



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-390/85-45 and 50-391/85-36

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

Docket Nos.: 50-390 and 50-391

License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: June 17-21, 1985

Inspector: W C Liu 7/17/85
for G. A. Hallstrom Date Signed

Approved by: B. R. Crowley 7/17/85
for J. J. Blake, Section Chief Date Signed
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope: This routine, unannounced inspection entailed 45 inspector-hours on site, in the areas of licensee action on previous enforcement matters (Units 1 and 2), construction progress (Unit 2), housekeeping and maintenance (Unit 1), safety-related piping (Unit 2), and expansion bellows to penetration welds (Unit 2).

Results: Two violations were identified - Failure to Follow Procedure for Control of Construction Loads (Unit 2) - paragraph 5a - and Failure to Accomplish Adequate Protection and Housekeeping in Cable Trays (Unit 2) - paragraph 7.

8508140436 850802
PDR ADOCK 05000390
G PDR

REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. T. Cottle, Site Director, Watts Bar Nuclear Plant
E. R. Ennis, Plant Manager
*F. A. Butcher, Project Engineer
*G. Owens, Nuclear Licensing Engineer - Office of Engineering (OE)
*G. Wadewitz, Construction Project Manager
*S. Johnson, Quality Manager - Construction
*H. J. Fischer, Construction Engineer
*L. J. Johnson, Assistant Construction Engineer
*A. T. Everitt, Welding Engineering Unit (WEU) Supervisor
*T. Hayes, Nuclear Licensing Unit Supervisor
*P. Wilson, Nuclear Licensing Unit
*C. A. Jetter, Construction Superintendent
*B. H. Anderson, Construction Superintendent
*C. Borrelli, Nuclear Power Compliance
*J. R. Griggs, Nuclear Power Compliance
*D. L. Pennycuff, Nuclear Power Compliance
*H. Lewis, Nuclear Services Branch - Construction
*R. Burt, Nuclear Services Branch - Construction
W. Smathers, Engineering Design (EN DES) Supervisor on Site
K. G. Calloway, Welding Quality Control (QC) Supervisor
A. M. Ray, Assistant Electrical Superintendent
L. D. Fraker, Assistant Steam Fitter Superintendent
S. J. Boney, Mechanical Engineering Verification Supervisor
P. Alexander, Assistant Steam Fitter Superintendent

Other licensee employees contacted included construction craftsmen, engineers, technicians, operators, mechanics, security force members, and office personnel.

NRC Resident Inspectors

M. Shymlock, Senior Resident Inspector-Operations
W. Holland, Resident Inspector-Operations

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on June 21, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comment were received from the licensee.

Item 50-391/85-36-02 was identified as an apparent violation at the time of the exit. Subsequent telephonic conversation with off-site cognizant licensee personnel has clarified intent of the specification involved but not resolved all NRC concerns. This item is now considered unresolved.

(Open) Violation 391/85-36-01, Failure to Follow Procedure for Control of Construction Loads - paragraph 5.a.

(Open) Unresolved Item 390/85-45-01, Adequacy of Conformance to Maintenance Request Procedure - paragraph 5.b.

(Open) Unresolved Item 390/85-45-02, 391/85-36-02, Control of Material for use on Austenitic Stainless Steel - paragraph 6.a.

(Open) Inspector Followup Item 391/85-36-03, Clarification of Liquid Penetrant Examination Procedure - paragraph 6.b.

(Open) Violation 391/85-36-04, Failure to Accomplish Adequate Protection and Housekeeping in Cable Trays - paragraph 7.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters (92702)

- a. (Closed) Violation 390/84-79-01, 391/84-53-01: Failure to Establish Adequate Controls for Storage and Preservation of Piping Assemblies.

Tennessee Valley Authority's (TVA) letter of response dated December 19, 1984, has been reviewed and determined to be acceptable by Region II. The inspector examined the corrective actions as stated in the letter of response. In this regard the inspector examined permanent and temporary storage areas of ASME code piping. All piping was stored on curbing and no missing, damaged or deteriorated closures were identified. Additionally, the inspector reviewed analyses and completed field examinations in low light levels in order to determine acceptable color contrast of tape used on austenitic stainless steels. The inspector concluded that TVA had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the subject conditions and developed the necessary corrective actions intended to preclude the recurrence of similar circumstances. The corrective actions identified in the letter of response were implemented.

- b. (Closed) Violation 390/84-79-02, 391/84-53-02: Failure to Establish Adequate Measures to Control NDE and Welding

TVA's letter of response dated December 19, 1984, has been reviewed and determined to be acceptable by Region II. The inspector examined the corrective actions as stated in the letter of response. In this regard the inspector conducted an examination of the following:

- o Design calculations which justify acceptance of a 3/16" fillet weld rather than the originally indicated 1/4" fillet weld to connect the 4"x4"x1/4" tube steel to base plate on pipe support No. 1062-555-7-40-13. Nonconformance Report (NCR) 5844, Support variance sheet (SVS) H-53-145-505, and reinspection and acceptance documentation.
- o The revision of detail welding procedure (DWP) GTA-88-S-2 (GTA-88-S-2E) for correct implementation of code case N-127 parameter requirements when making welds with astro-arc equipment.
- o Verification that all welds previously completed using GTA-88-S-2 under code case N-127 were included in NCR No. 5886 Rev. 0 and radiographed in order to obviate need for conformance to code case requirements. Review of radiographs involved was completed to verify acceptability of the welds involved.

The inspector concluded that TVA had determined the full extent of the subject violation, performed the necessary survey and followup actions to correct the subject conditions and developed the necessary corrective actions intended to preclude the recurrence of similar circumstances. The corrective actions identified in the letter of response were implemented.

- c. (Closed) Unresolved Item 390/84-79-03, 391/84-53-03: Skewed Weld Acceptance Criteria

This item concerned the adequacy of criteria to enable acceptance of the skewed weld on pipe support No. 1062-555-7-40-13. This weld connects the 3"x3"x1/4" tube steel to the 4"x4"x1/4" tube steel at an angle of approximately 27°.

The only weld size specified on the drawings other than those to the unistrut for the above support was a 1/4" fillet weld connecting the baseplate to the 4"x4"x1/4" tube steel.

Concern had been raised regarding acceptance based on a general pipe support drawing note that similar welds on the same support be the same size since:

- The weld in question is not a fillet weld and the weld with size specified is a fillet weld. Therefore, the two welds are not similar.

- The weld in question does not conform to G29C-0.C.1.1.(RO) of November 30, 1983, sheet 21 of 21, R1, "Figure 9.3 - Alternate Fillet Weld All Around Connection for Members Meeting at an Angle".

The inspector reviewed supporting documentation to verify that:

- o At the time (January 18, 1982) support No. 1062-555-7-40-13 was documented on the variance (SVS H53-145-94), there was general mishandling of skewed welds within TVA (AWS prequalified joint for skewed welds covered only those between 60° and 135°). This was later identified as a generic problem which led to NCR's being written against all of TVA's nuclear plants under construction and was reported to the NRC (NEB 820301 65B). Subsequently, the Office of Engineering (OE) has made revisions to the acceptance criteria for skewed welds.
- o The indicated 1/4" fillet welds were required for original support No. 560-2-19A-11. SVS-145-76 R/1 which was longer, had larger loads, and was unbraced. Since the installed structure was adequate without the brace OE approved SVS No. H53 145-94. (Review of design calculations supporting 3/16" fillets for other welds involved is reported above). There was a discrepancy due to the missing weld symbol for the skewed joint. However, the weld involved did not affect design calculations.
- o SWP 810522 067 dated May 21, 1981, allowed QC during the time frame involved to install fillet welds, including skewed fillets, with leg lengths equal to the fillet weld size specified on the drawing. Acceptance criteria for supports, as of January 12, 1982, was contained within WBNP-QCP-4.23 R2, Appendix 4, paragraph 7.1.
- o The lack of weld symbol on the brace added by SVS H-53-145-94 was offset by OE guidelines set forth in Note 99 on drawing 47A050-1Q R2 and augmented by Note 51 on drawing 47A050-1J R6 (Revised to 47A050-1M R4 on January 7, 1982). Therefore the TVA inspector of record correctly accepted the weld in question.
- o Current acceptance criteria is contained in WBNP-QCP-4.13-VTC R1, Process Specification 3.C.5.4(R1), and process specification 0.C.1.1. (RO). The weld in question is acceptable based on a 3/16" fillet size.

The inspector concluded that information provided was sufficient to resolve NRC concern. This item is considered closed.

d. (Closed) Unresolved Item 390/84-79-04: Code Case N-127 Records

This item concerned lack of records required by code case N-127 for those welds involved in violation 390/84-79-02, 391/84-53-02 as reported in paragraph 3.b. The inspector reviewed available records and concluded that some records were missing due to failure to follow code case N-127 requirements for the welds involved. Further, the inspector verified that corrective actions taken in response to the violation (obviation of need for conformance to the code case) were sufficient to satisfy NRC concern for this item. This item is considered closed.

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. Two new unresolved items identified during this inspection are discussed in paragraphs 5b and 6a.

5. Independent Inspection Effort (92706)

a. Construction Progress - Unit 2

The inspector conducted a general inspection of Unit 2 containment and the reactor auxiliary building to observe construction progress and construction activities such as welding, material handling and control, housekeeping and storage.

During the above inspection the inspector observed electrical craftsmen working on top of Seismic 1 HVAC duct between S and T lines near elevation 747 in the Reactor Auxiliary Building without covering the duct with plywood as required by Attachment B of WBNP-QCI-1.07 RII "work release". Cognizant licensee personnel determined that no work release had been issued and stated that no damage to the duct involved was evident. The inspector noted that damage apparently due to live loads had occurred to nonseismic duct from cooler 2A4 at A15 and U line on elevation 692. The inspector informed the licensee that this matter was considered a lack of conformance to 10 CFR 50, Appendix B, Criterion V, as implimented by procedure WBN-QCI-1.07 and would be identified as violation 391/85-36-01, Failure to Follow Procedure for Control of Construction Loads.

b. Housekeeping and Maintenance - Unit 1

The inspector conducted a general inspection of Unit 1 containment to observe housekeeping and maintenance activities.

During the above inspection the inspector observed damage to reactor coolant drain line 68-402B near the reactor wall at elevation 702. Dislocation from two supports and plastic deformation of the 1/2" stainless steel line had occurred. The inspector noted that assessment

would be required to ensure that no damage had occurred to the welded connections involved. Cognizant licensee personnel informed the inspector that paragraph 5.1.1 of WBN-AI-9.2, R12, requires that all operations plant personnel report the need for maintenance on plant equipment or systems by use of a maintenance request (MR).

Cognizant licensee personnel also informed the inspector that this area system had been turned over to operations responsibility during January 1985; that no MR had been issued for the damage involved; and that MR 491294 was being issued on the item during this inspection. The inspector noted that this matter raised NRC concern regarding potential generic lack of conformance to WBN-AI-9.2 and pending additional assessment during a future inspection the matter will be identified as unresolved item 390/85-45-01, Adequacy of Conformance to Maintenance Request Procedure.

Within the areas inspected, no violations, except as noted in paragraph a, or deviations were identified.

6. Safety-Related Piping (Unit 2) (55050)

The inspector observed field welding of safety-related piping outside the reactor coolant pressure boundary at various stages of weld completion. The applicable Code for safety-related pipe welding is ASME B&PV Code Section III, Subsections NC and ND, 1971 edition with addenda through summer 1973.

a. Production Welding

The inspector examined the below listed welds in-process to verify the following:

Welding procedures and drawing available; WPS assigned in accordance with applicable code; materials as specified; geometry as specified; fitup and alignments as specified; preheat as specified; technique as specified; welding electrodes as specified and consistent with the code; welding equipment as specified; interpass temperature controlled and consistent with the applicable codes; interpass cleaning and backgouging performed as specified; weld repairs conducted in accordance with specified procedures; base material repairs properly documented; welder identification; and peening not done on root or final weld surface layer.

<u>Joint No.</u>	<u>System</u>	<u>Location</u>	<u>Status</u>
2-047-W600-171-13	ERCW	RAB-E1 692	Fitup/tack
2-047-W600-171-14	ERCW	RAB-E1 692	Welding Root
2-072B-D047-04E	CS	Dome-E1 861	Welding Root
2-072B-D047-04F	CS	Dome-E1 861	Fill Passes

During the above inspection, the inspector observed that color coding was omitted from mill files, grinding rocks, and "flapper wheels" being used on stainless materials. Subsequent discussion with cognizant licensee personnel established that some materials for use on stainless steels are not color coded and craftsmen involved are expected to maintain separation of similar materials after their use on carbon steels. The inspector noted that this practice considerably increased the potential for inadvertent improper use of the tools involved.

The inspector also observed that the weld joint preparations were not cleaned prior to welding when flapper wheels were used to buff the weld joint areas. Cognizant licensee personnel informed the inspector that this type of cleaning had not been done during construction at WBNP. The inspector responded that this matter appeared to be a failure of conformance to paragraph 3.1.2.5 of upper-tier specification 4.M.1.1 (R8) Material Fabrication and Handling Requirements - Austenitic Stainless Steel". Paragraph 3.1.2.5 states that:

"Flapper wheels may be used for cleaning surfaces such as weld preps and the removal of other contaminants. However, this particular product is not produced with low-halogen content and leaves a residue which must be removed by thoroughly scrubbing with an approved solvent."

During the exit interview on June 21, 1985, the inspector identified this matter as unresolved item 390/85-45-02; violation 391/85-36-02, Control of Materials for use on Austenitic Stainless Steels.

Subsequent telephonic communication was received from off-site cognizant licensee personnel to clarify the intent of specification 4.M.1.1 (R8). Cognizant licensee personnel stated that the programmatic intent in the protection of austenitic stainless steels was to minimize exposure to halogens while recognizing that some exposure is unavoidable. Procedures are in place requiring cleaning and sample swipe testing of external surfaces prior to installation of insulation to ensure against contamination. Adequate removal of potential contamination on inside surfaces is anticipated due to required system flushing operations. Therefore, specification 4.M.1.1 provisions were not intended to require cleaning after use of flapper wheels and prior to welding. The inspector noted that "thorough scrubbing with an approved solvent" would not be possible for inside surfaces of socket welds or butt welds in several sizes of pipe. Therefore, a thorough assessment of the technical adequacy of paragraph 3.1.2.5 and potential residues which would not be removed by system

flushes was necessary to fully resolve NRC concern. Pending an examination of the licensee's assessment during a future inspection this matter will be identified as unresolved item 390/85-45-02; 391/85-36-02 "Control of Materials for use on Austenitic Stainless Steels".

b. Liquid Penetrant Examination (57060)

The inspector examined the welds listed below where liquid penetrant (PT) nondestructive examination (NDE) was in process to determine:

- whether the applicable drawings, instructions or travelers clearly specify the test procedure to be used and whether a copy of that procedure is available in the areas where the work is being performed.
- whether the sequencing and timing of the examination relative to other operations such as grinding, welding or heat treating, etc., are specified and are in accordance with applicable code and contract requirements.
- whether the required equipment and materials are at the work station and whether material certifications are available which demonstrate conformance with the applicable sulfur and halogen limitations.
- whether the specific areas, locations, and extent of examination are clearly defined.
- whether the following test attributes are as specified in the applicable procedure being used and consistent with the applicable code and contract requirements:
 - o Surface preparation/cleaning method, type, time, etc.
 - o Penetrant type
 - o Penetrant application method
 - o Penetration time (dwell time)
 - o Temperature of surface
 - o Penetrant removal
 - o Drying
 - o Developer, application, type
 - o Developing time

- whether any indications are evaluated at the proper time in accordance with the procedure requirements, correct acceptance criteria are used and the results are reported in a prescribed manner.
- whether the examined surfaces are cleaned at the conclusion of the examination.

<u>Joint No.</u>	<u>System</u>	<u>Location</u>
2-072B-D043-12B	CS	Dome-EI 861
2-072B-D043-12C	CS	Dome-EI 861
2-072B-D047-02B	CS	Dome-EI 861
2-072B-D047-02C	CS	Dome-EI 861

With regard to the examination above, the inspector noted a need for clarification regarding the minimum light intensity at the inspection site, since paragraph 7.4 of TVA procedure WBNP-QCP-4.13-PTM, Rev. 3 requires "adequate lighting" and the term is not defined in the procedure. The inspector informed cognizant licensee personnel that this matter will be identified as Inspector Followup Item 391/85-36-03, Clarification of Liquid Penetrant Examination Procedure.

Within the areas examined, no violations or deviations were identified.

7. Expansion Bellows to Penetration Welds (Unit 2)

The inspector examined field welding of safety-related expansion bellows to penetration joints to determine whether applicable code and procedure requirements were being met. The applicable code is the ASME B&PV code Section III, Subsection NE, 1971 edition with addenda through summer 1973.

The inspector examined the below listed in process expansion bellows to split-ring welds to verify the following:

Welding procedures and drawing available; WPS assigned in accordance with applicable code; materials as specified; geometry as specified; fitup and alignments as specified; preheat as specified; technique as specified; welding electrodes as specified and consistent with the code; welding equipment as specified; interpass temperature controlled and consistent with the applicable codes; interpass cleaning and backgouging performed as specified; weld repairs conducted in accordance with specified procedures; base material repairs properly documented; welder identification; and peening not done on root or final weld surface layer.

<u>Penetration No.</u>	<u>Annulus Location</u>		<u>Weld Status</u>
	<u>Azimuth</u>	<u>Elevation</u>	
X21	289° 30'	728' 6"	Backing ring installed
X22	294° 45'	730' 3"	Fit-up/ tack
X32	282° 30'	720' 6"	Fit-up/ tack
X33	277° 30'	720' 6"	Backing ring installed

During the above examination, the inspector observed a considerable amount of debris and miscellaneous scrap materials abandoned on top of installed unprotected cable in trays at approximate elevation 718'. The inspector also observed welding sparks and slag falling on top of class IE unprotected cables from work being completed at higher elevations. Cognizant licensee personnel informed the inspector that cable trays at this elevation had not been covered with fire-resistant materials through an oversight since the sparks and slag had penetrated to a lower elevation than anticipated. The inspector responded that these conditions were contrary to the requirements for housekeeping included within ANSI N45.2.3-1973 and licensee procedure WBN-QCP-1.36, Rev. 6. ANSI N45.2.3, paragraph 3.3 and WBN-QCP-1.36, paragraph 7.2.2.4 require permanent installed equipment to be protected to prevent damage from construction activities. Paragraph 7.2.2.4 specifically requires protection from welding arcs by barriers, screens, shields, or other means as necessary. This matter is considered a lack of conformance to 10 CFR 50, Appendix B, Criterion V and will be identified as violation 391/85-36-04, Failure to Accomplish Adequate Protection and Housekeeping in Cable Trays.

Within the areas inspected, one violation was identified. No deviations were identified.

8. Previously Identified Inspector Followup Items

- a. (Closed) Inspector Followup Item 390/84-79-05, 391/84-53-05: Scaffolding

This item concerned NRC review of work releases or demonstration of exemption from required work releases as permitted by paragraph 6.6.1 of QCI-1.67, Rev. 10, for three randomly selected scaffolds. The scaffolds involved are as listed below:

Locations (Approximate)
10'E of A13 and 15'N of U
10 feet above 713

10'E of A13 and 15'N of U
15 feet above 713

Just behind locked gate in the
Unit 2 pipe chase on EL 713

The inspector examined schematics and loading calculations which verified exemption from a required work release under paragraph 6.6.1 for each scaffold involved. The inspector concluded that licensee actions were sufficient to satisfy NRC concern and this item is considered closed.

- b. (Closed) Inspector Followup Item 390/84-79-06, 391/84-53-06: Chloride Swipe Testing

This item concerned cleaning practices prior to pipe covering. TVA Procedure WBNF-QCP-4.10-11 Revision 3, External Cleaning, as implemented by TVA Process Specification 4.M.4.1(R), requires random swipe testing for chloride contamination on accessible nonwetted surfaces of austenitic stainless steel pressure boundary materials prior to covering. NRC concern had been raised due to lack of a time requirement between the testing and the covering since as the time between the testing and the covering is increased, the validity of the testing is decreased.

The inspector examined Revision 4 of QCP-4.10-11 and Revision 1 of WBN-QCI-4.49 "Insulation Control" which have been reorganized to indicate swipe testing immediately prior to insulation. Cognizant licensee personnel informed the inspector that a search of upper-tier and NRC requirements indicated no necessity for a minimum time limit, but standard operating procedures had been revised to minimize the time involved. The inspector concluded that licensee actions were sufficient to satisfy NRC concern and this item is considered closed.

- c. (Closed) Inspector Followup Item 390/84-79-07, 391/84-53-07: Management Supervisory Appointed Inspectors.

This item concerned the potential for management appointment of welding inspectors since paragraph 2.1.A.2 of Section III, Revision 1 of the Quality Assurance Training Program Plan states that responsible management/supervisory personnel who direct the performance of final visual inspections of structural welds may, on occasion, perform and document these activities if they are certified by a letter from management who appointed them to the position of inspection supervisor.

Cognizant licensee personnel informed the inspector that this option had never been invoked for welding inspection at Watts Bar. The inspector examined Revision 2 of Section III and written instructions from the construction quality manager which verify that the exception involved does not apply to NDE and other welding inspection activities. The inspector concluded that licensee actions were sufficient to resolve NRC concern and this item is considered closed.

d. (Closed) Inspector Followup Item 390/84-79-08, 391/84-53-08: Liquid Penetrant Materials

This item concerned use of magnaflux type SKC-NF/ZC-7B cleaner for liquid penetrant inspection. Procedure WBNP-QCP-4.13-PTM, Rev. 1, "Liquid Penetrant Examination", Appendix A specifies Spot Check, Magnaflux Type SKC-S or SKC-NF as the only Spot Check, Magnaflux authorized cleaner.

The inspector examined documentation from the vendor involved which verifies that cleaner SKC-NF has been redesignated SKC-NF/2C-7B. The inspector also examined addendum No. 1 to Appendix A of process specification 3.M.1.1(R3) as incorporated in QCP-4.13-PTM. Addendum No. 1 has been amended to include all vendor redesignated liquid penetrant materials in use on the site. The inspector concluded that licensee actions are sufficient to resolve NRC concern and this item is considered closed.