

TENNESSEE VALLEY AUTHORITY

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January 21, 1982
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Mr. James P. O'Reilly, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 3100
101 Marietta Street
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

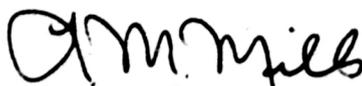
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - CONFIRMATION OF ACTION LETTER -
FINAL REPORT

By letter dated February 10, 1981 from J. P. O'Reilly to H. G. Parris, TVA was requested to address the Quality Assurance Program for the HVAC system of Watts Bar Nuclear Plant. Interim reports were submitted on February 27, April 3, and May 11, 1981. Enclosed is our final report.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY



L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: Mr. Richard C. DeYoung, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555



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ENCLOSURE
FINAL RESPONSE TO NRC CONFIRMATION OF ACTION LETTER
DATED FEBRUARY 10, 1981 CONCERNING WATTS BAR NUCLEAR PLANT
SAFETY-RELATED HVAC SYSTEMS

Three previous interim responses have defined various aspects of the TVA actions taken on Watts Bar safety-related HVAC systems as a result of the NRC Confirmation of Action Letter dated February 10, 1981. These responses summarized the program and hardware related deficiencies and problems identified through comprehensive audits and evaluations and outlined the extensive program of corrective action being implemented by TVA to remedy these identified adverse conditions, eliminate their causes, and prevent recurrence of similar situations. This comprehensive response, supplemented by detail from the previous responses, summarizes certain TVA actions related to HVAC systems taken since the May 11, 1981, submittal and provides current status of previous commitments made by TVA in any of the previous interim responses that were not fulfilled as of the May 11, 1981, submittal.

Underlying Causes

The requirement for a QA program for HVAC systems was established in the Watts Bar Final Safety Analysis Report. The design criteria WB-DC-40-36.1 issued February 11, 1975, stated that safety-related HVAC systems 'must have quality assurance invoked in the design, procurement, inspection, and testing' and that 'specific guidelines will be provided (later)' on quality assurance. Although the QA program in effect in TVA's Division of Engineering Design (EN DES) now and when the design and procurement documents for HVAC systems were being prepared and issued has been confirmed to be adequate, this program was not applied to the extent necessary to ensure that the requirement for quality assurance was translated into all required implementing documents and to provide the required assurance that an adequate site QA program would be implemented. These omissions resulted in the lack of a QA program for installation, erection, inspection, and testing of HVAC systems at Watts Bar. Line management in design and construction failed to identify this lack of a QA program. The QA organizations in TVA's Office of Engineering Design and Construction (OEDC) failed to identify this problem until the Watts Bar site QA Unit performed audit WB-G-80-02 during January 14 through February 1, 1980.

Construction site QA audit WB-G-80-02 formally identified the lack of a QA program for HVAC ducting and recommended as corrective action that a quality control procedure for duct system fabrication be initiated. Based on that audit, management action should have been taken to perform additional investigation to determine the extent of the problem and to expedite corrective action. Failure of management to perceive the broader generic implications of the audit findings resulted in the lack of timely and thorough corrective action and followup relative to the WB-G-80-02 audit. Further, TVA was remiss in not issuing a Stop Work Order at that time. The seven month delay in executing the corrective action of issuing site procedures to control construction activities was clearly excessive. Construction site QA audit WB-M-81-03 conducted from January 5-23, 1981, further indicated that adequate quality assurance requirements were not specified for duct work, components and piping for certain HVAC systems.

Around November 1980, the HVAC system situation was raised with TVA management by the NRC Resident Inspector. As a result of the Resident Inspector's findings and the NRC Confirmation of Action Letter of February 10, 1981, further reviews, audits, and discussions were conducted which indicated that several elements of the HVAC quality assurance program were inadequate or were not properly identified, resulting in a significant quality assurance program breakdown. These elements as well as the above information have been reported in the previous interim responses to the Confirmation of Action Letter and in the various 10CFR50.55(e) reports filed on HVAC system for Watts Bar.

The QA managers in OEDC issued a Stop Work Order April 1, 1981, which remained in effect until the QA organizations had substantive evidence that an adequate program was defined and implemented. Based on demonstrated evidence to that effect, the Stop Work Order was lifted September 25, 1981. Audits and reviews performed subsequent to issuance of the Stop Work Order have confirmed that problems similar to those at Watts Bar did not occur at other TVA sites.

Corrective Action

Throughout the overall resolution of the HVAC issue, TVA has pursued a very conservative approach in identifying deficiencies and directing corrective action. To date, for HVAC work approximately 150 Nonconforming Condition Reports (NCRs) and audit deficiencies have been identified, evaluated for safety significance, and for reportability as 10CFR50.55(e) items. Significant manpower has been devoted to comprehensive appraisal of the entire HVAC systems and the associated QA program and to carrying out the corrective action necessary to thoroughly resolve all deficiencies. Upper line management has thoroughly studied the results of the many audits, reviews, and evaluations conducted on HVAC systems and has been intimately involved in directing the program of corrective action described in interim response No. 3 dated May 11, 1981, in order to ensure that identified weaknesses in management controls have been eliminated and that action designed to prevent recurrence is being effective. Upper QA management has and will continue to review implementation of commitments and corrective action. The total effort has been in keeping with the TVA policy of applying whatever resources are necessary to thoroughly and satisfactorily resolve nuclear safety issues.

The status and effectiveness of the overall corrective action program committed to in previous interim responses is presented below. TVA expects the corrective actions to be adequate to ensure that completed HVAC systems will meet all regulatory and TVA requirements. Since the third TVA interim response dated May 11, 1981, the status of the elements of the overall corrective action program is as follows:

1. On September 25, 1981, the blanket Stop Work Order (originally invoked April 1, 1981) covering HVAC systems was lifted by the OEDC QA Manager. This action was coordinated with the NRC-OIE Region II office and with the NRC Resident Inspector for Watts Bar. Lifting of the order was based on the results of an indepth evaluation of the adequacy and effectiveness of implementation of the QA program in place at that date and the adequacy of corrective action for open deficiencies and nonconformances identified as of that date. The results of this evaluation demonstrated that an adequate QA program was in place and being effectively implemented to control all further activities on HVAC systems.

2. EN DES has reviewed and approved the construction site QA procedures critical to adequate control of the implementation of established design requirements for HVAC systems.
3. Corrective action for the majority of NCRs and audit deficiencies identifying conditions adverse to quality in the HVAC systems has been completed. The only ones remaining open are those having corrective action involving complicated interfaces or complex coordination that necessitates an extended period for complete resolution. Substantial progress has been made toward completion of corrective action for those still remaining open. NRC-OIE Region II will be able to monitor progress in resolving the more substantive open items related to installation, inspection and testing of HVAC systems via the 10CFR50.55(e) reports filed by TVA.
4. EN DES QA Branch, TVA's Division of Construction (CONST) QA Branch, and the OEDC QA Staff have completed audits of other systems at Watts Bar and of HVAC and other systems at other plants to determine if any areas lacked a QA Program for controlling activities. These particular audits did not identify any areas lacking a QA program but did identify several nonsignificant deficiencies which are being processed in accordance with established procedures.

Line management has identified several significant deficiencies related to HVAC and other systems at Watts Bar. The Watts Bar site QA Unit has identified several significant audit deficiencies on HVAC systems at Watts Bar. The OEDC QA Staff has identified problems with the QA program for HVAC systems at Watts Bar and has upgraded to significant several deficiencies originally classified as nonsignificant. The TVA Nuclear Safety Review Staff (NSRS) has also identified significant problems at Watts Bar. Corrective action is underway on all these identified problems and deficiencies and 10CFR50.55(e) reports have been filed on all those determined to be reportable. The OEDC Quality Action Plan is addressing underlying causes involved in these problems and deficiencies.

5. The Watts Bar construction organization has not yet completed verification by inspection and/or testing of all installed HVAC systems; however, substantial progress has been made. All completed systems will be verified by inspection and/or test to determine that they meet the current established design requirements. Where alternate acceptance criteria are applied to already installed systems, EN DES has evaluated and approved those criteria.
6. As a result of the reviews, audits and evaluations listed in items 1 through 5, OEDC, EN DES, and CONST have accomplished a comprehensive evaluation of the QA Program for Watts Bar HVAC systems and determined that the program now in place is adequate and being effectively implemented, with the exception of certain specific isolated cases recently identified (violations on duct cleanliness requirements and testing of dampers identified by the NRC). OEDC management is evaluating these areas and a response to the violations will be provided by January 22, 1982.

7. The Design Project Manager, Construction Project Manager, EN DES QA Branch Chief, CONST QA Branch Chief, and the OEDC QA Manager have devoted increased attention and direct involvement to monitoring the effectiveness of program adjustments reported in TVA's second and third interim responses to the NRC Confirmation of Action Letter.
8. Additions and/or revisions to Watts Bar construction procedures which have been completed will eliminate the causes of construction related deficiencies identified in earlier audits and evaluations of HVAC systems. After formal revision of Construction Specification N3G-881 and initial issuance of N3M-914 (see item 10 below), the site construction procedures will be reviewed to determine if any other additions or revisions are needed and any required changes will be made.
9. Several actions already completed or underway are aimed at improving interface controls to achieve more effective communication between the design and construction organizations responsible for HVAC and other systems for Watts Bar. These actions include:
 - o Appointment in August 1981 of an OEDC Project Manager with overall responsibility for both design and construction of Watts Bar Nuclear Plant
 - o Development and issuance on December 17, 1981, of a Construction Requirements Manual (CRM) for Watts Bar which provides a complete index of overall external commitments and internal technical requirements imposed on the Watts Bar construction organization (the CRM is designed to facilitate control of interfaces and commitments related to Watts Bar)
 - o Formation on May 1, 1981, of a Task Group assigned the responsibility of developing an interdivisional procedure system that defines applicable interfaces and specifies actions and responsibilities of EN DES, CONST and NUC PR necessary to ensure efficient and effective control of interface activities.
10. EN DES and CONST documents related to HVAC systems have been revised to eliminate the identified causes of the types of design-related and construction-related deficiencies and problems determined by audits and evaluations conducted in response to the NRC Confirmation of Action Letter dated February 10, 1981. Additional documents are being issued to ensure that QA requirements and acceptance criteria for HVAC systems are available in a thorough and comprehensive form. This will be accomplished by April 1, 1982, by EN DES issuing Revision 4 to construction specification N3G-881 and a new construction specification N3M-914. Formal interim documents containing this information have already been issued to CONST.

11. EN DES has an ongoing program for evaluating the adequacy of the OEDC licensing commitment control program. For Watts Bar, 90 percent of the NRC-OIE commitments from 1978 onward and all commitments in the HVAC area have been investigated to determine that they have been or are being effectively tracked and implemented. Lack of timeliness in resolving and completing OIE commitments was identified as a deficient area. To improve the timeliness and effectiveness of tracking and completing commitments, changes have been made to procedures that govern nonconformance reporting and commitment control.
12. Seven management audits by the OEDC QA Staff have been completed which concentrated on determining how well EN DES and CONST are implementing commitments and on the effectiveness of the system for identifying structures, systems and components covered by the nuclear Quality Assurance Program. Some deficiencies were discovered, but no conditions similar to those previously reported for the Watts Bar HVAC systems were identified.

Based on the results obtained to date from implementation of the above program of corrective action, TVA is confident that the HVAC systems being installed under the present program will meet regulatory requirements. On this same basis, it is felt that there is no need to further appraise the adequacy of the design of HVAC systems such as through conducting additional design reviews. With respect to installation, inspection, and testing of HVAC systems, TVA is confident that the QA program now being implemented is adequate to assure the quality of HVAC systems. The overall QA program for HVAC systems, even though adequate to meet established requirements, is still being reviewed and, where necessary, updated to meet any changes in requirements. Efforts continue to improve the program and to enhance its effectiveness to provide additional confidence that HVAC systems will meet their requirements.

With the improvements made in management controls, the increased awareness of both line and QA organizations of the causes of the Watts Bar HVAC problem, the increased management emphasis now being placed on commitment control, and the focus now being placed on OEDC audits to determine the effectiveness of systems for identifying items covered by the QA program, TVA feels that sufficient preventive measures are now in effect to preclude the recurrence at Watts Bar and initial occurrence at other TVA plants of problems similar to the Watts Bar HVAC experience.