UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos. 50-390/82-06 and 50-391/82-04

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 site near Spring City, TN

Inspectors: John W. York for — 3/17/82
J. L. Coley — Date Signed

John W. York — 3/17/82
J. W. York — Date Signed

Approved by: A R Herdt — 3/17/82
A. R. Herdt, Section Chief — Date Signed
Engineering Inspection Branch
Division of Engineering and Technical Programs

SUMMARY

Inspection on February 8-12, 1982

Areas Inspected

This routine, unannounced inspection involved 70 inspector-hours on site in the areas of as-built drawings (Unit 1); licensee identified items (Units 1 and 2); spent fuel storage racks (Units 1 and 2); IE Information Notice (Units 1 and 2); follow-up on regional request (Units 1 and 2); and reactor vessel internals (Unit 1).

Results

Of the six areas inspected, no violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

   Licensee Employees

   *R. W. Olson, Construction Engineer
   *S. Johnson, Assistant Construction Engineer
   *T. Hayes, Nuclear Licensing Unit
   *P. Wilson, Nuclear Licensing Unit
   *T. R. Trails, Nuclear Licensing Unit
   *A. W. Rogers, Quality Assurance Supervisor
   *E. Burke, Assistant Construction Engineer
   *S. R. Stout, Nuclear Licensing Section
   *P. Ortstadt, Construction QAB - Knoxville

   Other licensee employees contacted included construction craftsmen, technicians, and security force members.

   *Attended exit interview

2. Exit Interview

   The inspection scope and findings were summarized on February 12, 1982, with those persons indicated in paragraph 1 above. The inspector identified the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee.

   Unresolved Item - 390/82-06-01 and 391/82-04-01: "MSIVs Internal Locking Devices" - paragraph 9.

3. Licensee Action on Previous Inspection Findings

   Not inspected.

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. A new unresolved item identified during this inspection is discussed in paragraph 9.

5. Licensee Identified Items (50.55(e))

   a. (Closed) Construction Deficiency Report (CDR) #50-390/81-80, Violation of Weld Hold Points. TVA-WBNP letter dated November 30, 1981 has been reviewed and determined to be acceptable by Region II. The inspectors held discussions with cognizant personnel, reviewed records of

retraining administered to personnel involved, and reviewed a preliminary draft of changes to procedure NCM-41. The inspectors concluded that the licensee has determined the extent of the reported condition and performed the necessary survey and followup action to correct this condition. This item is considered closed.

b. (Closed) CDR #50-390/81-39 and 50-391/81-38, Deficiencies in Box Anchors and Hanger Lugs. TVA-WBNP letter dated January 29, 1982 has been reviewed and determined to be acceptable by Region II. Piping and shear lugs involved in this deficiency have been deleted from the design of this plant by means of engineering change notices (ECNs) 2756, 3049, 3174, and 3217. These ECNs specify removing the previously installed carbon steel piping and reinstalling stainless steel piping. This was due to a flow rate and corrosion study which had shown carbon steel to be inadequate to meet design requirements for this system. Since the features involved in the deficiency are no longer included in the design of the plant, this item is considered resolved.

c. (Closed) CDR #50-390/81-25 , Improper Welds on Surface Mounted Plates. TVA-WBNP letter dated January 5, 1982 has been reviewed and determined acceptable by Region II. The licensee determined after an evaluation that none of the weld sizes represented a safety concern since all of the supports having these welds will perform their intended function. In addition, the licensee changed construction specification G-29-C to prevent a recurrence of this situation; therefore, this item is considered closed.

d. (Closed) CDR #50-390/81-34 and 50-391/81-33, Design Calculations Performed Without Approved Qualification. TVA-WBNP letter dated July 16, 1981 has been reviewed and determined acceptable by Region II. The subject nonconforming conditions identify the modification, installation, and inspection of seismic pipe supports by personnel from the Tennessee Valley Authority's (TVA) Division of Construction (CONST) at Watts Bar Nuclear Plant (WBN) before receipt of approved drawings from TVA's Division of Engineering Design (EN DES). The seismic pipe supports, had previously been designed and drawings issued by EN DES. During installation, physical interferences were identified and CONST modified and installed the pipe supports before EN DES approval of the modification. This was accomplished through WBN Quality Control Instruction WBNP-QCI 4.30, a controlled CONST procedure permitting modification, installation, and inspection, as described above. WBNP-QCI 4.30 provided for control of these activities under support modification request (SMR) forms. Approval by EN DES was required after installation and inspection, but before completion of the EN DES documentation.

Modifications and installation of pipe supports were initiated by CONST before EN DES having a companion procedure approved to process the SMRs in EN DES. A verbal commitment was given CONST that an EN DES procedure would be provided to process the SMR. In the process of preparing

and reviewing the EN DES procedure, it was determined that EN DES could not adequately fulfill its commitments with the procedures as planned, and a nonconforming condition report (NCR) was initiated.

Upon notification of the subject nonconforming condition, CONST stopped modification and installation of the affected pipe supports. WBN-QCI 4.30 was cancelled, and no further modifications were made before receiving EN DES approval by existing procedures. All modification work for the affected pipe supports was transferred to EN DES for review. The inspectors reviewed the closed ECN that covered this work and verified that WBNP-QCI 4.30 had in fact been cancelled. This item is considered closed.

e. (Open) CDR #390,391/81-04-03, Unacceptable Welds on Duct Supports in the Auxiliary Building. TVA-WBNP letter dated January 25, 1982, has been reviewed and determined acceptable by Region II.

A comprehensive weld sampling program for all previously installed duct supports revealed welds which are unacceptable. The defects found include undersized welds, incomplete welds, slag inclusions, porosity, and overlap. The apparent cause was failure to clearly specify acceptance criteria on the applicable drawings.

TVA has re-evaluated the subject deficiency. As a result, an alternate criteria has been established by TVA for the visual inspection, of fillet welds instead of the stringent requirements of AWS D1.1. Site personnel have been instructed in the application of the revised acceptance criteria and welds performed in the future will be inspected by inspectors certified to the revised criteria.

The inspectors reviewed the samples taken to perform the analysis to relax the inspection criteria; however, it was noted that TVA would have to change their commitment in the FSAR before this item could be cleared. The licensee stated that this would be accomplished in amendment 47 to the FSAR. This item will remain open until this amendment is incorporated into the FSAR.

f. (Open) CDR #50-390/80-09 and 50-391/80-09, Improper Materials Used in Auxiliary Board Room Air Conditioning System. A portion of the copper tubing installed in the 480 V Board room HVAC system cannot be identified because the identification marks were removed. Some of the tubing can be identified as ASTM B-88 type "M" tubing. Type "M" copper tubing was used instead of the specified type "K" copper tubing. The reason for the subject deficiency was that the QA program for HVAC system was not well defined at the time this tubing was fabricated and installed in the system.

Subsequently, TVA has reevaluated the subject deficiency. Calculations based on ASNI B31.5 section 504.1.1 Chapter II, shows that ASTM B-88 type "M" tubing in the "annealed" condition will not meet the internal pressure requirements of ANSI B31.5 for this system. However,

ASTM B-88 type "M" hard drawn tubing does meet the pressure requirements. A survey of major manufacturers and distributors of copper tubing revealed that ASTM B-88 type "M" copper tubing is only available in the hard temper except for special orders. Furthermore, if type "M" annealed tubing is ordered, there is a considerable surcharge and a large quantity must be special ordered. Therefore, because no type "M" annealed tubing was special ordered, it was concluded that no type "M" annealed tubing was used in the construction of the HVAC system.

The inspectors requested to see the results of hardness tests performed on unidentified samples of the HVAC system copper tubing to verify that the hardness was within the range for ASTM B-88 type "M" hard drawn tubing. These reports were not available at the site. This item will be reinspected on a subsequent inspection when objective evidence can be produced that only ASTM B-88 type "M" hard drawn tubing was used in this installation.

g. (Open) CDR #390/80-12-06 and 391/80-09-06, Breakdown in Dravo QA Program. During preparation for baseline inspection (PSI), it was discovered that a number of welds on safety related subassemblies, manufactured by Dravo Corportion (Dravo) of Marietta, Ohio, appeared to have extra weld material near the TVA field welds. These unidentified welds were later determined to be weld buildups performed by Dravo for the purpose of obtaining proper dimensional tolerances for subsequent alignment and counterbore so as to comply with ASME Code fitup requirements. These additional welds were not documented in accordance with the QA requirements and a nonconformance report (NCR) was issued. The inspectors reviewed TVA's response and at this time do not have sufficient information to close this item. Region II areas of concern are as follows:

(1) TVA has stated that no defects in welding have been found as a result of TVA's and Dravo's NDE reviews and analysis. However, there is no traceability on the filler materials used or filler material certification for physical and chemical properties on over 1200 welds. Therefore, until Region II has more information on the control of filler materials at Dravo, this item remains open.

(2) TVA's Conclusion

(a) TVA stated that Dravo's QA program was audited and approved by NRC. Dravo has been audited by Region IV; however, NRC does not approve vendor programs. Region II however, has requested Region IV to look into this matter during their next scheduled inspection which will be conducted in the near future.

(b) TVA also stated that: "As a matter of standard operating procedures, it was Dravo's practice to use filler metals issued under a controlled program for all work, whether nuclear or nonnuclear, to prevent the inadvertent use of improper material on any contract." This practice will be audited by Region IV as reported above.

(c) As a result of a Telecon conversation with TVA-Knoxville, the inspectors were informed that the Dravo problem was also identified at Yankee Atomic and the NRC has cleared the item at that site. However, Region II has not received a copy of the Yankee Atomic Report to date.

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

6. Reactor Vessel Internals - Welding (Unit 1)

The inspectors observed welding work activities for reactor incore instrument tubes. The applicable code for the installation of the instrument tubes is the ASME Boiler and Pressure Vessel Code, Section III, Subsection NB, 1971 Edition with addenda through summer 1973.

The inspectors observed these activities by reviewing the welding and inspection records. Actual observation of the work was not possible since the window of opportunity had passed.

The records for the following welds were examined:

Weld Number	Location
1-094-W001-40A	Vessel Penetration to Guide Tube
1-094-W001-37E	Second Coupling to Guide Tube
1-094-W001-25D	Guide Tube to Second Coupling
1-094-W001-44E	Second Coupling to Guide Tube
1-094-W001-58B	Guide Tube to First Coupling
1-094-W001-55B	Guide Tube to First Coupling

These records were examined to determine whether:

(1) The surface for welding was reasonably smooth, and free of scale, rust, oil, grease and other deleterious foreign materials, including moisture.

(2) Cutting, forming, bending and alignment of material complied with the requirements as set forth in the ASME Code Section III, Division 1, Subsection NB, Class 1 - Components and Licensee's procedures.

(3) The techniques of alignment and the erection of parts, subassemblies, and components for welding was accomplished in accordance with licensee's/vendor's installation sequence specifications and assembly drawings.

(4) Suitable facilities were provided and maintained for the storage of electrodes, flux and other welding materials.

(5) Precautions were taken to minimize the absorption of moisture by fluxes and cored, fabricated and coated electrodes.

(6) Only authorized personnel were allowed to withdraw material.

(7) Only proper amounts of the correct material were dispersed for each job at any particular period of time.

(8) Unused material was returned, properly dispositioned and properly recorded in accordance with approved procedures.

(9) Dispensing of welding material was done in accordance with approved documentation controls which identifies the type and quantity of material, the weld location/number for which the material was designated to be used, and the name of the authorized withdrawer.

(10) Weld identification/location corresponded to respective weld card, drawing, work order, or other welding documentation.

(11) Welding material used corresponded with the material specified.

(12) Welder's qualification met the requirements for the weld.

(13) Applicable welding procedures were used and complied with the appropriate specifications and code requirements.

(14) Fitting and alignment methods secured final weld joints with offsets that did not exceed the maximum allowable dimensions specified by the ASME Code.

(15) The welding technique was applied as specified for the root portion and the remainder of each joint.

(16) Root pass welds were observed, accepted and signed off by QC prior to continuation of welding.

(17) Surface of welds were free from coarse ripples, grooves, overlaps, abrupt ridges, valleys, undercuts and otherwise met specified acceptance standards.

(18) Predetermined hold points were observed for QC examinations and that welding did not proceed prior to QC acceptance and release.

(19) Interpass temperatures were observed.

(20) Unused filler materials were returned to the welding material storage facility or disposed of in accordance with procedure.

(21) Weld repair, defect removal technique, defect removal verification and re-examination of repair work complied with applicable procedures, codes and standards.

(22) NDE was performed as specified.

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

7. Spent Fuel Storage Racks - Units 1 and 2

The inspectors observed work activities for the spent fuel racks. The applicable code for the welding of the spent fuel racks was the structural welding code ASW D1.1, 1975 Edition.

The inspectors observed the work activities by visually inspecting the completed work and by review of records associated with the spent fuel racks at various stages of construction, installation, and inspection. Observations were made in order to determine whether the requirements of applicable specification standards, work and/or inspection procedures were met for the activities involved. Actual observation of work was not possible as the window of opportunity had passed.

The following attributes were examined for the spent fuel racks.

a. Procurement. The required design and fabrication codes were invoked.

b. Site storage procedures provide for proper identification, handling, cleanliness preservation, protection from adverse weather, other physical damage and quality control surveillance.

c. Installation

(1) Qualified and controlled field welding and NDE procedures and personnel

(2) Control of rigging and handling to prevent damage to new racks, existing structures or spent fuel

(3) Removal or modification of existing rack structures

(4) Proper location and orientation

(5) Configuration of the spent fuel racks relative to the assembly drawings

(6) Identification

(7) Seismic restraints in place and gapped

(8) No apparent damage to the racks or spent fuel pool during installation

(9) Work was performed in accordance with approved procedures.

d. Records Reviewed

(1) Receiving records
(2) Fabrication records
(3) Material certifications
(4) Installation records

e. Nonconformance Reports were also reviewed.

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

8. Review of As-Builts (Unit 1)

The inspector reviewed the licensee's program for control of as-constructed drawings (Quality Control Instruction WBNP-QCI 1.25 Revision 2) to determine the adequacy of procedures governing generation and completion of as-built design documents.

During the inspector's review of drawings for piping systems, it became apparent that as-built system drawings could not be totally reviewed at this time because all Watts Bar as-constructed drawings have only been temporarily transferred to TVA's Power Division and did not totally represent the completed system. For example, as-constructed pipe drawings of the RHR system gave as-constructed details of pipe runs; however, support drawings giving location, type and configuration of supports for this system were not as-constructed. This was also true for pipe weld drawings which would give location and identification of welds for the RHR system. This examination of the licensee's as-built drawings will be rescheduled for a subsequent inspection closer to the actual fuel load date.

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

9. IE Information Notice (Unit 1)

IE Information Notice No. 81-33, Locking Devices Inadequately Installed on Ma Steam Isolation Valves. The inspectors found that the inspections of locking devices described by this Notice had not been performed by the licensee. However, the licensee had developed work plans to conduct these inspections. The inspectors, accompanied by a representative of the licensee, examined the four MSIVs for Unit 1 and found that all four valves had improperly installed locking devices. In addition, drawings for the

MSIVs revealed that these valves had identical design locking devices internally for locking fasteners on the valve disk. The inspectors inquired of the licensee the method to be used to determine if the internal locking had been properly installed. The licensee committed to disassemble one Unit 2 MSIV and inspect the internal locking devices. It was decided that if all internal locking devices for this valve were properly installed, the licensee would accept the other eight MSIVs. However, if one locking device on the disassembled valve was improperly installed, all eight valves would be disassembled and inspected. This sample was considered representative since it is felt the vendor would have had reason not to bend the external locking devices, because the valve might be disassembled as a result of testing. However, the vendor would not have expected the internal bolts and locking devices to be disassembled. It should also be noted that the resident NRC inspector requested to be present when this valve is disassembled and inspected. This was reported as unresolved item #390/82-06-01 and #391/82-04-01, MSIVs Internal Locking Devices.

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

10. Followup On Regional Request

A worker expressed the following concerns:

a. There is not a site procedure for the requirements of General Construction Specification G-43 to ensure that three or more hangers restrain a closure piece before that closure piece is fastened to a component. There is no procedure to inspect the support arrangement prior to the equipment being fastened to the closure piece.

The licensee stated that the following site procedure was being modified to reflect the requirements of G-43.

(1) WBNP-QCT-4.36, "General Procedure for Preoperational Cleaning and Flushing of Fluid Handling Systems and Components"

This procedure will contain the requirement to ensure that three or more hangers restrain a closure piece to a component area.

Two previous unresolved items pertain to this area of concern. These are items nos. 390/81-13-03 and 390/81-13-04.

b. Specification G-43 prohibits cold springing of pipe (unless specified on drawing) to get it in position for proper fit up. Concern was expressed that some of the piping had cold springing which could invalidate seismic analysis.

The licensee stated that the following site procedures were being modified to reflect the requirement of G-43.

(1) WBNP-QCP-1.42, "Flange Bolting For ASME Section III Systems"

(2) WBNP-QCP-4.13, "NDE Procedure"

Procedure QCP-1.42 will address the alignment of bolted closures to prevent cold springing. Procedure QCP-4.13 will address the alignment of welded closures to prevent cold springing.

In a memorandum from J. E. Wilkins to R. W. Cantrell (No. CEB 810407 008) dated April 7, 1981, a sampling program to determine preload conditions (potential cold springing) at equipment nozzles was outlined. Engineering Design (EN DES) developed a technical basis to be used in the program for selecting the most critical nozzles; i.e, pumps that were difficult to qualify to vendor allowable nozzle loads. The following systems were selected for sampling.

(1) Emergency Raw Cooling Water
(2) Component Cooling
(3) Chemical and Volume Control
(4) Residual Heat Removal
(5) Safety Injection
(6) Containment Spray
(7) Auxiliary Feedwater
(8) Fuel Pool Cooling

This sampling program has been started, but not completed. The licensee stated that if all flanges selected for evaluation are judged to be acceptable, the results will be documented and the preload question will be considered resolved. In the event there is reasonable question, further testing using strain gages will be required.

One previous unresolved item, identified as item numbers 390/79-09-02 and 391/79-07-02, pertains to the requirements for control of cold springing or misalignment in piping.

c. There is no coordination of piping and hanger installation, i.e., as temporary and permanent hangers are installed, the effects of pipe stresses and pipe locations are not being verified by the mechanical engineering unit responsible for piping.

With regard to the workers concern regarding coordination between piping and hanger installation, the licensee stated that the meeting summary (meeting held early 1981 - exact date not available) outlined in (1) and (2) below defines the working relationship between the two groups concerning the piping hanger location.

(1) Pipe Hung with Typical Hangers:

Mechanical Engineering Unit (MEU) and Hanger Engineering Unit (HEU) measures pipe and determines if pipe is on location at critical points (box anchors, sleeves, lugs, etc.) per piping drawing. If not, they determine whether to NCR pipe or to put pipe on location.

(a) If pipe is already hung with permanent hangers, there should be no problem with pipe accidentally moving.

(b) If pipe is not hung, MEU and HEU engineers determine where and to what exact dimensions (pipe to wall, floor or ceiling) permanent hangers are needed to retain pipe on location. Hangers are then installed on a top priority basis. Pipe accidentally moving before these hangers are installed would not matter since exact hanger dimensions were determined when pipe was verified.

(2) Pipe Hung with Engineered Hangers

MEU and HEU measures pipe at critical points (box anchors, sleeves, lugs, etc.) and determines if pipe is on location per piping drawing. If not, they determine whether to put pipe back on location or NCR pipe.

(a) If pipe is already hung and on location, no problem.

(b) If pipe is already hung and is off location, MEU and HEU engineers determine whether to move or NCR pipe. IF NCR'd, HEU awaits reanalysis before continuing work on pipe.

(c) If pipe is not hung but is on location, MEU and HEU engineer determines from piping drawings which hangers would retain pipe on location and exact pipe to wall, ceiling or floor dimensions. Hangers are then FCR'd if necessary, and installed on a top priority basis. Again, piping accidentally moved before hangers are installed would not present a major problem since exact hanger dimensions were determined when piping was verified.

The inspectors, in order to ascertain the site methods used for piping installation, reviewed a modification to the Component Cooling System currently being installed (Ref. ECN No. 2343 and Drawing Nos. 47BM464-9, sheet Nos. 1 and 2, and 47W464-4). The inspectors verified the pipe location of portions of the following segments:

(a) Segment Identifier 0-062-AB-P-809-3-43 in the Chemical and Volume Control System

(b) Segment Identifier 0-062-AB-L-809-3-43A in the Chemical and Volume Control System

(c) Segment Identifier 1-072-AB-P-812-1-07 in the Containment Spray System

(d) Segment Identifier 1-072-AB-P-812-1-11 in the Containment Spray System

(e) Segment Identifier 1-072-AB-P-812-1-13 in the Containment Spray System

In summary, these concerns will be tracked using the three unresolved previously mentioned.

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