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SUBJECT: Third revised final deficiency rept re failure of BBC Brown  
Boveri medium-voltage circuit breakers. Initially reported on  
850703. Action to correct deficiency will be completed before  
fuel load currently scheduled for 980327.

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JUN 28 1985

BLRD-50-438/85-21  
BLRD-50-439/85-20

10 CFR 50.55(e)

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Gentlemen:

In the Matter of the Application of )  
Tennessee Valley Authority )


Docket Nos. 50-438  
50-439

BELLEFONTE NUCLEAR PLANT (BLN) - UNITS 1 AND 2 - FAILURE OF BBC  
BROWN BOVERI MEDIUM-VOLTAGE CIRCUIT BREAKERS - BLRD-50-438/85-21  
AND BLRD-50-439/85-20 - THIRD REVISED FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Linda Watson on July 3, 1985 in accordance with 10 CFR 50.55(e) as NCR 4277 and 4352. This was followed by our final report dated July 27, 1985 and subsequent revisions to the final report dated August 12 and September 12, 1985. Enclosed is the third revised final report. This revision is being made to address NRC Information Notice 89-86 and to revise the completion date for the corrective actions.

Enclosure 2 identifies the commitments made for these reportable deficiencies.

Should there be any questions regarding this information, please telephone Greg Pierce, BLN Site Licensing Manager, at (205) 574-8058.

  
H. Fred McCluskey

Enclosures

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Page 2

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**ENCLOSURE 1**  
**BELLEFONTE NUCLEAR PLANT (BLN) - UNITS 1 AND 2**  
**FAILURE OF BBC BROWN BOVERI**  
**MEDIUM-VOLTAGE CIRCUIT BREAKERS**  
**BLRD-50-438/85-21, BLRD-50-439/85-20**  
**NCRs 4277 AND 4352**  
**10 CFR 50.55(e)**  
**THIRD REVISED FINAL REPORT**

**Description of Deficiency**

Two safety-related BBC Brown Boveri, Incorporated (Springhouse, Pennsylvania), medium-voltage circuit breakers failed to electrically close at Bellefonte Nuclear Plant (BLN) during routine maintenance. The circuit breakers are used in the class 1E 6.9kV switchgear. Failure was caused by a dislodged spring and contact in the circuit breaker limit switch model number 191921-T6. Dislodgement of the limit switch spring and contact renders the circuit breakers unable to electrically close.

The cause of this deficiency is a flaw in the model number 191921-T6 limit switch design. The contacts become loose due to the shock created by control level overtravel when the breaker is tripped. This flaw is limited to circuit breakers manufactured between March 1974 and July 1978 inclusive.

Additionally, in response to NRC Information Notice No. 89-86: Type HK Circuit Breakers Missing Close Latch Anti-Shock Springs, a review of BLN safety-related medium-voltage circuit breakers was conducted. This review indicated that the breakers were fabricated and shipped to BLN without the anti-shock springs. Lack of these springs can cause the breakers to inadvertently close or fail to close on demand.

**Safety Implications**

The deficient circuit breakers, due to dislodged limit switch spring and contact, can be closed manually; but manual operation is not an acceptable alternative to the sequential electrical closing that is required during abnormal plant conditions and which was assumed in the plant safety analysis. Failure of circuit breakers to close electrically as required in redundant safety-related power systems could cause unavailability of electrical power to redundant essential safety-related systems. The failure of the circuit breaker to close on demand or inadvertent closure of the breaker due to missing anti-shock springs could cause loss of power supply to class 1E equipment and systems. Therefore, if these conditions had remained uncorrected, the safety of operations of the plant could have been adversely affected.

## ENCLOSURE 1 (continued)

### Corrective Action

Corrective action for the deficient circuit breakers will be in accordance with Brown Boveri, Incorporated, recommendations and Instruction Book IB 8303, revision 1. This action will involve the installation of a 2-17/32-inch control lever stop in place of the 2-25/32-inch control lever stop found on most of the affected circuit breaker limit switches. The shorter lever stop will limit lever travel to reduce the shock to the contacts. Also, the mechanism will be adjusted to meet dimensional requirements specified in Instruction Book IB 8303, revision 1.

In order to prevent future failures of this nature, Brown Boveri, Incorporated, safety-related medium-voltage circuit breakers manufactured between March 1974 and July 1978 at BLN will be modified and adjusted as stated above. Also, safety-related medium-voltage circuit breakers manufactured after July 1978 will be inspected and adjusted as necessary to meet dimensional requirements specified in Instruction Book IB 8303, revision 1.

In addition, suspect Brown Boveri medium-voltage breakers at BLN will be inspected and refurbished, if necessary, to add the anti-shock springs as recommended by the manufacturer.

Action to correct the deficient conditions for unit 1 will be completed before fuel load, currently scheduled for March 27, 1998. Corrective actions for unit 2 will be completed before fuel load.

**ENCLOSURE 2**  
**COMMITMENTS MADE TO THE NRC**

1. Install 2-17/32" control level stop in place of the 2-25/32" control level stop found on most of the affected circuit breaker limit switches. Adjust mechanism to meet dimensional requirements specified in Instruction Book IB 8303, revision 1. Modify and adjust all Brown Boveri medium-voltage circuit breakers manufactured between March 1974 and July 1978 at BLN. Also medium-voltage circuit breakers manufactured after July 1978 will be inspected and adjusted as necessary to meet dimensional requirements specified in Instruction Book IB 8303, revision 1. Corrective actions for unit 1 will be completed before fuel load, currently scheduled for March 27, 1998. Corrective actions for unit 2 will be completed before fuel load.
2. Suspect Brown Boveri medium-voltage breakers at BLN will be inspected and refurbished, if necessary, to add the anti-shock springs as recommended by the manufacturer. Actions to correct the deficient condition will be completed for unit 1 before fuel load, currently scheduled for March 27, 1998. Unit 2 corrective actions will be completed before fuel load.