



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

ENCLOSURE 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 183 TO FACILITY OPERATING LICENSE NO. DPR-52

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-260

1.0 INTRODUCTION

By letter dated August 6, 1990, the Tennessee Valley Authority (TVA), requested changes to the Technical Specifications (TS) for Browns Ferry Nuclear Plant, Unit 2. TVA also provided additional information regarding its TS amendment request by letter dated October 9, 1990. The change is to the trip setting for the Level 1 low reactor pressure vessel (RPV) water level. During the process of generating setpoint and accuracy calculations for plant parameters for which no calculational basis could be found, it was determined that the trip setting for the Level 1 low RPV water level was not conservatively based.

2.0 DISCUSSION

A summary of the proposed changes to the reactor pressure vessel (RPV) level instruments are as follows:

- o Trip Level Setting changed from 378 to 398 inches above vessel zero (IAVZ) - LIMITING SAFETY SYSTEM SETTING (LSSS).
- o Analytical limit changed from 378 to 372.5 IAVZ - SAFETY LIMIT (SL)
- o Revise the bases section.
- o Remove exception to operability requirements for certain reactor low water level instruments during the time the RPV water level modifications are being performed.

There are no proposed TS changes to the minimum number of operable instruments, action statement, surveillance requirements for frequency of functional or calibration testing.

The reactor vessel water level 1 instruments, 2-LS-3-58A-D and 2-LIS-3-56A-D, are used to measure reactor pressure vessel (RPV) water level. At the existing setpoint, 378 IAVZ, low water level causes the initiation of the following systems:

- o containment spray system (CSS)
- o low pressure coolant injection system (LPCI)
- o main steamline isolation
- o permissive inputs to the automatic depressurization system (ADS)

3.0 EVALUATION

The original LSSS reactor vessel low water level value in TS Table 3.2.A and Table 3.2.B was equal to the SL of 378 inches above vessel zero (IAVZ). Section 50.36 "Technical Specifications" of 10 CFR 50 requires "Where a limiting safety system setting [LSSS] is specified for a variable on which a safety limit [SL] has been placed, the setting shall be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded."

This requirement of 10 CFR 50.36 cannot be achieved if the LSSS is equal to the SL. The LSSS must be set to actuate at a higher reactor vessel water level than the SL to account for instrument inaccuracies, loop inaccuracies, response time of; instrument channels, logic relays, isolation valves closing, or motor breaker closing, pump acceleration time, and injection water flow into the reactor vessel. Therefore, the licensee proposed to change the LSSS from 378 to 398 IAVZ to assure the SL is not exceeded, and still prevent inadvertent actuation from normal operating level transients. The LSSS is 37-11/16 inches above the top of the reactor core (which is at 360-5/16 IAVZ).

The Level 1 low RPV water level trip level setting of 398 IAVZ is the limiting value that instrument setpoint can have when tested periodically, beyond which the instrument channel is declared inoperable and corrective action must be taken.

TVA stated: "The analytical limit [SL] provided by GE [General Electric Company] was used as a design input to a scaling and setpoint calculation which determined the nominal trip setpoint and trip level setting [LSSS] based on inaccuracies associated with the instrument loops. The allowance for instrument inaccuracies in determining the actual trip setpoint provides conservative assurance that the trip function will be performed at or before reaching the analytical limit [SL]."

TVA performed a Setpoint and Scaling Calculation to determine the accuracy of the instruments and loops. This accuracy was compared to the required accuracies to assure that there is sufficient margin between the setpoints and the operating limits, and the safety limits. The calculations reviewed by the staff at TVA's Rockville office were as follows:

Instrument No.	Calculation No.	Revision No.
2-LT-3-56A	ED-Q2003-88122	3
2-LT-3-56B	ED-Q2003-88123	3
2-LT-3-56C	ED-Q2003-88124	3
2-LT-3-56D	ED-Q2003-88125	3
2-LT-3-58A	ED-Q2003-880126	4
2-LT-3-58B	ED-Q2003-880127	4
2-LT-3-58C	ED-Q2003-880128	4
2-LT-3-58D	ED-Q2003-880129	4

The staff's review of the calculations verified that TVA addressed instrument and loop errors for normal operation and accident conditions associated with the following sources:

- | | | | |
|---|---------------|---|-------------------------|
| o | temperature | o | power supply |
| o | pressure | o | seismic |
| o | zero | o | radiation |
| o | span | o | water leg |
| o | repeatability | o | condensate pot location |
| o | drift | o | vessel growth |

The vendor's errors were extrapolated to 18 months plus 25%, which is 22-1/2 months. This is the maximum calibration interval.

The methodology for determination of instrument setpoints used by TVA was in accordance with Regulatory Guide (RG) 1.105 that endorses Instrument Society of America (ISA) Standard ISA-S67.04 - 1982 "Setpoint for Nuclear Safety Related Instrumentation Used in Nuclear Power Plants". This standard provides guidance for ensuring that setpoints stay within TS limits.

The level instruments affected by this amendment, specified in the Setpoint and Scaling Calculations, are Rosemount models that have been identified in a 10 CFR Part 21 report, submitted by Rosemount, and NRC Bulletin 90-01 as being susceptible to failure under certain conditions. This failure is caused by leaking silicon oil from between the isolating diaphragm and sensing diaphragm of the instrument. The loss of silicon oil causes the transmitters to exhibit reduced performance (output shift, lack of response over their full range, and/or increase in response time) prior to detectable failure. The safety concern is a common cause failure since the redundant instruments are the same manufacture and model. Although there has not been a TS change to the surveillance frequency, TVA has committed to comply with the Bulletin and Rosemount Technical Bulletin Number 4. TVA's program included the development of procedures for increased surveillance. These procedures are Procedure Method PM89-02 R1 (EE) - "Handling of Rosemount Transmitters" and Procedure No. SII-2-XT-00-165, R0 - "Rosemount Transmitter Special Monitoring Program."

In the NRC letter of September 7, 1990, TVA was requested to provide documentation (surveying records) for the RPV zero elevation which is the reference for all water level instruments. TVA responded to this request by making available, at their Rockville office, a copy of a General Electric drawing 729E424 "Nuclear Boiler Vessel Instruments." The staff reviewed Revision 11 of this drawing and verified that the elevation listed on the drawing as 578 feet three inches above sea level was used in the calculations, and the drawing is referenced in the calculation in the "Source of Design Input Information (References)."

On November 15, 1990, TVA informed the staff "that documentation of the BFN Unit 2 vessel [reactor pressure vessel] zero elevation is on file in the BFN licensing TS record file." The pertinent information excerpted from the documentation dated September 14, 1971, and signed by H.L. Johnson was reviewed by the staff. The RPV zero elevation agreed with the elevation on drawing 729E424, Revision 11. The staff has no further concerns about the BFN Unit 2 RPV zero elevation.

Changing the LSSS will revise: Table 3.2.A instruments 2-LIS-3-56A-D; Table 3.2.B instruments 2-LS-3-58A-D; a Table 3.7.A note; and Bases Sections 3.2 and 3.7/4.7.

In this TS amendment, TVA is also deleting information which was added to the TS as a temporary amendment. The temporary amendment was requested in their application dated October 14, 1988, which the staff issued as Amendment No. 158 in a letter to TVA dated December 15, 1988. Amendment No. 158 modified the Limiting Condition for Operation which required specific conditions to be met when work involving the reactor vessel was being performed. The specific instruments involved in the change to the OPERABLE definition were level instruments 2-LIS-3-203A-D and 2-LIS-3-58A-D. The work on the reactor vessel involved installation of instrumentation for detection of inadequate core cooling in accordance with the NUREG-0737, Item II.F.2. Modifications were also made to the instrument sensing in accordance with TVA's response to Generic Letter 84-23. This work has been completed and Amendment 158 is no longer necessary.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (55 FR 36353). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

Based on our review of the material submitted by the licensee, we find the proposed changes acceptable. The proposed changes to the LSSS and SL settings are acceptable because they are based on a value derived by approved calculational means. This change ensures that trips occur within the analytical limit used to confirm the design bases of the plant. The deletion of a temporary amendment which modified the LCO requiring specific conditions be met when work involving the reactor vessel was performed is acceptable because the time for its need has passed.

TVA has a program to address the transmitter problems identified in Rosemount 10 CFR Part 21 report and NRC Bulletin 90-01. The adequacy of this program will be determined by the staff under separate correspondence and outside the scope of this safety evaluation.

The staff has no further concerns about the RPV zero elevation documentation since the survey records are now in the BFN licensing TS files.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

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