



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

March 27, 2013

10 CFR 50.55(e)

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

Bellefonte Nuclear Plant, Units 1 and 2  
Construction Permit Nos. CPPR-122 and CPPR-123  
NRC Docket Nos. 50-438 and 50-439

Subject: **CONTAINMENT VERTICAL TENDON COUPLING FAILURE – FINAL REPORT**

- References:
1. U.S. Nuclear Regulatory Commission Operations Center Event Report No. 45559, dated December 10, 2009 (ML093490942).
  2. Letter from TVA to NRC, "Bellefonte Nuclear Plant (BLN) Units 1 (CPPR-122) and 2 (CPPR-123) – Containment Vertical Tendon Coupling Failure – First Interim Report," dated December 10, 2009 (ML093480158).
  3. Letter from TVA to NRC, "Bellefonte Nuclear Plant (BLN) Units 1 (CPPR-122) and 2 (CPPR-123) – Containment Vertical Tendon Coupling Failure – Second Interim Report," dated March 29, 2010 (ML100900090).
  4. Letter from TVA to NRC, "Bellefonte Nuclear Plant (BLN) Units 1 (CPPR-122) and 2 (CPPR-123) – Containment Vertical Tendon Coupling Failure – Third Interim Report," dated September 20, 2010 (ML102660164).
  5. Letter from TVA to NRC, "Bellefonte Nuclear Plant (BLN) Units 1 (CPPR-122) and 2 (CPPR-123) – Containment Vertical Tendon Coupling Failure – Fourth Interim Report," dated March 29, 2011 (ML110940042).
  6. Letter from TVA to NRC, "Bellefonte Nuclear Plant (BLN) Units 1 (CPPR-122) and 2 (CPPR-123) – Containment Vertical Tendon Coupling Failure – Fifth Interim Report," dated March 29, 2012 (ML12093A401).

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The purpose of this letter is to provide the final report on the containment vertical tendon coupling failure, which TVA initially reported to the NRC Operations Center on December 10, 2009 (Reference 1). TVA has submitted five interim reports (References 2, 3, 4, 5 and 6) on this subject. TVA's fifth interim report described further actions being pursued within the Bellefonte corrective action program under Problem Evaluation Report (PER) 200119. The PER work effort has produced information deemed sufficient to support the final determination whether the subject failure is reportable pursuant to the requirements in 10 CFR 50.55(e).

The evaluations and supporting laboratory analyses of the Bellefonte Unit 1 V9 containment vertical tendon coupling failure on August 17, 2009 conclude the failure mode to be hydrogen-induced stress corrosion cracking (SCC). The root cause of failure was determined to be water and sulfides in the grease surrounding a high stress area of the failed coupling.

The evaluations to determine the extent of condition have found no SCC indications for any tendon component other than the failed V9 containment vertical tendon coupling. The vertical tendons are essential to the safety-related functions of the reactor building primary containment structure. The evaluations included performing the following activities:

- TVA reviewed applicable design specifications, design drawings, material test reports, as-built material properties, installation and maintenance history records, and operating experience, and concluded that the BLN design and added controls were adequate to minimize the introduction of water and sulfur contamination.
- TVA conducted grease analyses consistent with NRC Regulatory Guide (RG) 1.35 on the lower grease cans of all the Unit 1 containment vertical tendons. The grease inspection of the V41 vertical tendon detected a relatively small quantity of water, but did not detect any sulfur or other contaminants. The grease inspections for the remaining 183 vertical tendons did not detect the presence of water, sulfur or other contaminants, and determined the grease samples were within the applicable design specification limits.
- TVA detensioned, disassembled and performed non-destructive examination (NDE) testing on the coupling heads, couplers and tendons for the two vertical tendons (V41 and V121) determined to be potentially high-risk, one randomly selected horizontal tendon (106BD), and one randomly selected dome tendon (D3C17). In addition, RG 1.35 prescribed tests of grease samples at each end of these tendons were performed. The analysis and test results revealed no evidence of SCC and determined the material properties were within applicable design specification limits.

Based on the above results, the Bellefonte Unit 1 V9 containment vertical tendon coupling failure on August 17, 2009 does not represent a deviation that extends to other Unit 1 containment tendons and does not represent a deviation originating with the tendon supplier. Finally, the evaluation results indicate the deviation does not represent a substantial safety hazard and is not reportable pursuant to the requirements in 10 CFR Section 50.55(e).

Although TVA determined the deviation does not represent a substantial safety hazard and is not reportable, follow-on corrective actions for the subject containment vertical tendon coupling failure condition will continue to be assessed under PER 200119.

There are no regulatory commitments contained in this letter.

If you have any questions or require additional information, please do not hesitate to contact Martin Bryan at (256) 574-8265.

Respectfully,

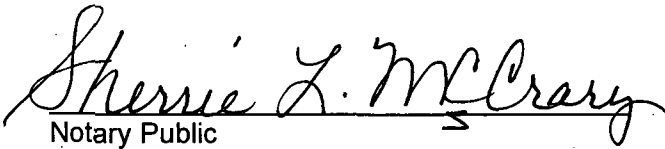


K. D. Stinson  
Vice President  
Bellefonte Project

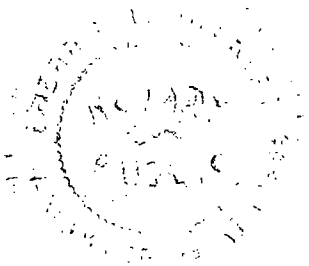
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Subscribed and sworn to before me

on this 27<sup>th</sup> day of March

  
Notary Public

My Commission Expires 1/19/2015



U.S. Nuclear Regulatory Commission  
Page 4  
March 27, 2013

cc:

Eric J. Leeds, Director  
U.S. Nuclear Regulatory Commission  
One White Flint North, 13H16M  
11555 Rockville Pike  
Rockville, Maryland 20852-2738

Robert C. Haag  
U.S. Nuclear Regulatory Commission  
Region II  
Marquis One Tower  
245 Peachtree Center Ave. NE, Suite 1200  
Atlanta, Georgia 30303-1257

Jessie F. Quichocho, Chief for Plant  
Licensing Branch II-2  
U.S. Nuclear Regulatory Commission  
One White Flint North, 8G9A  
11555 Rockville Pike  
Rockville, Maryland 20852-2738

Christopher J. Even  
U.S. Nuclear Regulatory Commission  
Region II  
Marquis One Tower  
245 Peachtree Center Ave. NE, Suite 1200  
Atlanta, Georgia 30303-1257

Justin C. Poole, Sr. Project Manager  
U.S. Nuclear Regulatory Commission  
One White Flint North, 8G9A  
11555 Rockville Pike  
Rockville, Maryland 20852-2738

Victor M. McCree, Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
Marquis One Tower  
245 Peachtree Center Ave. NE, Suite 1200  
Atlanta, Georgia 30303-1257

Frederick D. Brown, Deputy Regional  
Administrator for Construction  
U.S. Nuclear Regulatory Commission  
Region II  
Marquis One Tower  
245 Peachtree Center Avenue NE, Suite 1200  
Atlanta, Georgia 30303-1257