

50-296

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

05 APR 1 11:08

March 23, 1985

Mr. James M. Taylor, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Taylor:

Enclosed is our response to J. Nelson Grace's February 27, 1985 letter to H. G. Parris transmitting the Notice of Violation and Proposed Imposition of Civil Penalties: EA 84-136, Violations of Technical Specifications and Procedures During a Reactor Startup on October 22, 1984 (Inspection Report Nos. 50-259/84-45, -260/84-45, -296/84-45) for our Browns Ferry Nuclear Plant.

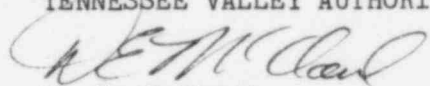
TVA has decided to deny Violation II and that Violation III is misstated for reasons described in the enclosure. We would like to request a meeting with your staff and NRR to discuss our denial of Violation II. Fees in response to the civil penalty of \$150,000 are being wired to the NRC, Attention: Office of Inspection and Enforcement.

If you have any questions, please call R. E. Alsup at FTS 858-2725.

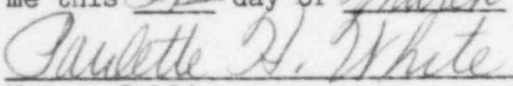
To the best of my knowledge, I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


D. E. McCloud
Nuclear Engineer

Sworn to and subscribed before
me this 23rd day of March 1985.


Notary Public
My Commission Expires 8-24-88

Enclosure

cc: See page 2

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PDR ADOCK 05000296
G PDR

Mr. James M. Taylor

March 29, 1985

cc (Enclosure):

U.S. Nuclear Regulatory Commission
Region II
ATTN: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Mr. R. J. Clark
Browns Ferry Project Manager
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Bethesda, Maryland 20814

DISCUSSION OF MANAGEMENT CONTROLS
TO PREVENT RECURRENCE

The Notice of Violation requested that TVA provide a discussion of management activities taken to preclude recurrence of these problems. The root cause of each violation must be analyzed in order to assess appropriate corrective action.

Item I reflected a problem of existing procedures not adequately fulfilling technical specification requirements.

Item III was fundamentally a communication problem between maintenance groups.

Items IV.A and IV.B were a combination of nonspecific procedures and taking liberty thereon.

Items IV.C, D, E, F, G, and H were caused by both inappropriate procedures and a lack of required meticulous compliance to procedures.

The solution to procedural problems is bifold. First, a long-term procedural upgrade is in progress which is oriented toward improving the format and content. Of immediate attention, is a continuing dedication to meticulous compliance to existing procedures. Inherent in this principle is that all activities will be contingent on acceptable, applicable procedures. In the event of unclear or inadequate procedures, all activities are to be halted pending resolution of the problem. The site director has issued this manner of business as policy. Recent violations of this policy have resulted in escalated punitive measures with involved personnel.

Item III is indicative of continuing problems associated with maintenance activities and communications between maintenance sections. We met with your Region II staff on February 7, 1985, to discuss our plans regarding improvements to the maintenance group organization.

A note of clarification regarding NRC's comments on the radiological hazards of the event as discussed in Inspection Report 84-45 is appropriate. The text states that the dose in the residual heat removal (RHR) rooms would have increased by a factor of 200 for full power operation. The RHR system, however, will automatically isolate from shutdown cooling at 100 psig.

RESPONSE
LEVEL III VIOLATIONS (\$150,000 CIVIL PENALTY) EA 84-136
EVENTS SURROUNDING UNIT 3 STARTUP
(REFERENCE NRC INSPECTION REPORT NOS.
50-259/84-45, 50-260/84-45, AND 50-296/84-45)

Enclosure 1

Item I - (50-296/84-45-02)

Technical Specification 4.3.B.3.c requires that the capability of the Rod Worth Minimizer (RWM) be verified before reactor startup by assuring the correctness of the control rod withdrawal sequence input to the RWM computer.

Contrary to the above, on October 22, 1984, the capability of the RWM was not verified before reactor startup in that the required RWM withdrawal sequence required by Refuel Test Instruction (RTI) 4, Table 4.1.B was incorrectly entered into the RWM computer and inadequately verified prior to use of the RWM program.

1. Admission or Denial of the Alleged Violation

TVA admits the violation as stated.

2. Reasons For the Violation

The RWM withdrawal sequence required by refueling test instruction RTI-4 was incorrectly entered into the process computer and inadequately verified prior to reactor startup due to procedural inadequacies and incomplete application of technical specifications (TS) and surveillance requirements. TS 4.3.B.3.c.1 has been applied in the past to only require the nuclear engineer to verify that the programmed RWM sequence is consistent with the predetermined rod sequence instructions.

3. Corrective Steps Which Have Been Taken and Results Achieved

The surveillance instruction concerning control rod movement has been revised to satisfy TS 4.3.B.3.c.1. A second nuclear engineer must now independently verify that the sequence is correct for RWM use and the nuclear engineer who issues the rod sequence instructions is responsible for verifying that the sequence loaded into RWM is consistent with the predetermined rod sequence instructions. Also, the nuclear engineers have been trained on the procedural changes and TS interpretations concerning their responsibilities on this subject.

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

Corrective action is complete.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Item II - (50-296/84-45-02)

Technical Specification (TS) 3.3.B.3.c requires that whenever the reactor is in the startup or run modes below 20 percent rate power, the Rod Worth Minimizer (RWM) shall be operable. A second licensed operator may verify that the operator at the reactor console is following the control rod program in lieu of an operable RWM. Furthermore, TS 3.3.B.3.d requires that if TS 3.3.B.3.a through 3.3.B.3.c cannot be met, the reactor shall not be started; or if the reactor is in the run or startup modes at less than 20 percent rated power, it shall be brought to a shutdown condition immediately.

Contrary to the above, on October 22, 1984, the RWM was not operable and the reactor was not shut down nor was a second licensed operator stationed at the reactor console.

1. Admission or Denial of the Alleged Violation

TVA denies this violation. Technical Specification 3.3.B.3.c states that a second licensed operator may verify that the operator at the reactor console is following the control rod program in lieu of an operable RWM. This has been interpreted in the past to not require the presence of a second licensed operator with RWM inoperable unless rod movement was actually in progress. Upon discovery of the RWM sequence error, all rod movement was stopped, and the rod pattern (31 rods withdrawn) was checked to ensure that the RWM performed its safety function up to that point in time. The nuclear engineer then corrected the RWM sequence. Due to RWM computer software requirements, RWM must be bypassed to correct the RWM sequence. Since no control rods were moved while RWM was not operable, TVA believes that the intent of Technical Specification 3.3.B.3.c was met; therefore, action required by Technical Specification 3.3.B.3.d was not required.

The above interpretation of Technical Specification 3.3.B.3.c is boiling water reactor (BWR) industry wide and based upon the following considerations.

1. Second party verification of activities, which is part of nuclear plant operation in many areas, applies only when an activity takes place and is to verify that the activity has occurred and occurred properly. This method of assurance is not generally applied to activities which are not currently occurring.
2. The letter of Technical Specification 3.3.B.3.c requires a second licensed operator to verify that the operator at the console is following the control rod program. Extension of this statement to require that a second licensed operator verify that no other operator at the console is moving control rods contrary to the control rod program is a questionable interpretation.

3. BWR standard technical specifications which contain similar but more explicit wording in Section 3/4.1.4, do not support NRC interpretation of Browns Ferry technical specifications reflected in this violation.

2. Reasons For the Violation

N/A

3. Corrective Steps Which Have Been Taken and Results Achieved

Plant procedures have been revised to require that a second licensed operator verify that the operator at the reactor console is following the control rod program when in startup or run modes at less than 30 percent power. This is prudent to avoid unnecessary scrams if RWM becomes inoperable or is bypassed until this matter is resolved. Also, operations and nuclear engineering personnel have been trained on these procedural changes and the new interpretation of Technical Specification 3.3.B.3.c.

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

Corrective action is complete.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Collectively, the above Violations I and II have been evaluated as a Severity Level III problem (supplement I).
(Cumulative Civil Penalty \$75,000 assessed equally among the violations)

Item III - (50-296/84-45-03)

Technical Specification (TS) 3.6.E.1 requires that whenever the reactor is in the startup mode, all jet pumps shall be demonstrated to be operable. TS 1.0.E defines operable as attendant instrumentation is capable of performing its related support function(s).

Contrary to the above, on October 22, 1984, during the Unit 3 reactor startup, two jet pumps were not demonstrated to be operable. Jet pump differential pressure flow instruments Flow Transmitter (FT) 68-19 and 68-40 were inoperable due to valve misalignment errors. This valve misalignment prevented verifying operability of the jet pumps. This violation pertains to Unit 3 only.

1. Admission or Denial of the Alleged Violation

TVA admits that the two flow transmitters were not valved in properly. In this configuration, however, jet pump operability may be demonstrated by passing the alternative criteria of TS 4.6.E.1.

2. Reasons For the Violation

The reason for the valving error was a communications error between maintenance sections following maintenance on the instrument valving manifold. This situation is difficult to detect from instrument readings for startup recirculation flow rates due to very low differential pressures across the jet pumps and was not detected during the October 21, 1984 performance of SI 4.6.E.1. Closer evaluation of the individual jet pumps differential pressures reading from the noon October 22, 1984 SI 4.6.E.1 data led to the correct diagnosis of the problem which was subsequently remedied by instrument maintenance personnel. In both cases, surveillance criteria 4.6.E.1.a was met and is sufficient to prove jet pump operability.

3. Corrective Steps Which Have Been Taken and Results Achieved

Instrument index SIMI-68 has been revised to identify requirements for alignment and operability checks of jet pump delta P instruments following maintenance.

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

A general procedural upgrade regarding requirements for instruments alignment and operability check is being undertaken and will be complete September 1985.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Item IV - (50-296/84-45-01)

Technical Specification 6.3.A.1 requires that detailed written procedures including applicable checkoff lists, covering normal startup, operation and shutdown of the reactor, and all systems and components involving nuclear safety of the facility, shall be prepared, approved, and adhered to.

Example IV.A - (50-296/84-45-01)

Browns Ferry Procedure BF GOI 100-1, Cold Startup Preparation for Approach to Critical, requires Section II.A to be completed prior to taking the reactor critical. Deviation from the procedural sequence to account for unit conditions is allowed with the consent of and under the direction of the shift engineer.

Contrary to the above, on October 22, 1984, the reactor was critical without steps II.A.9, II.A.10, and II.A.14 of BF GOI 100-1 having been completed, nor had the shift engineer consented to deviations from the procedural sequence.

1. Admission or Denial of the Alleged Violation

TVA admits the example occurred as stated.

2. Reasons For the Violation

During unit 3 startup activities, two initial criticals were required; one in each rod sequence control system sequence. The first critical in sequence B was to be performed for the purpose of verifying shutdown margin per RTI-4, and the second critical in sequence A was for the purpose of taking the reactor into heating power and startup operations.

The planned sequence of events after the first critical for RTI-4 was to fully insert all control rods, load a new sequence into the rodworth minimizer program, perform surveillance test on the rodworth minimizer and rod sequence control system in sequence "A", and pull control rods in sequence "A" for pressurization and heatup.

Shift personnel had reviewed GOI 100-1 requirements, the events required for startup, and discussed the sequence of events required to perform the shutdown margin critical with the residual heat removal system (step II.A.9 and II.A.10) running in shutdown cooling for the purpose of adding heat to maintain the moderator temperature greater than the minimum 180 degrees required by technical specifications. It was the opinion of personnel on shift that this decision was appropriate and within the scope of latitude provided by the disclaimer statement in GOI 100-1. Shift personnel also discussed the point in time during the startup sequence that steps II.A.9 and 10 would be

required to be performed, and the decision was made to defer these steps until the startup critical in sequence "A". Shift personnel also believed this action to be appropriate and within the bounds of latitude provided by GOI 100-1.

Based on the above discussion and sequence of events, the reason for the violation was that shift personnel did not interpret pulling control rods for the initial shutdown margin test to constitute a reactor startup, and no clear definition of reactor startup was defined in procedures.

3. Corrective Steps Which Have Been Taken and Results Achieved

GOI 100-1 has been revised to identify required steps that cannot be performed at the discretion of shift personnel, but must be completed prior to every startup. Additionally, a requirement has been added to ensure each prerequisite section has been completed prior to preceding to the next section. All prerequisite steps must be signed off prior to pulling control rods.

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

No further actions required.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.B - (50-296/84-45-01)

Browns Ferry Procedure, Master Refueling Test Instruction (MRTI), requires all testing within each major power test plateau be completed before proceeding to the next plateau, except for justifiable exceptions approved by the Plant Superintendent. In addition, MRTI step 28 and step 29 are designated as critical steps. These steps are required to be completed prior to taking the reactor critical for the shutdown margin determination.

Contrary to the above, on October 22, 1984, step 27 of the MRTI for the first test plateau was not completed as indicated by the fact that it was not signed or approved before proceeding to the second test plateau for initial criticality, nor was an exception approved by the Plant Superintendent. MRTI step 28 and step 29 were not completed prior to taking the reactor critical for the shutdown margin determination.

1. Admission or Denial of the Alleged Violation

TVA admits the example as stated.

2. Reasons For the Violation

The reason for the violation was that GOI 100-1 procedure was not adequate to ensure that MRTI signoffs were obtained prior to reactor startup. The test procedure listed GOI 100-1 prerequisites be met prior to taking this reactor critical, but the startup procedure (GOI 100-1) did not require that the MRTI be signed off prior to startup. Failure to sign off the MRTI was an oversight that was not assured by procedure controls.

3. Corrective Steps Which Have Been Taken and Results Achieved

GOI 100-1 has been revised adding a required signoff to be made by the shift engineer to verify completion of the required MRTI signoffs prior to performing control rod withdrawal. GOI 100-1 also requires the MRTI to be in possession of the shift engineer for verification of all MRTI approvals before proceeding to the next MRTI test plateau for startup operations following refueling outages.

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

No further corrective action is necessary.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.C - (50-296/84-45-01)

Browns Ferry Procedure BF GOI 100-1, Pre-startup Checklist, in Step I.B.2, requires that drywell equipment hatch trolley cranks be locked prior to startup. Deviation from the procedural sequence to account for unit conditions is allowed with the consent of and under the direction of the shift engineer.

Contrary to the above, on October 22, 1984, the drywell equipment hatch trolley cranks were found without locks installed on Unit 3 during the reactor startup, and the shift engineer had not consented to such deviation.

1. Admission or Denial of the Alleged Violation

TVA admits the example as stated.

2. Reasons For the Violation

The violation was caused by personnel error in not paying sufficient attention to procedural detail. The step was signed off, however, the signer did not review the full scope of the signoff.

3. Corrective Steps Which Have Been Taken and Results Achieved

The trolley cranks were immediately locked.

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

The involved party received a written reprimand. Required compliance to detailed written procedures is being reinforced through training with all mechanical maintenance craftsmen. All craftsmen will receive retraining by April 15, 1985.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.D - (50-296/84-45-01)

Browns Ferry Procedure BF GOI 100-1, Pre-startup Check List, in Step I.B.2 requires a graph of K-eff as a function of rods withdrawn to be attached to Surveillance Instruction (SI) 4.3.B.1.a data sheet.

Contrary to the above, the graph of K-eff was not attached to SI 4.3.B.1.a data sheet dated October 22, 1984.

1. Admission or Denial of the Alleged Violation

TVA admits to the example as stated.

2. Reasons For the Violation

GOI 100-1, prestartup checklist, requires a graph of K-eff as a function of rods be attached to SI 4.3.B.1.a data sheets. The graph was not physically attached to the data sheets because it was being used during the rod movement. This example can be attributed to inattentiveness to procedural detail.

3. Corrective Steps Which Have Been Taken and Results Achieved

The nuclear engineer was counselled concerning meticulous compliance to procedures. All nuclear engineers received training in procedural compliance.

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

To further eliminate future recurrences, GOI 100-1 will be modified to eliminate the requirement for the graph to be physically attached. The graph will continue to be used during rod movement for startup operations.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.E - (50-296/84-45-04)

Browns Ferry Procedure OI 77, Radwaste System Instrument Checklist, requires that the drywell floor drain sump transmitter 3-LT-77-1A for Unit 3 be in service prior to reactor power operation.

Contrary to the above, on October 22, 1984, the Unit 3 transmitter 3-LT-77-1A was discovered to be out of service in that its power was secured during the Unit 3 reactor startup.

1. Admission or Denial of the Alleged Violation

TVA admits to the example in that power was secured to 3-LT-77-1A during unit 3 startup on October 22, 1984.

2. Reasons For the Violation

The reason for the problem was that the instrument checklist was inadequate in that the checklist was not unitized.

3. Corrective Steps Which Have Been Taken and Results Achieved

OI-77 has been revised to reflect each unit's individual instruments.

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

No further actions are necessary.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.F - (50-296/84-45-01)

Criterion V of Appendix B to 10 CFR Part 50 requires that activities be prescribed by procedures of a type appropriate to the circumstances. These procedures shall include appropriate criteria for determining that the activities have been accomplished.

Contrary to the above, Browns Ferry Procedure OI 77, Radwaste Instrument Checklist, was inappropriate in that it did not specify individual unit lineups for floor drain level transmitter checks. This violation pertains to Unit 3 only.

1. Admission or Denial of the Alleged Violation

TVA admits to the example as stated.

2. Reasons For the Violation

The reason for the problem was that the instrument checklist was inadequate in that the checklist was not unitized.

3. Corrective Steps Which Have Been Taken and Results Achieved

OI-77 has been revised to reflect each unit's individual instruments.

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

No further actions are necessary.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.G - (50-296/84-45-01)

Browns Ferry Surveillance Instruction (SI) 4.6.E.1 for demonstrating jet pump operability requires in step 20 that the results comply with Technical Instruction (TI) 52 and that any exceptions be noted and explained in the remarks section.

Contrary to the above, SI. 4.6.E.1 was performed on Unit 3 on October 21, 1984, with results that did not meet the acceptance criteria of TI 52. This exception was neither noted nor explained in the remarks section of S.I. 4.6.E.1. This violation pertains to Unit 3 only.

1. Admission or Denial of the Alleged Violation

TVA admits to the example as stated.

2. Reasons For the Violation

Inadequate attention to detail and procedural discipline caused this violation.

3. Corrective Steps Which Have Been Taken and Results Achieved

SI 4.6.E.1 was revised to remove references to TI-52 and to clearly state technical specification requirements. STAs have received training in the revised procedure.

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

No further action is necessary.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Example IV.H - (50-296/84-45-01)

Technical Specification (TS) 4.6.E. requires that individual jet pump differential pressures be within 10 percent of the mean of all jet pump differential pressures when certain conditions exist. Technical Instruction (TI) 52 requires that individual jet pump differential pressures be within 10 percent of the established baseline data. The 10 percent criterion is a historical percent deviation from the mean of all jet pump differential pressures.

Contrary to the above, Browns Ferry Surveillance Instruction (SI) 4.6.E, Jet Pumps, is inadequate in that it does not demonstrate compliance with Technical Specification 4.6.E. S.I. 4.6.E states that completion of Section S.I. 4.6.E.1 fulfills the requirements of T.S. 4.6.E; however, it provides a different acceptance criteria from that given in TI 52. The TI 52 criterion would actually allow individual jet pump differential pressures in excess of 10 percent of the mean of all jet pump differential pressures. (Figure 12 of TI 52 shows that up to 15 percent deviation from the mean would be acceptable).

1. Admission or Denial of the Alleged Violation

TVA admits to the example as stated.

2. Reasons For the Violation

SI 4.6.E.1 (jet pump operability) which was in use at the time did not adequately cover the surveillance requirements of TS 4.6.E.1.c and hence, failed to fulfill the overall requirements of TS 4.6.E.1. TI-52 was used in addition to SI 4.6.E.1 to further analyze jet pump instrumentation data for potential failures. The surveillance criteria of TS 4.6.E.1.a and 4.6.E.1.b are virtually always sufficient to satisfy TS 4.6.E.1. This general misuse of section 4.6.E.1.c criteria may have contributed to the lack of concise instructions in this area.

3. Corrective Steps Which Have Been Taken and Results Achieved

SI 4.6.E.1 was revised to clearly state all technical specification requirements. References to TI-52 have been eliminated.

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

No further action is required.

5. Date When Full Compliance Will Be Achieved

Full compliance has been achieved.

Collectively, Violations III and IV have been evaluated as a Severity Level III problem (Supplement I).
(Cumulative Civil Penalty \$75,000 assessed equally among the violations.)