

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

September 12, 1983 4:18

BLRD-50-438/82-56
BLRD-50-439/82-50

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNIT 1 - SHIELDED POWER CABLE BEND RADIUS
DEFICIENCY - BLRD-50-438/82-56, BLRD-50-439/82-50 - THIRD INTERIM REPORT

The subject deficiency was initially reported to NRC-OIE Inspector R. V. Crlenjak on August 6, 1982 in accordance with 10 CFR 50.55(e) as NCR 1889. This was followed by our interim reports dated September 7 and December 20, 1982. Since that time, related NCR 2003 has also been reported. Enclosed is our third interim report for NCR 2003 and our final report for NCR 1889. We expect to submit our next report on NCR 2003 by January 20, 1984. The deficiency has also been reported on our Watts Bar Nuclear Plant as NCR 4194R.

Please note that TVA does not now consider NCR 1889 a nonconforming condition adverse to the safe operation of the plant. Therefore, we will amend our records to delete the subject nonconformance as a 10 CFR 50.55(e) item.

If you have any questions concerning this matter, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

DS Kammer

for L. M. Mills, Manager
Nuclear Licensing

Enclosure

cc: Mr. Richard C. DeYoung, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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1983-TVA 50TH ANNIVERSARY

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
SHIELDED POWER CABLE BEND RADIUS DEFICIENCY
NCRs 1889 AND 2003
BLRD-50-438/82-56, BLRD-50-439/82-50
10 CFR 50.55(e)
THIRD INTERIM REPORT

NCR 1889

Description of Deficiency

Some cable tray fittings used at Bellefonte allow bending radii of 8-kV shielded power cables to be less than the minimum required by TVA construction specifications. These specifications require a minimum bending radius of 12 times the cable outside diameter (OD) while the 12-inch radius tray fittings allow the cables to be bent from about 7.4 to 10.7 times cable OD depending on cable size. The design of the plant cable tray system was based on numerous factors; but in some cases, the bending radius required for the largest shielded power cables was not adequately considered. These cables can be used in class 1E systems and the added stress of the tighter bends conceivably could cause premature failure.

Safety Implications

The Okonite Company, Collyer Insulated Wire, and Triangle-PWC, Incorporated, furnished medium voltage (8kV and/or 15kV) power cable to Bellefonte. Okonite has furnished the majority of this cable on contracts 81K5-828088, 79K5-825903, and 79K7-825580. Their letters to TVA dated May 12 and June 7, 1983, state that the concern in the minimum installed radius is that the cable shield system does not buckle or separate at the tape overlap. They also state that their shield tape overlap is 12-1/2 percent minimum, and their calculations show that the 12-inch bend radius will not cause tape separation and, therefore, will not be detrimental to their 8kV medium voltage power cables.

Collyer's 8kV medium voltage power cable manufactured on contract 77K5-822173-3 was transferred to Bellefonte from Watts Bar Nuclear Plant on transfer requisition 828828. Collyer's letter to TVA dated January 24, 1983, with their test report No. 83-3, also showed that a bend radius of 12 inches will not be detrimental to their cable.

15kV power cable is not used in any Class 1E safety-related circuits at Bellefonte. However, using the same bend criteria as discussed above for 8kV power cable likewise shows that the 12-inch radius bends will not adversely affect the ability of the 15kV cable furnished by Okonite to provide service over its expected life.

Triangle-PWC furnished 8kV and 15kV power cable on contract 75K7-86150-2. However, this cable has been removed from cable trays in Category I structures, and its further use prohibited as a corrective action for NCR BLN EEB 8004, which dealt with flame retardancy.

Therefore, we have determined that the installation of the Okonite and Collyer cable in cable tray fittings (such as elbows, tees, and crosses) with 12-inch radii will not adversely affect service ability of the cable and is acceptable for use "as is." No further corrective action is required.

A review was made of design requirements at other TVA nuclear plants, and NCR 4194R was written for a similar condition at Watts Bar. No other violation of TVA bend criteria due to standard cable tray fittings was found at other nuclear plants.

To identify, evaluate and resolve Class 1E cable bend radius problems at Watts Bar and Bellefonte Nuclear Plants, TVA has appointed a task team of representatives from the Divisions of Engineering Design (EN DES) and Construction (CONST). Several problems have been identified at both plants, and NCRs have been written where the installed Class 1E cables do not meet the requirements of TVA Construction Specification G-38. These NCRs are being dispositioned on a case-by-case basis. In some cases, relaxed cable bend radius values have been obtained from the cable manufacturers to allow acceptance of the as-installed configurations. For all future installations, TVA will comply with the established cable bend radius values; or, receive specific relaxation of these values from vendors before cable installation.

Therefore, there are no safety implications to Bellefonte, and TVA no longer consider this NCR to be reportable under the requirements of 10 CFR 50.55(e).

NCR 2003

Description of Deficiency

Minimum bend radii of cables were exceeded when routed in exposed conduit runs containing Crouse-Hinds form 7 condulets. Cables are installed in exposed conduits for safety-related and nonsafety-related systems throughout the entire plant.

Interim Progress

TVA's Division of Construction (CONST) was requested by the Division of Engineering Design (EN DES) to reevaluate NCR 2003 on the basis of conduit bend radii obtained from the Crouse-Hinds Company. Using the vendor's data, CONST has developed a procedure for doing this reevaluation and will forward the results to EN DES for resolution of the nonconformance.