



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

Report No. 50-390/80-13

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

Facility Name: Watts Bar Nuclear Plant

Docket No. 50-390

License No. CPPR-91

Inspection at Watts Bar Nuclear Plant near Spring City, Tennessee

Inspector: C. Julian for
J. A. McDonald

5/27/80
Date Signed

Approved by: H. C. Dance
H. C. Dance, Section Chief, RONS Branch

5/27/80
Date Signed

SUMMARY

Inspection on April 1 - April 29, 1980

Areas Inspected

This routine, announced inspection involved 85 resident inspector-hours on site in the areas of preoperational test program implementation, preoperational test witnessing, preoperational quality assurance record program, and document control program.

Results

Of the four areas inspected, no items of noncompliance or deviations were identified in two areas; two items of noncompliance were found in two areas (Infraction - failure to control testing paragraph 5; Infraction - failure to follow and have adequate procedures, Paragraph 8).

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DETAILS

1. Persons Contacted

- *S. M. Anthony, PPROD - Mechanical Maintenance Engineer
- *J. F. Bledsoe, PPROD - Assistant Preoperational Test Supervisor
- D. L. Brazzell, CONST - Mechanical Engineer
- **T. B. Bucy, CONST - Supervisor, Hanger Engineering Unit
- J. H. Chattin, CONST - Mechanical Engineer
- M. L. DeBusk, CONST - Supervisor, Print Files
- *G. T. Denton, PPROD - Supervisor, Operations
- R. D. Eidson, CONST - Supervisor, Startup and Coordination Unit
- *E. R. Ennis, PPROD - Supervisor, Maintenance
- **T. W. Hayes, CONST - Supervisor, Instrument Engineering Unit
- **R. L. Heatherly, CONST - Supervisor, Quality Control & Records Unit
- **L. J. Johnson, CONST - Supervisor, Mechanical Engineering Unit, Section B
- *M. K. Jones, PPROD - Supervisor, Preoperational Test Group
- *L. A. Kendrick, PPROD - Administrative Services Section
- **J. M. Lamb, CONST - Supervisor, Mechanical Engineering Unit, Section A
- *R. C. Manley, PPROD - Plant Services Section
- *C. C. Mason, PPROD - Plant Superintendent
- **W. E. McNair, CONST - Instrument Engineer
- **J. A. Nicholls, CONST - Supervisor, Civil Engineering Unit
- *R. Norman, PPROD - Operations Engineer
- **L. C. Northard, CONST - Assistant Construction Engineer, QA
- **J. H. Perdue, CONST - Supervisor, Electrical Engineering Unit
- **H. C. Richardson, CONST - Construction Engineer
- R. K. Shanks, CONST - Startup and Coordination Engineer
- **J. A. Thompson, CONST - Supervisor, Welding Engineering Unit
- **J. E. Treadway, CONST - Construction Superintendent
- G. E. Vest, CONST - Mechanical Engineer
- *B. L. Willis, PPROD - Supervisor, Quality Assurance
- **J. E. Wilkins, CONST - Project Manager

Other licensee employees contacted included one operator and four office personnel.

*Attended exit interview on April 18, 1980

**Attended exit interview on April 23, 1980

2. Exit Interview

The inspection scope and findings including the noncompliance items were summarized on April 18 and April 23, 1980, with those persons indicated in Paragraph 1 above. The licensee acknowledged and indicated the findings would be reviewed. No commitments for resolution of the unresolved items or open items discussed in this report were made by the licensee. The inspector will make a separate request for such commitments.

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 noncompliance or deviations. New unresolved items identified during this inspection are discussed in Paragraphs 5.k and 5.l.

5. Preoperational Test Program Implementation

- References:
- a. Division of Engineering Design Construction Specification G-39, Cleaning During Fabrication of Fluid Handling Components, Revision 0, dated March 8, 1974, and Revision 1 dated May 13, 1975.
 - b. Division of Engineering Design Construction Specification N3M-890, Chemical Cleaning Instructions For Piping Systems for Watts Bar Nuclear Plant, Revision 0, dated September 6, 1978.
 - c. Technical Instruction TI-27, Chemical Specifications, Part III (Cleanliness Criteria for Piping Systems), Revision 1, dated March 30, 1979.
 - d. Watts Bar Nuclear Plant Field Instruction WBFI-M32, Preoperational Flushing Instructions For Residual Heat Removal System, Revision 1, dated May 29, 1979.
 - e. Watts Bar Nuclear Plant Quality Control Procedure WBNP-QCP-1.22, Transfer of Permanent Features to the Division of Power Production, Revision 6, dated November 6, 1979.
 - f. Memorandum from WBNP Mechanical Construction Engineer to WBNP Files, WATTS BAR NUCLEAR PLANT REVISIONS TO CONSTRUCTION SPECIFICATION G-39, dated February 3, 1975.
 - g. Memorandum from Sequoyah and Watts Bar Design Projects Manager to WBNP Project Manager, WATTS BAR NUCLEAR PLANT - CHEMICAL CLEANING OF PIPING SYSTEMS, WBNP-6, dated February 13, 1975.
 - h. WBNP Surveillance Instruction (SI) 4.0.5 (5R), Testing Setpoint of Safety Relief Valves (ASME Section XI, Category "C" Valves, Revision 0, dated March 1, 1979.

i. WBNP-QCP-4.10, Appendix D, Hydrostatic/Pneumatic Testing of Piping Systems and Piping Subassemblies.

The inspector reviewed the preoperational test program to determine whether the administrative controls set up by the licensee were being implemented. Areas examined were the preliminary tests of flushing and hydrostatically testing the Unit 1 Residual Heat Removal (RHR) system. Findings were acceptable with the following exceptions:

- a. Section 4.14 of WBNP-QCP-1.22 states that construction testing, including cleaning and flushing operations, is normally completed prior to system transfer. The inspector reviewed the cleaning and flushing operations which had been conducted on the RHR system prior to its tentative transfer and noted an absence of cleanliness verification of instrument sensing lines. References a., b., and c. collectively were incorporated in WBF1-M32, which governed the flushing of the remainder of the RHR system. However, no formal procedures or plans had been developed which addressed references a., b., and c. to the RHR system instrument sensing lines. This is a failure to identify and perform testing which incorporates the acceptance limits contained in design documents.

The Instrument Unit Supervisor described steps which were normally taken as part of instrument filling and venting which verified these lines would at least pass water, without the technician noting any obvious line blockage. The Instrument Unit Supervisor concluded from a review of references a., b., and c. that a program to satisfy these requirements was necessary and initiated its development during the course of this inspection.

- b. WBF1-M32, Section 12.1, requires the documentation of "Results of the final flush samples....". System flushing was conducted under Section 10.3 which did not distinguish between initial and final flushing and did not specify sampling of each flush path to verify cleanliness of each individual portion of the system flushed. Only Step 10.3.60 implies that a sample is to be taken and this is at the conclusion of all flushing. The one sample of RHR system water retained as a QA record was improperly recorded as being representative of all RHR piping within the boundaries of at least six flush paths. No QA record samples were attributed as being representative of the piping between the containment sump and the suction side of the RHR pumps. This constitutes a failure to incorporate appropriate requirements in a test procedure.
- c. Construction Specification G-39, Section 8.4.3.1, requires a flush cloth or strainer to be installed in the exit of a once-through flush. Test Procedure WBF1-M32 did not require such installation and one was not made during the once-through flushes of the Unit 1 RHR system lines between the containment sump and the suction side of the RHR pumps, completed June 12, 1979.

- d. Construction Specification G-39, Section 8.4.5 and 9.2.3, collectively, required flushing until two successive observations of a flush strainer met the clean strainer criteria of no particles dimensionally larger than one thirty-second of an inch. WBF1-M32 did not contain such a requirement and there were no strainer observations performed in conjunction with the multiple recirculation flushes of the Unit 1 RHR system, completed June 12, 1979.
- e. WBF1-M32, Section 11.1, gives one of the acceptance criteria for final flush water as compared to fillwater as to quality being "... virtually unchanged" In addition, Section 11.2 requires the final flush water to meet grade A water standards. The QA record of water analysis for the Unit 1 RHR system flushing which was completed June 12, 1979, reflected an increase in conductivity of the water between fill (0.49 micromhos per cm) and final flush (1.03 micromhos per cm). The evaluation of these chemistry analyses accepted this aspect of the results without comment even though it clearly did not meet the "virtually unchanged" acceptance criteria.
- f. TI-27, Section 3.3.1, required the water used to flush all the primary systems (Class B systems) to be Class A water. The acceptance criteria for Class A water were given in Table II of TI-27. The RHR system was categorized as a Class B system in N3M-890, Section 3.0. While using TI-27 and N3M-890 as references, the Test Procedure WBF1-M32, Section 7.12 required the fillwater for the RHR system flushing to only be demineralized. The water used for the Unit 1 RHR system flushing conducted from May 30 to June 12, 1979, was demineralized but did not meet the Class A water acceptance criteria for total solids. The water contained 8.1 ppm total solids whereas the specification was a maximum of 0.5 parts per million. This is an example of a test procedure failing to assure that the test is performed under suitable environmental conditions.
- g. Hydrostatic Test Procedure WBNP-QCP-4.10, Appendix D, Section 6.1.4.5, states "Precautions shall be considered to prevent excessive pressurization..." during hydrostatic tests. The step goes on to give the acceptance criteria for establishing adequate overpressure protection using a relief valve. In discussion with the Mechanical Engineering Unit Supervisor and two test engineers who have performed numerous hydrostatic tests on safety-related systems, it was established that the use of a relief valve is not the only method of overpressure protection which has been used. However, no other methods have been formally identified as acceptable. The actual methods used are not identifiable in this report as they were not recorded (see Paragraph 5.h.).
- h. WBNP-QCP-4.10, Appendix D, Attachment A is used to record the quality assurance verification of hydrostatic testing activities. Criterion XVII of 10 CFR 50, Appendix B requires quality assurance records to provide sufficient evidence of activities as well as to retain closely related data such as the qualifications of equipment. Though Attachment A has data blanks for start time and stop time, the interval to

be recorded is not clear. The test pressure must be maintained for ten minutes before inspection starts and then for such additional time as required to complete the inspection. Different test engineers presumed different intervals were to be recorded, rendering the information unreliable. For example, a time span of one minute was recorded for hydro No. 8 of Unit 1 RHR system while the engineer stated a ten-minute hold at test pressure was accomplished prior to inspection.

Additionally, the qualifications of the test equipment used, such as the hydrostatic pressure source and the overpressure protection are not required to be recorded on Attachment A. These examples of failure of a test procedure to assure that prerequisite overpressure protection is met, combined with similar examples in Paragraphs 5.a., 5.b., 5.c., 5.d., 5.e., 5.f., and 5.g., collectively, constitutes an item of non-compliance (50-390/80-13-01).

- i. The design documentation, G-39 and N3M-890, and the Station Technical Instruction, TI-27, are cleanliness procedures which give varying water quality acceptance criteria for water for flushing and for final flush results. Until the licensee resolves the conflicts in water cleanliness requirements existing in these procedures which govern the maintenance of suitable environments in safety-related systems, this item is open (50-390/80-13-03).
- j. Surveillance Instruction SI-4.0.5 for testing of ASME Code Section XI Category C relief valves, was identified in November 1979 as needing revision to incorporate four more relief valves which should be within the scope of the relief valve testing program. As of April 18, 1980, this revision had not been issued. Until the licensee completes a review of all relief valves which should be addressed in SI 4.0.5 and revises the procedure accordingly, this item (50-390/13-04) is open.
- k. The inspector raised a concern that certain safety-related check valves in emergency core cooling systems did not appear to be functionally tested to ensure prevention of reverse flow during the course of the preoperational test program. One example valve is a RHR pump discharge check valve 1-74-515. The licensee has conducted a preliminary review to identify which check valves perform safety functions, to identify how their testing is currently addressed, and to develop testing requirements for those not scheduled for appropriate testing. Until the licensee formally incorporates the required testing based upon a formal review of the concern, this item (50-390/80-13-05) is unresolved.
- l. The plant staff is currently seeking an exemption from inservice inspection requirements for some relief valves which are welded into safety-related systems. The listing of valves scheduled for inservice inspection is the source used for identifying preoperational test requirements. Therefore, there is currently no method in use for

assuring proper operation of welded-in relief valves prior to a system undergoing preoperational testing. The Preoperational Test Coordinator stated this area would be reviewed further. Until the licensee completes a review of required inspection and testing of welded in relief valves and implements the results of this review, this item (50-390/80-13-06) is unresolved.

- m. The inspector noted that the Unit 1 RHR system hydrostatic tests, serialized Nos. 1 and 2, were not followed by flushes with Grade A or B water as required by G-39, Section 7.2.1.1.1. The hydrostatic tests were performed with Grade C water. The inspector was shown two memoranda, references f. and g. which were effective prior to the March 13, 1975, hydros. Though these memoranda did not specifically waive the flush requirement, they referred to an upcoming revision to G-39. In May 1975, G-39 was revised to eliminate this requirement for the case in concern.

6. Preoperational Test Witnessing

The inspector witnessed a portion of the preoperational test of the Unit Hydrogen Recombiner system conducted under TVA-8, to determine that the test procedure was being followed; equipment performance was evaluated during test conduct; operations personnel were involved in the test; and operating procedures were being verified. Findings were acceptable with the exception of the following:

- a. A control room operator involved in the coordination of TVA-8 was knowledgeable in the requirements of the Hydrogen Recombiner system Operating Instruction OI-83.1. At one point in the test procedure, the operator recognized that the test procedure applied full power to the recombiner heating elements instantaneously whereas the operating instruction called for a phased increase in power over a twenty-five minute period. The operator chose to bring the power up over a period estimated at ten or fifteen minutes. This action did not invalidate the test results as the recombiner met its heatup rate requirements. The operator's logic for not adhering to OI 83.1 was that it was probably conservatively written based upon the operator's opinion that the originator of OI 83.1 always employed conservatism. In actuality OI 83.1 was no more conservative than the vendor technical manual requirements. Prior to proceeding with the test, the operator did not require resolution of what he perceived to be an inadequacy in the test procedure. He independently established what he considered to be appropriate engineering requirements based upon blanket assumptions he made about the style of work of another operator.

The inspector questioned equipment operation which results in operations personnel not believing that they must ensure procedural problems are resolved before proceeding with equipment operation. This is designated an open item (50-390/80-13-07) and will be reviewed during subsequent inspections.

7. Preoperational Quality Assurance Record Program

- References:
- a. Watts Bar Nuclear Plant (WBNP) Standard Practice WB 3.2.1, Document Control and Identification of Critical Systems, Structures, and Components (CSSC), revised September 19, 1979.
 - b. WBNP Standard Practice WB 3.2.8, Plant Master File, revised January 23, 1979.
 - c. WBNP Administrative Services Section Instruction Letter (SIL) No. 1, Plant Master File, Revision 2, dated January 19, 1979.
 - d. Division of Engineering Construction Quality Assurance Procedure (CONST-QAP) 17.1, Quality Assurance Records for Design and Construction, Revision 0.
 - e. WBNP-QCP-1.8, Quality Assurance Records, Revision 3, dated April 30, 1979.

The accepted QA Program for the operations phase commits to conformance with ANSI N45.2.9-1974 and the recordkeeping activities of the Division of Power Production were inspected to this standard. For the construction phase, recordkeeping activities were inspected against 10 CFR and reference d., as the guiding procedures referenced in FSAR Table 17.1A-1 have been cancelled and replacement procedures are in draft form.

The inspectors reviewed the QA record storage practices implemented with the Division of Power Production Master File, Trouble Record File, and Maintenance Instruction File in addition to the Division of Engineering Construction Temporary Vault. These practices were reviewed to ascertain the adequacy of storage and control of preoperational QA records. Findings were acceptable except as follows:

- a. The Division of Power Production Master File, Trouble Record File, and Maintenance Instruction File are operated under References a. and b. Additionally, the Master File is covered by Reference c. Collectively, these three procedures do not address the requirements of Sections 3.2.2, 3.2.6, 4.3, 4.4, 5.3, 5.5 and 6.2 of ANSI N45.2.9-1974. These sections give requirements for a recordkeeping system which is indexed; which controls supplemental information; which includes a receipt control system permitting ascertaining of the status of receiving records; which has a written storage procedure; which has a full time security system; and which has designated those personnel having access to the files. Until the recordkeeping activities associated with the Master File, Trouble Record File, and Maintenance Instruction File meet all the requirements of the accepted QA program this item (50-390/80-13-08) is open.

- b. The operation of the site construction QA recordkeeping system under WBNP-QCP-1.8 was noted to not fully address ten requirements of CONST-QAP-17.1. These sections of CONST-QAP-17.1 were 1.2, 3.B., 4.B., 5.B., 5.F., 5.G., 5.G.1., H., J.1, and J.2. Furthermore, to satisfy the FSAR commitments in Table 17.1A-1 the site implementing procedures would have to comply with procedures issued at the level of Office of Engineering Design and Construction. These procedures have been cancelled and not yet replaced by Interdivisional Quality Assurance Procedures. Until appropriate procedures are issued to satisfy the FSAR commitment in Table 17.1A-1 for recordkeeping, the FSAR appropriately revised and the licensees implementing procedures aligned to fulfill these commitments, this item (50-390/80-13-09) is open.

8. Document Control Program

- References:
- a. Watts Bar Nuclear Plant Quality Control Procedure (WBNP-QCP) 1.1, Print Room Procedure, Revision 7, dated April 23, 1979.
 - b. WBNP-QCP-1.13, Preparation and Documentation of Field Change Requests, Revision 8, dated December 27, 1979.

The inspector reviewed the implementation of the site document control procedures which were applicable to operations in the Division of Engineering Construction Quality Control and Records Unit Print Room. Findings were acceptable with the exception of the following:

- a. The inspector reviewed two hundred ledger cards in the Quality Control and Records Unit Print Room for drawings of safety-related and radiological waste disposal systems in series 47W200, 47W300, 47W400, 47W700 and 47W800. WBNP-QCP-1.1 requires in Section 6.1.7 that the removal and destruction of superseded drawings be noted on the ledger card. The 16 ledger cards listed below did not indicate removal and destruction of previously superseded drawings (noncompliance - see paragraph 8.c):

PRINT NO.	TITLE	REVISION	REVISED
47W809-1	Unit 1 and 2 Flow Diagram Chemical and Volume Control System	13	03/25/80
47W821-18	Aux Bldg. Flow Diagram Chem Cleaning CVCS Cont.	1	12/16/77
47W830-3	Mech Flow Diagram Waste Disposal System	10	12/10/79
47W830-6	Mech Flow Diagram Waste Disposal System	12	04/11/80

47W850-1	Turb Bldg Flow Diagram Fire Protection and Raw Service Water	10	01/19/78
47W850-2	Aux Bldg Flow Diagram Fire Protection and Raw Service Water	11	05/24/78
47W401-2	Mech Feedwater Piping	13	12/21/79
47W401-7	Mech Feedwater Piping	6	04/19/78
47W406-1	Mech Chem and Vol Cont System Piping	12	02/11/80
47W406-3	Mech Chem and Vol Cont System Piping	12	03/25/80
47W406-4	Mech Chem and Vol Cont System Piping	7	01/16/79
47W406-6	Mech Chem and Vol Cont System Piping	10	03/25/80
47W406-15	Mech Chem and Vol Cont System Piping	8	03/25/80
47W406-16	Mech Flood Mode Boration Make-up System Piping	7	10/17/78
47W432-2	Mech Residual Heat Removal System Piping	13	03/25/80
47W435-7	Mech Safety Injection System Piping	11	03/25/80

b. The inspector reviewed one hundred manufacturing master prints of safety-related systems which were maintained in the Quality Control and Records Unit Print Room. WBNP-QCP-1.1 Section 6.2.1 requires that such prints be stamped "MASTER" by Print Room personnel. The following six prints listed below were not appropriately stamped "MASTER" (in noncompliance - see paragraph 8.c.):

DRAWING	TITLE	REVISION	REVISED
1-63-585 Sheets 1, 2, and 3	Safety Injection Hanger	2	04/10/80
1-63-472 Sheets 1 and 2	Safety Injection Support	1	03/04/80

DRAWING (Continued)	TITLE	REVISION	REVISED
1-70-977 Sheets 1 and 2	Component Cooling System Hanger	0	06/24/77
1-70-978 Sheets 1 and 2	Component Cooling System Hanger	0	06/27/77
1-70-979 Sheet 1	Component Cooling System Hanger	0	06/21/77
1-70-980 Sheets 1 and 2	Component Cooling System Hanger	0	06/23/77

c. The inspector reviewed twelve safety-related Field Change Requests (FCRs) to verify that the master prints for the affected systems had been annotated to reflect the FCRs as required by Section 6.1.1.2 of WBNP-QCP-1.13. The following four FCRs were not reflected on the noted drawings:

FCR NO.	DRAWING	TITLE	REVISION	REVISED
H-146	47A060-62-96	Mech Tees For CVCS System Unit 1	RO	04/25/80
	47A060-62-97	Mech Tees For CVCS System Unit 2	RO	04/25/80
H135	47A060-62-68	Mech Anchors For CVCS System Unit 1	RO	03/11/78
	47A060-62-67	Mech Anchors For CVCS System Unit 2	RO	03/11/78
H-153-RO	47A060-62-100	Mech Tee Anchor For the CVCS System Unit 1	RO	04/25/78
EE-2238	45W826-11	Conduit and Grounding EL729.0 and 737.0 Cols A8-A15, U-W Ceiling Plan and Details	R8	12/12/79
	45W826-23	Conduit and Grounding EL729.0 and 737.0 Cols A1-A8, U-W Fire Protection	R1	08/31/79

This example of failure to follow procedures, combined with similar examples in Paragraphs 8.a., and 8.b., collectively, constitutes an item of noncompliance (50-390/80-13-02).

d. WBNP-QCP-11 does not contain requirements for the issuing of documents for the purpose of safety-related activities which ensure that only legible copies are issued. The inspectors were made aware that breakdowns in the quality of documents issued had occurred but no examples

were found during this inspection. Until the licensee revises his procedures to ensure distribution of legible documentation for safety-related activities this item (50-390/80-13-10) is open.

- e. The inspector offered the following comment. During the course of the inspection it was noted that drawing 47W471-6, Revision 15, Units 1 and 2, Flow Diagram General Plant Systems, dated 1/13/76, did not contain markings as required from Field Change Request Number M-3920. WBNP-QCP-1.13, Section 5.11 states in part "... the Engineering Unit Supervisor also ensures that all field changes ... are documented in accordance with the procedure...." WBNP-QCP-1.13, Section 6.1.1.2 further states, in part "... notes the change(s) by circling the affected area and records the field change request number on the print room master file drawing...." WBNP-QCP-1.1, Section 6.1.3.1 states, in part "... as revised drawings are received, the print room group shall be responsible for transferring any information to the revised drawing" The inspector questioned personnel from the mechanical engineering unit and print room group to determine which group had failed to follow procedures. Both groups stated they had complied with the applicable instructions. This failure to follow procedures was an isolated case, and the subsequent revision to the drawing showed that the field change request markings had been incorporated.