



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
101 MARIETTA ST., N.W., SUITE 3100  
ATLANTA, GEORGIA 30303

Report Nos. 50-390/81-15 and 50-391/81-15

Licensee: Tennessee Valley Authority  
500A Chestnut Street  
Chattanooga, TN 37401

Facility Name: Watts Bar

Docket Nos. 50-390 and 50-391

License Nos. CPPR-91 and CPPR-92

Inspection at Watts Bar near Spring City, TN

Inspectors: W. P. Kleinsorge  
W. P. Kleinsorge

August 25, 1981  
Date Signed

J. L. Coley  
J. L. Coley

August 25, 1981  
Date Signed

Approved by: A. R. Herdt  
A. R. Herdt, Section Chief  
Engineering Inspection Branch  
Engineering and Technical Inspection Division

8/26/81  
Date Signed

SUMMARY

Inspection on August 3-7, 1981

Areas Inspected

This routine, unannounced inspection involved 70 inspector-hours onsite in the areas of licensee action on previous inspection findings (Unit 1) construction activities (Units 1 & 2); reactor coolant pressure boundary piping (Units 1 and 2), safety related structures (Unit 1); and preservice inspection - audit of work and work activities by NRC reverification inspection (Unit 1).

Results

Of the five areas inspected, no violations were identified in two areas; two violations were found in three areas (Violation - Inadequate measures to control welding - paragraphs 5a(1), 6b(1)(d) and 7C(1), and Violation - Failure to Follow Scaffolding Procedure, paragraph 5a(2)). No deviations were found.

B110200717 B11013  
PDR ADOCK 05000390  
Q PDR

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. E. Wilkins, Project Manager, WBNP (Watts Bar Nuclear Plant)
- \*T. R. Trail, Management Systems Unit, WBNP
- \*K. G. Galloway, Assistant Supervisor, Welding Engineering Unit, WBNP
- \*J. E. Cross, Nuclear Power Division, WBNP
- \*G. W. Minton, QA Staff, Nuclear Power Division
- \*J. L. Goodner, QA Staff, Nuclear Power Division
- \*E. Ennis, Assistant Plant Supervisor, Division of Power
- \*M. Heatherly, Nuclear Engineering Branch, Nuclear Licensing Section

#### NRC Resident Inspector

- \*T. Heatherly

\*Attended exit interview

### 2. Exit Interview

The inspection scope and findings were summarized on August 7, 1981 with those persons indicated in paragraph 1 above. The inspectors identified the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee.

Violation 390, 391/81-15-01: Inadequate Measures to Control Welding - paragraph Nos. 5a(1), 6b(1)(d)1, and 7C(1).

Violation 390, 391/81-15-02: Failure To Follow Scaffolding Procedure - paragraph No. 5a(2).

Unresolved Item 391/81-15-03: Pipe Spool Serial Number - paragraph 6a(1)

Inspector Follow-up Item 390/81-15-04: Apparent Drawing Errors - paragraph 6b(1)(a)

Inspector Follow-up Item 390/81-15-05: Inspection Date Discrepancy - paragraph - 6b(1)(d)2.

Inspector Follow-up Item 391/81-15-06: Erroneous Weld Number. - paragraph 6b(1)(d)3.

Unresolved Item 390, 391/81-15-07: Revision Inconsistency - paragraph 7b(1).

### 3. Licensee Action on Previous Inspection Findings

(Open) Violation 50-390/81-06-01; Failure to follow procedures for accomplishing work/documentation of RCPB pipe welds. TVA-WBNP letter of response dated May 28, 1981 had been reviewed and determined acceptable by Region II. The inspectors held discussion with the Cognizant Unit Supervisor and found that a recent Watts Bar QA audit has determined that the letter of response was incorrect. Specifically, stainless steel filler material had been purchased by Watts Bar with a delta ferrite value of less than the required 5%. The licensee is presently in the process of reinspecting all stainless steel weld joints in material one inch and above to determine their percent delta ferrite values unless weld records clearly document that the inspection had been performed previously and were acceptable. Stainless steel weld joints one-fourth inch to one inch are sample inspected using an approved sample plan. The licensee stated that a revised response would be forwarded to Region II.

### 4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 6a(1) and 7b(1).

### 5. Independent Inspection Effort (Units 1 & 2)

#### a. Construction Activities

The inspectors conducted a general inspection of the auxiliary building, containments Units 1 and 2, and pipe storage areas to observe construction progress and construction activities such as welding, materials handling and control, housekeeping and storage.

(1) With regard to the above inspection the inspectors on August 3, 1981, accompanied by a representative of the licensee noted the following conditions:

- (a) The single bead cover pass on completed and accepted auxiliary feedwater system weld No. FW-09 of IC-6 deposited with an 1/8-inch diameter, type E-7018, electrode was 1½ inches wide.
- (b) The base material adjacent to completed and accepted auxiliary Feedwater System Weld Nos. FW-09 of IC-6 and F-08 of IC-8 was under-cut to a depth of approximately 3/32-inch.

TVA General Construction specification G29M, Process Specification 1.M.1.2(b) Paragraph 14.9.1(a) requires bead width, for 1/8-inch diameter type E-7018 electrodes, not to exceed 3/4-inch maximum.

G-29M, Process Specification 3.M.5.1(d) Paragraph B.5 requires that undercut shall not exceed 1/32-inch. Therefore the welders failed to follow procedure and the welding inspectors accepted as unacceptable surface condition. The above conditions indicate inadequate measures for the control of special processes and are examples of violation 390, 391/81-15-01. This matter is discussed further in paragraph 7c(1).

- (2) During the general inspection of the auxiliary building on August 3-4, 1981 the inspectors accompanied by a representative of the licensee noted twelve examples of scaffolding supported by installed safety related and balance of plant piping. The scaffolding with personnel tools and materials would exert a temporary construction load to permanent plant equipment in excess of 150 pounds. The inspectors determined that no rigging releases had been requested or approved for the above scaffolding.

TVA Procedure WBNP-QCP 1.7, revision II, "Release for Drilling, Chipping, Cutting of, Welding to, or Rigging From Permanent Plant Structures and/or Components," Appendix I, "Temporary Rigging From Permanent Plant Equipment," Paragraphs 5.2, 6.1, 6.1.1 and 6.3.6 require rigging releases to be requested and approved for all temporary construction loads exceeding 150 pounds supported by permanent plant equipment. Therefore, scaffolding was installed without the required approval.

Failure to follow procedure for activities affecting quality is in violation of 10 CFR 50 Appendix B, Criterion V. This violation will be identified as 390,391/81-15-02: "Failure to Follow Scaffolding Procedure."

Within the areas examined no violations or deviations were identified except as noted in paragraph nos. 5a(1) and 5a(2).

#### 6. Reactor Coolant Pressure Boundary Piping (Units 1 & 2)

The inspectors observed nonwelding and welding work activities for reactor coolant pressure boundary (RCPB) piping. The applicable code for the installation of RCPB piping is the ASME B and PV code Section III Subsection NB, 1971 Edition with addenda through summer 1973.

##### a. Non Welding Work Activities

##### (1) Review of Quality Records (Unit 2)

The inspectors selected various reactor coolant pressure boundary piping spools for review of pertinent records to determine conformance with procurement, storage and installation specifications and QA/QC site procedures.

Records of the following items were selected for review to ascertain whether they (records) were in conformance with applicable requirements relative to the following areas: material test reports/certifications; vendor supplied NDE reports; NSSS quality releases; site receipt inspection; storage; installation; vendor nonconformance reports.

<u>SPOOL NO</u>	<u>SERIAL NO</u>	<u>SYSTEM</u>
74-RHR-93	11688	Residual Heat Removal
74-RHR-74	11689	Residual Heat Removal
63-SI-172	12462	Safety Injection
63-SI-171	18461 & 12461	Safety Injection
87-UHI-18	11037	Upper Head Injection
87-UHI-19	11038	Upper Head Injection

With regard to the above inspection the inspectors noted that there were two code data reports for Pipe Spool No. 63-SI-171: Serial No. 12461 and 18461. The licensee stated that they changed serial number on the code data plate on the pipe spool to agree with the applicable weld travelers and drawings. At the time of this inspection the following could not be determined:

- (a) The current serial number on the pipe spool, and whether that number agrees with all applicable documentation.
- (b) If the serial number on the code data plate had been changed, whether approval and authorization had been obtained from the fabricator (Dravo Corp) and the fabricator's authorized inspector.

The licensee indicated that they would look further into the matter. The inspectors indicated that the above matter would be identified as unresolved item 391/81-15-03: "Pipe Spool Serial Number."

b. Welding Work Activities

(1) Observation of Work (Units 1 and 2)

The inspectors observed field welding activities by inspection of weld joints and review of records associated with RCPB piping at various stages of weld completion. Observations were made in order to determine whether the requirements of applicable specifications, standards, work and/or inspection procedures were met for the activities involved and in the following stages of weld completion. Actual observation of work was not possible as the window of opportunity had past.

- (a) The inspectors examined records of weld joint fitup prior to welding, to determine whether identification/location, joint preparation and alignment, evidence of QC verification meet applicable procedures. The following weld joints were examined:

<u>WELD NO</u>	<u>ISO NO</u>	<u>SIZE</u>	<u>UNIT</u>	<u>SYSTEM</u>
FW-5	IC-90	10"	1	Safety Injection
FW-7A	IC-90	10"	1	Safety Injection
*FW-7B	IC-90	10"	1	Safety Injection
FW-8	IC-90	10"	1	Safety Injection
*FW-5	IC-197	10"	2	Safety Injection
FW-7	IC-197	6"	2	Safety Injection
FW-8	IC-197	10"	2	Safety Injection
FW-9	IC-197	10"	2	Safety Injection
*FW-12	IC-55	8"	1	Residual Heat Removal
FW-13B	IC-55	8"	1	Residual Heat Removal
FW-14	IC-55	6"	1	Residual Heat Removal
*FW-15	IC-55	6"	1	Residual Heat Removal
FW-13	IC-33	8"	2	Residual Heat Removal
*FW-14	IC-33	6"	2	Residual Heat Removal
FW-5	IC-40	12"	1	Upper Head Injection
FW-6	IC-40	12"	1	Upper Head Injection
FW-7	IC-40	12"	1	Upper Head Injection
FW-7	IC-42	12"	1	Upper Head Injection
*FW-5	IC-18	12"	2	Upper Head Injection
FW-6	IC-18	12"	2	Upper Head Injection
FW-7	IC-18	12"	2	Upper Head Injection
FW-8	IC-20	8"	2	Upper Head Injection
*FW9C2	IC-20	8"	2	Upper Head Injection
*FW9C1	IC-20	8"	2	Upper Head Injection
*FW-9	IC-20	8"	2	Upper Head Injection

With regard to the inspection above the inspectors noted the following items on drawing WBN-E-2879 IC-90:

- 1 Welds FW-7A and FW-7B were erroneously shown separated 12-inches. The joints are actually separated by approximately 4-inches.
- 2 Welds IC-90-FW-7A and IC-90-FW-7B were erroneously shown as IC-80-FW-7A and IC-80-FW-7B.

At the time of this inspection it could not be determined whether the above drawing errors were isolated to IC-90 only. The licensee indicated that they would look further into the matter. The inspectors stated that the above would be inspectors followup item 390/81-15-04: "Apparent Drawing Errors".

- (b) The inspectors examined weld joint records where the root pass (only) had been completed to determined; weld/welder identification, qualified welder/weld procedure, physical appearance of weld and evidence of QC verification. The joints of paragraph (a) above were examined.
- (c) The inspectors examined records of weld joints and weld joints of pipe/fitting (PPF) and pipe to component (PC) where welding was beyond the root pass to determine; weld/welder identification, qualified welder/weld procedure, periodic checks of welding variables, use of specified weld material, proper interpass temperature and where applicable pre-heat and post-weld heat treatment and physical appearance of weld (e.g starts, stops, undercut and surface imperfections). The weld joints of paragraph (a) above examined.
- (d) The inspectors examined the welds radiographs and records of welds of paragraph (a) above marked with (\*) where non-destructive testing (NDE) had been in progress to determine; surface suitability, specified NDE being performed and with qualified personnel.

1 With regard to the above inspection the inspectors on August 4, 1981 noted that the delta ferrite examiners of record for weld joint Nos. FW-6 or ISO 40 and FW-7 on ISO 42 reported and accepted ferrite numbers of 1.0 and 2.5 respectively.

TVA Process Specification 5.M.2.1 (a) of 6/10/74, "Specification For the Measurement of Delta Ferrite Content of Austenitic Stainless Steel Welds," Paragraph 3.2 requires ferrite numbers to be 3 minimum. Therefore, the examiners did not apparently know the acceptance criteria for inspections they were required to perform.

The above condition indicates inadequate measures for the control of special processes and is an example of violation 390,391/81-15-01 and is discussed further in paragraph 7c(1).

2 With regard to the inspection above on August 4, 1981, the inspectors determined that the delta ferrite inspection for Weld Joint FW-7 of ISO 40, reported released on October 18, 1977 was actually made on or after May 14, 1978. This determination is based on a comparison of the Vault and WEU copies of Field Weld Operation Sheet 1-87-F-5-7. The above matter will be inspector followup item 390/81-15-05: "Inspection Date Discrepancy."

3 With regard to the above inspection the inspectors noted that Field Weld Operation Sheet No. 2-87-F-6-9 C2 for Weld 2-087B-D020-09 C2 erroneously indicated C1 for both the sheet and weld numbers. The inspectors indicated that the above matter would be inspector followup item 391/81-15-06: "Erroneous Weld Number."

(e) The inspectors observed activities at weld material issue stations to determine adequacy of; weld material storage/segregation, oven temperatures, issue records and return of unused weld material. Also the inspectors observed work areas for uncontrolled weld material.

(2) Review of Quality Records (Unit 2)

The inspectors reviewed the quality records described below relative to reactor coolant pressure boundary pipe welding to determine whether these records reflected work accomplishment consistent with NRC requirements and SAR commitments.

The following completed weld records were reviewed in the areas of visual and dimensional inspections, weld history, preheat and interpass temperature, stress relief, NDE, weld repair, welder qualification, and inspector qualification, as applicable to each weld:

<u>WELD NUMBER</u>	<u>ISO NUMBER</u>	<u>PIPE SIZE</u>
FW-5	IC-197	10"
FW-5	IC-197	6"
FW-13	IC-33	8"
FW-14	IC-33	6"
FW-5	IC-18	12"
FW-6	IC-18	12"
FW-7	IC-18	12"

Within the areas examined no violations or deviations were identified except as noted in Paragraph No. 7b(1)(d)1.

7. Safety Related Structures (Unit 1)

Observation of Work and Work Activities

The inspectors observed field welding activities associated with safety related structures and supports outside containment during various states of weld completion. Observations were made in order to determine whether the requirements of applicable specifications, standards, work and/or inspection procedures are being met for the activities involved and in the following stages of weld completion:

- a. The inspectors examined weld joint fitup, prior to welding, to determine whether weld identification/location, joint preparation and alignment and QC verification are in conformance with existing requirements.

The below listed structures and supports were examined.

RHR Pump Platform 1AA(Repair)  
 PDO-22 on 48W1707-20  
 PDO-19 on 48W1708-11  
 Pipe Support 03B-1-AFW-R110

- b. The inspectors examined weld joints where welding is in progress to determine whether weld identification, weld procedures, welder qualification, weld material, defect removal (if applicable), specified NDE and periodic checks of welding variables are in conformance with existing requirements. The following structures were examined.

RHR Pump Platform 1AA (Repair)  
 PDO-22 on 48W1707-20  
 PDO-19 on 48W1708-11

The following pipe supports were examined:

03B-1AFW-R110  
 03B-1AFW-R98  
 03B-1AFW-R108  
 61-462-3-103-5

- (1) With regard to the inspection of Paragraph Nos. 7a and 7b on August 3 and 4, 1981 the inspectors noted that the Weld Material Requisition (WMR) for PDO-22 indicated Detail Welding Procedure Specification (DWPS) SMU-1 revision 2 was to be used. The WMR for PDO-19 reflected DWPS SMU-1 revision 4. Further the inspectors noted that the welder of record for PDO-19 had revision two of the DWPS not revision four. The inspectors determined that revision four was the applicable procedure at the time of the inspection. The inspectors further noted that approximately one-half of all WMR's dated August 4, 1981 issued for DWPS SMU-1 were issued for revision two and the remainder for revision four. In accordance with the licensee's program, only changes in non-essential variables are permitted by DWPS revision change. The licensee indicated that they would look further into the matter of the procedure revision inconsistency. The inspectors stated that the above would be identified as unresolved item 390,391/81-15-07: "DWPS Revision Inconsistency."

- c. Observation of weld material control included; identification, segregation, oven temperatures, issue slips and control of unused material at issue stations and work areas.

- (1) With regard to the above inspection, the inspectors, accompanied by a representative of the licensee, on August 3 and 4, 1981 noted the following condition. Unused coated electrodes (Type E-7018) had been deposited, with electrode stubs, in open bins at four welding filler material return locations. The above is contrary to WBNP-QCI-4.1 Revision 0, "Procurement, Storage, Issue and Control of Welding Materials" Paragraph 6.3.3.8 which requires all unused coated electrodes to be deposited in locked collection boxes.

The above combined with the conditions described in Paragraph Nos. 5a(1) and 6b(1)(d)1 indicate that the licensee does not have adequate measures for the control of special processes. Failure to establish adequate measures to control special processes including welding is in violation of 10 CFR 50 Appendix B, Criterion IX. This violation will be identified as 390,391/81-15-01: "Inadequate Measures to Control Welding."

- d. During observation of weld activities there appeared to be a sufficient number of qualified inspection personnel at the work site.

Within the areas examined no violations or deviations were identified except as noted in Paragraph 7c(1).

8. Preservice Inspection - Audit of Work and Work Activities by Reverification Inspection (Unit 1)

The inspectors selected the following class 1 and class 2 pipe weld joints for inspection reverification. This verification was accomplished with Region II ultrasonic (UT) equipment and personnel. The applicable code for the preservice inspection is the ASME Boiler and Pressure Vessel Code Section XI and V, 1974 edition with addenda thru summer 1975. Reflectors used for calibration in each of the following pipe weld joint examinations were 5% notches.

<u>ISOMETRIC DWG.</u>	<u>WELD JOINT NO.</u>	<u>SIZE</u>	<u>SCAN PERFORMED</u>	<u>COMMENTS</u>
CHM-2636-C	RHR-12	14"	Scan 3 & 4	ID & OD Geometry
CHM-2671-C	FW-D001-8	16"	Scan 4 (8:00 to 3:00)	ID & OD Geometry
CHM-2671-C	FW-17	16"	Scan 3 & 4 (8:00 to 4:00)	ID Geometry
CHM-2636-C	RHR-D053-9	14"	Scan 3 & 4	ID & OD Geometry

CHM-2636-C	RHR-D053-2	14"	Scan 3 & 4 (9:00 top 3:00)	ID & OD Geometry
CHM-2636-C	RHR-5	14"	Scan 3 (2:00 to 9:00)	ID & OD Geometry

The inspectors performed all angle beam examinations with a 45 degree transducer. TVA's-Division of Nuclear Power NonDestructive Examination procedure N-UT-1 Revision 4 was used for the above examination.

The above inspections were compared with the applicable UT reports in the following areas:

- Adequate examination surface
- Extent of coverage and scanning technique
- Calibration method including frequency and use of required calibration block
- Size and frequencies of search units
- Beam angles
- Definition of reference level for monitoring discontinuities
- Demonstration of penetration
- Limits for evaluating and recording indications
- Acceptance limits

Within the areas inspected no violations or deviations were identified.