



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
230 PEACHTREE STREET, N.W. SUITE 1217  
ATLANTA, GEORGIA 30303

APR 6 1977

In Reply Refer To:

IE:II:VLB

50-390/77-2

50-391/77-2

Tennessee Valley Authority  
Attn: Mr. Godwin Williams, Jr.  
Manager of Power  
830 Power Building  
Chattanooga, Tennessee 37401

Gentlemen:

This refers to the inspection conducted by Mr. V. L. Brownlee of this office on February 23-25, 1977, of activities authorized by NRC Construction Permit Nos. CPPR-91 and CPPR-92 for the Watts Bar Nuclear Plant, Units 1 and 2 facilities, and to the discussion of our findings held with Mr. T. B. Northern, Jr. at the conclusion of the inspection.

Areas examined during the inspection and our findings are discussed in the enclosed inspection report. Within these areas, the inspection consisted of selective examination of procedures and representative records, interviews with personnel, and observations by the inspector.

We have also examined actions you have taken with regard to previously identified enforcement matters and unresolved items. The status of these items is identified in Sections II and IV of the summary of the enclosed report.

During the inspection, it was found that certain activities under your license appear to be in noncompliance with NRC requirements. These items and references to pertinent requirements are listed in Section I of the summary of the enclosed report. Corrective actions to prevent recurrence were completed prior to the conclusion of this inspection; therefore, a reply to these items of noncompliance is not requested.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you believe to be proprietary, it is necessary that you submit a written application to this office requesting that such information be withheld from public disclosure. If no proprietary information is identified, a written statement to that effect should be submitted. If an application is

Tennessee Valley Authority

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submitted, it must fully identify the bases for which information is claimed to be proprietary. The application should be prepared so that information sought to be withheld is incorporated in a separate paper and referenced in the application since the application will be placed in the Public Document Room. Your application, or written statement, should be submitted to us within 20 days. If we are not contacted as specified, the enclosed report and this letter may then be placed in the Public Document Room.

Should you have any questions concerning this letter, we will be glad to discuss them with you.

Very truly yours,



C. E. Murphy, Chief  
Reactor Construction and  
Engineering Support Branch

Enclosure:

IE Inspection Report Nos.  
50-390/77-2 and 50-391/77-2

cc: Mr. J. E. Gilleland  
Assistant Manager of Power  
831 Power Building  
Chattanooga, Tennessee 37401

Mr. J. C. Killian, Project Manager  
Watts Bar Nuclear Plant  
P. O. Box 2000  
Spring City, Tennessee 37381

Mr. Stan Duhan  
E4D112  
Knoxville, Tennessee 37902



UNITED STATES  
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230 PEACHTREE STREET, N.W. SUITE 1217  
ATLANTA, GEORGIA 30303

IE Inspection Report Nos. 50-390/77-2 and 50-391/77-2

Licensee: Tennessee Valley Authority  
830 Power Building  
Chattanooga, Tennessee 37401

Facility Name: Watts Bar Nuclear Plant, Units 1 and 2  
Docket Nos.: 50-390 and 50-391  
License Nos. CPPR-91 and CPPR-92  
Category: A2/A2

Location: Spring City, Tennessee

Type of License: W, PWR, 1160 Mwe

Type of Inspection: Unannounced, Construction

Dates of Inspection: February 23-25, 1977

Dates of Previous Inspection: February 2-4, 1977

Inspector-in-Charge: V. L. Brownlee, Principal Inspector  
Projects Section  
Reactor Construction and Engineering  
Support Branch

Accompanying Inspector: None

Other Accompanying Personnel: None

Principal Inspector: V. L. Brownlee  
V. L. Brownlee  
Projects Section  
Reactor Construction and Engineering  
Support Branch

4/5/77  
Date

Reviewed by: J. C. Bryant  
J. C. Bryant, Chief  
Projects Section  
Reactor Construction and Engineering  
Support Branch

4/5/77  
Date

## SUMMARY OF FINDINGS

### I. Enforcement Items

Certain items appear to be in noncompliance with the requirements of 10 CFR 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants," as indicated below:

#### Deficiency

##### 77-2-A1(III) Failure to Follow Procedures (Unit 1)

Criterion V of Appendix B, 10 CFR 50, as implemented by commitments set forth in the FSAR, Section 17, Paragraph 17.1A.5, requires that activities affecting quality shall be performed in accordance with established procedures.

Contrary to this commitment, TVA failed to meet the procedural requirements established for (1) qualification testing of cadwelders and (2) initiating a required engineering change notice or field change request prior to performing the work. (Details I, paragraphs 4.c and 6.b)

### II. Licensee Action on Previously Identified Enforcement Items

##### 76-11-A1(II) Failure to Report

TVA's letter of response dated January 24, 1977, was reviewed and found acceptable by IE:II. The inspector verified implementation of the corrective actions taken by TVA. This item is closed. (Details I, paragraph 3)

### III. New Unresolved Items

None

### IV. Previously Reported Unresolved Items

##### 76-7/2 Status of CB&I Welding Supervisor Qualifications (Units 1 and 2)

- 76-9/2 Breakdown in Vendor QA Program (Bristol Steel and Iron Works - Documentation) (10 CFR 50.55(e)) (Units 1 and 2)
- 76-10/1 Intake Channel - Unfavorable Gravel Conditions (10 CFR 50.55(e)) (Units 1 and 2)
- 76-10/2 Refueling and Primary Storage Water Tank Piping Tunnels - Seismic Criteria (10 CFR 50.55(e)) (Units 1 and 2)
- 76-10/3 Weld Repair Requirements - Inconsistencies Between Contractural and Procedural Requirements (Units 1 and 2)
- 76-10/4 NSSS Supplied Stainless Steel Piping - Pressurizer Surge Line - (Units 1 and 2)
- 76-11/1 Quality Control Procedure 3.5 - (Units 1 and 2)  
  
The procedure has been revised. This item is closed. (Details I, paragraph 4.a)
- 76-11/2 Quality Control Procedure 1.12 - (Units 1 and 2)
- 76-11/3 IE Circular 76-05, "Hydraulic Shock and Sway Suppressors - Maintenance of Bleed and Lock-up Velocities on ITT Grinnell Model Nos. - Fig. 200, and Fig. 201, Catalog PH-74-R" (Units 1 and 2)  
  
TVA's letter of January 7, 1977, states that no Grinnell shock suppressors or sway braces have been or will be installed at the Watts Bar plants. This item is closed.
- 76-11/4 Modification - General Warning Alarm System in the Solid State Protection System (Units 1 and 2)  
  
Westinghouse has provided TVA with the change notices and kits. This item remains open. (Details I, paragraph 4.b)
- 76-11/5 Nonconformance Report No. 554, "Relays - Shutdown Board Logic Panels" and Condition Adverse to Quality Report No. E3, "Two Position Selector Switch Operator - Square D Company 9001-DS11FB." (Units 1 and 2)

76-12/1 Lifting Equipment Load Testing (Unit 1)

77-1/1 Heat Exchanger Anchor Bolts (Units 1)

Design data concerning these anchor bolts supplied by the Knoxville office was reviewed and appeared to satisfy requirements. This item is closed. (Details I, paragraph 4.c)

77-1/2 Reactor Coolant Pump Casing Cleanliness (Units 1 and 2)

Chloride content of the limestone sand is reported to be 65 ppm. This item is closed. (Details I, paragraph 4.d)

V. Design Changes

None

VI. Unusual Occurrences

None

VII. Other Significant Findings

None

VIII. Management Interview

The exit interview was held on February 25, 1977, with T. Nothorn, Project Manager, members of his staff, and QA representatives of EN DES, CONST and OEDC. They were apprised of the findings of this inspection as noted in this report.

DETAILS I

Prepared by:

*V. L. Brownlee*

V. L. Brownlee, Principal Inspector  
Projects Section  
Reactor Construction and Engineering  
Support Branch

*4/4/77*  
Date

Dates of Inspection: February 23-25, 1977

Reviewed by:

*J. C. Bryant*

J. C. Bryant, Chief  
Projects Section  
Reactor Construction and Engineering  
Support Branch

*4/5/77*  
Date

1. Individuals Contacted

Tennessee Valley Authority (TVA)

Knoxville

S. Duhan - QA Engineer - OEDC  
J. S. Colley - QA Engineer, EN DES  
F. P. Levendowski - Structural Steel Design Section Supervisor  
C. A. Myers - Nuclear Licensing Section Supervisor  
P. L. Duncan - Head QA Engineer  
J. L. Parris - Chief of Quality Engineering Branch  
W. D. DeFord - Supervisor of QA Engineering Section

Watts Bar Site (WBNP)

T. B. Northern, Jr. - Project Manager  
H. C. Richardson - Construction Engineer  
J. H. Perdue - Electrical Engineering Unit Supervisor  
J. M. Lamb - Mechanical Engineering Unit Supervisor  
H. S. Sheppard - Civil Engineering Unit Supervisor  
R. L. Heatherly - QC and Records Unit Supervisor  
I. Q. Landsdale - Cadweld Foreman  
R. K. Perry - Cadwelder  
R. A. Lawson - Civil Engineering Unit

## 2. Project Status

### General

Overall construction is estimated to be 56% complete. Overall concrete placement for project is estimated to be 93% complete. The diesel generator building roof has been completed. Earth excavation of the intake pumping station intake channel has resumed. Most of the channel excavation will be completed soon.

### Unit 1

Physical construction is estimated to be 59% complete. The tenth ring was being welded on the containment shell. Ground assembly of the containment dome sections was in progress. Welding of the reactor coolant loop pipe, "hot legs," was in progress.

### Unit 2

Physical construction is estimated to be 52% complete. Reactor coolant pump casings were set near final locations. The reactor building crane wall and refueling canal work continues.

## 3. Licensee Action on Previously Identified Enforcement Items

### 76-11-A1(II) Failure to Report (Units 1 and 2)

Reference previous reports 50-390, 391/76-11 and 76-12. TVA's letter of response dated January 24, 1977 was received, evaluated and found to be acceptable by IE:II. The inspector held discussions at Knoxville and at the site with responsible personnel and reviewed the revised EN DES and WBNP procedures. Responsible personnel appeared to be knowledgeable of the changes and understood the interface functions between organizational units to assure that applicable NCR's and CAQR's are initiated, evaluated, and interfaced with the EN DES program for evaluation to determine reportability to NRC. This matter is closed.

## 4. Previously Reported Unresolved Items

### a. 76-11/1 Quality Control Procedure 3.5 (Units 1 and 2)

The inspector held discussions with the Electrical Engineering Unit Supervisor and reviewed the revised procedure. The procedure now provides a more clear



and concise definition of the color coding scheme and clearly reflects the design criteria. This item is closed.

b. 76-11/4 Modification - General Warning Alarm System in the Solid State Protection System (Units 1 and 2)

Westinghouse has provided TVA with the change notices and kits. TVA is performing the modification and tests. This item will remain open pending successful completion of tests and review of test results by IE:II.

c. 77-1/1 Heat Exchanger Anchor Bolts (Unit 1)

The inspector held discussions and reviewed records, drawings, and calculations within the areas of QA, design and engineering at Knoxville and at the site. TVA verified that the anchor bolts were designed to include seismic criteria and that cutting of the bolts from the specified 18 inches to 16 1/2 inches met minimum requirements.

During the review of this matter it was identified that bolt length was modified from that which was specified on the drawings without documenting in accordance with established procedures. WBNP-QCP 1.13, "Preparation and Documentation of Field Change Requests," requires that all changes must be approved by Field Change Requests (FCR) before work is started on the change. EN DES Procedures covers Engineering Change Notices (ECN). The inspector verified that field and design engineers did perform a design review consistent with the requirements of criterion III, Appendix B, 10 CFR 50; however, neither, a FCR or ECN was issued for this work. TVA acknowledged the failure to follow procedures and implemented Field Change Request action immediately. This matter is identified as a deficiency. TVA was advised that no written response would be required since adequate corrective actions had been completed prior to the completion of the inspection.

d. 77-1/2 Reactor Coolant Pump Casing Cleanliness (Units 1 and 2)

The inspector held discussions with the Mechanical Engineering Unit Supervisor and the responsible

engineer; reviewed TVA correspondence relative to Singleton Materials Engineering Laboratory (SML) test results; and performed a physical inspection of the pump casings. The SML analysis reports that the chloride content of the limestone sand is 65.0 ppm. Cleaning of the casings was verified by the inspector. This item is closed.

5. Partial Mid-Term Construction Permit QA Inspection (Units 1 and 2)

The inspector performed a review and evaluation of (1) the licensee's previous compliance record, (2) construction deficiency reports and resolutions, and (3) the status of construction relative to the I&E inspection program.

The review and evaluation of the enforcement correspondence and response verified that corrective actions of identified enforcement matters have been fully implemented. The review and evaluation of the construction deficiency file indicated that the thoroughness of the reports could be enhanced. The inspector held discussions in Knoxville and at the site relative to this matter and TVA personnel agreed to provide more clear and definitive descriptions, safety analysis and corrective action inputs to the report.

6. Independent Inspection Effort

a. Concrete

The inspector observed prepour preparations and placement activities of two pours at the intake pumping station. Pour preparation was adequate, pour cards were signed off, adequate crew size and equipment were available, and the placement was made in accordance with accepted practice and the concreting QA/QC program requirements.

b. Cadwelding

The inspector observed cadwelding operations in the Unit 1 containment equipment hatch area. Materials were controlled, workmen qualified, and production work was performed in accordance with accepted practice and the cadweld QA/QC program requirements.

TVA was informed that the inspector had observed cadweld helpers making a sister test splice for the purpose of qualification without being observed by the responsible civil

engineering unit personnel. This was contrary to paragraph 5.2 of WBNP-QCP 2.14, "Cadmold Operator Performance Qualification," requirements. This item is identified as a deficiency since this matter appeared to be an isolated case; posed little threat to the health and safety of the public; and required no undue expenditure of time or resources to implement corrective action. Site management took immediate corrective action to have the shots remade under the supervision of the responsible engineer and to reemphasize to all engineering unit supervisors that they were to reinforce, during their unit personnel meetings, that procedures must be implemented in their entirety. IE:II has no further questions regarding this matter. TVA was advised that no written response to the enforcement item would be required since adequate corrective actions had been completed prior to the completion of the inspection.