



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

John H. Garrity
Vice President, Watts Bar Nuclear Plant

DEC 19 1991

WBRD-50-390/90-12
WBRD-50-391/90-12

10 CFR 50.55(e)

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

Gentlemen:

In the Matter of the Application of)
Tennessee Valley Authority)

Docket Nos. 50-390
50-391

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - INADEQUATE ELECTRICAL
CONSTRUCTION WORK CONTROL PROCESSES (QUALITY ASSURANCE STOP WORK ORDER
WBN-90-01) - WBRD-50-390/90-12 AND WBRD-50-391/90-12 - FINAL REPORT

The subject deficiency was initially reported to NRC Region II on
January 23, 1991, in accordance with 10 CFR 50.55(e) as Condition Adverse
to Quality Report (CAQR) WBN 900602. TVA submitted an interim report to
NRC on February 26, 1991. CAQR WBN 900602 was subsequently converted to
Significant Corrective Action Report (SCAR) WBN 900602 SCA. Enclosure 1
contains TVA's final report on this subject.

SCAR WBN 900602 SCA is associated with the TVA Quality Assurance stop
work order issued December 21, 1990. Subsequently, TVA management has
met with NRC Region II representatives on several occasions (January 15,
March 12, April 12, October 17, and November 19, 1991) to discuss actions
being taken to address those conditions which led to the stop work
order. Additionally, NRC Team Inspection 50-390, 391/91-29 assessed
TVA's readiness to restart construction activities. The enclosed final
report provides a brief summary of the above activities to satisfy the
reporting requirements of 10 CFR 50.55(e).

The commitment made in this report is contained in Enclosure 2.

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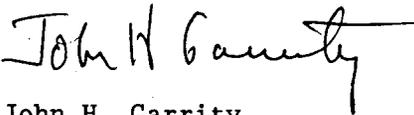
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U.S. Nuclear Regulatory Commission

DEC 19 1991

If there are any questions, please telephone P. L. Pace at (615) 365-1824.

Sincerely,



John H. Garrity

Enclosures

cc (Enclosures):

INPO Record Center
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

NRC Resident Inspector
Watts Bar Nuclear Plant
P.O. Box 700
Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. B. A. Wilson, Project Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN)
INADEQUATE ELECTRICAL CONSTRUCTION WORK CONTROL PROCESSES
(QUALITY ASSURANCE [QA] STOP WORK ORDER WBN-90-01)
SIGNIFICANT CORRECTIVE ACTION REPORT (SCAR) WBN 900602 SCA
WBRD 50-390/90-12 AND WBRD 50-391/90-12

FINAL REPORT

DESCRIPTION OF DEFICIENCY

On December 21, 1990, Condition Adverse to Quality Report (CAQR) WBN 900602 was issued to consolidate similar findings identified in three previously documented conditions adverse to quality (CAQs). Each of the previously issued CAQs identified examples of inadequate electrical construction work control processes. These examples, in part, led to the issuance of QA Stop Work Order WBN-90-01 on December 21, 1990. The stop work order resulted in temporary termination of electrical construction physical work activities at WBN. Based on a preliminary extent of condition review, the scope of Stop Work Order WBN-90-01 was expanded to include mechanical, instrumentation, civil, welding, and other construction work control processes on December 28, 1990. (SCAR WBN 900602 SCA applies to Unit 1 construction work activities and only those Unit 2 construction work activities required to support Unit 1 operation.)

On February 22, 1991, CAQR WBN 900602 was converted to SCAR WBN 900602 SCA. As part of the extent of condition review, TVA performed a review of active Problem Evaluation Reports, Finding Identification Reports, and SCARs. Those documented deficiencies associated with inadequate work control processes or unauthorized work were combined into SCAR WBN 900602 SCA. Based on the above review, the initial scope of SCAR WBN 900602 SCA was expanded to include mechanical, civil, instrumentation, and welding construction activities.

SAFETY IMPLICATIONS

Primary deficiencies identified through the self-assessment review of workplans and maintenance requests have been determined not to be significant. However, the programmatic nature of construction work control process deficiencies had the potential for creating quality problems at WBN. Therefore, this condition could have adversely affected the safe operation of the plant had it remained uncorrected.

ROOT CAUSE

The results of the TVA root cause analysis are outlined below:

- o General Performance Component
 - Inattention to detail
 - Supervisory ineffectiveness
 - Procedural complexity
 - Procedural lack of clarity
 - Procedural noncompliance
 - Ineffective implementation of Quality Assurance/Quality Control Program

RESULT: Some documentation and hardware deficiencies

ROOT CAUSE (continued)

° Attitudinal Component

- Denial of the need for change
- Failure to implement responsibilities
- Ineffective follow-through of corrective actions
- Inattention to detail

RESULT: Continuation of previously identified unacceptable performance

° Environmental Component

- Organizational structure
- Changing leadership direction
- Incorrect focus
- Unclear expectations

RESULT: Ineffectiveness in resolving issues

° Individual Performance Component

- Inappropriate beliefs regarding personnel responsibilities for quality
- Incorrect mindset that "inspecting in quality" was appropriate

RESULT: Failure of individuals to complete quality work right the first time

CORRECTIVE ACTIONS

1. A self-assessment performed for SCAR WBN 900602 SCA consisted of a sample review of 129 work documents (65 workplans and 64 maintenance requests). These documents were representative of the work control processes for nuclear construction and covered four stages of the work process:

- ° Documents in the vault
- ° Documents in the closure process with the engineer
- ° Documents in the closure process past the engineer
- ° Documents actively being worked in the field

The self-assessment identified 26 primary deficiencies. Of these primary deficiencies, 8 were electrical with 6 potential hardware deficiencies, and 18 were mechanical with 16 potential hardware deficiencies. Nuclear Engineering analyses indicated that the identified primary deficiencies would not have compromised plant safety had they remained uncorrected.

2. On December 6, 1991, TVA submitted Revision 4 of the QA Records Corrective Action Program Plan (CAP) to NRC. This plan was revised to incorporate the Additional Systematic Records Review (ASRR) and TVA's response to NRC's August 30, 1991 request for additional information.

CORRECTIVE ACTIONS (continued)

2. In late 1990, the ASRR was developed to provide an additional assessment of the condition of WBN QA records after TVA determined that a more systematic approach was required to provide the necessary level of assurance. The ASRR included a statistically based review of record quality attributes for ANSI N45.2.9 Appendix A record types currently applicable to WBN and a statistically based physical reinspection of hardware to compare the consistency of the installation records with the physical configuration. The ASRR provides for the evaluation of extent of condition (EOC) as necessary for each record type population and the establishment of recurrence controls. This assures that the entire record type population will satisfy the established acceptance criteria for unresolved defects.

Later in 1991, TVA further expanded the scope of the ASRR to address the technical content of records sampled with particular emphasis on the review of workplans and maintenance requests. The review of the technical content of records focuses on verification of the consistency of records with engineering output requirements. Thus, the technical content reviews coupled with the hardware reviews will enable a more complete perspective on the content consistency of the overall records package and the congruence of records and the physical configuration with engineering drawings and specifications.

The ASRR has been revised to reflect its enhanced scope and to incorporate comments previously discussed with NRC. The closure of the ASRR activities will include an integrated assessment of records technical content and the consistency of the physical installation with vaulted records.

3. TVA is continuing to perform safety net reviews on workplans initiated by nuclear construction engineering personnel and approved through February 20, 1991, but not yet closed and stored in the vault. After passing through this review, modification activities associated with each workplan will be in full compliance with existing site procedures and instructions. The remaining work was determined to have no impact on lifting the stop work order. These safety net reviews are scheduled to be completed by June 15, 1992.
4. TVA management met with NRC Region II representatives on March 12 and April 12, 1991, to discuss enforcement issues related to the December 21, 1990 stop work order. During the March 12, 1991 conference, TVA presented ten management objectives established to address the root causes for, and prevent recurrence of, the identified construction deficiencies. The management objectives have been reviewed by the responsible line organization(s) and senior site management for completion. Additionally, QA personnel have verified completion of each management objective.

CORRECTIVE ACTIONS (continued)

5. TVA management met with NRC Region II representatives on November 19, 1991, to present the results of construction restart-related work and to request NRC concurrence for restart. The TVA presentation reviewed the root causes and discussed, in detail, the accomplishments on the management objectives implemented to prevent recurrence. For reference, the root cause mapping of management objectives for restart presented to NRC Region II representatives is provided as an attachment to this enclosure. Based on the above presentation and preliminary results of NRC Team Inspection 50-390, 391/91-29, NRC Region II provided concurrence for restart. QA Stop Work Order WBN 90-01 was lifted on November 22, 1991.

ATTACHMENT

ROOT CAUSE MAPPING OF
OF MANAGEMENT OBJECTIVES FOR RESTART

GENERAL PERFORMANCE COMPONENTS	
INATTENTION TO DETAIL	6,7,8
SUPERVISORY INEFFECTIVENESS	7
PROCEDURAL COMPLEXITY	2,4
PROCEDURE LACK OF CLARITY	2,4
PROCEDURAL NONCOMPLIANCE	7,8
INEFFECTIVE IMPLEMENTATION OF QA/QC	5,7
ATTITUDINAL COMPONENTS	
DENIAL OF THE NEED FOR CHANGE	1,6,7
FAILURE TO IMPLEMENT RESPONSIBILITIES	7,8
INEFFECTIVE FOLLOW-THRU OF CORRECTIVE ACTIONS	5,6
INATTENTION TO DETAIL	6,7,8
ENVIRONMENTAL COMPONENT	
ORGANIZATIONAL STRUCTURE	7
CHANGING LEADERSHIP DIRECTION	3,6,8,9,10
INCORRECT FOCUS	3,6,8,10
UNCLEAR EXPECTATIONS	7,8
INDIVIDUAL PERFORMANCE COMPONENT	
INAPPROPRIATE BELIEFS REGARDING PERSONNEL RESPONSIBILITIES REGARDING QUALITY	1,6,7,8
INCORRECT MIND-SET THAT "INSPECTING IN QUALITY" WAS APPROPRIATE	1,6,7,8

MANAGEMENT OBJECTIVES FOR RESTART

1. ASSURANCE THAT HISTORICAL PROBLEMS ARE UNDERSTOOD AND NOT REPEATED.
2. NEW WORKPLAN FORMAT AND PROCEDURES,RELATED PROCEDURES SIMPLIFIED AND COMBINED.
3. BACKLOGGED PROBLEMS ADDRESSED
4. PROCESS IMPROVEMENTS
 - DESIGN ENGINEERING
 - CONSTRUCTION AND INSPECTION
 - MATERIALS
 - SYSTEM STATUS CONTROL
 - PRESTART TESTING
 - CLOSURE
5. CORRECTIVE ACTION PROGRAM IMPROVEMENTS
6. QUALITY MONITORING PIPELINE AND QUALITY INDICATORS IN PLACE.
7. ORGANIZATION CHANGES
8. TRAINING
9. ENGINEERING AHEAD OF CONSTRUCTION
10. PLANS FOR CAREFULLY MONITORED, SLOW RESTART

ENCLOSURE 2

LIST OF COMMITMENTS

TVA is continuing to perform safety net reviews on workplans initiated by nuclear construction engineering personnel and approved through February 20, 1991, but not yet closed and stored in the vault. After passing through this review, modification activities associated with each workplan will be in full compliance with existing site procedures and instructions. These safety net reviews are scheduled to be completed by June 15, 1992.