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OCT 04 1991

WBRD-50-390/85-51

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) UNIT 1 - AS-CONSTRUCTED DRAWING PROGRAM  
DEFICIENCIES - WBRD-50-390/85-51 - FINAL REPORT

The enclosure to this letter provides TVA's final report for the subject deficiency, initially reported to NRC on October 8, 1985, as Nonconforming Condition Report (NCR) WBN 6297. An interim report was provided November 14, 1985. The deficiency was upgraded to Significant Condition Report (SCR) WBN 6297-S on May 20, 1986, based upon its programmatic implications. Previous correspondence concerning this deficiency and related deficiencies was submitted on January 13, February 19, October 6, December 15, 1986, and January 28, 1987.

Under TVA's WBN Unit 1 Design Baseline and Verification Program (DBVP), TVA has implemented a comprehensive drawing program. TVA considers this program and the quality of drawing output from the program a substantial improvement over the previous Unit 1 as-constructed drawing process. In addition to the DBVP activity, TVA has in place a variety of other programs/processes which provide confidence that the as-constructed configuration of WBN is or will be appropriately reflected on as-constructed drawings as necessary to ensure the safe operation of WBN Unit 1.

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Please note the programmatic deficiencies associated with as-constructed drawings were identified for Unit 1 only. TVA's letter of May 20, 1986, incorrectly reported this issue for Unit 2 under WBRD-50-391/86-06.

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

Sincerely,



John H. Garrity

Enclosure

cc (Enclosure):

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## ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1  
AS-CONSTRUCTED DRAWING PROGRAM DEFICIENCIES  
WBRD-50-390/85-51  
SIGNIFICANT CONDITION REPORT (SCR) WBN 6297-S  
10 CFR 50.55(e) FINAL REPORT

### DESCRIPTION OF DEFICIENCY

In late 1985, a condition was identified at WBN in which some as-constructed (AC) (i.e., as-built) drawings did not accurately reflect the actual installed configuration of plant components or features. This deficiency was identified by personnel in TVA's Nuclear Construction organization based on a trend of several nonconforming condition reports (NCRs) which documented AC drawing discrepancies. The deficiency was indicative of a potentially generic condition involving weaknesses in the AC drawing process for WBN Unit 1. Extensive reviews conducted by TVA in 1986 and 1989 to evaluate and define the scope of the AC drawing problems brought to 73 the number of deficiency documents considered relevant to the Unit 1 AC drawing process. (Some of the 73 documents identified more than one drawing deficiency). Although weaknesses in the AC drawing program and its implementation were identified, the reviews found that as a whole the existing program was adequate.

An evaluation of the causal factors for each of the 73 CAQs was performed to provide the basis for evaluating the overall cause of problems associated with the AC drawing process. The discrepancies were categorized into the following groups:

1. Workplan control/processing
2. Design change processing
3. Miscellaneous problems

Within these three groups, there were two causal elements/areas of weakness that were indicated in the overall processing of AC drawings. First, there had been ineffective verification of some AC drawings during the drawing preparation and revision process due to lack of strict adherence to procedural requirements. This resulted in drawings that were not always correct or complete in accordance with completed workplans and/or change documents. Second, there had been a lack of adequate controls to ensure all affected drawings (especially vendor drawings) or documents were corrected to reflect completed modifications. Secondary causes can be attributed to human factors, such as carelessness and lack of attention to detail, particularly where minor drawing errors appear.

### SAFETY IMPLICATIONS

The failure to accurately reflect the installed configuration of WBN safety-related equipment on the AC drawings could result in miscommunication of information to plant personnel. As such, the subject deficiency could have adversely affected maintenance, modification, and operation procedures (or activities), and possibly the safe operation of the plant.

However, reviews of the AC drawing program found that overall the existing program was adequate. Considering the large output of the AC drawing program (approximately 37,000 drawings), together with previous opportunities to scrutinize plant drawings (e.g., preoperational testing, recovery efforts, plant maintenance, and training), the incidence of the 73 documented drawing discrepancies was not indicative of a breakdown in the AC drawing program. In addition, through drawing verifications performed under the WBN Design Baseline and Verification Program (DBVP) (see Corrective Action), significant functional discrepancies have not been identified.

#### CORRECTIVE ACTION

Corrective actions to address the AC drawing program deficiencies may be grouped in two general categories, (1) actions taken to address the AC drawing program, and (2) actions taken or planned to ensure plant drawings are adequate for licensing WBN Unit 1. These activities are discussed below.

##### New Drawing Control Program:

Under WBN's DBVP, substantial programmatic improvements were made to the WBN Unit 1 AC drawing program. The DBVP is described in the DBVP Corrective Action Program (CAP) (Revision 3) and was established, in part, to ensure continued maintenance of the functional configuration of WBN. Improvements implemented by the program reduce the potential for recurrence of AC drawing deficiencies. The DBVP improvements have been implemented through new processes for drawing production, design change control, and drawing maintenance. A significant improvement is that overall drawing program management and implementation is now performed by one organization (Nuclear Engineering) rather than the previous dual Construction/Engineering approach. These processes are described in Engineering Administrative Instructions 3.10, "Drawing Categorization and Configuration Control Drawing Origination by DBVP"; 3.05, "Design Change Notices"; 3.09, "Incorporation of Change Documents into Drawings"; and Site Standard Practice 9.52, "Initiating Design Change Notices."

Specifically, regarding the failure to identify all affected drawings and documents, the above procedures require and enable the preparer of design change notices (DCNs) to identify affected documents. Specific reviews of the DCNs performed before approval provide the opportunity to identify any missing documents by the use of checklists. Additionally, the procedures listed above should reduce the incidence of inadequate verification of drawings and human error problems. The procedures implement a single drawing system typically based on the AC drawings or Configuration Control Drawings (CCDs - discussed below), which are maintained by the Nuclear Engineering department. Changes are formally reviewed and approved by Nuclear Engineering. Field work is required to be completed before the drawings are updated to reflect the change. In addition, these procedures comprehensively cover initiation, processing, and closure of design change paperwork such that the opportunity for human errors to occur or go undetected and uncorrected should be significantly reduced.

#### Drawing Improvements:

Through the DBVP Configuration Control activity, a single series of baseline drawings (CCDs) are being developed to replace the former "as-designed" and/or AC drawings on the main control room drawing list. The CCDs consist of approximately 1,275 drawings, the majority of which represent the main control room drawing list. The main control room CCDs are those functional drawings needed to start up, operate, and shut down the plant in normal or emergency conditions, as well as to mitigate design basis events. These CCDs also include drawings needed for information and clearance tagging.

To provide assurance that the CCDs match plant functional configuration, a verification by walkdown and/or testing is performed on those portions of flow, control, and electrical single-line CCDs which depict components required to mitigate design basis events. In this manner, the CCD is baselined with subsequent changes to the drawing controlled under the drawing program.

Currently, over 90 percent of main control room CCDs have been produced. The remaining are scheduled to be complete by February 1992. For those CCDs requiring verification, most of the walkdowns have been completed. There were no significant functional discrepancies identified in these walkdowns. Discrepancies identified have typically either been minor or can be explained by in-process work.

The DBVP Configuration Control activity is limited to components within the boundary for mitigation of design basis events. Portions of CCDs which are outside this boundary are not evaluated by DBVP. However, TVA has established various CAPs and special programs which - although not their primary purpose - will correct drawings where known problems exist. Examples of these CAPs and special programs are: Cable Issues, Cable Tray and Supports, Electrical Conduit and Supports, Electrical Issues, Fire Protection, Hanger Analysis and Update Program (HAAUP), HVAC Supports, Instrument Lines, Prestart Test (discussed below), and Seismic Analysis. The activities under these CAPs together with the DBVP activities provide WBN a broad scope program for the identification and correction of AC drawing discrepancies.

#### Testing Activity:

As noted in TVA's resolution of NRC concerns about the adequacy of CCDs (Inspection Report 50-390, 391/90-09, Unresolved Item [URI] 390/90-09-02), the Prestart Test Program is an important element in the identification and resolution of drawing discrepancies. This program will especially facilitate verification of electrical drawings which contain functional components and circuits within the DBVP boundary that are not verifiable by the walkdown process previously discussed. The NRC (in Inspection Report 50-390, 391/90-30, February 1991) closed URI 50-390/90-09-02 noting that WBN has taken an effective approach in resolving the issue regarding the adequacy of CCDs.

#### NOTE:

The interim report for NCR WBN 6297 documented undersized transmitter brackets and committed to replace them. Resolution of this NCR is now under TVA's CAP Plan for the Equipment Seismic Program.