



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
101 MARIETTA STREET, N.W.  
ATLANTA, GEORGIA 30323

Report Nos.: 50-438/86-11, 50-439/86-11, 50-259/86-43, 50-260/86-43,  
50-296/86-43, 50-327/86-73, 50-328/86-73, 50-390/86-27,  
and 50-391/86-26

Licensee: Tennessee Valley Authority  
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Docket Nos.: 50-438, 50-439, 50-259, License Nos.: CPPR-122, CPPR-123,  
50-260, 50-296, 50-327, DPR-33, DPR-52, DPR-68,  
50-328, 50-390, and 50-391 DPR-77, DPR-79,  
CPPR-91, and CPPR-92

Facilities: Bellefonte Units 1 and 2; Browns Ferry Units 1, 2, and 3;  
Sequoyah Units 1 and 2; and Watts Bar Units 1 and 2

Inspection Conducted: December 15-19, 1986

Inspectors: *J. K. McMane for* *April 27, 1987*  
G. A. Walton, Inspection Team Leader  
Senior Resident Inspector  
Watts Bar  
Date Signed

*J. K. McMane for* *April 27, 1987*  
M. B. Shymlock, Section Chief  
Region II  
Date Signed

*J. K. McMane for* *April 27, 1987*  
P. F. McKee, Section Chief  
Office of Inspection and Enforcement  
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*J. K. McMane for* *April 27, 1987*  
P. G. Humphrey, Resident Inspector  
Watts Bar  
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*J. K. McMane for* *April 27, 1987*  
W. Bearden, Resident Inspector  
Bellefonte  
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*J. K. McMane for* *April 27, 1987*  
M. W. Branch, Senior Resident Inspector  
Watts Bar  
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Approved by: *S. A. Elrod* *4/27/87*  
S. A. Elrod, Section Chief  
Division of TVA Projects  
Date Signed

## SUMMARY

Scope: This special announced inspection was conducted to evaluate the licensee's performance in identifying Conditions Adverse to Quality (CAQs), in determining generic applicability of CAQs to their other nuclear plants, and in implementing adequate corrective actions at each site.

Results: Two Violations and one Unresolved Item were identified.

The violations involved failure to follow engineering procedures for implementing corrective actions and inadequate reviews of issues considered generic. The Unresolved Item concerned adequacy of CAQ review.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

\*D. C. Reagan, Knoxville Licensing Section  
\*J. J. Wilder, Nuclear Engineering Branch  
\*J. J. Ritts, Bellefonte Licensing Project  
\*J. T. McGehee, Division of Nuclear Construction, Field Services Branch  
\*B. J. Bates, Division of Nuclear Quality Assurance, Chattanooga  
\*L. E. Martin, Division of Nuclear Quality Assurance, Chattanooga  
\*W. S. Raughley, Electrical Engineering Branch  
\*J. L. Springer, Lead Engineer for Bellefonte Project  
\*J. P. Little, Jr., Mechanical Engineering Branch  
\*J. F. Weinhold, Engineering Assurance  
\*A. W. Latti, Division of Nuclear Engineering  
\*J. A. Kirkebo, Division of Nuclear Engineering  
\*W. E. Alkirc, Mechanical Engineering Branch  
\*D. L. Williams, Knoxville Licensing Staff  
\*L. I. Threlkeld, Engineering Procedures  
\*J. W. Webb, Sequoyah Projects  
\*H. Bennett, Engineering Assurance  
\*J. A. Ellis, Civil Engineering Branch  
\*J. H. Mayo, Electrical Engineering Branch  
\*R. N. Bell, Electrical Engineering Branch  
J. S. Colley, Engineering Assurance

\* Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on December 19, 1986, with those persons indicated by an asterisk in paragraph one above. The following new items were discussed:

- Inspector Followup Item (IFI) 438, 439/86-11-01; 259, 260, 296/86-43-01; 327, 328/86-73-01; 390/86-27-01; and 391/86-26-01; Evaluation of the Licensee's New Corrective Action Program. (paragraph 4a).
- Unresolved Item (URI) 438, 439/86-11-02; 259, 260, 296/86-43-02; 327, 328/86-73-02; 390/86-27-02; and 391/86-26-02; Adequacy of Conditions Adverse to Quality (CAQ) Review. (paragraph 4b).
- Violation 438, 439/86-11-03; 259, 260, 296/86-43-03; 327, 328/86-73-03; 390/86-27-03; and 391/86-26-03; Failure to Issue Potential Generic Condition Evaluation (PGCE) Reports and Untimely Response to Those Reports Issued by Other Plants. (paragraph 4c).

- Violation 438, 439/86-11-04; 259, 260, 296/86-43-04; 327, 328/86-73-04; 390/86-27-04; and 391/86-26-04; Adequacy of Engineering Evaluations Documented on Dispositioned CAQs. (paragraph 4d).

The licensee acknowledged the inspection findings with no dissenting comments. The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspectors during this inspection period. At no time during the inspection period did the inspectors provide written material to the licensee.

During the conduct of the inspection, licensee representatives indicated that an NRC inspection report yet to be issued from an inspection conducted in early 1986 would result in Notices of Violation in the same areas as this inspection. NRC was requested to consider double jeopardy when considering possible violations. Subsequent to the inspection, NRC Report 50-259,260,296/86-35; 50-327/328,86-56; 50-390,391/86-22; and 50-438,439/86-08 was issued on January 28, 1987. The NRC staff reviewed the issues identified in this report against the Notices of Violation issued with the previous report, consulted with the previous report author and concluded that, though the new Notice of Violation may address the same 10 CFR Appendix B requirement, the substance of the violation was different and was not identified during the early 1986 inspection.

### 3. Unresolved Items

Unresolved Items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

One Unresolved Item was identified during this inspection report and is discussed in paragraph 4.b.

### 4. Review of Licensee's Design Corrective Action Program (37997)

The inspector evaluated the licensee's corrective action program which was initiated for compliance with the Nuclear Regulatory Commission (NRC) Order Modifying Licenses, EA 85-49, dated June 14, 1985. The program's intent was to establish methods to identify and evaluate Conditions Adverse to Quality (CAQ) and to evaluate for generic applicability throughout the licensee's various nuclear facilities.

- a. The licensee's Nuclear Quality Assurance Manual, Part 1, Section 2.16. Rev. 1, "Corrective Action" (issued November 10, 1986) describes the licensee's program for full implementation of this procedure requirement by March 1987.

The Inspector reviewed this procedure and identified the following concerns: (1) unclear requirements on immediate notification of appropriate personnel upon identification of CAQs which could affect safety in an operating plant, (2) qualification requirements were not referenced for personnel evaluating CAQs, and (3) disposition and justification by other units at the same site of CAQs where the issue was determined to be generic. These issues will be evaluated upon completion of the procedure implementation. This will be tracked as IFI 438,439/86-11-01; 259,260,296/86-43-01; 327,328/86-73-01; 390/86-27-01; and 391/86-26-01; Evaluation of the Licensee's New Corrective Action Program.

- b. Office of Engineering Procedure (OEP)-17, "Corrective Action", was issued on June 30, 1985 to implement the requirements of Modification Order EA 85-49. The inspector reviewed numerous Nonconforming Condition Reports (NCRs) and Significant Condition Reports (SCRs) which were issued and dispositioned prior to the modification order to determine if the licensee had adequately reviewed and made proper disposition with consideration for generic applicability to other nuclear facilities. Engineering Design (EN DES)-EP 1.26, "Nonconformances-Reporting and Handling By EN DES", was in effect prior to the issuance of OEP-17. EN DES-EP 1.26 did not specifically address generic reviews of other TVA nuclear facilities.

The following concerns were identified relative to procedure EN DES-EP 1.26:

- (1) Bellefonte CAQ Report, BLN 1725 identified the presence of purge dam/glue residue in piping systems on January 28, 1982. The licensee was unable to obtain satisfactory flush results during construction testing of systems at Bellefonte due to the continued presence of purge dam/glue residue in the proof strainers. Usage of insoluble glue and the actual purge dam installation process had contributed to the problem. The inspector noted documentation (SQN B20413 601) which identified the purchase of insoluble glue by Sequoyah but a record of the usage could not be found. There is also a record of a review (PBN820330 005) at Phipps Bend (cancelled project) which stated that no glue was used at that project. Documentation was not provided which demonstrated that a generic review of this condition was performed.
- (2) Bellefonte CAQ Report, BLNEEB8003, identified blown fuses in Westinghouse low voltage switchgear on April 30, 1980. The licensee's investigation revealed that similar problems with this switchgear at Sequoyah and Watts Bar did not occur. Documentation was provided to show that this type of switchgear was not supplied to the three sites of Phipps Bend, Hartsville, and Yellow Creek which have been cancelled. Documentation was not provided to verify this concern was evaluated for applicability at the Browns Ferry facility.

- (3) Browns Ferry CAQ Report, BFNTDP8105, identified the lack of documentation to verify that the primary containment airlock electrical penetrations were environmentally qualified. The licensee reviewed the condition at Watts Bar and Sequoyah and determined that the MI type cable installations had been replaced. No documentation was provided to assure the concern had been evaluated at Bellefonte.
- (4) Browns Ferry CAQ Report, BFNMEB8406/SCRBFNCEB8520, identified the lack of criteria for seismically qualifying field routed schedule 160 piping that is 2 inch diameter and smaller. Block 17 of the NCR was marked 'NO' to signify that the condition did not require a Potential Generic Condition Evaluation (PGCE). The licensee did not produce any documentation to justify the determination that the condition did not apply to other sites.

The adequacy of CAQs reviewed are URI 438,439/86-11-02; 259, 260, 296/86-43-02; 327, 328/86-73-02; 390/86-27-02; and 391/86-26-02; pending NRC review of the licensee's evaluation.

- c. The inspectors reviewed numerous NCR's, SCR's and Problem Identification Reports (PIR's) for determination of generic applicability, justification for considering items not generic, adequacy and timeliness of PGCE reports and adequacy and timeliness of PGCE replies received from the sites.

The inspector reviewed the licensee's actions in this area against the applicable procedures. The applicable procedures and implementation dates are as follow:

- OEP-17 "Corrective Action". Implementation dates: June 30, 1985 to July 1, 1986.
- Division of Nuclear Engineering Procedure (NEP)-9.1 "Corrective Action". Implementation date: July 1, 1986.

The review specifically was performed to assess the licensee's timeliness when a PIR/SCR was determined by procedure definition to be significant. As stated in the applicable procedures, after a PIR/SCR is indicated as significant and a generic review for other nuclear facilities is warranted, the following actions are required: "After a PIR/SCR form is initiated, part A must be completed and, as applicable, a PGCE memo issued within 8 calendar days; the generic implication evaluations are to be assessed within 14 calendar days of the date of the evaluation memo; and corrective action (Part B) must be determined within a maximum of 60 days of issue of the PIR/SCR. The affected lead engineer (LE) has the responsibility to ensure these timeframes are met." These requirements are stated in both procedures.

The following examples of untimely responses and failure to establish corrective action were identified:

- Browns Ferry CAQ Report, SCRBFNNEB8601, identified on October 2, 1986, piping and penetration seals which were not seismic Class 1 where they penetrate secondary containment. This results in the possible failure of the secondary containment to perform its function, during a Design Baseline Event (DBE) per Final Safety Analysis Report (FSAR) Section 5.1.3, as a result of secondary containment failing to limit in-leakage. Block 11 of the SCR was marked 'yes' signifying that a PGCE was required. Review of this condition was performed for the other two units at Browns Ferry but no generic review for other sites was performed and the licensee could not provide any documentation to justify excluding other sites from the review process. This is contrary to procedure requirements.
- Browns Ferry CAQ Report, SCRBFNEEB8624, identified on May 7, 1986, the misapplication of static pressure effects on Rosemont transmitters. The condition was classified as generic and PGCE memos were forwarded to the other sites on May 14, 1986. All PGCE memos were returned indicating the condition did not exist at their site. The inspector noted that the PGCE reply from Sequoyah was not made until September 15, 1986. This is contrary to OEP-17, "Corrective Action", section 3.2 which requires that the evaluation be assessed within 14 calendar days after the PGCE memo is issued.
- Watts Bar CAQ Report, SCRWBNEEB8630, Rev. 1, identified on June 10, 1986, a generic condition. PGCE memos were forwarded to other sites on June 10, 1986. This condition concerns adequacy of redundant overcurrent protection devices. Bellefonte responded to the PGCE memo on July 2, 1986 which was 8 days late. Sequoyah responded on July 1, 1986 which was 7 days late. Sequoyah indicated the condition did exist at their site and SCRSQNEEB 8632 was issued. In compliance with the procedure requirements, Sequoyah was required to establish corrective action within 60 days. At the conclusion of this inspection, SCR 8632 had not been dispositioned for corrective action as required. Browns Ferry responded to the PGCE memo on July 14, 1986, which was 20 days late. The late responses or failure to establish corrective action is contrary to the procedure requirements.

The frequent occurrence of untimely responses to the PGCE memos and failure to establish corrective action on an SCR is violation 438,439/86-11-03; 259,260,296/86-43-03; 327,328/86-73-03; 390/86-27-03; and 391/86-26-03; "Failure to Issue Potential Generic Condition Evaluation Reports and Untimely Responses By Other Plants".

- d. The inspector reviewed the licensee's actions regarding the adequacy of engineering evaluations documented on numerous NCRs/SCRs. Based on this review, the following deficiencies were identified:



- Bellefonte CAQ Report, BLN 4929, identified on June 30, 1986, damage to the Diesel Generator 1A base plate/shim plate welds and surrounding grout due to an error in paralleling electric power supplies during quarterly operation of the diesel generator. The operator had closed the output breaker with the synchroscope in the 9 o'clock position (too early, i.e. out-of-sync) rather than at the 11 o'clock position required by operating instruction, RG-1A, dated April 9, 1986. The apparent cause on the original NCR was stated to be failure to follow procedure, while Rev. 1 to the NCR was stated to be due to an error in judgement by the operator. On July 9, 1986 an SCR was written which described the condition as being cracked welds between the generator base plate and shim plate, and cracked grout around the base plate.

The PGCE memo which was forwarded to the other sites contained a copy of the SCR without a description of the cause and a copy of Rev. 1 to the NCR with cause as stated above. The inspector reviewed the PGCE replies from the other sites and noted inconsistent evaluations of the condition. Watts Bar determined that the condition did exist and PIRWBNEEB8656 was generated to document the concern that the diesel generator output breaker could be closed under the same circumstances.

Sequoyah did not consider the condition to exist at their site based on a field verification. No description of that field verification existed. No documentation was provided by the licensee as justification for that determination. Browns Ferry also considered the condition did not exist at their site. This determination was apparently made based on inspection of the diesel generators at the three Browns Ferry units. Cracked welds or damaged grout were apparently not found during this inspection. The evaluations of this condition at Browns Ferry and Sequoyah do not properly address the actual concern, i.e. can the diesel generator breaker be closed out-of-sync and what measures could prevent recurrence (i.e. interlock, training).

- Bellefonte CAQ Report, BLN 1885, identified on September 11, 1984, the failure of numerous expansion shell anchors (SSDs) due to below strength surface zone concrete. This condition was classified as non-generic and no evaluation was performed even though similar procedures and processes were in place at Watts Bar. Subsequent CAQs (NCR 6511, Rev. 1) have identified similar problems at Watts Bar.
- Bellefonte CAQ Report, BLN 2551, identified on November 22, 1983, that ASCO solenoid valves were mounted horizontally. Per ASCO Catalog Number NP-1, valves must be mounted with the solenoid vertical and upright. The PGCE was performed at Watts Bar on July 12, 1984, and it was determined that the condition does not exist as checking the valve for proper orientation as required by the drawings and/or vendor manuals is part of the inspection process.



In NRC Inspection Report 50-390, 391/86-18 dated October 28, 1986, the NRC identified a violation at Watts Bar in that ASCO solenoid valve installation requirements to orient solenoid valves vertical and upright, were not translated into installation instructions. The licensee responded to the violation by letter dated November 25, 1986 and stated that a contributing factor to this violation was that procedures for installation and inspection did not provide acceptance criteria for the orientation attribute.

Failure to properly evaluate the generic applicability at other nuclear TVA facilities, as demonstrated by the examples cited above is violation 438, 439/86-11-04; 259, 260, 296/86-43-04; 327, 328/86-73-04; 390/86-27-04; and 391/86-26-04; "Adequacy of Engineering Evaluations Documented on Dispositioned CAQs.

- e. Disposition of CAQs prior to the implementation of the licensee's Nuclear Quality Assurance Manual, Part 1, Section 2.16, "Corrective Action", which involved rework, use-as-is, and repair did not require review for generic applicability at the various other sites where the potential for the condition existed.

Therefore, failure to include this requirement allowed the potential for this condition to exist without being detected at other sites. This will be included with the URI discussed in paragraph 4b, "Adequacy of Conditions Adverse to Quality Review."