UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2
ATLANTA, GEORGIA 30323-0199

July 7, 1997

EA 97-177

Tennessee Valley Authority
ATTN: Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: NRC INTEGRATED INSPECTION REPORT NOS. 50-390/97-04, 50-391/97-04 AND NOTICE OF VIOLATION

Dear Mr. Kingsley:

This refers to the inspection conducted on April 27 through June 7, 1997, at the Watts Bar facility. The enclosed report presents the results of this inspection.

Based on the results of this inspection, the NRC determined that four violations of NRC requirements occurred. These violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. Violation A involved the failure of your operators to promptly respond to an annunciator for low air pressure on Diesel Generator 2A-A and previous corrective actions failed to prevent recurrence. Violation B occurred due to a failure to follow procedure requirements which resulted in the Auxiliary Building Gas Treatment System being inoperable. Violation C involved the failure to perform procedurally required radiation surveys. Violation D involved the failure to include radiation monitor heat trace components in the preventative maintenance program.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

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31

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure(s), and your response will be placed in the NRC Public Document Room (PDR).

Sincerely,

Mark S. Lesser, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos.: 50-390 and 50-391
License Nos: NPF-90 and
Construction Permit CPPR-92

Enclosures: Notice of Violation
Inspection Report

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NOTICE OF VIOLATION

Tennessee Valley Authority
Watts Bar Unit 1

Docket No. 50-390
License No. NPF-90
EA 97-177

During an NRC inspection conducted on April 27 through June 7, 1997, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

A. Technical Specification 5.7.1.1 requires that written procedures be established, implemented, and maintained for activities recommended in Appendix A of Regulatory Guide 1.33, Quality Assurance Program Requirements, Revision 2, February 1978. This includes procedures for responding to alarms.

Watts Bar Site Standard Practice SSP-12.01, Conduct of Operations, Revision 6, Section 2.6.B, requires for control board indications and alarms, that prompt actions be taken to address and correct abnormalities.

Contrary to the above, on May 2, 1997, operators failed to promptly take prompt action to address and correct an alarm for low air pressure on Diesel Generator 2A-A.

This is a Severity Level IV violation (Supplement I).

B. Technical Specification 5.7.1.1 requires that written procedures be established, implemented, and maintained for activities recommended in Appendix A of Regulatory Guide 1.33, Quality Assurance Program Requirements, Revision 2, February 1978. This includes procedures for Technical Specifications surveillance tests.

Surveillance Instruction 0-SI-30-8-B, Auxiliary Building Gas Treatment System (ABGTS) Train B 10-Hour Operation, Revision 1, Step 6.0.(14), requires operators to verify that heater outlet temperature for the Auxiliary Building Gas Treatment System has increased to confirm heater operation.

Technical Specifications Surveillance Requirement 3.7.12.1 requires that each train of Auxiliary Building Gas Treatment System be operated for greater or equal to 10 continuous hours with the heaters operating every 31 days.

Contrary to the above, on January 18, 1997, operators failed to adequately verify that heater outlet temperature for ABGTS had increased and therefore heater operation was not confirmed. This resulted in failure to implement Technical Specifications Surveillance Requirement 3.7.12.1. for Train B of the Auxiliary Building Gas Treatment System. The heaters for Train B of Auxiliary Building Gas Treatment System were, in fact, inoperable which was not discovered until the next test on February 14, 1997.

This is a Severity Level IV violation (Supplement I).

C. Technical Specification 5.7.1.1, requires, in part, that procedures shall be established, implemented, and maintained governing the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, Section 1.

Radiological Control Instruction RCI-101, Radiation, Contamination, and Airborne Surveys, Section 2.2 e. requires that, "Radiation Surveys will be performed at least semiannually in areas outside the RCA (e.g., shops, offices, storage areas, Rhea County Landfill, and ground surveys at the Site Restricted Area boundary fence)."

Contrary to the above, on May 16, 1997, the radiation surveys for the Rhea County Landfill were determined not to have been performed on at least a semiannual frequency. These surveys, at that time, had not been performed since the plant was licensed.

This is a Severity Level IV violation (Supplement IV).

D. Technical Specification 5.7.1.1, requires, in part, that procedures shall be established, implemented, and maintained governing the activities recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978.

Site Standard Practice SSP-9.53, Reviewing and Approving Field Work Required DCNs, requires that heat trace for radiation monitor 1-RE-90-129 was required by calculations (EPM-APA-111694) and design drawing (47W600-465Q) associated with Design Change Notice 33688-B. This procedure also requires, as part of the actions required for design change notice closure, that preventative maintenance requirements be identified for scheduling and tracking.

Contrary to the above, on May 16, 1997, effluent radiation monitor (1-RE-90-129) heat trace circuits were not part of the preventative maintenance program.

This is a Severity Level IV violation (Supplement IV).

Pursuant to the provisions of 10 CFR 2.201, Tennessee Valley Authority is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Regional Administrator, Region II, and a copy to the

NRC Resident Inspector at the Watts Bar facility within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you <u>must</u> specifically identify the portions of your response that you seek to have withheld and provide in detail the basis for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Dated at Atlanta, Georgia
this 7th day of July 1997

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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|---|---|
| Docket Nos.: | 50-390, 50-391 |
| License Nos.: | NFP-90 and Construction Permit CPPR-92 |
| Report Nos: | 50-390/97-04, 50-391/97-04 |
| Licensee: | Tennessee Valley Authority |
| Facility: | Watts Bar, Units 1 and 2 |
| Location: | 1260 Nuclear Plant Road<br>Spring City TN 37381 |
| Dates: | April 27 through June 7, 1997 |
| Inspectors: | P. Van Doorn, Senior Resident Inspector<br>E. Lea, Resident Inspector<br>D. Rich, Resident Inspector<br>N. Economos, Reactor Inspector (Section E2.3)<br>W. Miller, Fire Protection Specialist, RII (Sections F2, F3, F5, F6, and F7)<br>E. Testa, Radiation Specialist, RII (Sections R1.2 R1.5, R2, R7, R8)<br>H. Whitener, Maintenance Specialist, RII (Section M8.1) |
| Approved by: | M. Lesser, Chief<br>Reactor Projects Branch 6<br>Division of Reactor Projects |

Enclosure 2

# EXECUTIVE SUMMARY

Watts Bar Nuclear Power Plant, Units 1 and 2
NRC Inspection Report 50-390/97-04, 50-391/97-04

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 by a regional radiation specialist, reactor inspector, a regional maintenance specialist, and a fire protection specialist.

## Operations

- Good control room performance was noted during the inspection period. Operators were typically attentive to control room alarms and responded as required by procedures, with one exception noted. The one exception involved the failure of the unit operators to promptly respond to an annunciator for low air pressure on diesel generator 2A-A. The failure to promptly respond to the annunciator is identified as a violation. Walkdowns of several systems found proper alignment and good material condition. (Sections O1.1 and O1.5).

- Control room briefings were well controlled and all personnel involved with performing the job(s) attended the briefings (Section O1.2).

- The shift technical adviser demonstrated a good questioning attitude that resulted in the identification of a procedure problem and a simulator modeling problem concerning steam generator wide range level indication (Section O1.3).

- The licensee continued to identify configuration issues. There was one instance in which the 1A-A diesel generator exhaust fan switch was found in the incorrect position (Section O2.2).

- Self-assessment processes continued to be thorough and self-critical (Section O7.1).

- The licensee failed to follow procedure steps for testing of the Auxiliary Building Gas Treatment System. This is identified as a violation (Section O8.1) .

## Maintenance

- Eleven maintenance/surveillance activities were observed. Personnel performing each activity were knowledgeable of the activity being performed and followed procedures (Section M1.1).

- One maintenance procedure failed to verify that the manual handswitches for Phase A containment isolation, containment vent isolation and containment spray functioned properly. (Section M1.2)

- Good maintenance support was provided to help resolve issues once they were identified (Section M1.2).

- The licensee has implemented a self-assessment program. A sample review indicates the process is valuable and has identified findings for improvement. (Section M7.1).

- Two non-cited violations were noted for failure to implement surveillance tests (Sections M8.4 and M8.5).

Engineering

- Detailed engineering reviews of GL 96-01 resulted in the identification of an insufficient surveillance procedures (Section E1.2).

- Engineering provided excellent support for emergent issues during the inspection period. One example is the detailed engineering procedure written to verify that the manual handswitches for Phase A containment isolation, containment vent isolation, and containment spray functioned properly (Section E1.2).

- Engineering continued to provide excellent support for diesel generator troubleshooting (Section E2.1).

- Good engineering oversight was provided for the ice condenser system (Sections E2.2 and E2.3).

- Engineering failure to properly close a design change notice resulted in preventive maintenance not being performed on charcoal radiation monitor heat trace equipment. This is identified as a violation (Section R2.2).

Plant Support

- Good radiological controls and oversight were noted during fuel rack replacement activities (Section R1.1).

- A program for shipping radioactive materials required by the Nuclear Regulatory Commission and the Department of Transportation regulations was effectively implemented (Section R1.2).

- Radiological facility conditions and housekeeping in radioactive waste storage areas were observed to be good (Section R1.3).

- Health physics and as low as reasonably achievable (ALARA) preplanning for the first refueling outage in September 1997 was progressing satisfactorily. Radiation worker internal and external doses were being maintained well below regulatory limits and the licensee was continuing to maintain exposures as low as reasonably achievable (Section R1.3).

- Lack of aggressive management oversight in the area of plant support resulted in a failure to perform procedurally required surveys. This is a violation for failure to conduct a required survey (Section R1.3).

- The licensee's water chemistry control program for monitoring primary and secondary water quality has been implemented, for those parameters that were reviewed, in accordance with Technical Specifications requirements (Section R1.4).

- Poor health physics communication resulted in poor work control while performing work on 1B-B charging pump (Section R1.5).

- The total dose from the 40 CFR 190 calculation for the radiological impact from the first year of facility operation was less than one percent of the regulatory limit. The exposures calculated from the 1996 Annual Radioactive Effluent Release Report resultant data were consistent with results from the preoperational monitoring program (Section R2.1).

- The licensee had maintained an overall high level of operability for radiation monitors in 1996 and to date in 1997. The licensee has also effectively tracked monitor performance (Section R2.2).

- Radiation Protection and Chemistry self-assessment program effectively conducted formal audits as required by Technical Specifications and completed corrective actions in a timely manner (R7.1).

- The licensee demonstrated good performance during an Emergency Preparedness drill performed during the inspection period (Section P1.1).

- The licensee has placed the appropriate emphasis on maintenance and operability of the fire protection equipment and components (Section F2.1).

- Good surveillance and test procedures were provided for fire protection system and features. The implementation of the procedures was effective and met NRC requirements (Sections F2.2 and F3.1).

- Fire brigade organization and training met the requirements of the site procedures (Section F5.1).

- Good fire brigade and incident commander performance was noted during the fire brigade drill (Section F5.1).

- Strong management oversight was provided over facility's fire protection program. This strong management oversight resulted in good performance and effective implementation of an effective fire protection program (Section F6.1).

- Fire protection performed comprehensive audits and self-assessments of the fire protection program. Prompt corrective actions were taken to resolve identified issues (Section F7.1).

## Report Details

### Summary of Plant Status

Unit 1 began this inspection period operating in Mode 1 at 100 percent of rated power. Power was reduced on May 5, 1997, to 98 percent for maintenance on the 1B main feed pump (MFP) controller. On May 16, 1997, power was reduced to 95 percent due to loss of control of condensate pressure and the trip of the 1A condensate booster pump. On May 19, 1997, power was reduced to 80 percent due to a steam leak on the A1 feedwater heater which occurred when a relief valve lifted due to spring failure. The unit was returned to 100 percent power on May 20, 1997, where it remained for the rest of the period.

Unit 2 remained in a construction deferred status.

## I. Operations

### 01 Conduct of Operations

#### 01.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent inspections and reviews of ongoing plant operations activities, and performed engineering safety system (ESF) walkdowns. This included routine control room (CR) observations, review of tagouts, observation of assistant unit operator (AUO) rounds and reviews of configuration control issues. In general, the conduct of operations was good. Improvements were noted in the quality of the CR briefings, and operators demonstrated a good questioning attitude in response to several plant issues/transients. The inspectors did notice that the licensee continues to identify configuration issues.

The inspector also conducted a walkdown of the Technical Specifications (TS) radiation monitors, both trains of the 6.9 kilovolt reactor shutdown power system, both trains of the 480 volt shutdown power system, and diesel generator (DG) systems. Proper alignment and good material condition were noted.

#### 01.2 Control Room Briefings (71707)

The inspectors observed several CR briefings conducted by Operations and Engineering personnel. The inspectors specifically observed these meetings to determine if minor weaknesses, which were identified during the previous inspection period, still existed. After observing several briefings, the inspectors concluded that the weaknesses identified earlier no longer existed. The inspectors noticed that all individuals involved in performing the scheduled tasks attended the briefing. Each briefing was stopped to address any distraction that occurred. The inspectors concluded that the briefings observed were well controlled and conducted in a very serious and professional manner.

01.3 Steam Generator (SG) Wide Range Level Indications (71707, 92901)

a. Inspection Scope

The inspector interviewed licensee personnel and reviewed documentation concerning steam generator (SG) wide range level instrumentation discrepancies identified by the shift technical advisor (STA).

b. Observations and Findings

Documentation indicated that, on May 28, 1997, the STA performed a review of System Operating Instruction (SOI)-2&3.01, Condensate and Feedwater System, Revision 27, Appendix B, which contained a chart representing SG program level versus nuclear power. During the review the STA noticed that the chart indicated that at 100 percent power the wide range level should indicate 86 percent SG level. The STA compared the level indicated on the chart to the actual CR room wide range level indication. During the comparison the STA noted that CR instrumentation indicated that actual wide range level was approximately 62 percent. The STA questioned the differences and notified shift personnel of the discrepancies.

While discussing the discrepancies the crew realized that the information contained on the chart in Appendix B matched the simulator wide range level indication. The shift manager (SM) contacted simulator personnel and verified that wide range level indication in the simulator indicated 86 percent SG level at 100 percent power. The SM contacted Engineering to help resolve the issue and address operability concerns. Operations' management initiated a problem evaluation report (PER) to document the discrepancies. The SM also contacted Operations personnel at Sequoyah Nuclear Plant (SQN) to compare SG wide range level indicated in their procedure versus actual CR SG wide range level indications at 100 percent power.

During the investigation the licensee determined that the wide range SG level indicated in the CR was correct. The licensee also determined that the SG wide range level indications identified on the chart were for cold conditions and should not have been identified on the chart. The inspectors reviewed documentation and interviewed licensee personnel concerning their findings. Based on the reviews and interviews conducted, the inspectors determined that the licensee's evaluation was accurate and that no operability concerns existed. The inspectors also agreed that the licensee had identified appropriate corrective actions to resolve the discrepancies identified by the STA. The corrective actions included revising procedure SOI-2&3.01 and correcting simulator modeling concerns.

c. Conclusions

The inspectors concluded that the STA demonstrated a good questioning attitude which resulted in identifying a procedure concern and a simulator modeling problem. The inspectors also concluded that, once the problem was identified, the licensee was aggressive in addressing operability concerns and implementing adequate corrective actions.

01.4 ERCW Bypass Valve Interference (71707)

While conducting routine plant tours, the inspector noticed that ERCW 0-BYP-67-6872 inlet bypass valve could not be opened due to insulation interference. The inspector notified the licensee of the interference problem. Operations personnel independently verified that the valve could not be opened due to the insulation interference. Operations immediately issued a work order (WO) to correct the problem. The inspector verified that system operability was not affected by the interference caused by the insulation. However, the inspector concluded that the operators failed to notice that the valve could not be opened while performing daily rounds and valve lineups.

01.5 Failure to Respond to Diesel Generator Alarm (71707, 92901)

On May 2, 1997, at 10:10 p.m., the DG 2A-A low air pressure alarm actuated in the control room. The Operations crew failed to respond to this alarm. However, the same crew recognized that the alarm should not be lit just prior to shift turnover the next morning. The air pressure was restored to above TS limits and the TS Limiting Condition for Operation (LCO) was entered and exited appropriately. The licensee uses a green label on alarm windows to identify if maintenance activities are ongoing which could affect the alarm. Maintenance had been completed on the air system but the tag had not been removed. A slow leak had led to air pressure being below the TS limit. The presence of the maintenance tag contributed to the failure of operators to respond to the alarm. In addition, the licensee identified the failure to communicate special requirements to an oncoming shift. The licensee had been aware of the slow air leak and an AUO had been tasked to check air pressure regularly. This was not communicated to oncoming shift management, however, an oncoming AUO was informed. The new AUO checked the wrong gauges on his shift. A previous situation occurred when operators failed to respond to a hydrogen analyzer alarm due, in part, to a maintenance tag being on the window. A non-cited violation (NCV) was issued for this event (see inspection report (IR) 50-390/96-13, Section 02.1). Licensee procedure Site Standard Practice (SSP)-12.01, Conduct of Operations, Revision 6, Section 2.6.B. states, "Control board indications and alarms should be monitored frequently, and prompt actions taken to address and correct abnormalities." Due to a previous similar problem, this licensee-identified issue is being identified as violation (VIO) 50-390/97-04-01, Failure to Respond to Control Room Alarm.

## 02 Operational Status of Facilities and Equipment

### 02.1 Configuration Control Problems

a. Inspection Scope (71707)

The inspector reviewed documentation associated with components that the licensee found mispositioned during the inspection period.

During the inspection period the licensee identified three status control issues. The inspectors verified that a PER was initiated for each status control issue identified. The inspector reviewed each PER and verified that adequate corrective actions had been identified. The following PERs were reviewed:

- WBPER970511 was written when the licensee determined that the auto/manual handswitch for reactor coolant pump start bus B on 0ECB-2 was found in manual instead of auto;
- WPBPER970544 was issued when the licensee determined that the main control room handswitches for high pressure fire protection (HPFP) fire pumps were not aligned as required by SOI-26.01, Section 5.1, Place HPFP System in Standby;
- WBPER970498 was written after the DG exhaust fan switch was found mispositioned during AUO daily rounds.

The inspector determined that once the configuration control issues were identified, the licensee typically took appropriate corrective actions and returned the component(s) to the appropriate position. However, the licensee exhibited weak communications in addressing the DG exhaust fan switch that was found mispositioned (see Section 02.2).

### 02.2 DG Exhaust Fan Switch Mispositioned (71707) (37551)

a. Inspection Scope

The inspector reviewed documentation and interviewed licensee personnel concerning the DG exhaust fan switch that was found in the Pull-to-Stop position instead of P-Auto.

b. Observations and Findings

While performing a tour of the DG building on May 20, 1997, the inspector noticed that the 1A-A DG room temperature was warmer than the other DG rooms and that the exhaust fan in that room was not running. The inspector questioned the CR operator concerning the warm temperature. The unit supervisor initiated an investigation to address the NRC concerns. During the investigation the unit supervisor was informed by an AUO that the 2A-A fan handswitch had been found in the Pull-to-Stop, and that the shift technical advisor (STA) had been notified of the switch's position. The AUO also informed the unit

supervisor that the STA gave instructions to place the 2A-A fan handswitch in the Pull-to-Standby position. No other CR crew members had been informed by the STA that a switch had been found in the incorrect position. The unit supervisor immediately initiated WBPER970498 to address the issue of the mispositioned 2A-A fan handswitch. During the unit supervisor's initial investigation, it was also noted that the 1A-A fan breaker was tagged under hold order 1-97-30-491. The licensee later determined that the hold order should have required the 2A-A handswitch to be placed in the P-Auto position.

The inspector questioned the licensee concerning the operability of the 2A-A DG; specifically, if an exhaust fan would have started, as designed, on an automatic or manual start of the DG. The inspector and the licensee confirmed, following a review of applicable drawings, that the fans would not have started on a DG start. However, it was determined that the fan would have started on high room temperature even if the 2A-A exhaust fan handswitch was in Pull-to-Stop. The inspector reviewed the engineering evaluation and supporting documentation which addressed DG operability concerns. Following the review, the inspector concluded and agreed with the licensee that the fan would have started prior to the room temperatures exceeding any temperatures which would have adversely affected any safety-related equipment.

The inspector reviewed documentation associated with the PER and interviewed licensee personnel to determine if other concerns or weaknesses that were identified as a result of the mispositioned switch were addressed, specifically, why the STA failed to inform other crew members of the mispositioned switch; why no log entry was made indicating that a component was found in the incorrect position; and the fact that the clearance, which removed the 1A-A fan from service, failed to specify the correct switch position for exhaust fan 2A-A (P-Auto). Upon completion of the review of associated documentation and interviews with licensee personnel, the inspector determined that all concerns were addressed.

c. Conclusions

The inspector concluded that the evaluation provided by the licensee adequately addressed DG operability concerns. The inspector concluded that some performance problems occurred: 1) the STA's failure to inform other crew members of the mispositioned switch 2) failure to document configuration issues in the operator logs and 3) the clearance failed to adequately specify configuration of all components.

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;

- review of Nuclear Assurance assessment findings;
- observation of three Plant Operations Review Committee meetings.

Reviews continued to be thorough and a questioning attitude was exhibited during the activities observed.

08 Miscellaneous Operations Issues (92700, 92901)

08.1 (Closed) Licensee Event Report (LER) 50-390/97-004: Auxiliary Building Gas Treatment System (ABGTS) Inoperable

(Closed) Unresolved Item (URI) 50-390/97-02-03: Review of ABGTS Inoperability for LER 50-390/97-004. This issue was previously described in IR 50-390/97-02, Section 08.2. The licensee submitted a supplemental response to the LER on June 9, 1997. The licensee had conducted a surveillance test of the ABGTS on January 18, 1997, and failed to recognize that filter heaters were not operable. These heaters are required in accordance with the licensee's design basis and TS Surveillance Requirement (SR) 3.7.12.1. These heaters are provided to assure that the relative humidity at the charcoal absorbers does not exceed 70 percent. This assures maximum efficiency for iodine removal. The heater inoperability was not discovered until a test was conducted on February 14, 1997. At this time the licensee found a loose connection for a heater overload circuit. The licensee identified that the overload circuit had tripped during a previous test on December 21, 1996. In IR 50-390/97-02, the inspector questioned whether licensee actions for the December event were appropriate and also questioned the technical significance of the inoperable heaters. The licensee conducted additional reviews and performed calculations to determine significance.

Regarding the previous overload failure, the licensee's actions appear to have been appropriate. Licensee procedure General Operating Instruction (GOI)-7, Generic Equipment Operating Guidelines, Revision 13, Step 5.6(1).l., allows resetting of protection devices and one attempt to restart before initiating repairs. This appears to be appropriate. During the December test, a deficiency notice (DN) was written. This deficiency notice was dispositioned by resetting the overload and rerunning the test which was satisfactory. The inspector reviewed licensee procedures and test documentation for the December test. Licensee actions were considered acceptable for this occurrence.

The licensee reviewed actual humidity data for the period of November 27, 1996, through February 14, 1997. Three days of actual humidity greater than 70 percent were identified. The other train of ABGTS was available during these days. The licensee also evaluated actual charcoal efficiency based on test data for the period. The inspector reviewed licensee documentation and licensee Calculation Nos. WBNOSG4-243 and WBNAPS3-086 associated with this evaluation. Based on this review, the inspector determined that the ABGTS would have performed its function. Nevertheless, this issue is being identified as

a violation due to the poor implementation of a TS required test. Procedure O-SI-30-8-B, Auxiliary Building Gas Treatment System Train B 10-Hour Operation, Revision 1, Step 6.0.(14), states, "Verify temperatures in Steps (11) and (12) are greater than the temperature recorded in Step (3)." This step verifies a temperature increase to assure heaters are operating. Operators signed off this step based upon a .1 degree F temperature rise utilizing a gauge with a scale of 300 degrees F which was insufficient to verify a temperature rise. This led to failure to implement TS SR 3.7.12.1 which requires that each train of ABGTS be operated for greater or equal to 10 continuous hours with the heaters operating every 31 days. This is VIO 50-390/97-04-02, Failure to Follow Procedure for Testing of Auxiliary Building Gas Treatment System. The above-listed items are closed. Corrective actions will be reviewed during followup inspection of the VIO.

08.2 (Closed) LER 50-390/97-006: Reactor/Turbine Trip Due to Low-Low Steam Generator Level. This LER was submitted on April 4, 1997. This LER identified an automatic reactor trip from 100 percent power that occurred due to low-low level in steam generator No. 4. Three conditions led to the low-low level in the SG: 1) the main feed pump (MFP) B shaft fractured and broke in half; 2) the standby MFP was out of service for recirculation line repairs; and 3) flow was partially restricted to SG No. 4 due to foreign material obstruction at the feedwater inlet. The licensee evaluated each condition which contributed to the reactor trip.

The licensee determined that the flow restrictions, at the feedwater inlet nozzle, was caused by pieces of flexitallic gasket material that separated from a flange connection in the feed water line and became lodged in front of the feedwater inlet nozzle of SG No. 4. NCV 50-390/97-01-03 was documented in IR 50-390/97-01 (Section M1.2) as a result of the licensee findings. The inspectors reviewed the LER and determined that the licensee had identified the root causes and implemented appropriate corrective actions to reduce the possibility of future recurrence. The inspectors verified that the corrective actions had been completed.

## II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (62707) (61726)

Using Inspection procedure 62707 and 61726, the inspector observed all or portions of the following WOs and surveillances and reviewed associated documentation. The following activities were observed:

- WO 96-011874-003, 18 Month Periodic Testing of Molded Case Circuit Breakers

- WO 97-000617-000, MI-57.002, 480 Volt Circuit Breaker Routine Maintenance, Inspection and Testing, Revision 23
- WO 97-007350-000, Perform Missed TS Surveillance On Containment Phase A
- WO 97-007370-000, DG 2A-A Troubleshooting
- WO 96-012246-000, Auxiliary Control Air Filter B Replacement
- WO 97-007446-000, Continued DG 1B-B Troubleshooting
- WO 97-005746-000, DG 2B-B Load Test
- WO 97-002629-000, DG 2A-A Air Dryer Flow Control Valve Maintenance
- 0-TRI-52-101, 184 Day Channel Test of Kinemetrics, Revision 3
- 1-SI-92-44, Revision 2, 18 Channel Cal of System N-44, Revision 2
- 0-SI-82-11-B, Monthly DG Start And Load Test, DG 1B-B

b. Observations and Findings

The inspectors observed the activities identified above and concluded that they were properly performed by qualified personnel and that the work instructions were followed. The work instructions provided with each of the activities generally provided sufficient detail and guidance for the intended work activity. The inspectors noted that Maintenance personnel provided excellent support to issues that occurred during the inspection period; specifically, in support provided to resolve missed TS surveillance issues and supporting ongoing DG troubleshooting activities. The inspector also reviewed Maintenance's self-assessment process and issues that have been identified as a result of the self-assessment process. The inspector concluded that the Maintenance self-assessment program has been effective in identifying issues and it appears that adequate corrective actions for problems identified are being implemented or planned for implementation.

c. Conclusions

The inspector concluded that the licensee provided excellent support to issues which occurred during the inspection period. The inspector also concluded that Maintenance had implemented a self-assessment program to identify concerns.

M7 Quality Assurance in Maintenance Activities

M7.1 Maintenance Self-Assessment Activities (40500)

The inspector reviewed the Maintenance self-assessment program conducted by Maintenance staff personnel. This included discussions with

Maintenance personnel, review of the assessment schedule, and review of two recently completed assessments. These included SA-MTN-97-005, Environmental Qualification, and SA-MTN-97-004, Fix It Now Team Minor Maintenance. Each department has implemented assessments utilizing department personnel. This was implemented to improve overall quality and quality attitude within departments. Twenty assessments were planned in the Maintenance department and nine have been completed. The overall process appears valuable and some good findings have resulted. The two assessments reviewed appeared thorough.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) URI 50-390/96-14-02, Further Review of the Licensee's Justifications for Performing 18-Month Surveillances On-Line Is Warranted: Performance of 18-month surveillance on-line became a concern when the inspectors noted several problems associated with these tests. For instance, in one case the plant was in a LCO for 22 hours for an 18-month reactor protection circuit test due to procedural problems. Since 18-month surveillances are frequently scheduled so that the test may be done during a refueling outage, the inspectors questioned if the licensee was meeting the intent of the TS when taking a safety system or risk significant system out of service on-line. The licensee's data base showed that 122 surveillances were performed or scheduled to be performed on-line. However, many of these were low risk situations involving radiation monitors or calibrations of backup control panel components.

Review of the TS Bases for TS 3.0.2 delineated the following requirement:

> Completion times of required actions are applicable when a system or component is removed from service intentionally. The reasons for intentionally relying on TS Actions include, but are not limited to, performance of surveillance, preventive maintenance, corrective maintenance, or investigation of operational problems. Entering TS Actions for these reasons must be done in a manner that does not compromise safety. Intentional entry into TS Actions should not be made for operational convenience. Alternatives that would not result in redundant equipment being inoperable should be used instead. Doing so limits the time both subsystems/trains of a safety function are inoperable and limits the time other conditions exist which results in LCO 3.0.3 being entered.

This specification clearly stated that an LCO Action statement may be entered for the purpose of performing surveillance, preventive maintenance, or corrective maintenance, but must be done so consistent with plant safety. Also, it stated that an LCO cannot be entered for operational convenience.

It was clear that an inservice pump or valve quarterly surveillance test required by regulations would require entering an LCO Action statement to prevent bringing the plant to shutdown repeatedly. Eighteen month surveillance testing was not as clear. Historically, 18-month tests, consistent with 18-month refueling outages, have been considered outage tests. However, the practice of taking a system out of service to perform surveillance testing on line at 18-month intervals has been implemented by some licensees. The intent was to reduce down time by performing the surveillance on line.

Entering an LCO to perform on-line maintenance or surveillance tests was allowable by the TS, and system unavailability and reliability must be balanced according to the maintenance rule. The inspector reviewed the licensee's evaluation of the risk associated with removal of a system from service.

The licensee developed a 12-week rolling work schedule. Functional equipment groups (FEG) were developed and analyzed for the effect on core damage frequency (CDF) when a FEG was removed from service. Groups were analyzed individually for equipment within the FEG boundary, and combinations of groups have been analyzed for risk using the RISKMAN computer program. When emergent work interfered with the preanalysis, the FEG was moved to the next available window or a special analysis could be performed.

The licensee stated that the risks of performing these surveillances on-line were evaluated for increased risk based on calculations of CDF using the RISKMAN program and determined to be acceptable. The removal of systems from service had been categorized as low, medium, or high risk. No high risk maintenance or surveillance had been performed at Watts Bar Nuclear Plant (WBN) to date. Any activity other than pre-evaluated low risk equipment configurations required additional review and plant manager written approval in accordance with SSP-7.01, Work Control, Revision 15. SSP-7.01 delineated the responsibilities of the organization in the planning and scheduling process and tied the work control process to the probabilistic risk assessment of plant systems. This document contained the WBN Probabilistic-Based Maintenance Guideline which was a table listing 31 risk-significant systems and specifying in detail what equipment must be in service and operable to remove one of these systems from service. The document also contains Form D, which was an evaluation of the preparations for the job, any contingency plans, and a risk assessment. This form must be approved and signed by the plant manager or designee prior to entering into any maintenance or surveillance activity which had not been pre-evaluated and determined to be low risk. Completed Form Ds were reviewed for the last six months using the Work Week Manager's files. No problem was identified in the documentation.

The inspectors reviewed the controls used by the system engineers to assure that system unavailability and reliability hours were maintained. Also, the inspectors discussed the risk assessment calculations of CDF performed, using the RISKMAN computer code, to develop the risk

assessments for removing equipment from service. No problems were identified in this review. However, a technical review of the quality of the risk calculations was not performed in this inspection. Review of the risk calculational methods and techniques will be performed by specialists during the Maintenance Rule Baseline inspection.

The inspectors also reviewed a licensee assessment (SA-MTN-97-006) on plant surveillances and on-line surveillance activities. The audit findings indicated that, while there had been some procedural, human performance, and documentation process problems, the risk assessment tie to the plant scheduling and planning process was sound. No program changes were recommended.

The inspectors concluded that the licensee was operating as required by the TS. Quantitative core damage frequency risk assessment calculations were performed and train separation was controlled through the work scheduling process.

M8.2 (Closed) LER 50-390/96-024: Maintenance Activity Rendered Train B of the Auxiliary Feedwater System (AFW) Inoperable. The licensee submitted this LER on December 24, 1996. An NOV was previously described in IR 50-390/96-13. This LER refers to the licensee's maintenance activities which rendered the B-train of the AFW system in a degraded condition. Specifically, inadequate documentation in the work document resulted in improper configuration of the air supplies to level control valve (LCV)-3-148A. The valve would not open because the air supply to the operator of the LCV was terminated incorrectly to the exhaust port of the solenoid. The inspectors reviewed the LER and determined that the licensee had identified the root causes and appropriate corrective actions to reduce the possibility of future recurrence. The inspectors verified the completion of the corrective actions. This LER is closed.

M8.3 (Closed) LER 50-390/97-002: Reactor/Turbine Trip Due to Loss of Two Main Feedwater Pumps. The licensee submitted this LER on February 20, 1997. This issue involved the failure of the turbine-driven MFP B condenser drain tank level switch and inadvertent shutdown of the MFP condenser drain tank pump B; specifically, the level switch failed to provide CR annunciation. The annunciation should have alerted the operators of a need to open the condensate drain tank bypass valve to the condenser providing bypass flow and also allowed time to place the condenser drain tank pump B back into service before the MFP trip setpoints were reached. The inspector reviewed the licensee's analysis of the event and the corrective actions. The inspector found the analysis to be thorough and the corrective actions were adequate. This LER is closed.

M8.4 (Closed) LER 50-390/97-003: Performance of a Surveillance Instruction Was Not Current Following the Return to the Applicable Mode. This LER was submitted on February 27, 1997. The issue involved the failure of the licensee to perform surveillance instruction 1-SI-0-21, Excore Quadrant Power Tilt Ratio (QPTR), as required by TS surveillance requirement (SR) 3.2.4.1. The SI was required to be performed once

every seven days or during power ascension in accordance with General Operating Instruction (GO)-4, Normal Power Operation. GO-4 required that the SI be performed prior to exceeding 50 percent reactor thermal power or the performance may be waived if the SI had been successfully completed within seven days. However, the routine performance of 1-SI-0-21, which was scheduled for January 29, 1997, was cancelled by Reactor Engineering using Appendix B of SSP-8.02, Surveillance Program. The SI was cancelled due to existing plant conditions which did not support the implementation of the SI. Reactor Engineering did not reschedule a conditional SI. Reactor Engineering failed to reschedule the SI based on an assumption that it would be performed prior to reaching 50 percent power in accordance with step 17c of GO-4. However, the step was waived by Operations on February 1, 1997, after verifying that the SI was within frequency from a conditional performance on January 25, 1997. During a review of GO-4 on February 1, 1997, the SI program manager was unable to locate the finalized package for 1-SI-0-21. Subsequent investigations by the licensee revealed that the SI had not been completed in its required frequency. The SI was successfully performed on February 5, 1997. The failure to perform 1-SI-0-21 within the seven day frequency is a violation of TS 3.2.4. The inspector reviewed the licensee's assessment of safety consequences, and corrective actions implemented as a result of the missed surveillance. The inspector determined that the assessment performed and the corrective actions implemented by the licensee were adequate. This licensee-identified and corrected violation is being treated as a non-cited violation consistent with Section VII.B.1 of the NRC Enforcement Policy. This is NCV 50-390/97-04-03, Failure to Perform Excore Quadrant Power Tilt Ratio (QPTR) as required by TS SR 3.2.4.1.

M8.5 <u>Closed LER 50-390/97-007, Noncompliance with Technical Specification Surveillance Requirements 3.3.1.15 and 3.3.2.10:</u> The licensee submitted this LER on April 4, 1997. This issue involved the failure of the licensee to conduct proper post-maintenance testing following the replacement of 1-PT-68-340. The inspector reviewed documentation associated with the licensee's failure to perform the response time testing following the replacement of 1-PT-68-340. The failure to perform the response time testing was identified during a review of WO 97-001742-00. Once the problem was identified the SM was notified of the problem. The SM immediately entered the appropriate LCOs and authorized the performance of 1-SI-99-223, Response Time Test of Reactor Protection and Engineering Safety Feature Actuation Systems Transmitters (ID-100 Method) for Cycle A, Revision 1, to conduct the required response time testing associated with the replacement of 1-PT-68-340. The SI was successfully completed and the LCOs exited.

The inspectors reviewed the LER and associated documentation and determined that the licensee had identified the root causes and appropriate corrective actions to reduce the possibility of future recurrence. The inspector verified that all corrective actions were completed. The failure to perform the surveillance as required by TS is a violation of NRC requirements. This licensee-identified and corrected violation is being treated as a non-cited violation consistent with

Section VII.B.1 of the NRC Enforcement Policy. This is NCV 50-390/97-04-04, Failure to Perform Response Time testing Requirement as Required by TS 3.3.1.15 and 3.3.2.10.

## III. Engineering

### E1 Conduct of Engineering

#### E1.1 General Comments (37551)

The inspectors observed Engineering support activities for emergent issues and long-term problems. Efforts to identify and correct instances of erratic DG operation (Section E2.1) continued to be strong. Good support was noted for resolving the following emergent issues: SG wide range level requirements; Diesel 7-Day Fuel Oil Storage Tank Level requirements; DG exhaust fan switch position; and a missed TS surveillance concern. One VIO was identified for failure to properly close out a DCN (Section R2.2)

#### E1.2 Generic Letter Review

a. Inspection Scope (37551, 92903)

The inspectors observed the licensee conduct testing that was required to correct deficiencies which the licensee identified during a follow-up of Generic Letter (GL) 96-01, Testing of Safety-Related Logic Circuits. The inspectors also interviewed licensee personnel and reviewed both current and previous test data to determine if the deficiencies identified by the licensee were adequately addressed.

b. Observations and Findings

Documentation indicated that on April 28, 1997, Engineering personnel identified components that had not been tested as required by TS. Engineering determined that the trip actuating device operational test, which the licensee conducted to satisfy the requirements identified in SR 3.3.2.8 and SR 3.3.6.6, was incomplete. The surveillance test failed to verify that the manual handswitches for Phase A containment isolation, containment vent isolation, and containment spray functioned properly. Specifically, the procedure failed to include the requirements to:

- verify that 1-HS-30-63A successfully initiated containment isolation Phase A and containment vent isolation A-train and B-train of the solid state protection system (SSPS);
- verify that 1-HS-30-63B successfully initiated containment isolation Phase A and containment vent isolation to A-train and B-train of SSPS;

- verify that 1-HS-30-64A in combination with 1-HS-30-64B would successfully initiate a containment spray to A-train and B-train of SSPS;

- verify that 1-HS-30-68A in combination with 1-HS-30-68B successfully initiated a containment spray signal to A-train and B-train of SSPS.

Documentation reviewed by the inspectors indicated that, for the items identified above, previously performed surveillance instructions failed to verify operability of each switch because the various signals occurred through parallel circuit paths; specifically, containment isolation Phase A and containment vent isolation manual signals occur through parallel logic circuit paths, and containment spray and containment isolation Phase B signals also occur through parallel circuit paths.

The inspectors observed the licensee conduct management meetings, PORC reviews, CR, and pre-job briefings associated with resolving the incomplete surveillance requirements. The test provided by Engineering was very detailed. PORC reviews performed were very detailed, and all questions raised as a result of the reviews were forwarded back to Engineering for resolution. Engineering aggressively resolved all concerns identified by PORC committee members and questions raised by the resident inspectors.

While testing handswitch 1-HS-30-68A, a continuity problem was encountered. The handswitch was subsequently replaced, retested, and returned to operable status. The inspectors determined that the failure of the handswitch would not have prevented the system from performing its automatic function. Specifically, a Containment Isolation Phase A and Containment Vent Isolation Train A and Train B would have occurred if an automatic isolation signal was received.

After observing the licensee conduct other portions of the test and reviewing associated documentation, the inspectors determined that the licensee had adequately tested the equipment and satisfied surveillance requirements identified in SR 3.3.2.8 and SR 3.3.6.6. The licensee's failure to perform testing as required by TS is a violation of NRC requirements. However, because this was licensee-identified and the corrective actions were adequate, this violation is being treated as a non-cited violation consistent with Section VII.B.1 of the NRC Enforcement Policy, NCV 50-390/97-04-05, Failure to Complete TS requirements identified in SR 3.3.2.8 and SR 3.3.6.6.

c. Conclusions

The inspectors concluded that the licensee's missed TS surveillance requirement was identified due to the thorough ongoing Engineering review which is being conducted as a result of GL 96-01. The inspectors concluded that, once the licensee identified the problem, they aggressively determined and implemented corrective action. The

inspectors also concluded that excellent communication between the various departments contributed to the successful identification and implementation of appropriate corrective actions.

E2 Engineering Support of Facilities and Equipment

E2.1 Diesel Generator Troubleshooting (37551) (40500)

a. Inspection Scope

The inspectors reviewed the engineering evaluation and support activities associated with problems experienced during emergency DG surveillance tests, reviewed DG circuitry, and observed DG troubleshooting operations.

b. Observations and Findings

On April 29, the 2A-A DG output breaker tripped on overcurrent during the monthly surveillance test. Consultations with the DG owner's group had led the licensee to suspect the voltage regulator range potentiometer (R-4) as a possible cause. During troubleshooting, the signal output from R-4 was monitored with a volt-ohm meter while R-4 was exercised or "swept" through its full range. The change of voltage on the first sweep showed some irregularities indicating dirt or corrosion product buildup. However, after the first sweep the signal output showed a smooth change of voltage. No other problems were found and the DG was successfully retested on April 30.

On May 7, the 1B-B DG exhibited erratic volt-amps reactive readings during monthly surveillance testing and troubleshooting which revealed a faulty motor-operated potentiometer in the voltage regulator. The voltage regulator MOP was replaced and the DG was satisfactorily retested on May 8.

The 1A-A DG output breaker tripped on overcurrent during the monthly surveillance test on May 20. The licensee had added temporary instrumentation to monitor the DG control systems including the R-4 pot. The instrumentation showed that the R-4 output was unstable and produced the overcurrent situation which caused the trip. The R-4 potentiometer was replaced and the DG was successfully retested.

On June 4, after a successful monthly surveillance run, the R-4 potentiometer on the 1B-B DG voltage regulator was checked first by tapping (mechanically agitating) then exercising and observing the output. The tapping produced a change of approximately 10 volts, and the voltage change during the first sweep showed some irregularities. After the first sweep, however, tapping produced no voltage change, and, during a sweep, the output was a smooth change of voltage.

The licensee planned to check the R-4 potentiometer on the 2B-B DG voltage regulator during the week of June 8. The DG vendor identified a more durable replacement potentiometer, and the licensee was evaluating

a course of action to replace each of the R-4 potentiometers. The inspectors will continue to follow the DG troubleshooting activities to determine if problems still exist and what corrective actions are identified. The continued monitoring of DG troubleshooting activities will be tracked by the NRC as Inspector Follow-up Item (IFI) 50-390/97-04-06, Monitor DG Troubleshooting and Corrective Actions.

c. Conclusions

The licensee continued to experience erratic DG operation including overcurrent trips. Improved instrumentation and continuing research enabled the licensee to positively identify and correct the cause of some of the problems. The cause of the overcurrent trip on the 2A-A DG on April 29 was not positively identified. The licensee planned to continue to use additional instrumentation during DG surveillance testing to identify remaining equipment deficiencies and was making steady progress toward long term resolution of this problem.

E2.2 Ice Condenser System Review

a. Inspection Scope (37551)

The inspector conducted a review of system engineer (SE) activities associated with the ice condenser system (ICS) and reviewed ICS information to assess whether SE activities were in accordance with licensee requirements procedure SSP-12.52, System Engineering Program, Revision 7) and whether ICS exhibited adverse trends regarding performance. This included a review of WOs and PERs issued during the previous six months, review of the open WO list, review of the system status report (first quarter 1997), review of surveillance results, review of trend information, review of SE notebook information, and discussions with the SE.

b. Observations and Findings

The inspector noted that some individual component problems have occurred, however, no system adverse performance trends were noted. The SE was performing required duties including system walkdowns, trend reviews, maintaining system notebook information, reviewing testing results, and developing the system status report. The SE indicated he was assigned one other small system and assists on the valve testing program. He stated that this affords him sufficient time for ICS overview. The SE exhibited good knowledge of the ICS and was maintaining good documentation. Significant trend data, such as ice bed temperature, was maintained and charted. Some minor problems have been noted during recent surveillance observations. These included blockage of three channels and minor amounts of ice noted on the upper plenum top

deck blankets and support beams. The channels were unblocked and the ice removed. Additional inspections found no other problems. Overall, the ICS was rated White (acceptable) with the possibility of being rated Green (excellent) during the second quarter and category (a)(2) (acceptable) for the Maintenance Rule. Unreliability was rated at zero.

c. Conclusions

The ICS has been adequately maintained to prevent any adverse performance trends. The SE was performing his duties well and has provided sufficient oversight of the ICS.

E2.3 Review of Problem Evaluation Report Associated With Ice Condenser System

a. Inspection Scope (37551)

The inspector conducted a review of the licensee's metallurgical investigation results associated with ice condenser screws that were documented in Central Laboratory Services Reports 95-1021 dated June 2 and 19, 1995, and WBPER950246, Revision 0.

b. Observations and Findings

By review of the licensee's metallurgical investigation results that were documented in Central Laboratory Services Report 95-1021, dated June 2 and 19, 1995, and WBPER950246, Revision 0, the inspector ascertained the following:

The chemical analyses determined that the screws were fabricated from material with carbon, manganese and sulfur contents that were within the typical range of American Iron and Steel Institute (AISI) 1022 plain carbon steel. Microhardness surveys revealed a relatively high surface hardness and a significantly softer core. This condition indicated that the screws were carburized. This condition also corresponded with the microstructure described in the subject metallurgical investigation report and was confirmed by the associated photomicrographs.

On April 26, 1995, the licensee wrote a PER to document the discovery of a rather significant quantity of ice condenser ice basket, sheet metal screws (screws), both in sections and in whole. The screws were found in the temporary waste ice melt tank (tank). This report was assigned number WBPER950246 for tracking purposes. The task of loading the ice basket was completed on February 17, 1995. The tank, where the screws were found, had remained in place until April 1995, when it was removed for cleaning purposes. The subject screws were identified as item 9 on Westinghouse (W) Drawing Number 1191E57, Contract 71C62-5411-1. Following this discovery, the licensee formulated an action plan which included a metallurgical investigation to determine the mode of the failure and verification of the type of material used to manufacture the screws. The investigation included random samples of the broken screws, screws that were removed from ice baskets in service, and screws that were removed from stores at the warehouse.

In reference to the 170 broken sheet metal screw heads and the 32 whole screws found inside the temporary waste ice melt tank, the investigation report disclosed that the root cause assessment revealed the screws were broken because of apparent overtightening at the time these ice baskets were being assembled. One ice meltdown and one cooldown since the initial assembly were regarded as possible contributing factors. A visual inspection of a random sample of ice baskets, showed no evidence of broken or missing screws from the interconnecting ice basket coupling rings (rings).

The Westinghouse analysis and assessment indicated that the rings were capable of performing their design function against all design basis accidents loads and surveillance loadings with a minimum of 10 sheet metal screws instead of the 12 required by design.

With reference to the concern being applicable to the Sequoyah Nuclear Plant (SQN), the report indicated that no broken or missing sheet metal screws had ever been found at SQN during any of the post-servicing periods, with the exception of a few (10), that were attributed to basket disassembly or upper reinforcement ring replacement.

c. Conclusions

Based on this review, the inspector concluded that the screws in question were fabricated from material made from AISI 1022 plain carbon steel that was heat treated to meet the requirements of W Equipment Specification No.678956. Licensee actions were adequate.

E3 Engineering Procedures and Documentation

E3.1 Final Safety Analysis Report (FSAR) Reviews

A recent discovery of a licensee operating their facility in a manner contrary to the Updated Final Safety Analysis Report (UFSAR) description highlighted the need for a special focused review that compares plant practices, procedures, and/or parameters to the UFSAR descriptions.

While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the FSAR that related to the areas inspected. The inspectors verified that the FSAR wording was consistent with the observed plant practices, procedures, and/or parameters.

## IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R.1 General Comments (71750)

The inspectors routinely observed radiologically controlled areas to verify adequacy of access controls, locked areas, personnel monitoring

surveys, and posting. The inspectors also observed licensee personnel performing work activities within radiological controlled areas. The inspectors observed the licensee's continued efforts to replace fuel rack on the refueling floor. The inspectors determined that health physics (HP) oversight of activities associated with fuel rack replacement was strong and that the licensee established adequate access controls and implemented appropriate HP procedures. The inspector also noted that the work activities on the refueling floor were well controlled. Briefings for several HP controlled activities were also observed. A special briefing regarding emergency core cooling system venting and temporary alteration installation was determined to be very thorough and beneficial.

R1.2 Transportation of Radioactive Materials

a. Inspection Scope (86750) (TI 2515/133)

The inspectors evaluated the licensee's transportation of radioactive materials program for implementing the revised Department of Transportation (DOT) and NRC transportation regulations for shipment of radioactive materials as required by 10 CFR 71.5 and 49 CFR Parts 100 through 177.

b. Observations and Findings

The inspectors reviewed procedures and determined that they adequately addressed the following: 1) assuring that the receiver has a license to receive the material being shipped; 2) assigning the form, quantity type, and proper shipping name of the material to be shipped; 3) classifying waste destined for burial; 4) selecting the type of package required; 5) assuring that the radiation and contamination limits were met; and 6) preparing shipping papers.

The inspectors attended a continuing education training class entitled Transportation and Shipping of Radioactive Material. This class was being taught to maintain the health physics technicians current on the requirements of the shipping regulations. The presented training material was detailed and adequately covered the revised shipping regulations. The attendees were encouraged to ask questions. A test was required at the conclusion of the training class and all of the students made a passing grade of 80 percent or better.

The licensee's records for technical staff training were reviewed and the inspectors determined that the technical staff had received the requisite training for rad material shipments. The training for the technical staff this year has been scheduled for summer.

The inspectors requested that the licensee produce a sample shipping manifest using their software program. The inspectors provided sample input information and the resultant printed sample manifest was reviewed. The inspectors determined that the form met the current requirements.

c. Conclusions

Based on the above reviews, the inspectors determined that the licensee had effectively implemented a program for shipping radioactive materials required by NRC and DOT regulations.

R1.3 Occupational Radiation Exposure Control Program

a. Inspection Scope (83750)

The inspectors reviewed implementation of selected elements of the licensee's radiation protection program (10 CFR 20.1101). The review included observation of radiological protection activities including personnel monitoring (10 CFR 20.1502), radiological postings (10 CFR 20.1904 and 1902), high radiation area controls (10 CFR 20.1601 and 1602), and verification of posted radiation dose rates (10 CFR 20.1501 and 1502) and contamination controls within the radiologically controlled area (RCA). The inspectors also reviewed licensee records of personnel radiation exposure and discussed as low as reasonably achievable (ALARA) program details, implementation, and goals.

b. Observations and Findings

The inspectors toured Auxiliary Building facilities, Unit 1 Turbine Building, and radioactive waste storage area. At the time of the inspection, radiological housekeeping was observed to be good. RCAs observed were appropriately posted, and radioactive material observed was appropriately stored and labeled. The inspectors observed that, at the time of the inspection, there was essentially no contaminated floor space in the RCA.

The inspectors reviewed operational and administrative controls for entering the RCA and performing work. These controls included the use of radiological work permits (RWPs) to be reviewed and understood by workers prior to entering the RCA. The inspectors reviewed selected RWPs for adequacy of the radiation protection requirements based on work scope, location, and conditions. For the RWPs reviewed, the inspector noted that appropriate protective clothing and dosimetry were required. During tours of the plant, the inspectors observed the adherence of plant workers to the RWP requirements. The inspectors also performed independent radiation and contamination surveys of selected areas in the Auxiliary Building and confirmed RWP information. Housekeeping was observed to be orderly and material appropriately stored.

The inspectors discussed outage planning with licensee management and determined the licensee understands the challenge and was actively engaged in the planning. The inspectors observed the planning process by attending an outage planning meeting and reviewed the Radiological Control (RADCON) Unit 1 Cycle (U1C1) Refueling Outage Organization. The RADCON organization planning appears to be appropriately positioned at this stage of scheduling.

The inspectors, accompanied by a health physicist, a representative from nuclear assessment and licensing, and a warehouse representative, performed a survey for radiological material in the approximately 900,000 square foot warehouse (HUTs) storage facilities. No unexpected radioactive material was found; however, some chemicals in HUT 19 showed some evidence of leakage. Some chemicals had receipt dates of about 1975. The licensee initiated a PER (WBPER970487) and was evaluating the storage life and leakage of chemicals in storage.

The inspectors reviewed the postings and performed independent contamination and boundary surveys for the RADCON storage building (HUT 23). All postings were found accurate and current. Boundary surveys were as posted and no contamination was found on the inspector requested smears.

The inspectors reviewed the most recent wholebody counting measurement quality assurance report dated December 19, 1996. The FastScan wholebody counters met the quality assurance tests for Co-57, Cs-137, Co-60 and (thyroid) Eu-152. No areas of concern were identified.

The Fiscal Year (FY) 1997 site exposure goal, not including U1C1 refueling outage, has been set at 32.450 person-rem. At the time of the inspection, the site person-rem was about 16.463 person-rem (not thermoluminescent dosimeters (TLD) corrected); thus, about 50.7 percent of the goal had been expended.

During a morning turnover, health physics technicians were requested, by the health physics shift supervisor, to perform a survey for the Rhea County Landfill. The inspector requested to see the last survey performed at the landfill. It was determined that this was the first survey to be performed at this site even though RCI-101, Radiation, Contamination, and Airborne Surveys, Section 2.2e, states, "Radiation Surveys will be performed at least semiannually in areas outside the RCA (e.g., shops, offices, storage areas, Rhea County Landfill, and ground surveys at the Site Restricted Area boundary fence)." The licensee initiated a PER (WBPER970488) to assess the status of the requirements. The PER addressed a ground survey at the site restricted area boundary that also had not been performed since start-up. This survey requirement had been placed in the procedure during a 1992 revision. The licensee was informed that the failure to perform semi-annual surveys was a violation of a procedural requirement, VIO 50-390/97-04-07, Failure to Perform Procedurally Required Radiation Surveys.

c. Conclusions

Radiological facility conditions and housekeeping in radioactive waste storage areas were observed to be good. Material was labeled appropriately, and areas were properly posted. In addition, health physics and ALARA preplanning for the first refueling outage in September 1997 were progressing satisfactorily. Radiation worker internal and external doses were being maintained well below regulatory

limits and the licensee was continuing to maintain exposures ALARA. One violation for failure to perform procedurally required radiation surveys was identified.

R1.4 Water Chemistry Controls

a. Inspection Scope (84750)

The inspectors reviewed implementation of selected elements of the licensee's water chemistry control program for monitoring primary and secondary water quality. The review included examination of program guidance and implementing procedures and analytical results for selected chemistry parameters.

b. Observations and Findings

The inspectors reviewed TS, which described the operational and surveillance requirements for reactor coolant activity and chemistry, and FSAR, Section 10.3.5, Water Chemistry. The section indicated that guidelines for maintaining reactor coolant and feedwater quality were derived from vendor recommendations and the current revisions of the Electric Power Research Institute (EPRI) Pressurized Water Reactor (PWR) Primary and Secondary Water Chemistry Guidelines. The FSAR also indicated that detailed operating specifications for the chemistry of those systems were addressed in the Station Chemistry Section.

The inspectors reviewed selected analytical results recorded for Unit 1 reactor coolant and secondary samples taken during the inspection period. The selected parameters reviewed for primary chemistry included dissolved oxygen, chloride, fluoride, and sulfate. The selected parameters reviewed for secondary chemistry included hydrazine, iron, and copper. Those primary parameters reviewed were maintained well within the relevant TS limits and within the EPRI guidelines for power operations and cold shutdown modes.

c. Conclusions

Based on the above reviews, it was concluded that the licensee's water chemistry control program for monitoring primary and secondary water quality had been implemented, for those parameters reviewed, in accordance with the TS requirements.

R1.5 RADCON Control of 1B-B Centrifugal Charging Pump Work Activities (71750)

a. Inspection Scope

The inspector observed maintenance workers perform work inside a radiological area.

b. Observations and Findings

On May 5, 1997, the inspector observed maintenance workers perform a PM on the 1B-B centrifugal charging pump. While observing the work, the inspector noticed that some of the maintenance workers had on rubber gloves, some workers had on only cotton gloves, and some workers had on no gloves at all while performing work inside of an area where HP had established specific radiological controls. The inspector also noticed that the maintenance workers had placed a piece of material over one side of the boundary line established by HP. While observing the work in progress, an HP technician came to the area, observed the work activities, and stopped the job. The HP technician surveyed the workers and the area outside the posted contaminated area to ensure contamination was not spreading outside the contaminated area. The HP technician briefed the maintenance workers on proper radiological and contamination control measures for the work being performed.

The inspector questioned the maintenance workers and the HP technician concerning the on-going work activities; specifically, why did some of the workers have on gloves, and other workers had no gloves at all, and why was the established HP boundary covered. Following the discussion it appeared that there was a breakdown in communication between the various HP shifts and the maintenance workers. Different maintenance shifts were given different HP instruction as to dress requirements to perform the job. Workers on one shift were instructed to wear lab coats and rubber gloves to perform the work, while workers on another shift were not instructed to wear rubber gloves. The HP technician performed a survey of the area and reestablished the radiation boundary and no contamination was found. The HP technician also surveyed the worker and found no contamination.

The inspector questioned the maintenance workers concerning their understanding of work requirements when working inside of a designated contaminated area; specifically, 1) how are radiation boundaries established and identified; 2) what is required to enter an area that has been designated as a contaminated area; and 3) what type of dress requirements should be followed when working in contaminated area. All workers adequately answered the questions concerning radiation work requirements.

c. Conclusions

The inspector concluded that poor communication resulted in the maintenance workers wearing different protective clothing while performing work on the 1B-B charging pump work. The inspector also concluded that HP took appropriate action when the maintenance work practices were noticed.

R2 Status of Radiation Protection Facilities and Equipment

R2.1 Radiation Monitor and Instrument Inspection

a. Inspection Scope (83750) (84750)

TS, Section 5.7.2.3, Offsite Dose Calculation Manual, details the methodology and parameters used in the calculation of offsite doses. Section 5.9.2 and 5.9.3 require the submission of the 1996 Annual Radioactive Effluent Release Report and Annual Radiological Environmental Operating Report.

b. Observations and Findings

The inspectors reviewed the 1996 Annual Radioactive Effluent Release Report. The report was the first annual report and covered the first year of operation. The report detailed the solid waste shipped offsite for burial or disposition. A tabulation for this waste is listed below.

| | Type of Waste | Unit | 12 Month Period | Est. Tot. Error % |
|---|---|---|---|---|
| a. | Spent resins, filter sludges, evaporator bottoms, etc. | $m^3$<br>Ci | None<br>None | N/A<br>N/A |
| b. | Dry Active Waste, Compressible Waste Contaminated Equipment, etc. | $m^3$<br>Ci | 3.68E-02<br>1.73E-04 | N/A<br>N/A |
| c. | Irradiated Components, Control Rods, etc. | $m^3$<br>Ci | None<br>None | N/A<br>N/A |
| d. | Other - Thermal destruction of scintillation fluids | $m^3$<br>Ci | 5.66E-03<br>1.01E-05 | N/A<br>N/A |

Potential doses to maximum individuals and the population around WBN were calculated for each quarter as required in Section 5.2 of the Offsite Dose Calculation Manual (ODCM). Measured plant releases for the reporting period were then used to estimate these doses. Dispersion of radioactive effluents in the environment were estimated using meteorological data and river flow data measured during the period. In this report, the doses resulting from releases were described and compared to limits established for WBN.

The ODCM specifies limits for the release of radioactive effluents, as well as limits for doses to the general public from the release of radioactive effluents. These limits were set well below the TS limits which govern the concentrations of radioactivity and doses permissible in unrestricted areas.

For liquid effluents, the populace was exposed to radiation from three sources: 1) the ingestion of water from the Tennessee River; 2) the ingestion of fish caught in the Tennessee River; and 3) direct exposure from radioactive material deposited on the river shoreline sediment (recreation).

The concentrations of radioactivity in the Tennessee River were estimated by a computer model which uses measured hydraulic data downstream of WBN. Parameters used to determine the doses were based on guidance in Regulatory Guide 1.109 for maximum ingestion rates, exposure times.

Doses were calculated for locations within a 50 mile radius downstream of the plant site. The maximum potential recreation dose was calculated for a location immediately downstream from the plant outfall. The maximum individual dose from ingestion of fish was assumed to be that calculated for the consumption of fish caught anywhere between the plant and the first downstream dam (Chickamauga Dam). The maximum individual dose from drinking water was assumed to be that calculated at the nearest downstream public water supply (Dayton, TN).

External gamma radiation levels were measured by TLDs deployed around WBN as part of the offsite Environmental Radiological Monitoring Program. The quarterly gamma radiation levels determined from these TLDs during this reporting period averaged approximately 16.2 mR/quarter at onsite (at or near the site boundary) stations and approximately 14.6 mR/quarter at offsite stations or approximately 1.6 mR/quarter higher onsite than at offsite stations. This difference was consistent with levels measured for preoperation and construction phases of the WBN plant site where the average radiation levels onsite were generally 2-6 mR/quarter higher than the levels offsite. This may be attributable to natural variations in environmental radiation levels, earth moving activities onsite, the mass of concrete employed in the construction of the plants, or other undetermined influences. Fluctuations in natural background dose rates and in TLD readings tend to mask any small increments which may be due to plant operations. There was no identifiable increase in dose rate levels attributable to direct radiation from plant equipment and/or gaseous effluents.

To determine compliance with 40 CFR 190, annual total dose contribution to the maximum individual from WBN radioactive effluents and all other nearby uranium fuel cycle sources were considered.

The annual dose to any organ other than thyroid for the maximum individual was estimated by summing the following doses: 1) the total body air submersion dose for each quarter; 2) the critical organ dose (for any organ other than the thyroid) from airborne effluents for each quarter from ground contamination; 3) inhalation and ingestion; 4) the total body dose from liquid effluents for each quarter; 5) the maximum organ dose (for any organ other than the thyroid) from liquid effluents for each quarter; and 6) any identifiable increase in direct radiation dose levels as measured by the environmental monitoring program. This

dose was compared to the 40 CFR 190 limit for total body or any organ dose (other than thyroid) to determine compliance.

The annual thyroid dose to the maximum individual was estimated by summing the following doses: 1) the total body air submersion dose for each quarter; 2) the thyroid dose from airborne effluents for each quarter; the total body dose from liquid effluents for each quarter; the thyroid dose from liquid effluents for each quarter; and any identifiable increase in direct radiation dose levels as measured by the environmental monitoring program. This dose was compared to the 40 CFR 190 limit for thyroid dose to determine compliance. Cumulative annual total doses are presented in the following table:

Total Dose from Fuel Cycle
1996

| Dose | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | |
|---|---|---|---|---|---|
| Total Body or any Organ (except thyroid) | | | | | |
| Total body air submersion | 2.7E-05 | 2.0E-03 | 1.2E-02 | 3.9E-03 | |
| Critical organ dose (air) | 1.5E-05 | 1.7E-03 | 8.7E-03 | 9.0E-03 | |
| Total body dose (liquid) | 7.9E-08 | 4.6E-05 | 2.5E-04 | 6.8E-04 | |
| Maximum organ dose (liquid) | 7.9E-07 | 4.6E-05 | 2.6E-04 | 1.1E-03 | |
| Direct Radiation Dose | 0.0E-00 | 0.0E-00 | 0.0E-00 | 0.0E-00 | |
| Total | 4.3E-05 | 3.8E-03 | 2.1E-02 | 1.6E-02 | |
| Cumulative Total Dose (mrem) | | | | | 4.1E-02 |
| Annual Dose Limit (mrem) | | | | | 2.50E+01 |
| Percent of Limit | | | | | < 1 % |
| Thyroid | | | | | |
| Total body air submersion | 2.7E-05 | 2.0E-03 | 1.2E-02 | 3.9E-03 | |
| Thyroid dose (airborne) | 1.5E-05 | 1.7E-03 | 8.7E-03 | 9.0E-03 | |
| Total body dose (liquid) | 7.9E-08 | 4.6E-05 | 2.5E-04 | 6.8E-04 | |
| Thyroid dose (liquid) | 6.2E-07 | 4.6E-05 | 2.6E-04 | 7.0E-04 | |
| Direct Radiation Dose | 0.0E-00 | 0.0E-00 | 0.0E-00 | 0.0E-00 | |
| Total | 4.3E-05 | 3.8E-03 | 2.1E-02 | 1.4E-02 | |
| Cumulative Total Dose (mrem) | | | | | 3.9E-02 |
| Annual Dose Limit (mrem) | | | | | 7.50E+01 |
| Percent of Limit | | | | | < 1 % |

The inspectors selectively reviewed the Annual Radiological Environmental Operating Report and the data supporting the report. The inspectors' review of the data determined that there was no radioactivity attributable to the plant detected in the 1996 monitoring program. Environmental radioactivity measured by the program was due to naturally occurring radioactive materials or radionuclides commonly found in the environment as a result of atmospheric fallout. The exposures calculated from the Annual Radiological Environmental Operating Report resultant data were consistent with results from the preoperational monitoring program.

c. Conclusions

The total dose from the 40 CFR 190 calculation for the radiological impact from the first year of facility operation was less than one percent of the regulatory limit. The exposures calculated from the 1996 Annual Radioactive Effluent Release Report resultant data were consistent with results from the preoperational monitoring program.

R2.2 Process and Effluent Radiation Monitors

a. Inspection Scope (84750)

The inspectors reviewed selected licensee procedures and records for required surveillances on process and effluent radiation monitors and for radiation monitor availability as required by the TS and/or ODCM.

b. Observations and Findings

The inspectors toured the facility to observe the physical operation of selected process and radiation monitors in use. The inspectors reviewed selected radiation and process monitor surveillance procedures and records for performance of channel checks and channel operational tests. Performance of those surveillances was required by the TSs and/or the ODCM to demonstrate that the instrumentation was operable.

During a review of records, the inspectors looked at the radiation monitoring system heat trace requirements. The heat trace for effluent monitor 1-RE-90-129 was required by calculations (EPM-APA-111694) and design drawing (47W600-465Q) associated with DCN 33688-B, Block 15. The heat trace was installed but not made part of the PM program for this system. Procedure SSP-9.53, Reviewing and Approving Field Work Required DCNs, requires that an impact review form be completed. Information in Block 15, stated in part, that the Systems Engineering system engineer shall review the DCN to determine if there were any retest requirements. Appendix K, Block 15, of this procedure also required as part of the actions required for DCN closure that: "A. Preventative Maintenance (PM) Requirements have been identified and input forms have been sent to PM scheduling and tracking and B. All Procedures/Instructions required for closure have been revised." No records for heat trace PM checks could be found for this monitor. PER WBPER960436, dated May 28, 1996, identified additional heat trace circuits that were to be added to the

PM program. These additional heat traced lines were added to the PM program. The failure to include this monitor's heat trace in the PM program for the 1-RE-90-129 radiation monitor was identified as a violation. VIO 50-390/97-04-08, Failure to Implement the Requirements of Site Standard Practice SSP-9.53, Reviewing and Approving Field Work Required DCNs, which resulted in a failure to include radiation monitor 1-RE-90-129 in the PM program.

The most recent effluent monitor availability system status report available, which covered the period October 1966 through April 1997, indicated that the overall availability for the Radiation Monitoring System remained at the goal of 97 percent availability.

c. Conclusions

Discussions with cognizant licensee personnel and a review of performance records determined the licensee had maintained an overall high level of operability for radiation monitors in 1996 and to date in 1997. The licensee was also effectively tracking monitor performance. One violation was identified for failure to implement the requirements of SSP-9.53, Reviewing and Approving Field Work Required DCNs.

R7 Quality Assurance in Radiological Protection (RP) and Chemistry Activities

R7.1 Self-Assessment Activities

a. Inspection Scope (83750) (84750)

Licensee activities and self-assessment programs (10 CFR 20.2102) were reviewed to determine the adequacy of identification and corrective action programs for deficiencies in the areas of RP and Chemistry.

b. Observations and Findings

The inspectors reviewed Audit SSA9701 dated January 13, 1997, Audit SSA9610 dated November 1, 1996, and Monthly Nuclear Assurance Chemistry and RADCON Oversight Activities for the time period January 1997-April 1997. The inspectors determined that Quality Assurance audits and self-assessment efforts in the area of RP and chemistry were accomplished by reviewing RP procedures, observing work, reviewing industry documentation, and performing plant walkdowns including surveillance of work areas by supervisors and technicians during normal work coverage. Documentation of problems by licensee representatives was included in quality assurance audits and self-assessment reports. Corrective actions were included in the licensee's problem investigative process and were being completed in a timely manner.

c. Conclusions

The inspectors determined the licensee was effectively conducting formal RP and chemistry audits as required by TS and completing corrective actions in a timely manner.

R8 Miscellaneous Radiological Protection and Chemistry Controls

R8.1 (Closed) VIO 50-390/96-02-03, Failure to Provide Adequate Documentation of the Condenser Vacuum Exhaust Mid- and High Range Monitors of Calibration Data to Meet 10 CFR 20.2103 Requirements

The inspectors reviewed the closure package for this item which included the Reply to Notices of Violation dated April 22, 1996, and the associated licensee actions.

The inspectors independently verified selected stated actions of the licensee and found the closeout appropriate.

(Closed) VIO 50-390/96-08-03, Failure to Have Adequate Procedures for Liquid Effluent Release Processing

The inspectors reviewed the closure package for this item which included the Reply to Notices of Violation dated August 29, 1996 and the associated licensee actions.

The inspectors independently verified selected stated actions of the licensee and found the closeout appropriate.

(Closed) IFI 50-390/96-06-06, Review Licensee Evaluation and Resolution of Positive Pressures Observed for Floor Drain System

The inspectors reviewed the closure package for this item which was tracked as WBPER960338 and the associated licensee actions.

The inspectors independently verified selected stated actions of the licensee and found the closeout appropriate.

(Closed) IFI 50-390/96-06-07, Review Licensee Actions to Upgrade the Liquid Effluent Release Procedures Regarding Liquid Waste Tank Recirculation Times

The inspectors independently reviewed and verified licensee actions associated with the upgrade to the procedures for liquid effluent regarding liquid waste tank recirculation times and found the upgrades adequately addressed the recirculation requirements.

(Closed) IFI 50-390/96-06-08, Review and Evaluate Licensee 10 CFR 50.59 Evaluation for Outside Storage Pad to Provide Storage and/or Staging for Radioactive Waste

The inspectors reviewed the progress of 10 CFR 50.59, Evaluation for Outside Storage Pad to Provide Storage and/or Staging for Radioactive Waste, and determined that the licensee has the document on a schedule to have the evaluation closed prior to the September refueling outage.

(Open) IFI 50-390/96-08-05, Review Licensee in situ RMS Sample Line Particulate Deposition and Iodine Plateout

The inspectors reviewed the current status of activity that would be sampled and determined that the concentrations of particulates and iodines at this time were not sufficient to conduct evaluations for the radiation monitor sample lines. This item will remain open.

R8.2 (Closed) LER 50-390/96-025: Failure to Adequately Implement Surveillance Program To Ensure Oxygen/Hydrogen Limits Were Being Maintained. The licensee submitted this LER on January 10, 1997. This issue involved a failure of the licensee to implement commitments described in Section 11.3 of the FSAR to assure that explosive gas limits were being maintained in accordance with TS. Specifically, improper system lineup and an alarm requirement were not implemented. NOV 50-390/96-13-06, Failure to Implement TS Explosive Gas Monitoring Program Requirements, was issued in IR 50-390/96-13. The inspectors reviewed the LER and the licensee's response to the NOV. The inspectors verified that corrective actions identified in the LER and the NOV were implemented and that root causes were identified. This LER is closed.

P1 Conduct of EP Activities

P1.1 Emergency Drill (71750)

The inspectors responded to an emergency preparedness (EP) drill that was conducted on May 22, 1997. The inspectors determined that the overall assessment of the drill was good. The Technical Support Center (TSC) was properly staffed and the exchange of information was typically good. There was one instance in which health physics representatives in the TSC failed to pass on important dose information to the emergency director. This information would have been useful in accessing activities which occurred within the reactor. The licensee conducted critiques at the completion of the drill. The inspector noted that the TSC critique was very thorough, and questions and comments were encouraged from all participants. The evaluators participating in the drill typically did a good job at identifying concerns that, once implemented, should enhance the quality of future drills. However, the inspector noted that during the simulator critique the exchange of information was not very detailed. The inspector did notice that the licensee identified a simulator modeling problem associated with the turbine building radiation monitors during the critique.

F2 Status of Fire Protection Facilities and Equipment

F2.1 Operability of Fire Protection Facilities and Equipment (64704)

a. Inspection Scope

The inspector reviewed the Shift Supervisor's Daily Operating Requirement Log and Fire Protection Out of Service Report which listed the inoperable or degraded fire protection systems, the open corrective maintenance WOs on fire protection components, and the fire protection systems status reports to assess the licensee's performance for returning degraded fire protection components to service. In addition, walkdown inspections were made to assess the material condition of the plant's fire protection systems, equipment, features and fire brigade equipment.

b. Observations and Findings

Maintenance and Operability of Fire Protection Equipment and Components:

There were a total of 47 fire protection systems listed on the Shift Operations Supervisor's Daily Operating Requirement Log as being degraded or out of service. Twenty five of these items were associated with NRC required fire protection systems which required some type of compensatory measure when the system was not operable. The remaining 22 items involved other fire protection features which were installed for property protection or to meet requirements other than the NRC's.

Of the 25 degraded NRC-required fire protection systems, 23 were degraded or inoperable due to on-going plant maintenance, construction, and modification activities. Some of these activities required fire barrier penetrations to be opened at various times during the construction or modification activities due to blocking opening fire doors, temporarily opening electrical penetration seals, etc. On June 2, 1997, no work was being performed that resulted in the fire protection systems or fire barriers being degraded; therefore, no compensatory measures were required. However, compensatory measures were scheduled to be initiated as soon as these fire protection systems were placed out of service for the modification or maintenance activity.

On June 2, 1997, two degraded fire protection features required compensatory measures. One included the 8-hour emergency battery powered lights in the auxiliary shutdown board rooms. The batteries for these lights had exceeded their administrative battery life on May 31, 1997. The compensatory actions initiated included the provision of portable hand-held lighting to be used if needed until the batteries could be replaced. The other item included inoperable raw service water valves on the fire protection water system. These valves were designed to close automatically when the fire pumps were required for a fire. The compensatory measures implemented for these inoperable valves included manually closing these valves during fire fighting activities.

These valves were identified as inoperable on March 30, 1997, and repairs had been deferred pending receipt of required parts.

Four inaccessible fire detectors within the Unit 1 containment purge air filters had not been tested within the specified time, prior to December 6, 1996. These detectors were not required until Mode 6 when the containment air purge filters were required to be operable. These detectors were scheduled to be tested during the next cold shutdown exceeding 24 hours. A fire watch was scheduled to be provided when the unit reached Mode 6 until the detectors were satisfactorily tested.

The number of fire protection systems out of service was very low. These inoperable systems were properly identified and appropriate compensatory measures had been implemented.

As of June 2, 1997, approximately 54 open maintenance WOs existed on the fire protection systems. These items included: 7 fire detection, 17 high pressure fire protection water systems, 1 $CO_2$, 9 emergency lights, and 20 fire doors. Most of these work requests had been issued within the past 90 days with 40 issued in 1997, 13 in 1996 and one in 1995. The degraded fire protection systems required by the NRC to be operable were the inoperable emergency lighting for the auxiliary shutdown board rooms and the inoperable raw service water automatic isolation valves in the high pressure fire protection system. Most of the degraded items were associated with repairs and modifications to fire protection systems required as a result of plant construction, maintenance, and modifications activities to other plant components or involved minor fire protection issues that did not affect the operability of the fire protection systems, such as the painting of fire doors. Two fire protection items were not significant issues. These were related to removal of a fire hydrant outside the protected area and removal of the foam from the fire suppression system for the fifth emergency DG which was not in use or require.

The oldest maintenance item originated in July 1995 and involved a binding stem on a fire protection valve which, although difficult to open or close, was considered operable. This valve was scheduled to be replaced with a new valve.

The inspector concluded that the prioritization of the maintenance, repairs, and modifications to the fire protection systems was appropriate. There was no significant maintenance backlog associated with fire protection components and appropriate attention was given towards maintaining the fire protection systems operable.

During the plant tours, the inspector noted that the fire protection systems were operable, well maintained, and the material condition was excellent.

Fire Protection System Status Reports:

The inspector reviewed the Second Quarter Fiscal Year (FY) 1997 System Status to assess the status of High Pressure Fire Protection System 26 and $CO_2$ Fire Protection System 39. The status report indicated that the performance for these two systems was good in the second quarter of FY 1997 and had been good for four consecutive quarters. A system status report was provided for these systems since they are covered by the maintenance rule. A status report was not being provided for the other fire protection systems (i.e., fire detectors, fire barriers, etc). The licensee was maintaining records of the operable status of all the fire protection features. These records were included in the Daily Team Meeting Report. Inoperable or degraded systems were tracked and were normally restored to operable status in a timely manner. The daily tracking of the operable status of the fire protection features by the Daily Team Meeting Report resulted in a very low number of systems being in a degraded or inoperable status for any appreciable period of time.

Repairs Parts for Appendix R Shutdown Components:

The components required to perform repairs to components needed to bring the plant to a cold shutdown following an Appendix R fire were stored in two equipment lockers on 755 elevation of the Turbine Building, adjacent to the CR. The inspector verified that the equipment stored in these lockers met the requirements of preventive maintenance procedure PM 1-JB-291-6917, Revision 0, Inventory of Appendix R Repair Equipment in 1-JB-291-6917 and 1-JB -291-6918. The equipment was appropriately labeled and satisfactorily stored.

Fire Brigade Equipment:

Two mobile fire trucks, a 750 gpm pumper and a 1000 gpm pumper, and miscellaneous fire brigade equipment including fire brigade turnout gear were stored in the fire protection equipment building located within the protected area east of the Unit 2 Reactor Building. Additional fire brigade equipment was stored in the service building adjacent to the Turbine Building and in the Auxiliary Building adjacent to the CR. A sufficient number of turnout gear, consisting of coats, pants, boots, helmets, etc., was provided to properly equip each fire brigade member. The fire brigade equipment was properly stored and well maintained.

c. Conclusions

The low number of open maintenance WOs and degraded fire protection components, in conjunction with the excellent material condition of the fire protection components and fire brigade equipment, indicated that appropriate emphasis had been placed on the maintenance and operability of the fire protection equipment and components.

F2.2 Surveillance of Fire Protection Features and Equipment (64704)

a. Inspection Scope

The inspectors reviewed the following completed surveillance and test procedures:

- 0-FOR-13-618, Revision 0, 6 Month Detector Test - Panel L618. Completed January 23, 1997.
- 0-FOR-26-2, Revision 1, 3 Year High Pressure Fire Protection Hydraulic Performance Verification. Completed September 12, 1996.
- 0-FOR-26-7-A, Revision 2, 18 Month Test of High Pressure Fire Protection Fire Pump 1A-A. Completed November 10, 1996.
- 0-FOR-26-7-B, Revision 3, 18 Month Test of High Pressure Fire Protection Fire Pump 1B-B. Completed April 16, 1997.
- 0-FOR-26-8-A, Revision 2, 18 Month Test of High Pressure Fire Protection Fire Pump 2A-A. Completed November 10, 1996.
- 0-FOR-26-8-B, Revision 3, 18 Month Test of High Pressure Fire Protection Fire Pump 2B-B. Completed April 16, 1997.
- 0-FOR-26-25, Revision 2, 18 Month Diesel Driven Fire Pump Capacity Test. Completed April 28, 1997.
- 0-FOR-39-3, Revision 1, 18 Month $CO_2$ Fire Protection Inspection and Test for Diesel Generator Building. Completed October 24, 1996.
- 0-FOR-304-1, Revision 5, Visual Inspection of Fire Rated Assemblies in Unit 1 Reactor Building. [3M Material] Completed October 5, 1996.
- 0-FOR-304-2, Revision 0, Electrical Raceway Fire Barrier Visual Inspection - Auxiliary Building. [Thermo-Lag Material] Completed June 20, 1996.
- 1-FOR-1-3, Revision 0, SG PORV Operation Using Nitrogen Supply Performance Test. [Appendix R Shutdown System] Completed January 9, 1997.
- 0-FOR-70-2, Revision 1, Component Cooling System Pump 2B-B Quarterly Performance Test. [Appendix R Shutdown System] Completed April 11, 1997.
- 1-FOR-70-4, Revision 0, Component Cooling System Thermal Barrier Booster Pump 1A Quarterly Performance Test. [Appendix R Shutdown System] Completed March 24, 1997.

- 1-FOR-70-5, Revision 0, Component Cooling System Thermal Barrier Booster Pump 1B Quarterly Performance Test. [Appendix R Shutdown System] Completed April 11, 1997.

- 1-SI-0-4, Revision 0, Monthly Surveillances, Appendix L (250V Batteries and Battery Board Breakers). [Appendix R Shutdown System] Completed May 24, 1997.

The inspector witnessed the performance of the following surveillance test procedure:

- 0-FOR-26-20, Revision 1, Diesel Fire Pump Battery Weekly Inspection. Completed June 5, 1997.

The list of fire protection surveillance test procedures was also reviewed to determine if surveillance procedures were provided for all of the NRC required fire protection systems and features.

b. Observations and Findings

The completed fire protection surveillance tests reviewed by the inspectors were appropriately completed and met the acceptance criteria. The test procedures were well written and met the fire protection surveillance requirements of the WBN Fire Protection Report as referenced by the FSAR. The surveillance procedures for the capacity tests on the fire pumps required test data to be obtained at multiple points on each fire pump's performance curve. This provided reference data to evaluate the performance of each pump.

The WBN Fire Protection Report identifies the surveillance requirements for the fire protection systems. The inspector reviewed the existing surveillance procedures and verified that each surveillance requirement of the Fire Protection Report had been addressed by a site procedure.

c. Conclusions

Good surveillance and test procedures were provided for the fire protection systems and features. Procedure implementation was effective.

F3 Fire Protection Procedures and Documentation

F3.1 Review of Fire Protection Procedures and Documentation (64704)

a. Inspection Scope

The inspectors reviewed the following procedures for compliance with the NRC requirements and guidelines:

- Site Standard Practice SSP-12.15, Revision 3 Change 2, Fire Protection

- Fire Protection Instruction FPI-0100, Revision 4 Change 3, Transient Fire Loads

- Fire Protection Instruction FPI-0101, Revision 0 Change 2, Control of Ignition Sources

- Fire Protection Instruction FPI-0102, Revision 1 Change 2, Control of Fire Protection Impairments

- Fire Protection Instruction FPI-0103, Revision 0 Change 1, Fire Protection Review of Facilities Design, Modifications, and Temporary Structures

Plant tours and reviews were also performed to assess procedure compliance.

b. Observations and Findings

The above procedures were the principle procedures issued to implement the facility's fire protection program. These procedures contained the requirements for program administration, controls over combustibles and ignition sources, fire brigade organization and training, and operability requirements for the fire protection systems and features. The procedures were well written and met the licensee's commitments to the NRC.

The inspectors performed plant tours and noted that implementation of the site's fire prevention program for the control of ignition sources, transient combustibles, and general housekeeping was excellent in Unit 1 and the common plant areas. The general housekeeping in the Unit 2 areas was satisfactory.

During the plant tours, the inspectors noted that the fire detection system for the Unit 1 north and south main steam valve rooms had been removed from service. The inspectors reviewed DCN 38746-A which removed these detectors from service and verified that an appropriate 50.59 safety evaluation had been performed to justify this modification.

c. Conclusions

The fire protection program implementing procedures were good and met license conditions and NRC requirements. Implementation of the procedures for the control of ignition sources, transient combustibles, and general housekeeping was excellent in Unit 1 and the common plant areas and satisfactory in the Unit 2 areas.

F5 Fire Protection Staff Training and Qualification

F5.1 Review of Fire Protection Staff Training and Qualification (64704)

a. Inspection Scope

The inspectors reviewed the fire brigade organization and training program and fire brigade drill participation for compliance with the NRC guidelines and requirements.

b. Observations and Findings

Fire Brigade Organization and Training

The organization and training requirements for the plant fire brigade were established by SSP-12.15, Fire Protection. The fire brigade for the site consisted of a dedicated organization which provided fire protection fire fighting response. This organization was also trained and equipped to respond to medical and hazardous material emergencies and other accident events. In addition, the fire brigade was performing most of the maintenance and surveillance testing on the facility's fire protection systems and features.

The fire brigade was composed of four crews. Each crew consisted of a shift foreman/brigade leader and at least four brigade members. This met the NRC requirements for a five-person fire brigade. The crews worked 12-hour shifts and provided continuous coverage for response to a fire or other emergency.

An incident commander was available to assist the fire brigade leader in the direction of fire fighting activities. The incident commander position was normally filled by the Operation's shift STA who was also one of the shift SRO unit supervisors. A shift support supervisor was normally available to fill the incident commander position if the STA was required to respond to the CR to assume other duties.

Each fire brigade leader and fire brigade member was required to receive initial, quarterly, and annual fire fighting related training and to satisfactorily complete an annual medical evaluation and certification for participation in fire brigade fire fighting activities. Each brigade member was required to participate in at least two drills per year. In addition to the fire fighting, medical, and hazards material training, each fire brigade member was trained in the design, operations, maintenance, and testing requirements for all of fire protection system and features installed at the facility.

The inspector reviewed the training and medical records for the fire brigade members and verified that the training and medical records were up-to-date. The facility utilized the off-site TVA Fire Academy which was staffed with qualified and certified fire brigade training instructors. Adequate fire training facilities and equipment were

available at TVA's academy to perform the annual fire brigade training and practical fire training scenarios.

Specialized fire protection and operation related training was required for the incident commanders. The inspector reviewed the training records for the incident commander and noted that the training for three of the 28 incident commanders was not up-to-date. Two of these were assigned to operations support functions. However, one individual was assigned to one of the operating shift crews. This resulted in crew Group 4 having only two personnel qualified as incident commanders. The other four crew groups had three certified incident commanders. The licensee stated that this training discrepancy was to be corrected; however, in the interim sufficient manning was available to assure that at least one incident commander would be available per shift in the event of a fire.

Fire Brigade Drill

During this inspection, the inspector witnessed an unannounced fire brigade drill involving a simulated fire in an electrical cable tray in the cable spreading room on elevation 729 of the Control Building. The response of the fire brigade to the simulated fire and the brigade leader's direction of the fire brigade members' performance was good. The coordination and support between the incident commander and the fire brigade leader were also good. The critique to discuss the brigade performance, which was held following the drill, identified several items which, when implemented, should enhance the licensee's performance during a fire.

c. Conclusions

The fire brigade organization and training met the requirements of the site procedures. The fire brigade and the incident commander's performance during a drill was good.

F6 Fire Protection Organization and Administration

F6.1 Review of Fire Protection Organization and Administration (64704)

a. Inspection Scope

The licensee's management and administration of the facility's fire protection program were reviewed for compliance with the commitments to the NRC.

b. Observations and Findings

The WBN Operations manager was responsible for implementing the facility's fire protection program, including the management of the Operations fire protection section. This responsibility had been delegated to the fire protection manager. Technical engineering coordination and oversight of the fire protection section was provided

by two fire protection engineers and a fire protection specialist who were under the management of the fire protection manager who was responsible for coordinating the administration of the facility's entire fire protection program. The fire protection section was composed of four crews which provided continuous coverage of the facility. Each crew was composed of a foreman and at least four fire protection operators. Two crews had five fire protection operators. The Fire Operations section responded to all fire, medical, and hazardous material emergencies and performed most of the maintenance and surveillance testing on the fire detection systems, fire suppression systems, fire barriers, and fire barrier penetrations. During this inspection, the inspector noted that these employees demonstrated a pride of ownership in the performance of their assigned duties resulting in the effective implementation of the fire protection program.

c. Conclusions

Strong management, coordination, and oversight were provided over the facility's fire protection program. The fire protection section provided excellent response to fires and other emergencies and in the performance of maintenance and surveillance tests of the fire protection components. This good performance was one of the principle factors in the implementation of an effective fire protection program.

F7 Quality Assurance in Fire Protection Activities

F7.1 Review of Quality Assurance in Fire Protection Activities (64704)

a. Inspection Scope

The following audit and self-assessment reports were reviewed:

- Audit SSA-96-04 Watts Bar Triennial Fire Protection Audit conducted March 1996;

- Self-Assessment of Watts Bar Fire Protection Program conducted May 12-16, 1997 (Report in preparation);

b. Observations and Findings

Audit SSA-96-04 was a triennial quality assurance audit of the Watts Bar fire protection program and identified no findings or recommendations. Two minor discrepancies were identified which were promptly corrected. An Annual/Biennial QA Audit was performed during March - April 1997. This report had not yet been issued; however, the licensee stated that no findings were identified during the audit. However, eight enhancement items were identified. Six of these items had been corrected and corrective action on the remaining two items was in process.

A self-assessment of the fire protection program was conducted May 12 - 16, 1997. The final report from this assessment had not yet

been issued. However, the licensee stated that the assessment had identified a number of strengths, one minor finding, and several recommended enhancement items. This assessment was performed to meet the requirements of TVA Nuclear Standard STD 1.8, Organizational Self Assessments, Revision 1. The licensee planned to evaluate and initiate the appropriate action for the finding and each enhancement item identified during the assessment.

The inspector noted that the licensee was receptive to discrepancies and enhancement items identified during audits and self-assessments of the fire protection program. Action was promptly initiated to address these items which further enhanced an existing effective program.

c. Conclusions

Comprehensive audits and self-assessments were being performed on the facility's fire protection program. Corrective action was promptly taken to resolve identified issues to further enhance an existing effective program.

## V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on June 9, 1997. Interim exits were held May 9, May 16 and June 6, 1997. 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
T. Davis, Fire Protection Manager
P. Hughes, Radiological Control Manager
D. Kehoe, Site Nuclear Assurance Manager
D. Koehl, Operations Manager
D. Kulisek, Systems Engineering Manager
J. Maddox, Engineering Manager
D. Nelson, Business and Work Performance Manager
P. Pace, Licensing and Industry Affairs Manager
R. Purcell, Plant Manager
J. Scalice, Site Vice President
B. Schofield, Operations Support Manager

T. Stockdale, Operations Superintendent
G. Vickery, Acting Chemistry Manager

NRC

P. Van Doorn, Senior Resident Inspector
E. Lea, Resident Inspector
W. Miller, Fire Protection Specialist, RII
D. Rich, Resident Inspector
E. Testa, Radiation Specialist, RII
H. Whitener, Maintenance Specialist, RII

## INSPECTION PROCEDURES USED

| | |
|---|---|
| IP 37551: | Onsite Engineering |
| IP 40500: | Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems |
| IP 61726: | Surveillance Observations |
| IP 64704: | Fire Protection Program |
| IP 71707: | Plant Operations |
| IP 71750: | Plant Support Activities |
| IP 83750: | Occupational Radiation Exposure |
| IP 84750: | Radioactive Waste Treatment and Effluent and Environmental Monitoring |
| IP 86750: | Solid Radioactive Waste Management and Transportation of Radioactive Material |
| IP 92700: | Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities |
| IP 92902: | Followup - Maintenance |
| IP 62707 | Maintenance Observations |
| IP 92901 | Followup - Operations |
| IP 92903 | Followup - Engineering |
| TI 2515/133: | Implementation of Revised 49 CFR 100-179 and 10 CFR 71 |

## ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

| | | |
|---|---|---|
| 50-390/97-04-01 | VIO | Failure to Respond to Control Room Alarm (Section O1.5) |
| 50-390/97-04-02 | VIO | Failure to Follow Procedure for Testing of Auxiliary Building Gas Treatment System (Section O8.1) |
| 50-390/97-04-03 | NCV | Failure to Perform Excore Quadrant Power Tilt Ratio (QPTR) as required by TS SR 3.2.4.1 (Section M8.4) |

| | | |
|---|---|---|
| 50-390/97-04-04 | NCV | Failure to Perform Response Time Testing Requirement as Required by TS 3.3.1.15 and 3.3.2.10 (Section M8.5) |
| 50-390/97-04-05 | NCV | Failure to Complete TS Requirements Identified in SR 3.3.2.8 and SR 3.3.6.6 (Section E1.2) |
| 50-390/97-04-06 | IFI | Monitor DG Troubleshooting and Corrective Actions (Section E2.1) |
| 50-390/97-04-07 | VIO | Failure to Perform Procedurally Required Radiation Surveys (Section R1.3) |
| 50-390/97-04-08 | VIO | Failure to Implement the Requirements of Site Standard Practice SSP-9.53, Reviewing and Approving Field Work Required DCNs which Resulted in a Failure to Include Heat Trace Circuits for Radiation Monitor 1-RE-90-129 in the Preventative Maintenance Program (Section R2.2) |

Closed

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|---|---|---|
| 50-390/96-02-03 | VIO | Failure to Provide Adequate Documentation of the Condenser Vacuum Exhaust Mid- and High-Range Monitors of Calibration Data to Meet 10 CFR 20.2103 Requirements (Section R8.1) |
| 50-390/96-06-06 | IFI | Review Licensee Evaluation and Resolution of Positive Pressures Observed for Floor Drain System (Section R8.1) |
| 50-390/96-06-07 | IFI | Review Licensee Actions to Upgrade the Liquid Effluent Release Procedures Regarding Liquid Waste Tank Recirculation Times (Section R8.1) |
| 50-390/96-06-08 | IFI | Review and Evaluate Licensee 10 CFR 50.59 Evaluation for Outside Storage Pad to Provide Storage and/or Staging for Radioactive Waste (Section R8.1) |
| 50-390/96-08-03 | VIO | Failure to Have Adequate Procedures for Liquid Effluent Release Processing (Section R8.1) |
| 50-390/96-14-02 | URI | Further Review of the Licensee's Justifications for Performing 18-Month Surveillances On-Line Is Warranted (Section M8.1) |
| 50-390/96-024 | LER | Maintenance Activity Rendered Train B of the Auxiliary Feedwater System (AFW) Inoperable (Section M8.2) |
| 50-390/96-025 | LER | Failure to Adequately Implement Surveillance Program to Ensure Oxygen/Hydrogen Limits Were Being Maintained (Section R8.2) |

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|---|---|---|
| 50-390/97-002 | LER | Reactor/Turbine Trip Due to Loss of Two Main Feedwater Pumps (Section M8.3) |
| 50-390/97-003 | LER | Performance of a Surveillance Instruction Was Not Current Following the Return to the Applicable Mode (Section M8.4) |
| 50-390/97-004 | LER | Auxiliary Building Gas Treatment System (ABGTS) Inoperable (Section O8.1) |
| 50-390/97-02-03 | URI | Review of ABGTS Inoperability for LER 50-390/97-004 (Section O8.1) |
| 50-390/97-04-03 | NCV | Failure to Perform Excore Quadrant Power Tilt Ratio (QPTR) as required by TS SR 3.2.4.1 (Section M8.4) |
| 50-390/97-04-04 | NCV | Failure to Perform Response Time Testing Requirement as Required by TS 3.3.1.15 and 3.3.2.10 (Section M8.5) |
| 50-390/97-04-05 | NCV | Failure to Complete TS Requirements Identified in SR 3.3.2.8 and SR 3.3.6.6 (Section E1.2) |
| 50-390/97-006 | LER | Reactor/Turbine Trip Due to Low-Low Steam Generator Level (Section O8.2) |
| 50-390/97-007 | LER | Noncompliance with Technical Specifications Surveillance Requirements 3.3.1.15 and 3.3.2.10 (Section M8.5) |

Discussed

| | | |
|---|---|---|
| 50-390/96-08-05 | IFI | Review Licensee in situ RMS Sample Line Particulate Deposition and Iodine Plateout (Section R8.1) |

## LIST OF ACRONYMS USED

| | |
|---|---|
| ABGTS | Auxiliary Building Gas Treatment System |
| AFW | Auxiliary Feedwater |
| ALARA | As Low As Reasonably Achievable |
| AUO | Assistant Unit Operator |
| CDF | Core Damage Frequency |
| CFR | Code of Federal Regulations |
| CR | Control Room |
| DCN | Design Change Notice |
| DG | Diesel Generator |
| DN | Deficiency Notice |
| DOT | Department of Transportation |
| EP | Emergency Preparedness |
| EPRI | Electric Power Research Institute |
| ERCW | Essential Raw Cooling Water |

| | |
|---|---|
| ESF | Engineered Safety Feature |
| FEG | Functional Equipment Group |
| FSAR | Final Safety Analysis Report |
| FY | Fiscal Year |
| GL | Generic Letter |
| GO | General Operating Instruction |
| gpm | gallons per minute |
| ICS | Ice Condenser System |
| IFI | Inspection Followup Item |
| IR | Inspection Report |
| LCO | Limiting Condition for Operation |
| LCV | Level Control Valve |
| LER | Licensee Event Report |
| MFP | Main Feedwater Pump |
| MRC | Management Review Committee |
| NCV | Non-Cited Violation |
| NRC | Nuclear Regulatory Commission |
| NUREG | NRC technical report designation |
| ODCM | Offsite Dose Calculation Manual |
| PER | Problem Evaluation Report |
| PM | Preventive Maintenance |
| PORC | Plant Operations Review Committee |
| RCA | Radiologically Controlled Area |
| RCI | Radiological Control Instruction |
| RP | Radiation Protection |
| RPA | Radiologically Protected Area |
| RPR | Radiological Problem Report |
| RWP | Radiological Work Permit |
| SE | Shift Engineer |
| SG | Steam Generator |
| SI | Surveillance Instruction |
| SM | Shift Manager |
| SOI | System Operating Instruction |
| SQN | Sequoyah Nuclear Plant |
| SR | Surveillance Requirement |
| SRO | Senior Reactor Operator |
| SSP | Site Standard Practice |
| SSPS | Solid State Protection System |
| STA | Shift Technical Advisor |
| TLD | Thermoluminescent Dosimeter |
| TS | Technical Specification |
| TSC | Technical Support Center |
| UFSAR | Updated Final Safety Analysis Report |
| VIO | Violation |
| W | Westinghouse |
| WBN | Watts Bar Nuclear Plant |
| WO | Work Order |