOWABLE <sup>(3)</sup> VALUE FOR EACH CONNECTED CELL
Electrolyte Level	>Minimum level indication mark, and $\leq \frac{1}{4}$ " above maximum level indication mark	>Minimum level indication mark, and $\leq \frac{1}{4}$ " above maximum level indication mark	Above top of plates, and not overflowing
Float Voltage	$\geq 2.13$ volts	$\geq 2.13$ volts <sup>(6)</sup>	$> 2.07$ volts
Specific Gravity <sup>(4)</sup>	$\geq 1.200$ <sup>(5)</sup>	$\geq 1.195$ Average of all connected cells $> 1.205$	Not more than 0.020 below the average of all connected cells Average of all connected cells $\geq 1.195$ <sup>(5)</sup>

TABLE NOTATIONS

- (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.
- (4) Corrected for electrolyte temperature and level.
- (5) Or battery charging current is less than 2 amps when on charge.
- (6) Corrected for average electrolyte temperature.

## ELECTRICAL POWER SYSTEMS

### D.C. SOURCES

#### SHUTDOWN

#### LIMITING CONDITION FOR OPERATION

---

3.8.2.2 As a minimum, one 125-volt D.C. bus fed from its battery and its associated full-capacity charger shall be OPERABLE.\*

APPLICABILITY: MODES 5 and 6.

#### ACTION:

With the required battery bank and/or full-capacity charger inoperable, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes or movement of irradiated fuel; initiate corrective action to restore the required battery bank and full-capacity charger to OPERABLE status as soon as possible, and within 8 hours, depressurize and vent the Reactor Coolant System through at least a 2 square inch vent.

#### SURVEILLANCE REQUIREMENTS

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4.8.2.2 The above required 125-volt D.C. bus fed from its battery and its associated charger shall be demonstrated OPERABLE per Specifications 4.8.2.1.1 and 4.8.2.1.2.

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\*Use of the D.C. crosstie breakers is covered in Technical Specification 3.8.2.1, Action Statement c.



ELECTRICAL POWER SYSTEMS

3/4.8.3 ONSITE POWER DISTRIBUTION

OPERATING

LIMITING CONDITION FOR OPERATION

---

3.8.3.1 The following electrical busses shall be energized in the specified manner for the applicable unit:

- a. A.C. ESF Busses consisting of:

<u>UNIT 1</u>	<u>UNIT 2</u>
Division 11	Division 21
1) 4160-Volt Bus 141,	1) 4160-Volt Bus 241
2) 480-Volt Bus 131X.	2) 480-Volt Bus 231X.

- b. A.C. ESF Busses consisting of:

<u>UNIT 1</u>	<u>UNIT 2</u>
Division 12	Division 22
1) 4160-Volt Bus 142	1) 4160-Volt Bus 242
2) 480-Volt Bus 132X.	2) 480-Volt Bus 232X.

- c. 120-Volt A.C. Instrument Bus 111 for Unit 1 (Bus 211 for Unit 2) energized from its associated inverter connected to D.C. Bus 111 for Unit 1 (Bus 211 for Unit 2),
- d. 120-Volt A.C. Instrument Bus 113 for Unit 1 (Bus 213 for Unit 2) energized from its associated inverter connected to D.C. Bus 111 for Unit 1 (Bus 211 for Unit 2),
- e. 120-Volt A.C. Instrument Bus 112 for Unit 1 (Bus 212 for Unit 2) energized from its associated inverter connected to D.C. Bus 112 for Unit 1 (Bus 212 for Unit 2), and
- f. 120-Volt A.C. Instrument Bus 114 for Unit 1 (Bus 214 for Unit 2) energized from its associated inverter connected to D.C. Bus 112 for Unit 1 (Bus 212 for Unit 2).

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

- a. With one of the required divisions of A.C. ESF busses not fully energized, reenergize the division within 8 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 A.C. instrument bus either not energized from its associated inverter, or with the inverter not connected to its associated D.C. bus: 1) reenergize the A.C. instrument bus within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and 2) reenergize the A.C. instrument bus from its associated inverter connected to its associated D.C. bus within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 5 TO FACILITY OPERATING LICENSE NO. NPF-72  
AND AMENDMENT NO. 5 TO FACILITY OPERATING LICENSE NO. NPF-75  
COMMONWEALTH EDISON COMPANY  
BRAIDWOOD STATION, UNITS 1 AND 2  
DOCKET NOS. STN 50-456 AND STN 50-457

1.0 INTRODUCTION

By letter dated December 3, 1987, Commonwealth Edison Company (the licensee) requested an amendment to the Technical Specifications for the Braidwood Station, Units 1 and 2. The proposed changes would modify the D.C. system Technical Specifications to permit a crosstie between the Unit 1 and Unit 2 Class 1E 125-Vdc buses under limiting conditions for operation.

2.0 EVALUATION

Braidwood Unit 1 and Unit 2 each have two Class 1E 125-Vdc buses which meet the capability, independence, redundancy, and testability requirements of GDC 17 and 18 of 10 CFR 50, Appendix A. The present Technical Specifications are applicable to single unit (Unit 1) operation. If one of the 125-Vdc buses is inoperable (LCO 3.8.2.1), the following Action statements apply:

- a. With one of the required battery banks and/or charges inoperable, restore the inoperable battery bank and/or battery bus 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 the normal full capacity charger inoperable: 1) restore the affected battery and/or battery bus to operable status with the opposite unit's full capacity charger within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and 2) restore the normal full capacity charger to operable status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

For two unit operation, the licensee proposes to add the following Action statements:

- c. Use of the D.C. crosstie breakers between opposite unit D.C. buses (bus 111 and 211, or bus 112 and 212) shall be limited to the following:

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- (1) With a normal full capacity charger inoperable, comply with action statement (b) above.
- (2) With a D.C. bus inoperable or not energized on a shutdown unit (Mode 5 or 6), the affected D.C. bus may be energized from the operating unit (Mode 1,2,3 or 4) opposite D.C. bus via the crosstie breakers after limiting the D.C. loads on the affected D.C. bus; operation may then continue for up to 7 days or open the crosstie breakers.

The following surveillance requirement would also be added:

- 4.8.2.1.3 At least once per 12 hours, when in specification 3.8.2.1.c.(2), verify the total crosstie loading will not exceed 63 amps.

The licensee summarizes the effect of the proposed Technical Specification changes as follows:

- (1) With both units operating and one battery charger fails, the D.C. crosstie may be used for up to 24 hours to maintain the D.C. bus in an operable status while the battery charger is being repaired.
- (2) With one unit operating and the other unit shutdown with a battery and its associated battery charger out of service, the D.C. crosstie may be used for up to 7 days to maintain the D.C. bus in an operable status.

For the first situation, each battery will be connected to its bus and one battery charger will serve both buses. For this situation, use of the D.C. crosstie will not exceed the design parameters of the D.C. system.

For the second situation, the battery charger and battery of the operable D.C. bus will supply both buses. However, the D.C. crosstie will be limited to 63 amps (per proposed surveillance requirement 4.8.2.1.3) so as not to exceed the capacity of the operable battery.

The licensee states that the D.C. bus loading, when using the crosstie, will be restricted so that the capacity of the operating unit's battery will not be exceeded in the event of a single failure and simultaneous accident and loss of offsite power conditions. These were the conditions assumed for a D.C. bus in previously evaluated accidents, thus the probability or consequences of accidents previously evaluated are not changed by the proposed Technical Specification changes.

The staff has made further inquiries by telephone as to the adequacy of one battery charger to supply the normal loads of both D.C. buses simultaneously. The licensee stated that the charger has a nominal capability of 400 amperes

and a 10 percent overload capability whereas the normal load on each D.C. bus would be less than 130 amperes. Thus, if the battery charger is operable, there would be no net drain on the battery during non-emergency conditions.

Further, the Byron/Braidwood FSAR (Section 8.3.2) indicates that a battery charger failure would be immediately detectable through a low voltage relay on the D.C. bus and various alarm relays on the charger. Under this situation, the Technical Specifications would require the battery charger to be restored to OPERABLE status within two hours or actions must be taken to achieve HOT STANDBY within the next six hours and COLD SHUTDOWN within the following 30 hours.

The FSAR also indicates that a breaker exists on either side of the crosstie which would isolate any potential short circuit from either unit. These breakers are coordinated with the D.C. bus main breaker to assure the crosstie will isolate from the affected D.C. bus before the battery would be isolated. This would prevent a cascade from one bus to the other during the time the two buses are crosstied.

The staff notes that the existing Technical Specifications require extensive testing on a 7 day cycle to assure that each D.C. bus, battery bank, and associated charger is operable. Additionally, power failure and undervoltage alarms would alert the operators of any absolute failure of a D.C. bus or an A.C. power supply to the battery charger. Therefore, the possibility of an undetected inoperability of a D.C. bus is remote.

The staff also notes that loss of all offsite power will not directly affect the D.C. bus or the battery chargers to the D.C. batteries because the diesel generators would be available to supply D.C. power to the battery chargers.

The evaluation has disclosed no conditions resulting from the crosstie operation under the Technical Specification changes that would significantly impact the capability, independence, redundancy, and testability requirements of GDC 17 and GDC 18 of 10 CFR 50, Appendix A. As such, the margin of safety is not reduced. Similarly, the evaluation has disclosed no conditions that would significantly impact the health and safety of the public.

### 3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of the facilities components located within the restricted areas as defined in 10 CFR 20. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Sec. 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

#### 4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Sands

Dated: January 27, 1988