

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

August 20, 1984

Mr. R. C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. DeYoung

Enclosed is our response to J. P. O'Reilly's July 20, 1984 letter to H. G. Parris transmitting Proposed Civil Penalty Action: EA 84-25, Failure to Identify and Correct Conditions Adverse to Quality, to Submit Required Reports, and Adhere to the Requirements of the Technical Specifications (Reference Inspection Reports 50-259/83-46, -260/83-46, -296/83-46, 50-259/83-55, -260/83-55, -296/83-55, 50-259/84-01, -260/84-01, and -296/84-01) for our Browns Ferry Nuclear Plant which appeared to deviate from NRC commitments. We have enclosed our response to the Notice of Violation and Proposed Imposition of Civil Penalty. Fees in the response to the civil penalty of \$120,000 are being wired to the NRC, Attention: Office of Inspection and Enforcement.

If you have any questions, please call me at FTS 858-2725.

To the best of my knowledge, I believe the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

James A. Domer
James A. Domer
Nuclear Engineer

Enclosure

cc (Enclosure):

U.S. Nuclear Regulatory Commission
Region II
ATTN: James P. O'Reilly, Regional Administrator
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ENCLOSURE
RESPONSE

PROPOSED IMPOSITION OF CIVIL PENALTIES: EA-84-25
FAILURE TO IDENTIFY AND CORRECT CONDITIONS ADVERSE TO QUALITY,
TO SUBMIT REQUIRED REPORTS, AND ADHERE TO THE REQUIREMENTS OF THE
TECHNICAL SPECIFICATIONS

Item I.A.

10 CFR 50, Appendix B, Criterion XVI, as implemented by TVA Topical Report, Section 17.2.16, requires the licensee to establish measures to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances, are promptly identified and corrected.

Contrary to the above, from March 18, 1983 through October 13, 1983, one of the unit 2 west scram discharge instrument volume scram level switches (2-LT-85-45A) was inoperable making the number of operable instrument channels less than two. The licensee had information available from scrams occurring on May 30, September 16, September 18, and October 7, 1983 which indicated that level transmitter 2-LT-85-45A was inoperable yet did not correct the problem.

1. Admission or Denial of the Alleged Violation

TVA admits to the violation.

2. Reasons for the Violation if Admitted

At the time of the violation plant procedures regarding post-trip review and analysis did not specifically require an evaluation of the response of the scram discharge instrument volume (SDIV) switches. The cognizant engineer for the system in the Nuclear Central Office (NCO) conducted a system followup review in September 1983. He specifically requested this and other data from the plant. Upon review of the data, the site engineer immediately recognized the problem and reported the situation to the Browns Ferry superintendent and prompt corrective action was subsequently implemented.

3. Corrective Steps Which Have Been Taken and Results Achieved

In the same timeframe of the discovery of this event, Browns Ferry was already working on improvement of the post-trip review and analysis procedure as a result of NRC Generic Letter 83-28, 'Required Actions Based on Generic Implication of Salem ATWS Events.' Plant instruction, TI-74, was approved on December 2, 1983 to upgrade post-trip review by specifically enumerating required reviews. For this particular case, response of the individual SDIV instruments are tabulated and compared to each other. This evaluation has already noted an apparent time delay with the SDIV Magnetrol float switches as reported in our letter dated June 27, 1984 from L. M. Mills to H. R. Denton.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

The improved post-trip evaluation will continue to be used.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Item I.B.

10 CFR 50, Appendix B, Criterion III, requires that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculative methods, or by the performance of a suitable testing program. Design control measures shall be applied to the delineation of acceptance criteria for test.

Contrary to the above, the requirement was not met in that the post-modification testing (PTM-100) conducted to assure design adequacy on the newly installed differential pressure high level switches (Rosemount 1153DP) (2-LT-85-45A) on the unit 2 scram discharge instrument lines, did not include instrument response timing requirements. A subsequent response timing test on 2-LT-85-45A, conducted on October 14, 1983, revealed an instrument response time of 17.5 minutes. This response time exceeded the currently accepted safety evaluation criteria. Additionally, the monthly surveillance (SI 4.1.A-8) for the scram discharge instrument volume high level instruments did not include specific time response requirements.

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred.

2. Reasons for the Violation if Admitted

The reason for the violation was inadequate review of the unreviewed safety question determination (USQD), and a misunderstanding of time response requirements. As noted in NRC Inspection Report 83-46, it was recognized that the instruments had a slow response time as determined by laboratory tests. However, because of miscommunication and confusing wording in the USQD, the net result was that plant personnel did not understand that timing of the instruments was to be included as a surveillance criteria.

In regard to the post-modification test, we agree that switch timing should have been included. PMT-110 was primarily concerned with hydraulic performance of the SDIV system and utilized the surveillance

instruction discussed above to prove operability of the level instruments. We attribute the omission in part to failure to specify special test requirements. Also, at the time of the installation, procedures were not in place whereas the test group reviewed USQD revisions and special requirements.

Regarding the 'as-found' state of the instrument response time (17.5 minutes), TVA has previously provided an analysis that states 19 minutes as bounding.

3. Corrective Steps Which Have Been Taken and Results Achieved

The defective instrument was promptly removed and replaced. Different type instruments are being installed for long-term use. Response time criteria was included in the instrument surveillance instruction. A special survey of USQD special requirements and revisions was conducted to verify that this type situation was an isolated case.

On a programmatic basis, standard practice 8.3, 'Plant Modifications,' has been strengthened to ensure adequate identification and review of USQD special requirements. Similarly, beginning in April 1983, all workplans were being reviewed by test sections for identification and evaluation of testing requirements. In November 1983, this review was expanded to include a formal review of all modification USQDs with special attention given to testing requirements.

We believe this level of attention is sufficient to prevent recurrence.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

The differential pressure-type level transmitters will be replaced with a new type during the upcoming unit 2 refueling outage. Units 1 and 3 have since been fitted with the heated referenced resistive temperature devices with good results.

We also believe the current reorganization which is in progress will serve to improve communications between the TVA design and operating staffs.

5. Date When Full Compliance Will Be Achieved

Unit 2 modifications will be completed during fall 1984 refueling outage to achieve full compliance on this item.

Item I.C.

Technical Specification 6.2.B.4.c, as implemented by Browns Ferry Standard Practices 8.3 and 17.8, requires the Plant Operations Review Committee (PORC) to review proposed changes to systems having safety significance which may constitute an unreviewed safety question.

Contrary to the above, the PORC failed to identify the special time response requirement in Revision 8 of Unreviewed Safety Question Determination for Engineering Change Notice (ECN) 0392, dated December 17, 1982, concerning the installation of the scram discharge volume and associated instrumentation. As a result, neither the plant personnel nor the plant manager were aware that the trip signal initiation response for the scram discharge volume high level exceeded the special timing requirement imposed by the engineering design group in ECN 0392, and the original time response for the level instrumentation.

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred.

2. Reasons for the Violation if Admitted

Procedures were not in place to assure PORC review of all USQD revisions after approval of work start.

3. Corrective Steps Which Have Been Taken and Results Achieved

Standard Practice 8.3 now requires flagging of USQD special requirements for PORC review. Workplan closeout further verifies that stated special requirements have been met.

4. Corrective Steps Which Will Be Taken to Prevent Recurrence

No further corrective action is required.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Item I.D(1)(2)

I.D 10 CFR 50, Appendix D, Criterion III, requires that measures shall be established for the identification and control of design interfaces and for coordination among participating design organizations; that design control measures shall provide for verifying or checking the adequacy of design; and that design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design.

1. Contrary to the above, this requirement was not met in that the emergency equipment cooling water (EECW) diesel-generator heat exchangers were operated, since the original installation, at pressures ranging from 100 to 135 lb/in² with the design pressure of the heat exchangers being 75 lb/in².

2. Contrary to the above, Engineering Design (EN DES) Engineering Procedure (EP) 1.48 issued December 16, 1983, allowed decisions to be made for a significant nonconforming condition without design control measures commensurate with those applied to the original design. In consequence, 16 emergency diesel-generator cooling heat exchangers and 12 residual heat removal (RHR) pump seal cooling heat exchangers were not targeted for prompt corrective action applying the guidance from EN DES-EP 1.48.

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred.

2. Reasons for the Violation if Admitted

Reason for Violation

- I.D(1) - The BFN units 1 and 2 heat exchangers were supplied with the diesel generators packages as part of the nuclear steam supply system (NSSS) purchased in 1966 from General Electric (GE). The unit 3 diesel generators were contracted for by TVA in 1973, to the same specifications as those for units 1 and 2. TVA, in designing the EECW, assumed that the equipment being supplied by GE that utilized EECW was rated for operation at the EECW system pressure. As such, this interface was overlooked at the design review stage.
- I.D(2) - The diesel generator EECW heat exchanger design deficiency was originally identified by nonconformance report (NCR) BFNMEB8301. This NCR was later superseded by NCR BFNWBWP8311 which identified similar problems with other EECW 'users' including the residual heat removal (RHR) pump seal coolers. Failure evaluation/engineering reports (FE/ERs) provided in accordance with EN DES-EP 1.48 as part of these NCR transmittals supplied engineering evaluations of these conditions to assist in the determination of the condition's reportability to NRC. The FE/ER also provides (when available) recommendations for corrective actions. However, implementation of corrective actions is accomplished not by the issuance of FE/ERs but through the existing design change request (DCR)/engineering change notice (ECN) process. As such, it is our position that the FE/ER is not a part of TVA's design change control process.

For the diesel generator EECW heat exchangers, it was determined that failure of the heat exchangers at the maximum system operating pressure was unlikely. This assessment was based on engineering analysis of the heat exchanger

subcomponents, a successful hydrostatic test of the heat exchangers at a pressure above the maximum system operating pressure, and the previous years of satisfactory service from the heat exchangers at Browns Ferry Nuclear Plant (BFN). As a result, modifications to the EECW for reducing the system pressure at the heat exchanger inlet to the design pressure of the diesel generator heat exchangers were implemented on a schedule that was considered timely by TVA and yet did not perturbate ongoing work of equal or greater priority at BFN. As for the RHR pump seal cooler heat exchangers, TVA had begun replacing the original heat exchangers with a newer model (same 150 lb/in²g design pressure) when the EECW design pressure discrepancy was identified. However, it was determined that even though the EECW system design pressure was higher than the rated pressure for these heat exchangers (both the original and new models), the actual EECW system pressure at the heat exchangers was lower than the heat exchanger design pressure (note that the EECW system pressure at the diesel generator heat exchangers was higher than the heat exchanger design pressure). Also, the manufacturer of the new heat exchangers certified to TVA that the heat exchangers were qualified for service at the EECW system design pressure of 185 lb/in²g. Hence, corrective actions for this condition involve changes in design documentation only. Replacement of the RHR pump seal cooler heat exchangers has been scheduled by TVA in a manner such that previously scheduled work of equal or greater priority would not be adversely impacted. In summary, we consider our scheduling of corrective actions on these conditions to be acceptable and not untimely due to any procedural deficiencies in EP 1.48.

3. Corrective Steps Which Have Been Taken and Results Achieved

ECN PO709 was initiated in November 1983 to install throttling valves in the EECW supply to the diesel-generator heat exchangers to reduce the EECW system operating pressure at the heat exchangers. As of July 1984, all of the throttling valves have been installed and tested.

As noted above, the RHR seal cooler heat exchangers are being replaced by new heat exchangers that are qualified for operation at the EECW system design pressure (185 lb/in²g). Per L. M. Mills' letter to J. P. O'Reilly dated February 1, 1984, the new heat exchangers have been installed on units 1 and 3.

These modifications will require some minor changes to the information on these systems and components in the Browns Ferry Final Safety Analysis Report (FSAR).

4. Corrective Steps Taken to Avoid Further Noncompliance

Additional investigation of possible pressure rating problems with selected components in the EECW and RHR service water systems have been performed. These investigations have been documented by NCR BFNBP8406. The replacement RHR seal cooler heat exchangers will be installed during the fall 1984 refueling outage.

5. Date When Full Compliance Will Be Achieved

Upon completion of the modifications in unit 2 cycle 5 refueling outage the FSAR changes will be reflected in the next appropriate update.

Item II.A.

Technical Specification 6.7.2.A.9 required that a prompt (within 24 hours) notification be made upon discovery during plant life of conditions not specifically considered in the safety analysis report or technical specifications that require remedial action or corrective measures to prevent the existence or development of an unsafe condition.

- (1) Contrary to the above, this requirement was not met in that known deficiencies existed with the scram discharge instrument volume pressure transmitters (Rosemount 1153DP) on unit 2 and these deficiencies were not promptly reported. The response time of level switch 2-LT-85-45A exceeded current safety evaluation criteria. The response time was known by plant personnel to be variable from 15-29 minutes while the accepted maximum response time was approximately 71 seconds. TVA's design organization redesigned the level detector system after determining that the level transmitter response times were 'excessive' (memorandum dated 12/23/82 concerning ECN P03920). This redesign effort was not reported and an evaluation establishing new response time criteria was not conducted until October 14, 1983. During this period the instrument failed to trip in response to high level in the scram discharge instrument volume following four scrams.
- (2) Contrary to the above, this requirement was not met in that in March 1983, it was discovered that the diesel generator cooling water heat exchangers were being operated at pressures in excess of the rated pressure and a report acknowledging the design deficiency was not submitted to NRC until November 25, 1983 in Licensee Event Report 50-296/83-26, Revision 4.

This is a Severity Level III problem (Supplement I).
(Civil Penalty - \$40,000)

Item II.A.(1)

1. Admission or Denial of the Alleged Violation

TVA admits to the violation as explained in item 2.

2. Reasons for the Violation if Admitted

We agree that a report was required for the defective transmitter (2-LT-85-45A). As discussed in item I.B, plant staff did not identify existence of a problem until October 1983. Reporting procedures were then promptly initiated.

We do not believe that utilization of the Rosemount transmitter system required a report. Revision 8 to ECN P0392 addressed this situation and approved use of the transmitters. This matter was dispositioned prior to unit startup. The redesign effort initiated by EN DES was at the explicit request of NCO cognizant engineers who recognized the long-term need for more suitable instrumentation.

3. Corrective Steps Which Have Been Taken and Results Achieved

A telecopied event report on instrument 2-LT-85-45A was made on October 14, 1983 and a written report was made on October 24, 1983. The response time criteria was included in the surveillance instruction to identify recurrences or reportability.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

No further corrective steps are required.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Item II.A.(2)

1. Admission or Denial of the Alleged Violation

TVA admits the violation occurred.

2. Reasons for the Violation if Admitted

TVA failed to recognize that deficiency was reportable under technical specification 6.7.2.a.(a).

3. Corrective Steps Which Have Been Taken and Results Achieved

The event was reported on November 25, 1983. All determinations for reportability are now made by a single staff (Compliance Section) at Browns Ferry.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

No further steps are necessary. We do note that the new reporting rule has clarified reporting requirements in general.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Item III.A.

Technical Specification 4.1.C requires upon determining that a reactor protection system (RPS) channel is failed in an unsafe condition, that the other RPS channel monitoring the same variable be functionally tested immediately before the trip system containing the failure is tripped.

Contrary to the above, on October 13, 1983, when it was determined that 2-LT-85-45A, an 'A' RPS level transmitter for the SDIV, failed in the unsafe condition, the required channel functional test for RPS channel 'B' was not performed. The functional test was not performed until the NRC resident inspector notified the licensee of the requirement in the plant technical specifications.

This is a Severity Level III violation (Supplement I).
(Civil Penalty - \$40,000)

1. Admission or Denial of the Alleged Violation

TVA admits the violation.

2. Reasons for the Violation if Admitted

Attention was focused on tripping the inoperable channel and the requirement to test the alternate channel prior to tripping the inoperable channel was thus overlooked.

3. Corrective Steps Which Have Been Taken and Results Achieved

Involved personnel were admonished regarding failure to adhere to the technical specification criteria for testing of redundant instrument channels.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

No further recurrence control is required. Standard technical specifications have a similar but more logical specification on this matter. We intend to propose a technical specification incorporating this methodology in the very near future.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.