



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381

AUG 31 1994

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

Gentlemen:

In the Matter of the Application of ) Docket Nos. 50-390  
Tennessee Valley Authority ) 50-391

WATTS BAR NUCLEAR PLANT (WBN) - UNITS 1 AND 2 - NRC INSPECTION REPORT NO. 390, 391/93-66 - SUPPLEMENTAL REPLY TO NOTICE OF VIOLATION

The purpose of this letter is to supplement TVA's December 10, 1993, reply to Notice of Violation 390/93-66-01 and 390/93-66-02 cited in the subject inspection report dated October 29, 1993. This submittal also addresses two issues from NRC's letter dated January 26, 1994.

Enclosure 1 documents the actions taken to address the issues and supplements TVA's December 10, 1993, response. Enclosure 2 is a tabulation of valves reviewed as an element of a vertical slice evaluation performed by Site Nuclear Assurance (SNA).

No additional commitments are made by this submittal. If you should have any questions, contact P. L. Pace at (615)-365-1824.

Sincerely,

Dwight E. Nunn  
Vice President  
New Plant Completion  
Watts Bar Nuclear Plant

Enclosures  
cc: See page 2

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cc (Enclosures):

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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
SUPPLEMENTAL RESPONSE TO NRC'S OCTOBER 29, 1993, LETTER TO TVA  
NRC VIOLATION 390/93-66-01 AND 390/93-66-02

**Background**

TVA's letter dated December 10, 1993, provided a response to Notice of Violation 390/93-66-01 and 390/93-66-02. NRC's letter dated January 26, 1994, identified the following concerns with TVA's response:

1. Corrective actions do not adequately address the possible extent of condition due to the number of deficiencies identified with one of those deficiencies being reportable under 10 CFR 50.55(e). Broad assessment for similar deficiencies should be performed to avoid future violations.
2. One corrective action may be unsatisfactory in the absence of a more precise statement of the acceptable time limit in a System Description.

In response to the NRC's January 26, 1994 letter, TVA submitted a letter dated February 25, 1994, documenting that TVA had initiated further assessments of the specific examples of the Notices of Violation to determine whether the initial extent of condition reviews was comprehensive. TVA also stated that by March 25, 1994, either a response would be submitted documenting the results of the assessments, or a schedule would be coordinated with the Region II staff to discuss the assessments and proposed corrective actions. After assessing the material involved in addressing the issues, TVA defined the basis for the actions that had been taken and discussed this with the Region II staff on April 22, 1994.

**Concern 1. Extent of Condition - Basis for Action Taken:**

The concern expressed by NRC generally questioned the certain aspects of the Design Baseline Verification Program (DBVP) Corrective Action Program (CAP). However, it can be established that numerous audits, assessments, inspections, and Integrated Design Inspections (IDIs) performed by TVA and other industry organizations, have reviewed or impacted the elements of the DBVP and contributed towards the reverification of the design of key plant systems. In addition, plant systems have also been reviewed as part of NRC inspection efforts. The plant systems which were encompassed by these reviews include:

System Number	System
003	Auxiliary Feedwater
032	Control Air
063	Safety Injection
067	Essential Raw Cooling Water
070	Component Cooling Water
072	Containment Spray
074	Residual Heat Removal
082	Standby Diesel Generators
211	6.9 kV Shutdown Power
212	480V Shutdown Power
235	120 VAC Vital Power
236	125 VDC Vital Power

When appropriate, TVA has utilized the reviews, especially the problems that may have been identified, as a means to modify and enhance the DBVP and provide for programmatic correction of the program.

In addition to the various reviews that have been performed, the Startup and Test program provides coverage for the majority of the commodities addressed by the program elements of the DBVP. The commodities which are not confirmed by the Startup and Test program include civil elements, materials, and material application. Coverage for the civil elements has been provided in three specific areas:

- Design Basis Inputs - This group of inputs were validated as an element of the Seismic CAP.
- Calculations - The required calculations were developed under the Calculations element of the DBVP. The civil calculations were inspected by NRC during IDI 390/92-201.
- Civil Design and Modifications - The civil design of the plant was confirmed through the implementation of the Seismic CAP. Design changes and plant modifications which resulted from the Seismic CAP were initiated and implemented. NRC verified the performance of the Seismic CAP during IDIs 390/92-201 and 390/93-201 and the 100 percent inspection of the Seismic CAP.

For the Materials commodities, coverage has been provided by utilizing the Replacement Items Program (RIP), Material Improvement Program (MIP), and the Additional Systematic Records Review (ASRR). Coverage for the Materials

commodity has also been provided in the area of support material which was resolved through activities associated with NRC Unresolved Item (URI) 390/92-21-01.

The last commodity not covered by the Startup and Test program, material application, includes the extent of condition review performed by TVA for Example 1 of Violation 390/93-66-02 and Significant Corrective Action Report (SCAR) WBSA930218. TVA's extent of condition review established that the cited condition was unique in that the Safety Injection pumps have high developed heads, but discharge into a completely depressurized reactor coolant system for certain accident modes. To ensure that no other components could be affected by this condition, a complete review of Westinghouse supplied systems was performed. One other case was identified and this involved the Centrifugal Charging pumps (CCPs) supplying flow to the Reactor Coolant pump seal injection lines after a large break loss of coolant accident (LOCA). However, no material application problems were found to exist in this system, since the seal injection lines use needle valves suited for the throttling application. Based on the extent of condition review, TVA concluded that the cited deficiency was the only case of TVA procured valves in Westinghouse systems that were not suited for the required high differential pressure. In support of this conclusion, corrective actions were developed which required:

1. The addition of a pressure reduction orifice in each of the 12 CCP and Safety Injection pump (SIP) Emergency Core Cooling System (ECCS) injection paths.
2. The revision of Appendix B, Design Checklist, of Engineering Administrative Instruction (EAI) 3.05, "Design Change Notices," to assure that erosion/cavitation is considered in future design.

To provide further assurance that Material Application is not a problem, Site Nuclear Assurance performed a vertical slice evaluation of the Residual Heat Removal system and the Safety Injection System. It should be noted that this vertical slice was not solely performed to address NRC's concerns with the response to the notice of violation, but was performed as a part of the SNA assessment plan for closure of the DBVP. However, the scope of the assessment was modified to include a review of material applications to aid in addressing NRC's concerns. System walkdowns performed during the vertical slice collected valve identification data for thirty valves. This data was used by SNA and Nuclear Engineering (NE) to assess the appropriateness of the application of the valves. Enclosure 2 is a tabulation of the valves which were reviewed based on walkdown data. The results of the assessment concluded that the valves were of the type depicted in the system design and that the valves would perform their intended function.

Another factor relevant to this issue is that the products of the DBVP, the Design Basis Document (DBD), the Configuration Control Drawings (CCDs), and the Calculations, are continually being improved. This is achieved as the products are used for the writing of preoperational tests, procedures required for plant operation or general use in preparation for the operation of the plant. Through this usage, inconsistencies and discrepancies can be identified and corrected. Therefore, additional safeguards exist to ensure discrepancies in the output of the DBVP are corrected.

In summary, the key points in the preceding discussion are:

- The DBVP has been assessed and enhanced through numerous audits and inspections.
- The Startup and Test program supplements the DBVP to ensure consistency between the plant and the design and ensures functionality of components and systems.
- Three principal commodities are not confirmed by the Startup program; Civil, Material, and Material Applications.
- Civil and Material commodities assessed through IDIs, CAPs/CAP closure, or special programs.
- Material Application assessed as an element of a SNA vertical slice and the extent of condition for Example 1 of Violation 390/93-66-02 and SCAR WBSA930218.
- Operational readiness programs and processes provide a means to supplement the program elements of the DBVP.

TVA concluded from the April 22, 1994, discussion with Region II staff members, that the extent of condition review for Example 1 of Violation 390/93-66-02 and SCAR WBSA930218 and the SNA valve assessment adequately assessed the misapplication of valves. Therefore, no additional broad based assessment should be required. However, since TVA had stated that there are programs that could use and correct output from the DBVP, NRC indicated that the NRC 100 percent inspection of the DBVP should focus on the usage of the DBVP output by other site organizations and should especially focus on the process through which errors, identified by organizations using the outputs, are defined and corrected. Also during the April 22, 1994, discussion NRC asked whether the Startup and Test program had identified any valves or other components that were not suited for their application. TVA did not have this information available at that time. However, TVA subsequently initiated a review of the Test Deficiency Notices submitted to NE to be dispositioned. This review revealed one instance where components were not suitable for the intended nonsafety-related application. Test Deficiency Notice 94-0728 documented the condition of four System 43, Sample and Water Quality, pressure gauges, 1-PI-043-80, 1-PI-043-81, 1-PI-043-84, and 1-PI-043-85, which were "over-ranged." Work Orders 94-11572-00, 94-11573-00, 94-11638-00, and 94-11639-00 replaced the gauges with proper units. No instances of component misapplication involving safety-related components were identified.

**Concern 2. System Description Revision - Basis for Action Taken:**

The deficiency cited as an example of Violation 390/93-66-01, stated:

The Residual Heat Removal (RHR) System Description (N3-74-4001, Rev. 4) incorrectly indicated that a loss of RHR pump seal water would not result in an unsafe condition. Referenced information indicated acceptable short term operability but did not support safe operation for the full duration of the design basis accident.

The corrective action for this example required the issuance of Design Change Notice (DCN) S-27128-A to revise the RHR system description to clarify that only short term loss of component cooling water does not result in an unsafe condition. This corrective action was judged by TVA to be appropriate after consideration of the following factors:

- RHR pump seal temperature is monitored and high temperature is annunciated in the control room.
- Component Cooling Water (CCW) flow is monitored and low flow is annunciated in the control room.
- Plant procedures require the operators to investigate high temperature conditions and secure the in-service pump (switch to other train) if seal cooling cannot be restored.
- The precise time for seal temperature to reach the 180°F limit is variable dependent on RHR temperature and flow and CCW temperature and flow.
- Establishment of a time limit could result in the premature removal of an RHR pump from service.

Based on the April 22, 1994, discussion it is TVA's understanding that NRC agreed with TVA's conclusion that determination of a specific time which encompasses the entire range of operating conditions is not practical and would not enhance the safe operation of the pump. Therefore, TVA considers that no further action is required for resolution of this issue.

**TABLE 1  
VALVE VERTICAL SLICE REVIEW  
VALVE TYPE VALIDATION  
SYSTEM 74 VALVES**

Valve Number	TVA Drawing No.	Valve Type (TVA Flo Dia)	Vendor Drawing Number	Valve Type (Vendor Dwg)	Valve Type (Installed)	Valve Type Match?	Valve Function	Valve Type Meet Reqmt's
1-CKV-74-515	1-47W810-1	8" check	934D179	8" check	8" check	yes	Pump disch ck	yes
1-DRV-74-508	1-47W810-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Pump disch drain	yes
1-DRV-74-509	1-47W810-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Pump suction drain	yes
1-DRV-74-516	1-47W810-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Flushing Isolation	yes
1-DRV-74-517	1-47W810-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Flushing Isolation	yes
1-FCV-74-3	1-47W810-1	14" gate (MOV)	115E007	14" gate (MOV)	14" gate (MOV)	yes	Pump suction Isolation	yes
1-FCV-74-12	1-47W810-1	3" globe (MOV)	D-266157	3" globe (MOV)	3" globe (MOV)	yes	Miniflow Isolation	yes
1-FCV-74-24	1-47W810-1	3" globe (MOV)	D-266157	3" globe (MOV)	3" globe (MOV)	yes	Miniflow Isolation	yes
1-FLV-74-513	1-47W810-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Flushing Isolation	yes
1-RTV-74-100A	1-47W810-1	globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Pi 74-14 root vlv	yes
1-RTV-74-101A	1-47W810-1	globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Pi 74-6 root vlv	yes
1-RTV-74-104A	1-47W810-1	globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	PT74-13 root vlv	yes
1-RTV-74-107A	1-47W810-1	globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Pi 74-22 root vlv	yes

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
 SUPPLEMENTAL RESPONSE TO NRC'S OCTOBER 29, 1993, LETTER TO TVA  
 NRC VIOLATION 390/93-66-01 AND 390/93-66-02

ENCLOSURE 2

**TABLE 2**  
**VALVE VERTICAL SLICE REVIEW**  
**VALVE TYPE VALIDATION**  
**SYSTEM 63 VALVES**

Valve Number	TVA Drawing No.	Valve Type (TVA Flo Dia)	Vendor Drawing Number	Valve Type (Vendor Dwg)	Valve Type (Installed)	Valve Type Match?	Valve Function	Valve Type Meet Reqmt's
1-DRV-63-519	1-47W811-1	3/4" diaphragm	TVD-D-9954-(2)	3/4" globe	3/4" globe	no #	Pump Drain	yes
1-FCV-63-1	1-47W811-1	14" gate (MOV)	115E285	14" gate (MOV)	14" gate	yes	RWST to RHR Suction	yes
1-FCV-63-3	1-47W811-1	2" globe (MOV)	E73-033	2" globe (MOV)	2" globe	yes	Common Minflo Return	yes
1-FCV-63-5	1-47W811-1	8" gate (MOV)	115E280	8" gate (MOV)	8" gate (MOV)	yes	Pump suction to RWST	yes
1-RTV-63-349A	1-47W811-1	globe	TVD-D-9954-(2)	3/4" globe	globe	yes	FI 63-2 root valve	yes
1-RTV-63-350A	1-47W811-1	globe	TVD-D-9954-(2)	3/4" globe	globe	yes	FI 63-2 root valve	yes
1-VTV-63-503	1-47W811-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Test conn root valve	yes
1-VTV-63-500	1-47W811-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Test conn root valve	yes
1-VTV-63-517	1-47W811-1	3/4" globe	TVD-D-9954-(2)	3/4" globe	3/4" globe	yes	Pump vent	yes
1-VTV-63-727	1-47W811-1	3/4" globe	13824	3/4" globe	3/4" globe	yes	K-15 test conn	yes
1-VTV-63-728	1-47W811-1	3/4" globe	13824	3/4" globe	3/4" globe	yes	K-15 test conn	yes
1-VTV-63-730	1-47W811-1	3/4" globe	13924	3/4" globe	3/4" globe	yes	K-14 test conn	yes
1-RFV-63-604	1-47W811-1	1" relief	DS-C-A56887	1" relief	1" relief	yes	Accumulator press reif	yes
1-RFV-63-535	1-47W811-1	3/4" relief	DS-C-A56886	3/4" relief	3/4" relief	yes	SI Injection press reif	yes
1-RFV-63-511	1-47W811-1	3/4" relief	DS-C-A56883	3/4" relief	3/4" relief	yes	SI suction press reif	yes
1-RFV-63-626	1-47W811-1	2" relief	DS-C-A56902	2" relief	2" relief	yes	RHR Injection press reif	yes
1-RFV-63-534	1-47W811-1	3/4" relief	DS-C-A56886	3/4" relief	3/4" relief	yes	SI Injection press reif	yes

\* Note: 1-DRV-63-519 is shown as a 3/4" diaphragm valve on the flow diagram but is shown as a 3/4" globe valve on the vendor drawing. This discrepancy is example 1B of Violation 390/93-66-02.