U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-390, 50-391 License No.: NPF-90 and Construction Permit CPPR-92 Report Nos: 50-390/98-01, 50-391/98-01 المراجعة المتعادية ا Tennessee Valley Authority Licensee: Facility: Watts Bar. Units 1 and 2 1260 Nuclear Plant Road Location: Spring City TN 37381 Dates: January 4 through February 14, 1998 Inspectors: P. Van Doorn, Senior Resident Inspector D. Rich, Resident Inspector J. Blake, Senior Project Manager, RII (Sections M1.3, M2.1, M7.1) W. Kleinsorge, Reactor Inspector, RII (Sections M1.1, M1.4) W. Miller, Reactor Inspector, RII (Sections M1.2, F8.1) E. Testa, Reactor Inspector, RII (Sections R8.1, R8.2, R8.3)

Approved by:

M. Lesser, Chief Reactor Projects Branch 6 Division of Reactor Projects



Enclosure 1

EXECUTIVE SUMMARY

Watts Bar Nuclear Power Plant, Units 1 and 2 NRC Inspection Report 50-390/98-01, 50-391/98-01

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a six-week period of resident inspection; in addition, it includes the results of announced inspections in the preventive maintenance and corrective maintenance areas.

Operations of the second secon

- The conduct of Operations was good including assistant unit operator performance and control room narrative log useage. (Section 01.1).
- The 1B feedwater heater isolated due to the failure of the hi-hi level switch. The isolated condition was not identified for 2 hours and 50 minutes. This was considered a lack of attention to detail and a lack of a questioning attitude (Section 04.1).
- Several minor examples of operator awareness problems were noted, one of which was a non-cited violation (Section 04.2).
- A continued strength in self-assessment was identified and management exhibited a strong questioning attitude. (Section 07.1).
- A non-cited violation was identified for failure to use annunciator lens covers correctly (Section 08.3).

<u>Maintenance</u>

- Observed maintenance activities were adequately performed by qualified individuals. Maintenance personnel provided good support and work performance was properly documented. Lack of attention to detail during maintenance of a nonsafety-related 480-volt breaker was indicative of a poor work practice that could extend to safety-related equipment (Sections M1.1 and M2.1).
- Post-maintenance test activities following repairs to valve 1-FCV-003-0236 were excellent and demonstrated good communications and support between Operations and Maintenance personnel in the correction and resolution of plant equipment problems (Section M1.2).
- The inspection and evaluation of the 1B main feedwater pump shaft were an example of a well-coordinated effort involving Maintenance and Engineering (Section M1.3).

- The preventive maintenance program was adequately implemented although documentation of technical justifications for preventive maintenance task deferrals was not complete in all cases (Section M1.4).
- Centrifugal charging pump 1B-B was vented and drained for minor maintenance. A containment integrity concern was identified due to the centrifugal charging pump being opened without installing a flange in place of a relief valve on the suction side of the drained system. This is identified as an unresolved item (Section M3.1).
- The inspector identified an incorrect fitting installed on the 1A-A centrifugal charging pump suction line vent. This is identified as an unresolved item (Section M3.2).
- The inspector identified plastic sheet material left on the cable trays. It was determined that the material was left from work performed during the Unit 1 Cycle 1 refueling outage. (Section M4.1).
- Based on the report and results reviewed, the inspectors concluded that the self-assessment process has provided valuable insight into potential weaknesses in the area of maintenance implementation (Section M7.1).
- Failure to install 1B safety injection pump mechanical seal cover plate screws as required by the vendor manual was identified as a non-cited violation (M8.1).

Engineering

 Good support from system engineers in the areas of emergent operations and maintenance issues was noted including inspection and evaluation of the main feed pump shafts. (Section E1.1)

Plant_Support

- Adequate radiological controls were observed for work in progress. Aggressive action was taken for a minor spill (Section R1.1).
- Security personnel performed acceptably and barriers and zones were well maintained (Section S1.1).
- A negative observation was made at a fire drill when a knowledge deficiency was identified (Section F4.1).
- A non-cited violation was identified for two licensee-identified problems that were outside the design basis of the plant and did not meet the requirements of Title 10 of the Code of Federal Regulations Part 50, Appendix R. These issues were a missing cover plate on the reactor coolant pump oil collection system and inadequate separation provided for control cables to the control room air handling system (Section F8.1).

Report Details

Summary of Plant Status

Unit 1 began this inspection period operating in Mode 1 at 100 percent reactor power. Power was reduced to 95 percent on January 18, 1997, for the repair of the No. 7 heater drain tank B pump. Power was returned to 100 percent on January 19. On January 27, power was reduced to 92 percent after the 1B feedwater heater isolated due to an instrument failure. Repairs were completed and power was returned to 100 percent on January 28. On February 6 power was reduced to 55 percent to remove the west condenser waterbox from service. Power was maintained less than 85 percent for condenser tube plugging and inspection of A and B main feed pumps until February 13 when power was returned to 100 percent where it remained for the rest of the inspection period.

Unit 2 remained in a suspended construction status.

I. Operations

01 Conduct of Operations

01.1 <u>General Comments (71707)</u>

Using Inspection Procedure 71707, the inspectors conducted frequent inspections and reviews of ongoing plant operations and performed a walkdown of an engineered safety system. This included routine control room observations, crew turnover observations, evaluation of self-assessment programs, attendance at the daily planning meeting, review of tagouts, and observation of assistant unit operator (AUO) rounds. In general, the conduct of operations was good including observations of AUOs and Operations requiring independent verification. Inspectors noted an improvement in the control room narrative log in that plant evolutions and problem areas were recorded on a more consistent and more detailed basis. Inspectors noted one example of control room operations which did not meet normal standards where operators did not determine the cause of a small power change. This is discussed in Section 04.1. Minor instances of weak individual performance by operators is discussed in Section 04.2.

The inspector conducted a general walkdown of the emergency diesel generator system. System alignment was in accordance with System Operating Instruction (SOI)-82.01, Diesel Generator (DG) 1A-A, Revision 29, and material condition was satisfactory.

04 Operator Knowledge and Performance

04.1 <u>Feedwater Heater Isolation Caused By Switch Failure</u>

a. <u>Inspection Scope (71707)</u>

On January 27, the 1B feedwater heater isolated due to failure of the hi-hi level switch. The inspector reviewed operator response and licensee evaluation of the issue.

b. Observations and Findings

The 1B heater is one of three high pressure feedwater heaters in parallel between the main feed pumps (MFPs) and the steam generators (SGs). The plant was at 100 percent power. The effect on the plant was a thermal power increase of less than one percent. The operators identified the power increase and reduced power accordingly. The operators had also just made an adjustment in generator volt-amps reactive (VARs) and mistakenly attributed the power change to the change in VARs. Although three valve position indication lights in the control room were out of normal, the isolated heater went unnoticed by the operating crew. The event was identified 2 hours and 50 minutes later when Engineering noted changes in MFP vibration levels and changes in the 1A and 1C heater levels and notified Operations.

The licensee reduced power to return 1A and 1C heater levels to normal, repaired the failed hi-hi level switch, and placed the 1B heater back in service. The other level switches on the high pressure feedwater heaters were evaluated for operability.

The on-shift crew critiqued the event, and management held standown meetings with each crew concerning board walkdowns and crew briefs on events occurring during the shift. A night order was issued which specified the expected frequency for board walkdowns. The event was also critiqued as a reactivity management issue. The licensee modeled the event on the plant specific simulator and planned to include a simulator scenario in upcoming crew regualification sessions.

c. <u>Conclusions</u>

Attributing the power change to a change in generator VARs was a knowledge deficiency. Although the power change was small and the operators noticed it quickly, failure to determine the root cause of the power change was a lack of questioning attitude. Failure to notice out-of-normal balance of plant indications in the control room was a lack of alertness by control room operators. Licensee management acknowledged that this level of performance did not meet their expectations. The inspector determined the licensee's corrective action to be appropriate.

04.2 Operator Awareness

a. <u>Inspection Scope (71707)</u>

The inspector noted several examples of operator awareness problems.

b. Observations and Findings

The inspector noted one example of a weak turnover when the operator at the controls was not aware that the previous shift received a reactor coolant pump standpipe level alarm. This condition was an ongoing problem and was discussed at crew turnover by the shift manager but was not noted on the operator turnover sheet. The licensee identified one minor clearance discrepancy, and the inspector identified two control room radiation monitor recorders which had run out of paper.

On January 13, the inspector identified that the suction line vent on the 1B charging pump was open with no foreign material exclusion (FME) cover. Operations was responsible for control of the vent. Site Standard Practice (SSP)-12.08, Foreign Material Exclusion, Revision 7, required covers on system openings. This failure constitutes a violation of minor significance and is being treated as a non-cited violation (NCV), consistent with Section IV of the <u>NRC Enforcement</u> <u>Policy</u>. This is NCV 50-390/98-01-01, Failure to Use FME Cover. Management reinforced FME requirements and expectations.

c. Conclusions

Licensee management addressed each matter adequately. The inspector concluded that these were not examples of routine performance but were isolated instances of weak performance.

07 Quality Assurance in Operations

07.1 Licensee Self-Assessment Activities (40500)

The inspectors reviewed various self-assessment activities which included the following:

- Observation of Management Review Committee (MRC) meetings;
- Observation of two Plant Operations Review Committee (PORC) meetings;
- Review of selected Problem Evaluation Reports (PERs) for adequacy of corrective actions and implementation of procedural requirements.

The licensee's self-assessment process continued to be a strength. The inspectors reviewed results of Nuclear Assurance activities and found strengths in department self-assessment reviews, plant housekeeping, and material condition walkdowns. Management emphasized thorough evaluation of problem areas and continued to have a strong questioning attitude.

- 08 Miscellaneous Operations Issues (92901)
- 08.1 <u>(Closed) VIO 50-390/96-10-02</u>: Loss of Configuration Control on AFW Low Pressure Steam Trap Valve. The inspector verified the corrective actions described in the licensee's response letter, dated December 20, 1996, to be reasonable and complete. Although other configuration control problems have occurred, no similar problems of valves being bumped out of position were identified.
- 08.2 <u>(Closed) Licensee Event Report (LER) 50-390/97-009-00</u>: Main Control Room Heating, Ventilation and Air Conditioning (HVAC) Inoperable. This issue was described in Inspection Report (IR) 50-390/97-02. No new issues were revealed by the LER. The inspector determined the licensee's corrective actions were appropriate and verified corrective actions were completed.
- 08.3 <u>(Closed) Inspector Followup Item (IFI) 50-390/97-10-04</u>: Use of Control Room Annunciator Lens Covers. Plant Administrative Instruction (PAI) 2.08 required annunciators affected by maintenance to be covered with a green lens cover. The inspectors identified that this was not always done on annunciators with multiple inputs. This failure constitutes a violation of minor significance and is being treated as a non-cited violation, consistent with Section IV of the <u>NRC Enforcement Policy</u>. This is NCV 50-390/98-01-02. Failure to Use Annunciator Lens Covers.

The licensee's corrective action included revising PAI-2.08 and clarifying management expectations to operating crews. The licensee planned to evaluate use of a posted operator aid for multiple input annunciators which were affected by maintenance.

08.4 (Closed) LER 50-390/97-015-00: Manual Reactor Trip Due To Feedwater Isolation. This LER was discussed in IR 50-390/97-09. No new issues were identified by the LER. The inspector determined the licensee's corrective actions were appropriate and verified corrective actions were completed.

II. Maintenance

- M1 Conduct of Maintenance
- M1.1 General Comments
 - a. <u>Inspection Scope (62707) (61726)</u>

Using Inspection Procedures 62707 and 61726, the inspectors observed all



or portions of the following work orders (WOs) and surveillances and reviewed associated documentation. The following activities were observed:

- 1-SI-63-51, 18 Month Channel Calibration of RWST Level Channel II Loop 1-LPL-63-51 (L-914), Revision 1
- WO 97-012756-000, Calibration Check of B-B Traveling Screen Differential Pressure Loop IAW SSD-0-LPP-67-447-S
- WO 97-016121-000, Repair Leaking Fitting On 1B-B CCP Mechanical Seal
- WO 97-015384-000, Inspect DG 1A Air Dryer, WBN-1-DRYA-082-0181
- WO 97-001285-000, Repack 1-LCV-3-148A, #3 Steam Generator Motor Driven Auxiliary Feed Bypass Level Control Valve
- 1-SI-3-901-B. Motor Driven Auxiliary Feedwater Pump 1B-B Quarterly Performance Test. Revision 2
- 1-SI-62-901-B, Centrifugal Charging Pump 1B-B Quarterly Performance Test, Revision 3
- WO 98-000536-000, Replace 1-DRV-62-528, 1B CCP casing drain valve
- WO 97-014311-000, Repair DG 1A-A Room Exhaust Low Flow Switch
- WO 97-007347-001, Install New Waste Gas Oxygen/Hydrogen Sequencer/Recorder
- WO 97-016572-000, 18 Month Channel Calibration of Shield Building Vent EGTS Flow
- 1-SI-82-11B, Monthly Diesel Generator Start and Load Test DG-1B-B, Revision 4, including the six-month fast start
- WO 97-017294-000, IMP-90.003, 30 Day General Atomic Pig Monitor Flow Instrument Calibration, Revision 4, WBN-0.P.P.-012909-90-0132A
- WO 97-005382-000, MI-57.002, 480-volt Circuit Breaker Routine Maintenance and Testing, Revision 24, WBN-0-548-0296

b. Observations and Findings

The inspectors observed the activities identified above and concluded that they were being performed by qualified personnel and that work instructions were followed. During the observation, the inspectors questioned the licensee's personnel concerning the work being performed and determined personnel involved were knowledgeable of the task(s) being performed. The inspectors also observed that work activities were properly documented and that problems encountered during the performance of the work activities were appropriately resolved with one exception noted.

The inspector noted a problem with routine maintenance and testing of a non-1E, nonsafety-related, 480-volt circuit breaker under WO 97-005382. A lack of attention to detail was observed in the use of a wire brush to - clean the breaker contacts. To address this issue, the licensee issued PER WBPER980168. Although no problems were noted on safety-related work, this example of a poor work practice was indication of a problem that could extend to safety-related maintenance also.

c. Conclusions

The inspector concluded that maintenance activities were adequately performed and that Maintenance provided good support to resolve plant equipment or component problems. The inspectors concluded that the documentation of work performed was typically good. Lack of attention to detail during maintenance on a nonsafety-related, 480-volt breaker was indicative of a poor work practice that could extend to safety-related equipment.

M1.2 <u>Valve Repair and Test</u>

a. Inspection Scope (62707)

Using Inspection Procedure 62707, the inspectors observed portions of the work activity associated with the post-maintenance testing for WO 98-000133-000, Repair Air Leak on 1-FCV-003-0236, number 1 main feed bypass isolation valve, for compliance to site procedures and NRC requirements.

b. Observations and Findings

The inspectors attended the prejob briefing conducted prior to the postmaintenance testing performed following completion of the repairs to valve FCV-003-0236. This prejob briefing was thorough and demonstrated good communications between Maintenance and Operations personnel. The work and test activities were being performed by qualified personnel following the appropriate work instructions.

c. Conclusions

The inspector concluded that the post-maintenance test activities following repairs to valve 1-FCV-003-0236 were excellent and demonstrated good communications and support between Operations and Maintenance personnel in the correction and resolution of plant equipment problems.

M1.3 <u>Inspection of Main Feedwater Pump 1B</u>

a. <u>Inspection Scope (62707)</u>

The inspectors observed maintenance activities associated with the inspection of feedwater pump 1B. The maintenance activities observed by the inspectors involved the nondestructive examinations (NDE) and evaluations of the condition of the pump shaft.

b. <u>Observations and Findings</u>

Because of a previous shaft failure, the shaft of the 1B feedwater pump was visually and ultrasonically examined to determine the soundness of the material in the area of the shaft key-way. During these examinations, the NDE inspectors noted "checkerboard" patterns of linear indications in the journal bearing regions of both ends of the shaft.

Through a cooperative effort between Maintenance and Engineering personnel, a thorough investigation and evaluation of the indications were conducted, using multiple NDE techniques. Engineering personnel contacted the manufacturer and determined that the journal bearing areas of the shaft were coated with approximately 0.005-inch thick chromium plating to provide a bearing wear surface.

As directed by Engineering, the areas with linear indications were inspected using solvent-removable visible liquid penetrant to map the extent of the indications. The shaft bearing areas were then subjected to a fluorescent magnetic particle examination and an ultrasonic examination to determine if the type 410 stainless steel shaft material beneath the chromium plating exhibited any indications of cracking. As an additional examination to confirm that the cracks did not penetrate into the base material below the chromium plating, the areas were examined using an eddy current probe which had been calibrated on ½-inch long edm notches, from 0.010-inch to 0.060-inch in depth.

The results of the magnetic particle and ultrasonic examinations indicated no detectable cracking in the 410 stainless steel beneath the chromium plating. The eddy current examination results estimated that the cracking in the chromium plating extended to less than a depth of approximately 0.008-inches. Based on the results of these NDE inspections, site engineering concluded that the cracking was a surface phenomenon affecting only the chromium plating and that the shaft could be put back into service.

After observing a part of the NDE and reviewing the final inspection reports and evaluations, the inspectors agreed with the conclusion that the "craze-cracking" of the journal, bearing-area, chromium plating was a surface phenomenon which had not affected the structural integrity of the pump shaft.

c. <u>Conclusions</u>

The inspection and evaluation of the 1B Main Feedwater Pump shaft were an example of a well-coordinated effort involving maintenance and engineering.

M1.4 Preventive Maintenance (PM) Program

a. Inspection Scope (62702)

The inspectors reviewed procedures, interviewed licensee personnel, observed work in progress, and examined selected records to evaluate the licensee's PM Program. The specific areas examined are discussed below.

The inspectors examined the following procedures: SSP-6.03, Preventive Maintenance Program, Revision 9, effective date May 12, 1997, with Change Notices (CNs) 1-9; SSP-2.04, Source Requirements Identification and Tracking, Revision 5 effective date June 23, 1997; SSP-6.01, Conduct of Maintenance, Revision 3, effective date May 12, 1995, with CNs 1-3; NADP-12, Equipment Failure Trending, Revision 0, effective date February 5, 1998; and SSP-2.03, Administration of Site Procedures, Revision 18, effective date August 29, 1997.

The inspectors observed in process PM work activities for WOs 97-017294-000 and 97-005382-000, further discussed in Section M1.1 above. The inspectors also examined records for 50 rescheduled PM tasks.

b. Observations and Findings

The inspectors reviewed procedures, observed work in progress and examined selected records identified above and found that the licensee's PM program for safety-related structures, systems, and components had been adequately established and included: 1) responsibility for the program; 2) master schedule for PM; 3) documentation and review of completion of PM activities; 4) responsibilities and methods for establishing PM frequencies; 5) responsibility for periodic upgrading based on system or component failures; and 6) methods for incorporating revisions to Technical Specifications, procedures, and the master program.

The inspectors noted that the licensee stored instructions. procedures and other similar documents on their Local Area Network (LAN). This practice made the latest revision and latest CNs for a document available in real time to all users. In general this practice was working well; however, due to variation in individual work station printer setups and choice of fonts, the number of pages needed to reproduce a procedure varied depending on which computer work station and printer combination was used. As an example, the copy of SSP-2.03 provided to the inspectors contained a number of pages which included only a header or a header and just a few lines of text. As a result, the last page of SSP-2.03 was identified as "Page 59 of 48". This is of note because the list of affected pages contained in the revision log on Page 2 of 48 reflected page numbers based on a total document length of 48 pages, not 59 pages. Changes indicated to be located on page 48 by the list of affected pages were, in actuality, on page 59.

Of the 2059 Repetitive Change Requests (RCRs) issued for rescheduling PM tasks, from August 22, 1996, to February 4, 1998, the inspectors examined 50. The inspectors noted that Procedure SSP-6.03, Page 19 of 70, contained a note that stated, "Lack of manpower is not a justification for deferral of a PM item on a component." Of the 50 RCRs examined, 15 cited manpower issues as a contributing reason for rescheduling the PM task. Of the 15, five RCRs made no reference to the effect the postponement of the PM task would have on the equipment. The inspectors discussed this with the licensee. The licensee indicated that it was their intent that lack of manpower should not be the only justification for PM task deferral. The licensee further indicated that, in all the cases identified by the inspectors, the system engineer had been consulted and subsequently approved the deferral of PM tasks for technical nonschedule-driven grounds as evidenced by his signature on the RCR. The licensee admitted that in some cases they did not do a sufficient job of documenting the actual technical justification for PM task deferral. To address this issue and initiate corrective actions, the licensee issued PER WBPER980182. The inspectors found this to be indicative of a less than adequate effort in documenting the technical justification for PM task deferrals. The inspectors did not identify any equipment that had degraded due to deferred PM tasks.

c. <u>Conclusions</u>

The inspectors concluded that the preventive maintenance program was adequately implemented. Documentation of technical justification for PM task deferrals was not complete in all cases.

M2 Maintenance and Material Condition of Facilities and Equipment

- M2.1 Repair of Seal Weld Leak on Feedwater Check Valve
 - a. <u>Inspection Scope (62707)</u>

The inspector reviewed the documentation concerning the repair of a leaking seal weld on feedwater check valve 1-CKV-003-0508.

b. <u>Observations and Findings</u>

Check Valve 1-CKV-003-0508 is an American Society of Mechanical Engineers (ASME) Section III, TVA Class B, Safety Related, 16-inch Walworth model 5353-WE check valve with a cast steel body. The design pressure and temperature are 1185 psig and 600 degrees Fahrenheit (F). The check valve body is designed with holes through the body for the insertion of the valve disc hinge pin; these holes are designed to be sealed using a threaded plug with a soft iron gasket. In 1995, the licensee added a seal weld between the plug and the valve body in addition to the iron gasket.

On January 22, 1998, the licensee originated WO 98-000731-000 to repair a steam leak through a seal weld on check valve WBN-1-CKV-003-0508. The WO instructed maintenance personnel to "peen" the weld in the area of the steam leak in order to mechanically seal the leak.

On January 27, 1998, PER WBPER980089 documented that a temporary leak repair was performed on a safety-related component without a required engineering evaluation. As a result of the PER, Temporary Alteration Control Form (TACF) 1-98-002-003 was generated to provide the required engineering justification for the temporary leak repair.

The inspectors reviewed the WO, PER, and TACF, along with the valve drawings and vendor's maintenance manual (WBN-VTD-W030-0020, "The Walworth Company Maintenance Manual for Cast Steel. Bolted Bonnet, Gate, Globe, and Swing Check Valves," Revision 3). After a review of the documentation, the inspectors agreed with the licensee's interpretation that the mechanical sealing (peening) of the check valve seal weld was a temporary repair of a threaded connection and, therefore, did not require NRC approval.

c. <u>Conclusions</u>

The mechanical sealing (peening) of a steam leak through a seal weld was a well-documented temporary repair of a mechanical pressure-boundary connection.

- M3.1 <u>Control of Containment Integrity</u>
 - a. <u>Inspection Scope (62707)</u>

The inspectors reviewed a licensee identified issue which potentially challenged a containment boundary.

b. <u>Findings and Conclusions</u>

On January 13, the 1B-B centrifugal charging pump (CCP) casing was vented and drained for minor repairs. While the maintenance was in progress, the licensee determined that containment integrity at the CCP suction relief line containment penetration depended on a closed loop outside containment as a second barrier. When the CCP was opened without installing a blank flange at the suction line relief, containment integrity was potentially compromised.

The licensee removed the relief valve and installed a blank flange to restore containment integrity. The licensee tested the CCP suction line relief and found seat leakage to be zero in the reverse direction which would have prevented any leakage from containment during an accident. However, the relief valve was not the design containment barrier. This is unresolved item (URI) 50-390/98-01-03, Compromise of Containment Integrity pending review of a similar issue identified by the licensee on WBPER 961061.

M3.2 Incorrect Fitting on the 1A-A CCP Vent

The inspector found a quick disconnect fitting on the 1A-A CCP suction line vent instead of a threaded pipe cap as required by Design Change Notice (DCN) S-14783-1 for systems containing radioactive liquids or gases. This is URI 50-390/98-01-04, Incorrect Fitting on 1A-A CCP Vent pending review of extent of condition and applicable DCNs.

M4 Maintenance Staff Knowledge and Performance

M4.1 Plastic Sheet Left in Cable Spreading Room

a. <u>Inspection Scope (62707)</u>

The inspector found approximately 70 feet of plastic sheet material draped over cable trays in the cable spreading room.

b. <u>Observations and Findings</u>

The licensee identified the material as fire retardant plastic cloth used to protect cables being installed. The plastic cloth was used for cable installation during the Unit 1 Cycle 1 refueling outage and was not removed when the maintenance was completed.

When notified of the finding, the licensee took prompt action to remove the material, identified the material, and searched the plant for similar problems. No similar problems were found. The licensee updated its requirements for tagging material temporarily staged for use and reviewed the incident with management from all departments.

c. <u>Conclusions</u>

The inspector determined the licensee's corrective action was appropriate and timely.

M7 Quality Assurance in Maintenance Activities

M7.1 Maintenance Self-Assessment

a. <u>Inspection Scope (40500)</u>

The inspector reviewed the licensee's self-assessment program for maintenance. The review was conducted through discussions with Maintenance personnel and an examination of the results of a recently completed self-assessment.

b. <u>Observations and Findings</u>

The licensee had scheduled 10 maintenance/modification areas for self-assessments during Fiscal Year 1998 (October 1. 1997 -September 30, 1998). The first of these self-assessments involved configuration control and was completed in November 1997. The second of the series, involving material control, was completed in January 1998, but the report had not been issued at the time of this inspection.

The inspectors reviewed the completed report and the close-out reports for the two PERs that were generated during this self-assessment. One of the PERs was WBPER971412, which documented procedural confusion and perceived conflict, between SSP-6.02 and SSP-12.06, as to when second party and/or independent verification inspections were required; the other PER was WBPER971413, which documented weaknesses in the performance of configuration control verifications by maintenance personnel.

c. <u>Conclusions</u>

Based on the report and results reviewed, the inspectors concluded that the self-assessment process has provided valuable insight into potential weaknesses in the area of maintenance implementation.

M8 Miscellaneous Maintenance Issues (92902) (92700)

M8.1 (Closed) URI 50-390/97-09-03: Safety Injection Pump Mechanical Seal Screws Missing. This issue was discussed in IRs 50-390/97-09 and 50-390/97-10. The screws secured a cover plate on the safety injection (SI) pump mechanical seal and were required to be installed by vendor technical manual WBN-VTD-D245-0350. This failure constitutes a violation of minor significance and is being treated as a non-cited violation, consistent with Section IV of the <u>NRC Enforcement Policy</u>. This is NCV 50-390/98-01-06, Safety Injection Pump Mechanical Seal Screws Missing.

The licensee chose an updated mechanical seal to be installed during the 1B SI pump overhaul which had four screws where the old style seal only used two screws. The machinist assembling the pump installed only two screws under the direction of the vendor technical representative but failed to document this deviation and also failed to obtain site engineering concurrence. The licensee subsequently obtained written concurrence from the vendor that function was not impacted by the failure to install two of the four screws.

Initially, the licensee's corrective action was to replace the screws. When questioned by the inspector about long-term corrective action, the licensee demonstrated that PER 971247 documented maintenance self-assessment activities and had identified a range of WO compliance and procedure deficiencies prior to the inspector identifying the missing SI pump screws. Furthermore, PER 971247 documented 104 deficiencies which had been found and corrected as initial corrective action. Although a comprehensive corrective action plan was not completed at the time the missing screws were identified, the licensee had identified and initiated corrective action for the same work practice deficiencies which led to the incident.

The inspector verified that long-term corrective action was planned which included training for identified work document deficiencies, revision of management field observation program for maintenance and modifications and incorporation of administrative requirements into hands-on maintenance training process. Corrective action also included self-assessment of the effectiveness of the training of procedural requirements and management expectations. The inspector agreed that the corrective actions were appropriate.

M8.2 (<u>Closed</u>) IFI 50-391/95-01-01: Inadequate Qualification of QA Procedure Reviewers. This item was discussed in IR 50-390,391/97-06. This issue is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 General Observations (37551)

The inspectors observed engineering activities associated with emergent operations and maintenance issues and other activities such as the PORC and MRC meetings. In general, good support was noted with positive observations in the following areas:

- System Engineering support for the ice condenser
- System Engineering support for radiation monitors
- System Engineering support for the emergency gas treatment system
- Maintenance rule documentation of heater drain system problems

Engineering support for the main feed pump shaft inspections was good and was discussed in Section M1.3.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 General Observations (71750)

The inspectors routinely observed radiologically controlled areas (RCAs) to verify adequacy of access controls, locked areas, personnel monitoring, surveys, and postings. The inspectors also routinely reviewed chemistry results. In general, the inspectors noted adequate

radiological controls on work in progress. A minor spill did occur but the licensee took aggressive action to determine the extent of the spill and perform cleanup. The licensee provided good daily oversight of chemistry results. The licensee took aggressive action to correct balance of plant problems which caused short-term, out-of-specification conditions on condensate dissolved oxygen and SG sulfates and sodium. Actions included a down-power to plug condenser tubes which was a positive observation. Regulatory limits were met.

R8 Miscellaneous RP&C Issues 92904

- R8.1 (Closed) EEI 50-390/97-011-01: Failure to Provide Adequate Radiation Work Permit and Prejob Briefing. This item was closed as a result of material presented by the licensee at the Open Predecisional Enforcement Conference held January 13, 1998.
- R8.2 (Closed) EEI 50-390/97-011-02: Failure to Conduct Prejob Briefing Using the Latest Survey Data. This item was closed to a non-cited violation after evaluation of the material presented by the licensee at the Open Predecisional Enforcement Conference held January 13, 1998. NCV 50-390/98-01-05 Failure to Include Radiation Survey in Prejob brief.
- R8.3 <u>(Closed) EEI 50-390/97-011-03:</u> Failure to Follow Procedure Requirements of Maintenance Instruction (MI)-68 which cautioned workers that all debris was to be treated as highly radioactive until Radiological Controls group determined otherwise. This item was closed. A cited violation was issued (NOV ID No. 01014 Failure to Follow MI-68 Procedure) in Enforcement Action EA 97-580 dated January 21, 1998.
- S1 Conduct of Security and Safeguards Activities
- S1.1 <u>General Comments</u>

The inspectors routinely observed security activities for conformance to requirements which included protected area barriers, isolation zones, personnel access, and package inspections. Barriers and zones were well maintained and personnel performed acceptably.

- F4 Fire Protection Staff Knowledge and Performance
- F4.1 Fire Drill Observations (71750)

The inspector observed a fire drill on February 5. Good personnel response was noted and equipment was in good condition. The inspector asked one of the firemen to describe the operation of the clamp on a fire hose rack which prevented water from charging the hose until the last loop of hose was pulled from the rack. The fireman informed the inspector that if the control valve was opened, the pressure would cause the clamp to release, which was not true. This was a knowledge deficiency and was a negative observation.

F8 Miscellaneous Fire Protection Issues (92904)

F8.1 (Closed) LER 50-390/97-014-00, Appendix R Conditions: This LER identified two issues which did not meet the requirements of Title 10 of the Code of Federal Regulations, Part 50, Appendix R, and which were outside the design basis of the plant. These were: 1) a missing cover plate on the reactor coolant pump (RCP) oil collection system for one of the RCPs; and 2) inadequate separation provided for control cables to the control room air handling system.

DEGRADED REACTOR COOLANT PUMP OIL COLLECTION SYSTEM

On September 22, 1997, while performing routine refueling outage work activities, the licensee's personnel noted a cover missing from the No. 2 reactor coolant pump (RCP) oil collection system. This resulted in the oil collection system being in a degraded condition. The licensee's investigation determined that this cover was probably removed and not reinstalled following pre-fuel load activities in March 1995. The licensee's analysis concluded that the safety significance of this missing cover was minimal. In the event of a break or rupture of the RCP's lubrication system, any leaking oil not contained by the installed oil collection system would have drained into the basin beneath the RCP motor and not presented a fire hazard. However, in the unlikely event that the leaking oil struck some ignition source, the fire detection and water spray suppression system installed over the RCP motor would have provided fire indication to the main control room and should have extinguished the fire. The corrective action was the installation of a new cover on the upper oil cooler for the No. 2 RCP motor and the proposed revision to Plant Administrative Instruction (PAI)-2.03, Containment Access, by April 1, 1998, to require verification that the oil collection systems for the RCPs are in place prior to restart following an outage. The completion of the revision to this procedure is being tracked by the licensee as an open item of PER WBPER971145. The inspectors reviewed completed WO 97-011469-01 and verified that the missing cover plate had been installed.

The Watts Bar Operating License, Section 2.F, states, "TVA shall implement and maintain in effect all provisions of the approved fire protection program as described in the (Watts Bar) Fire Protection Report for the facility" The Watts Bar Fire Protection Report. Part II Section 3 and Part IX identifies TVA's commitment to implement 10 CFR 50, Appendix R, Sections III.G and III.O. The failure to maintain, in effect. a fully operable oil collection system as required by Appendix R, Section III.O, is a violation. This non-repetitive, licensee identified and corrected violation is being treated as a Non-Cited Violation (NCV), consistent with Section VII.B.1 of the NRC Enforcement Manual and is identified as Example 1 of NCV 50-390/98-01-07, Appendix R Conditions.

INADEQUATE CABLE SEPARATION FOR CONTROL ROOM HVAC EQUIPMENT

On October 16, 1997, with the unit in Mode 3 (hot standby) following a refueling outage, the licensee identified two control cables to the redundant main control room HVAC equipment that were routed through three fire areas in the Auxiliary Building without the required separation specified by 10 CFR 50 Appendix R, Section III.G. These misrouted cables were discovered during a re-evaluation of a calculation required for an unrelated design change. The licensee determined that the cause of the mis-analyzed cables was due to technical inaccuracies in the design input resulting from personnel error. The licensee's analysis concluded that this issue had minimal safety significance based on: 1) low fire hazards in the areas containing the cables; 2) industry experience which indicates that a fire involving the electrical cables. or electrical equipment in the area should be self-extinguishing once the initial energy is released; and 3) the automatic fire detection and fire suppression systems installed in the plant areas of concern which should have provided early detection and suppression in the event of a fire.

Following identification of this issue, compensatory actions consisting of the implementation of a fire watch for the affected plant areas were initiated and an alternative means of providing ventilation by the use of portable emergency ventilation fans was identified. However, the inspector noted that the licensee did not have an evaluation to substantiate that the use of portable fans would provide adequate cooling for the control room complex. To address the inspector's concern, the licensee revised PER WBPER970777 for this issue on January 9, 1998, to include calculations for the heat-up from control room equipment and the cooling needed to maintain the control room below the design basis of 104 degrees F. In addition, the evaluation referenced an April 1991 event at the Sequoyah Nuclear Plant involving the loss of cooling for the Sequoyah control room. During the Sequoyah event, the control room temperature did not exceed 95 degrees F. After approximately 12 hours, the licensee utilized portable fans to maintain the temperature in the control room to less that 104 degrees F. The licensee's calculation and evaluation concluded that there was sufficient time to establish compensatory cooling for the Watts Bar control room in the unlikely event that all permanent HVAC cooling equipment for this room was lost. This evaluation also concluded that the use of the compensatory cooling by portable fans was adequate until the permanent control room HVAC equipment could be returned to service. The inspectors reviewed the licensee's revised evaluation found it acceptable.

The control room HVAC equipment is required to maintain control room habitability conditions in the event of a fire outside of the control building complex. The failure to provide the fire protection features for redundant control cables to the control room HVAC equipment as required by Section 2.F of the Operating License and Part II Section 3 and Part IX of the Watts Bar Fire Protection Report, is a violation. However, this non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VII.B.1 of the NRC Enforcement Manual and is identified as Example 2 of NCV 50-390/98-01-07, Appendix R Conditions.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management on February 18, 1998. An interim exit was held January 7, 1998. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

- R. Beecken, Maintenance and Modifications Manager
- J. Cox, Radiological Control/Chemistry Manager
- P. Hughes, Radiological Control Manager
- D. Kehoe, Site Nuclear Assurance Manager
- S. Krupski, Site Scheduling Manager
- D. Kulisek, Operations Manager
- W. Lagergren, Plant Manager
- J. Maddox, Engineering Manager
- D. Nelson, Business and Work Performance Manager
- P. Pace, Licensing and Industry Affairs Manager R. Purcell, Site Vice President
- T. Stockdale, Operations Superintendent
- G. Vickery, Acting Chemistry Manager J. West, Assistant Plant Manager

NRC

- P. Van Doorn, Senior Resident Inspector
- D. Rich, Resident Inspector
- W. Miller, Reactor Inspector, RII

INSPECTION PROCEDURES USED

- IP 37551: Onsite Engineering
- IP 40500: Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
- IP 61726: Surveillance Observations
- Maintenance Program IP 62702:
- Maintenance Observation IP 62707:



- IP 71707:
- IP 71750:
- Plant Operations Plant Support Activities Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities Followup Plant Operations Followup Maintenance Followup Plant Support IP 92700:
- IP 92901:
- IP 92902:
- IP 92904:

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-390/98-01-01	NCV	Failure to Use FME Cover (Section 04.2)
50-390/98-01-02	NCV	Failure to Use Control Room Annunciator Lens Covers (Section 08.3)
50-390/98-01-03	URI	Compromise of Containment Integrity (Section M3.1)
50-390/98-01-04	URI	Incorrect Fitting on 1A-A CCP Vent (Section M3.2)
50-390/98-01-05	NCV	Failure to Include Radiation Survey in Prejob Brief (Section R8.2)
50-390/98-01-06	NCV	Safety Injection Pump Mechanical Seal Screws Missing (Section M8.1)
50-390/98-01-07	NCV	Appendix R Conditions (Section F8.1)
EA 97-580/01014	VIO	Failure to Follow MI-68 Procedure (Section R8.3)
<u>Closed</u>		
50-391/95-01-01	IFI	Inadequate Qualification of QA Procedure Reviewers (Section M8.2)
50-390/96-10-02	VIO	Loss of Configuration Control on AFW Low Pressure Steam Trap Valve (Section 08.1)
50-390/97-009-00	LËR	Main Control Room Heating, Ventilation and Air Conditioning (HVAC) Inoperable (Section 08.2)
50-390/97-09-03	URI	Safety Injection Pump Mechanical Seal Screws Missing (Section M8.1)

50-390/97-10-04 Use of Control Room Annunciator Lens Covers (Section IFI 08.3)50-390/97-011-01 EEI Failure to Provide Adequate Radiation Work Permit and Prejob Briefing (Section R8.1) Failure to Conduct Prejob Briefing Using the Latest 50-390/97-011-02 EEI Survey Data (Section R8.2) Failure to Follow Procedure Requirements of Maintenance Instruction MI-68 (Section R8.3) 50-390/97-011-03 EEI 50-390/97-014-00 LER Appendix R Conditions (Section F8.1) 50-390/97-015-00 LER Manual Reactor Trip Due to Feedwater Isolation. (Section 08.4) Failure to Use FME Cover (Section 04.2) 50-390/98-01-01 NCV Failure to Use Control Room Annunciator Lens Covers 50-390/98-01-02 NCV (Section 08.3) Failure to Include Radiation Survey in Prejob Brief 50-390/98-01-05 NCV (Section R8.2) Safety Injection Pump Mechanical Seal Screws Missing 50-390/98-01-06 NCV (Section M8.1) 50-390/98-01-07 Appendix R Conditions (Section F8.1) NCV

LIST OF ACRONYMS USED

ASME	American Society of Mechanical Engineers
	Contrifugal Charging Dump
	Change Notice
	Design Change Notice
	Diesel Congrator
	Escalated Enforcement Item
	Estanaleu Entorcement Item
FME	Foreign Material Exclusion
HVAC	Heat Ventilation and Air Conditioning
ITET	Inspector Follow-up Item
	local Area Network
	Liconsoo Event Pepert
	Modification and Addition Instruction
MED	Main Ecoduaton Dump
	Management Deview Committee
	Man Cited Vielation
	Non-Cilled Violation
NUE	Non-Destructive Examination
NKC	NUCLEAR REGULATORY COMMISSION

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PAI	Plant Administrative Instruction
PER	Problem Evaluation Report
PM	Preventive Maintenance
PORC	Plant Operations Review Committee
psig	pounds per square inch gauge
RCA	Radiologically Controlled Area
RCP	Reactor Coolant Pump
RCR	Repetitive Change Request
SG	Steam Generator
SI	Safety Injection
SOI	System Operating Instruction
SSP	Site Standard Practice
TACF	Temporary Alteration Control Form
TS	Technical Specifications
TVA	Tennessee Valley Authority
URI	Unresolved Item
VAR	Volt-Amps Reactive
VIO	Violation
WBN	Watts Bar Nuclear Plant
WO	Work Order

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