



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

August 16, 2011

EA-11-018

Mr. Preston D. Swafford
Executive Vice President and Chief Nuclear Officer
Tennessee Valley Authority
1101 Market Street, LP 3R
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY RED FINDING AND NOTICE OF VIOLATION

Dear Mr. Swafford:

In a letter dated June 8, 2011, the Tennessee Valley Authority (TVA) appealed the Nuclear Regulatory Commission's (NRC) Final Significance Determination for a Red Finding and Notice of Violation (NOV) for the Browns Ferry Nuclear Plant (BFN) Unit 1. The red finding involves the failure of low pressure coolant injection (LPCI)/residual heat removal (RHR) outboard injection valve 1-FCV-74-66 to open on October 23, 2010, when operators attempted to place the BFN Unit 1 RHR Loop II in Shutdown Cooling to support refueling outage activities. The NOV contained in the inspection report identified a non-compliance with Technical Specification (TS) 3.5.1, Emergency Core Cooling System (ECCS) – Operating, from March 13, 2009, to October 23, 2010. As described in NRC Inspection Report 05000259/2011008, dated May 9, 2011, the NRC determined that TVA's failure to implement an In-service Testing (IST) program in accordance with the American Society of Mechanical Engineers (ASME), Code for Operation and Maintenance of Nuclear Power Plants (OM Code), 1995 Edition including the 1996 Addenda, Section ISTC 4.1, precluded the timely identification that the valve had failed and that the BFN Unit 1 LPCI/RHR loop II subsystem was unable to fulfill its safety function. The NRC concluded that TVA's IST program inadequacy was within its purview and represented a performance deficiency.

While acknowledging the safety significance of the valve's failure, TVA's June 8 letter raised several issues to support its appeal of the red finding, including the view that the IST program at BFN was "not inadequate...and that no licensee performance deficiency related to IST was involved in the valve failure." In my response dated June 22, 2011, I indicated that the issues raised in your June 8 letter were previously considered during the NRC's development of the final significance determination for the red finding and that your appeal did not meet the merit guidelines contained in Section 3, Limitations, of Inspection Manual Chapter 0609, Attachment 2. However, I also informed you that the NRC would conduct an independent review of this matter to provide additional assurance that appropriate regulatory actions were being taken for this finding. The NRC's independent review was completed and the insights have been considered in the NRC's final position contained in this letter regarding the failure of valve 1-FCV-74-66.

NRC regulations require that components that are important to the safe operation of a nuclear power plant be treated in a manner that provides assurance of their performance. 10 CFR Part 50.55a(b)3(ii) requires licensees to establish programs to provide assurance that motor-operated valves continue to be capable of performing their design basis safety function. The IST program, motor operated valve (MOV) testing program, and corrective action program are relevant examples of such programs. As described below, the NRC determined that the inadequate establishment and/or implementation of these programs at BFN represented a performance deficiency, and that appropriate implementation of these programs would have enabled TVA to promptly identify and correct the failure of 1-FCV-74-66.

The NRC assessed TVA's review of the partial Motor Operated Valve Analysis and Test System (MOVATS) testing (which included a time trace of electrical current taken at the motor control center) performed on valve 1-FCV-74-66 on October 31, 2008. This partial MOVATS testing provided evidence that the valve's disc was detached from the stem. The NRC determined that a more comprehensive review of the test data by TVA would likely have resulted in a more timely identification of the stem to disc separation. In addition, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that safety-related procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been successfully accomplished. TVA's Procedure ECI-0-000-MOV009, "Testing of Motor Operated Valves using MOVATS Universal Diagnostic System (UDS) and Viper 20," Revision 20, a safety-related procedure, did not contain appropriate quantitative or qualitative acceptance criteria for determining that partial MOVATS testing was successfully accomplished. TVA's failure to include appropriate quantitative or qualitative acceptance criteria for partial MOVATS testing in Procedure ECI-0-000-MOV009 was within its purview and contributed to the performance deficiency.

The NRC also reviewed TVA's decision to exclude 1-FCV-74-66 from the scope of the Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," program. TVA had excluded the outboard LPCI valves from the program because it considered them to be passive valves with no safety-related function to reposition. The NRC determined that the LPCI outboard injection valves have an active safety function to close and TVA's classification was incorrect. Therefore, these valves should have been included within the scope of the Generic Letter 89-10 program. The safety functions enabled by closing these valves include several modes of post-accident containment cooling. The BFN Updated Final Safety Analysis Report stated the containment cooling function of RHR was a required safety function to mitigate an accident, and TVA's emergency operating instructions required the LPCI outboard injection valves to be repositioned closed to accomplish this function. The NRC concluded that the cause(s) for not including these valves within the scope of the Generic Letter 89-10 program was within TVA's ability to foresee and correct, and that this contributed to the performance deficiency.

With respect to the IST performance deficiency described in our May 9 inspection report, the NRC determined that the requirements of the ASME OM Code concerning the verification of valve obturator position warrants additional clarification due to the diversity of views among NRC staff and industry experts. As a result, the NRC staff will continue to pursue generic resolution of the OM Code testing issues separate from the resolution of this finding. However, independent of the eventual outcome of the IST generic issues, the failure to establish adequate

programs that ensured the 1-FCV-74-66 continued to be capable of performing its design-basis safety function was supported by the original inspection.

The NRC has determined that the failure to establish adequate programs to ensure that motor-operated valves continue to be capable of performing their design basis safety functions was a performance deficiency. The inadequacy of TVA programs resulted in the Unit 1 LPCI outboard injection valve, 1-FCV-74-66, being left in a significantly degraded condition and the Unit 1 LPCI/RHR Loop II unable to fulfill its safety function.

Although the NRC has not fully assessed TVA's root cause analysis (RCA) of the failure of 1-FCV-74-66, this RCA does not appear to address the broader issues associated with programs to ensure the continued capability of motor-operated valves to perform their design basis safety function. Therefore, the NRC staff has concluded that it is appropriate to provide the more broadly stated performance deficiency described above to ensure a comprehensive evaluation and corrective actions by TVA for the LPCI valve failure.

The basis and outcome of the final risk significance determination evaluation by the NRC remains unchanged. Therefore, BFN Unit 1 will remain in the Multiple/Repetitive Degraded Cornerstone Column (Column 4) of the Action Matrix, and the NRC will continue to plan associated supplemental inspection activities. This letter constitutes the NRC's final determination on this matter and further appeal will not be considered.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this letter, please contact Mr. Eugene F. Guthrie, at (404) 997-4662.

Sincerely,

/RA/

Victor M. McCree
Regional Administrator

Docket No.: 50-259
License No.: DPR-33

cc: (See page 4)

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Letter to P. D. Swafford from Victor M. McCree dated August 16, 2011

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