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SUBJECT: Final deficiency rept re failure of installed cables to meet min bend radius criteria. Licensee design documents did not include min bend radius limits for permanent trained cables. Cables replaced entirely.

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 TITLE: 50.55(e) Construction Deficiency Report

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Site Vice President, Bellefonte Nuclear Plant

AUG 27 1993

BLRD-50-438/93-08  
BLRD-50-439/93-08

10 CFR 50.55(e)

U.S. Nuclear Regulatory Commission  
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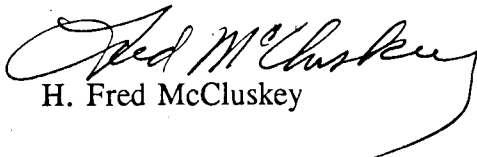
In the Matter of the Application of )  
Tennessee Valley Authority )

Docket Nos. 50-438  
50-439

BELLEFONTE NUCLEAR PLANT (BLN) - FAILURE OF INSTALLED CABLES TO  
MEET MINIMUM BEND RADIUS CRITERIA - BLRD-50-438/93-08 AND  
BLRD-50-439/93-08 - FINAL REPORT

The subject deficiency was reported to the NRC Operations Center on August 4, 1993 in  
accordance with 10 CFR 50.55(e)(3) as Significant Corrective Action Report (SCAR)  
BLSCA930010. Enclosed is TVA's final report on this subject.

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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AUG 27 1993

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**ENCLOSURE 1**  
**BELLEFONTE NUCLEAR PLANT (BLN) UNITS 1 AND 2**  
**FAILURE OF INSTALLED CABLES TO MEET**  
**MINIMUM BEND RADIUS CRITERIA -**  
**SIGNIFICANT CORRECTIVE ACTION REPORT (SCAR) BLSCA930010**  
**BLRD-50-438/93-08 AND BLRD-50-439/93-08**

FINAL REPORT

DESCRIPTION OF DEFICIENCY

On approximately June 9, 1993, during implementation of BLN's inspection plan for bend radius of safety-related cable, the results of a sample walkdown were reviewed against revised minimum bend radius criteria. Ten unit 1 cables and one unit 2 cable did not meet the minimum bend radius criteria. This condition was determined to be reportable based upon cable IRT-ECA5-71A. Enclosure 2 provides a list of the eleven cables along with the equipment they supply.

SAFETY IMPLICATIONS

Excessive bending of safety-related cable results in the degradation and permanent deformation of cable components including insulation. Failure of a safety-related cable could adversely affect plant operations.

Cable IRT-ECA5-71A is a medium voltage power cable whose failure would result in the loss of the output from Diesel Generator 1A. Failure of this particular cable would result in a loss of redundancy in the Diesel Generator power system.

CAUSE

Prior to 1983, TVA design documents did not include minimum bend radius limits for permanent trained cables. In 1983 TVA issued its specification DS-E12.1.5 - Minimum Radius for Field-Installed Insulated Cables Rated 15,000 Volts or Less - to establish such limits. Engineering specifications were revised in 1987 to reflect Insulated Cable Engineers Association (ICEA) cable bend radii recommendations as described in TVA's position paper on cable bend radius.

## ENCLOSURE 1 (continued)

### CORRECTIVE ACTIONS

Corrective actions will be as previously outlined in TVA's position paper regarding cable bend radius. These corrective actions are as follows.

Safety-related medium voltage cables in areas other than mild environments and safety-related low voltage power cables in worst-case accident environment areas will be evaluated against minimum bend radius design documents. Those cables that are not in compliance will be retrained or replaced entirely or in part.

A sample of safety-related cable installations located in other harsh environment areas will also be evaluated against the minimum bend radius design documents. TVA will select a sampling plan which will provide a 95 percent assurance level that at least 95 percent of the cable bends throughout BLN safety-related installations located in harsh environment areas meet bend radius criteria.

Procedures have been revised to incorporate minimum bend radius criteria. Therefore, procedural controls are in place to preclude recurrence.

These corrective actions will be completed prior to the last system turnover to operations for each unit.

**ENCLOSURE 2**  
**BELLEFONTE NUCLEAR PLANT (BLN) UNITS 1 AND 2**  
**BLRD-50-438/93-08 AND BLRD-50-439/93-08**

CABLE IDENTIFIER	END DEVICE
IVA-ECA3-93A	Local Test Panel for Fan Room Air Handling Units MAHU-042-A
1VA-ECA3-99A	Local Test Panel for Battery Room Air Handling Units MAHU-043-A
1KC-ECA4-324A	Component Cooling Supply OKC-1FCV-311-A
1ND-ECA4-243B	Reactor Coolant Hotleg Dump to Sump Isolation 1-FCV-238-B
1NB-ECA4-135A	Boric Acid Pump 1B 1NB-EMOT-008-A
1VA-ECA4-500G	Instrument Room DC Exhaust Fan 1VA-EMOT-312-G
1VX-ECA4-58B	Reactor Building Secondary Containment Cleanup Fan Motor 1VX-EMOT-004-B
2NV-ECA4-103B	Auxiliary Lube Oil Pump 2NV-EMOT-838-B
1EG-ECA5-502A	6.9KV Intake Pumping Station Shutdown Board 1ETI-A Train A
1RT-ECA5-71A	Diesel Generator 1A Breaker 1EG-52E-163-A
1EG-ECA5-512B	6.9KV Intake Pumping Station Shutdown Board 1ETI-B Train B

**ENCLOSURE 3**  
**BELLEFONTE NUCLEAR PLANT (BLN) UNITS 1 AND 2**  
**BLRD-50-438/93-08 AND BLRD-50-439/93-08**

COMMITMENTS

- Safety-related medium voltage cables in areas other than mild environments and low voltage power cables in worst-case accident environment areas will be evaluated against minimum bend radius design documents. Those cables that are not in compliance will be retrained or replaced entirely or in part. These corrective actions will be completed prior to transfer of the final system to operations for each unit.
  
- A sample of safety-related cable installations located in other harsh environment areas will also be evaluated against the minimum bend radius design documents. TVA will select a sampling plan which will provide a 95 percent assurance level that at least 95 percent of the cable bends throughout BLN safety-related installations located in harsh environment areas meet bend radius criteria. These corrective actions will be completed prior to transfer of the final system to operations for each unit.