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

Report Nos: 50-390/89-24 and 50-391/89-22

Licensee: Tennessee Valley Authority
6N11 B Missionary Place
1101 Market Street
Chattanooga, TN 37402-2801

Docket Nos.: 50-390 and 50-391 License Nos.: CPPR-91 and CPPR-92

Facility Name: Watts Bar 1 and 2

Inspection Conducted: November 21 - December 19, 1989

Inspectors: A.R. Long For — 1/17/90
S. P. Burris, Senior Resident Inspector Operations — Date Signed

A.R. Long For — 1/17/90
P. G. Humphrey, Resident Inspector — Date Signed

A.R. Long — 1/17/90
A. R. Long, Project Engineer — Date Signed

Approved by: [signature] — 1/17/90
K. P. Barr, Section Chief
Projects Section 3
TVA Projects Division
Office of Nuclear Reactor Regulation — Date Signed

SUMMARY

Scope: The inspection consisted of monthly maintenance observations, monthly surveillance observations, review of security issues, plant tours, and followup of licensee actions on previous inspection findings.

Results: Within the areas inspected, no violations or deviations were identified. One Unresolved Item* was identified during this inspection period and is described below. All other areas reviewed were found to be acceptable.

*URIs are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*G. Ashley, Compliance Licensing Support Supervisor
G. Brantley, Employee Concerns Site Representative
D. Douthit, Program Manager
E. Fuller, Chairman, Program Team
W. Hastie, Acting Plant Manager
T. Horning, Regulatory Licensing Supervisor
*L. Jackson, Operations Manager
H. Johnson, Site Quality Manager
*M. Jones, Startup and Test Manager
D. Koehl, Technical Support Superintendent
P. Mandava, Project Engineer
*C. Nelson, Maintenance Manager
L. Nolan, Construction Manager
*J. Scalice, Plant Manager
R. Stevens, Licensing Manager
R. Wilson, Vice President, New Projects

Other licensee employees contacted included engineers, technicians, nuclear power supervisors, and construction supervisors.

Nuclear Regulatory Commission

*S. Burris, Senior Resident Inspector
*G. Humphrey, Resident Inspector

* Attended exit interview

Acronyms used throughout this report are listed in the last paragraph.

2. Monthly Maintenance Observations (62703)

During this inspection period, the inspectors observed the licensee during the performance of selected maintenance activities. The inspection included review of clearances, work packages, work instructions, and in-process work activities. The inspectors reviewed these activities to verify that:

- The required administrative approvals and any required tagouts were obtained prior to starting any work.

- Approved procedures were in use by the personnel performing the work.

- The procedures being used were adequate to accomplish the activity and the personnel were qualified to the appropriate levels to complete the work.

- Quality control hold points were established and accomplished as required.

- Electrical equipment which is environmentally qualified is being properly preserved during and after any maintenance activities.

- The appropriate post-maintenance testing was performed on equipment which had been reworked or repaired.

The inspectors witnessed several of the licensee's work activities as discussed below.

Essential Raw Cooling Water Valve Testing

The inspectors observed construction craft personnel during the conduct of post maintenance testing on Essential Raw Cooling Water strainer back flush valves 1-FCV-67-10A-B and 1-FCV-67-10B-B. As identified on the original maintenance request, the conduit for the control and power cables for these motor operated valves had been broken and therefore, could not maintain their environmental qualification requirements. The licensee determinated the cables, replaced the conduit and reterminated the cables in accordance with the MR (# A-631259) and associated work instructions (AI-9.2.3 and CPI-8.1.8)

The inspector witnessed the licensee perform a functional test of valves 1-FCV-67-10A-B and 1-FCV-67-10B-B, by implementing the functional testing portion of MR 631259. The inspectors verified that the licensee established all necessary prerequisite conditions, obtained the appropriate shift operations approval, and used an approved procedure for conducting this test. The inspectors also verified that personnel involved in the test were briefed and knowledgeable of the requirements and the expected results of the test, and that the results of the test were being properly documented.

As part of this test, the licensee was required to reposition valve breakers, lift wire leads and install jumpers in Motor Control Centers 1-MCC-214-B1/4E-B and 1-MCC-214-B1/6E-B. The inspectors verified that the test personnel were correctly implementing the procedure as written, documented the modified conditions, and properly reestablished the designed configuration for those steps witnessed.

Those activities observed appeared to meet the intent of the licensee's administrative control program and the inspectors did not identify any adverse conditions or trends.

Diesel Generator Work and Testing

The inspectors observed ongoing work and testing activities conducted during this inspection period on the 1B-B Diesel Generator. This inspection was performed to ensure that the licensee was properly implementing approved administrative and work control procedures by verifying that administrative controls on procedures, including any required QA activities, were being implemented, followed, and documented; management was aware and involved with any identified discrepancies; the latest revision of the test procedure was in use; all test equipment used had been appropriately calibrated and documented; testing was conducted in accordance with the approved procedure; criteria for interruption of the test and continuation of the testing was clearly outlined and followed; and any temporary modifications, such as jumpers, strainers, spool pieces, or blank flanges, were installed and properly documented per the established administrative controls.

The licensee had recently completed a six-year inspection of the DG engine, in accordance with Maintenance Instruction, MI-82.6, Revision 5. In parallel with MI-S2.6, the licensee performed MI-82.1, "Monthly, Quarterly and Six-Month Inspection", MI-82.3, " 18-Month Inspection", and MI-82.5, "Three Year Inspection". The inspectors noted that a procedure change had been implemented to tie together the performance of these procedures, and a Temporary Instruction had been issued to formally tie relevant Maintenance Requests and Work Plans to the MI procedures. This prevented possible conflicts due to the simultaneous performance of multiple procedures.

The DG inspection resulted in the replacement of a piston ring. The licensee had also replaced an open-bodied speed-set potentiometer on the governor with a sealed-bodied potentiometer, in response to a generically applicable CAQR originated at the Sequoyah Nuclear Plant. No problems with the potentiometer had been experienced at WBN and the part was replaced as a preventative measure. In addition, the voltage regulator had been replaced because the licensee had identified that the part had been obtained directly from the manufacturer rather than from Power Systems, and had not been qualified.

Upon successful completion of the inspection and maintenance activities, the licensee performed various required pre-run checks and verifications. The DG was then started and brought up to 450 RPM for one minute. Following the one-minute run at idle speed, the licensee checked for lube oil leaks, cooling water leaks, fuel oil leaks, abnormal noises, abnormal temperatures and pressures and excessive vibrations. Following these checks, the licensee stopped the engine and had the mechanics check for "hot bearing" on the connecting rod bearings and any other abnormalities.

Due to the replacement of the rings, a series of incremental "break-in" runs were performed. The engine was restarted and run for

five minutes and then stopped, at which time the licensee reinspected the engine. The engine was again started and run for 30 minutes and reinspected. Various mechanical checks and adjustments (valve lash, setting the injectors, checking the torque of accessible head to liner nuts, etc.) were performed. Additional runs were performed at increasing engine speeds, with significant engine parameters monitored. During the break-in runs, a lube-oil temperature gauge was found to be reading high and the cause was determined to be a failed spring. After the repair of the oil temperature gauge, the licensee completed the break-in runs, performed a final 12-hour run on the engine, and performed the final inspections.

Based on the previous work activities and testing scope, the licensee determined that the 1B-B Diesel Generator was capable of performing its intended function. Those activities inspected by the inspectors were found to be acceptable.

3. Monthly Surveillance Observations (61726)

The inspector reviewed the status of the High Pressure Fire Protection System (System #26) to determine if the system was being maintained adequately to afford the needed protection, specifically in the plant areas surrounding and including those related to the fuel storage and record storage areas. In addition the inspectors reviewed a memorandum (Robert A. Pedde, Site Director, NC to D. E. McCloud, Acting Site Licensing Manager, NC, "Special Nuclear Material License - Fire Protection", RIMS # T02 890321 821) which listed the specific fire protection equipment required to insure that the system is operable to protect the fuel stored at the site. The memorandum specified that pressure switches O-PS-26-2, O-PS-26-5, O-PS-26-10, O-PS-26-12 are required to maintain the system in an operable status. The licensee's records indicated that an outstanding work plan, #L56308-1, had been initiated to replace the pressure switches, but the replacement had not been performed. The inspector noted that the required calibrations of the switches had been overdue since March, 1987.

Fire protection personnel contended that the pressure switches had been removed from the fire protection circuit and that their removal provided for a more conservative system. No evaluation was produced to verify this analysis.

The inspector further noted that surveillance SI-7-14, "High Pressure Fire Protection Pumps - Verification of Pump Start Sequence", was not being performed within the time period specified. The last data package produced for SI-7.14 was dated April 30, 1985. The inspector could find no evaluation to indicate that the system was operable without performing the SI.

This issue was identified as as Unresolved Item, URI 390/89-24-01 and 391/89-22-01, Failure to Verify the High Pressure Fire Protection Operability, pending the licensee's evaluation of the present status of the system.

4. Security (81601)

During this inspection period, the licensee performed a special security barrier test to prove the capability of the proposed inter-plant security barrier to prevent forced entry to selected areas. The objective of this test was to verify conformance of the proposed interim barrier fence with the Physical Security Interior Unit Separation Barrier Design Criteria.

The licensee is currently proposing to construct an interim barrier between the construction plant (Unit 2) and the operating plant (Unit 1) protected area. To validate this type of barrier design, the licensee constructed and tested a section of the simulated barrier.

The inspectors observed the actual test of this simulated fence on December 14, 1989. The inspectors obtained a copy of the Special Test Instruction, "Physical Security Unit Separation Barrier", for review. The procedure outlined the following format to be used to test the simulated barrier fence. The following items were stressed in the procedure:

- Method to be used in the construction of the barrier.
- QA/QC involvement in the construction of the barrier.
- Verification of the barrier design and confirmation of the acceptability of any modifications or changes.
- Number of personnel who would be involved in the actual testing of the barrier integrity.
- Limitation of tools available for use during the test.
- Identification of the responsible test authority and the methodology used for timing the test, since the test was to be limited to a maximum time available for forced entry.
- Two clearly defined acceptance criteria.

The inspectors noted that the test was implemented as written and met the identified acceptance criteria. The use of an interim barrier program for Watts Bar is still being reviewed by TVA and NRC.

5. Plant Tours (54834)

The inspectors toured the plant areas and randomly performed housekeeping inspections, reviews of activities in progress, and inspections of equipment to determine if proper lay-up and preservation had been maintained. These tours revealed that the plant areas viewed were clean, and free of rodent infestation. Work documents reviewed were found to require that cleanliness be maintained in the work areas.

Work activities in progress were reviewed by the inspectors and were found to be performed in accordance with procedures and instructions. In specific, special protectors were utilized with activities associated with the modifications of control panels in the main control room to avoid grit from the cutting, grinding, and other activities from spreading to nearby instruments and controls.

The auxiliary, control, and containment areas were heated and humidity controls were maintained on equipment inspected.

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

6. Action on Previous Inspection Findings (92701)

a. (Closed) URI 391/87-01-03, Review of Basis for Deleting Unit 2 Electrical Penetration Nitrogen Requirements.

It was previously identified that the licensee was not maintaining a 15 psig nitrogen pressure during storage on the Unit 2 Conax Electrical Containment Penetrations as required by the vendor's drawing 87064-7429-10003, Revision E. The licensee discovered that this issue had been previously identified in 1979 and Nonconformance Report No. 1601, Revision 1, was issued to identify the condition and at that time, the 15 psig requirement was eliminated. No technical basis for the elimination was stated. URI 87-01-03 was opened pending review of the licensee's technical basis for the deletion of the nitrogen storage pressure requirement.

The vendor (Conax) has since issued Revision F to drawing 87064-7429-10003 and related penetration drawings to relax the 15 psig requirement and specifies that only a positive nitrogen pressure be maintained for PM purposes.

Based on the changed requirement implemented by the vendor, this item is closed.

b. (Closed) URI 390/87-11-03, Cleanliness of Electrical Equipment.

The original concern dealt with the accumulation of dirt and debris in electrical junction boxes. The inspector pointed out that it is necessary to maintain safety-related electrical equipment clean in order not to impair the intended function of the system. Discussions with the licensee found that TVA supervision was in the process of modifying their administrative system to require cleaning of the interior of equipment prior to returning the equipment to service.

The inspector verified that the licensee had indeed changed their administrative controls to implement the previously identified cleaning controls. The inspector reviewed applicable procedures to ensure that cleanliness controls existed at a sufficient level to preclude similar problems if correctly implemented, and had the following observations:

- Maintenance Instruction (MI)-57-99.10, Revision 1, "Environmentally Qualified Junction Box Maintenance", was established to implement cleanliness controls for environmentally qualified electrical junction boxes. The licensee will implement this procedure whenever an EQ junction box is opened for inspection of maintenance.

- Site Director Procedure AI-9.2.3, Revision 0, "Maintenance and Service Request Performance", requires that Maintenance observe equipment being worked for degradation. On EQ equipment, the craftsman shall conduct and then document an inspection using the appropriate appendix of the procedure. In addition, the appendix requires visual inspection for evidence of excessive dirt and dust.

Based on this review the inspector considers licensee actions adequate to resolve the unresolved item as originally issued. This item is closed.

c. (Closed) URI 390/89-03-04, Electrical Cable Tracing Without Procedures.

The original concern identified that signal tracing was performed without using a signal tracing procedure. This was subsequently substantiated; however, due to the relative simple equipment involved, the inspector was unable to verify the need for a procedure. At that time the licensee advised they would reverify the proper routing of the 57 specific cables involved.

The licensee's reverification program found that the majority of the documents reviewed did not contain sufficient objective evidence of which inspection method was employed. The licensee therefore performed additional verifications, which included interviews of the

inspectors who performed the initial verifications to determine their work experience. Based on these interviews and existing documentation, the licensee developed a random population for reinspection. An inspector not associated with the original inspection effort was trained to the current standards and procedures and performed both signal tracing and visual inspection of the suspect cable routing. Except for two identified routing problems, which had been previously documented, the licensee determined that the original inspection effort was adequate to provide confidence in the original inspections.

However, the licensee determined that a lack of objective evidence of the inspection method was a significant concern and would require corrective action to resolve the issue. This concern is being resolved as part of the action plan for cable issues.

Based on this review, the unresolved item has been adequately addressed and is therefore closed.

7. Exit Interview (30703)

The inspection scope and findings were summarized on December 19, 1989, with those persons indicated in paragraph one. The inspectors described the areas inspected and discussed in detail the inspection results listed below. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection. Dissenting comments were not received from the licensee.

Item Number	Status	Description and Reference
390/89-24-01 391/89-22-02	Open Open	URI - Failure to Verify that High Pressure Fire Protection is Operable (Paragraph 3)
391/87-01-03	Closed	URI - Review of Basis for Deleting Unit 2 Electrical Penetration Nitrogen Requirement (Paragraph 6.a)
390/87-11-03	Closed	URI - Cleanliness of Electrical Equipment (Paragraph 6.b)
390/89-03-04	Closed	URI - Electrical Cable Tracing Without Procedures (Paragraph 6.c)

8. List of Acronyms

AFW	Auxiliary Feedwater
AI	Administrative Instruction
CAQR	Condition Adverse to Quality Report
DG	Diesel Generator

DNC	Department of Nuclear Construction
ERCW	Essential Raw Cooling Water
FCV	Flow Control Valve
MCC	Motor Control Center
MR	Maintenance Request
MI	Maintenance Instruction
NC	Nuclear Construction
NRC	Nuclear Regulatory Commission
PM	Preventive Maintenance
PSIG	Per Square Inch Guage
QA	Quality Assurance
QCI	Quality Control Instruction
RPM	Revolutions Per Minute
SI	Surveillance Instruction
URI	Unresolved Item
VIO	Violation
WBN	Watts Bar Nuclear Plant
WBPT	Watts Bar Program Team
WP	Work Plan