U.S. NUCLEAR REGULATORY COMMISSION

REGION II

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Licensee:	Tennessee Valley Authority (TVA)
Facility:	Sequoyah Nuclear Plant, Units 1 & 2
Location:	Sequoyah Access Road Hamilton County, TN 37379
Dates:	July 19 through August 29, 1998
Inspectors:	M. Shannon, Senior Resident Inspector R. Starkey, Resident Inspector R. Telson, Resident Inspector D. Rich, Resident Inspector, Watts Bar E. DiPaolo, Resident Inspector, Browns Ferry J. Starefos, Acting Senior Resident Inspector, Browns Ferry
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Enclosure

EXECUTIVE SUMMARY

Sequoyah Nuclear Plant, Units 1 & 2
NRC Inspection Report 50-327/98-08, 50-328/98-08

This integrated inspection included aspects of licensee operations, maintenance, engineering, plant support, and effectiveness of licensee controls in identifying, resolving, and preventing problems.

Operations

- Operators failed to identify an incorrect control room log book entry related to cold leg accumulator boron concentration. As written, the entry would have required entry into a Technical Specification action statement (Section O1.2).

- Fuel handling personnel were very thorough in the handling and inspection of new fuel (Section O1.3).

- The licensee conducted a thorough Unit 2 post trip review of the main bank transformer sudden pressure relay failure (Section O1.4).

- The Unit 2 startup was thoroughly briefed and carefully executed by operations personnel (Section O1.5).

- Operator response was good for the main feedwater pump problems and the power excursion caused by a failed open steam dump valve during the Unit 2 startup (Section O1.5).

Maintenance

- The licensee implemented a well-planned forced outage schedule following the Unit 2 trip on August 27, 1998 (Section M1.1).

- The licensee's replacement and calibration of the pressurizer level transmitter for instrument 2-LT-68-320 was well performed (Section M1.2).

- The replacement of suspect coupling capacitor voltage transformers was a good example of the licensee's effort to improve the reliability of the switchyard (Section M2.1).

- The licensee has successfully implemented the initial phase of a design change notice to replace the existing emergency diesel generator batteries (Section M2.2).

- Deficiencies were identified in vendor technical guidance and weaknesses were identified in the licensee's maintenance and inspection program for type DS 532 480 Vac circuit breakers (Section M2.3).

- Deficiencies were observed in ice condenser housekeeping. Practices used to free frozen ice baskets have resulted in minor ice basket damage in Unit 2. Frosting of the outer ice passages was prevalent (Section M2.4)

Engineering

- Modifications to the Spent Fuel Pool cooling system were successfully implemented due in part to the thorough evaluation of the design change notice by engineering and site management (Section E2.1).

Plant Support

- On August 12, 1998, the licensee conducted an effective Radiological Emergency Plan drill (Section P1.1).

Report Details

Summary of Plant Status

Unit 1 began the inspection period at full power. On August 12, 1998, the unit began a coast down for a refueling outage scheduled to begin on September 9, 1998. When the inspection period ended, the unit was at approximately 88% power.

Unit 2 operated at full power until August 27 when the unit automatically tripped from 100% power due to a failed main transformer sudden pressure relay which tripped the main generator, followed by a turbine trip and reactor trip. When the inspection period ended the unit was in Mode 3 with unit startup scheduled to commence on August 30.

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was considered to be good.

O1.2 Inaccurate Control Room Log Entry

a. Inspection Scope (71707)

The inspector followed up on a Unit 2 log entry, related to cold leg accumulator boron concentration, which initially indicated a failure to meet Technical Specification (TS) requirements.

b. Observations and Findings

On August 6, 1998, during a review of control room logs, the inspector observed a Unit 2, August 2, 1998, entry which recorded the chemistry sample results of the #4 cold leg accumulator boron concentration at 1853 ppm. TS requires a concentration of between 2400 and 2700 ppm. If found to be out of limits, the concentration must be restored to within limits within 72 hours. The inspector noted that there were no followup log entries to explain the out-of-specification condition nor had a TS action statement been entered.

On August 6 the inspector verified through discussions with licensed operators and with chemistry personnel that the sample taken on August 2 was actually 2553 ppm, not 1853 ppm. Chemistry stated that the sample had been taken at 1830 hours on August 2, 1998. The inspector concluded that the incorrect log entry was the likely result of a transposition of numbers between the sample value (2553 ppm) and the sample time (1830) and that the actual boron concentration was within TS limits.

The inspector was concerned that neither the off-going nor on-coming shift on August 2 questioned the log entry of 1853 ppm. Operations supervision also did not identify the error during their reviews of the logs. Following the inspector's questioning on August 6, operators amended the August 2 log entry to reflect the correct boron sample results.

c. Conclusion

Operators failed to identify an incorrect control room log book entry related to cold leg accumulator boron concentration. The entry, as written, would have required entry into a TS action statement.

01.3 New Fuel Receipt and Inspection

a. Inspection Scope (71707)

During this inspection period the inspectors observed the licensee's receipt and inspection of new fuel for the upcoming Unit 1 refueling outage.

b. Observations and Findings

On several occasions during this report period the inspectors observed receipt and inspection of new fuel for the Unit 1 refueling outage. The inspectors verified that the licensee conducted the receipt and inspections according to procedure FHI-1, Receiving, Returning, Inspecting and Storing New Fuel and Inserts. The procedure was revised following the last refueling outage to include checking for assembly gadolinium patterns. This corrective action was taken following the misassignment of fuel assemblies which occurred during the last Unit 2 outage as discussed in Inspection Report (IR) 50-327, 328/97-17.

The inspectors noted that most of the operations personnel involved in handling the new fuel were experienced in fuel handling from previous outages. The inspectors observed that the assistant unit operators (AUOs) and the fuel handling senior reactor operator (SRO) were thorough and meticulous in performing fuel inspections. One noteworthy example of thoroughness occurred on July 24, 1998, when an AUO identified a defective weld on an assembly hold down spring locking pin inner weld. The fuel vendor subsequently determined that the weld did not affect the structural integrity of the assembly and no repairs were necessary.

c. Conclusion

Fuel handling personnel were very thorough in the handling and inspection of new fuel.

O1.4 Unit 2 Trip Due to Actuation of Main Bank Transformer Sudden Pressure Relay

a. Inspection Scope (71707)

The inspectors reviewed the events surrounding the Unit 2 trip which occurred as a result of the failure of the sudden pressure relay on the B phase of the main bank transformer.

b. Observations and Findings

The inspectors responded to the control room when Unit 2 tripped, on August 27, 1998, at 1.57 p.m., and observed that the unit was stable in Mode 3. The inspectors confirmed through observations and discussions with operators that plant systems responded to the trip as designed. However, approximately six hours after the trip, the outboard pump packing on the 2A-A auxiliary feedwater (AFW) pump failed and the pump was manually stopped by operators. The turbine driven auxiliary feedwater (TDAFW) pump, which operators had stopped following the trip, was restarted to maintain steam generator levels.

The inspectors noted that a previous packing failure occurred on the Unit 2 TDAFW pump in June 1998 and was documented in IR 50-327, 328/98-07. Problem Evaluation Report (PER) No. SQ981142PER was initiated for the 2A-A AFW pump packing failure. The inspector's followup on the licensee's root cause and corrective action for the packing failure is being identified as an Inspection Followup Item (IFI 50-328/98-08-01).

The licensee determined that the Unit 2 trip was caused by the actuation of the B phase main bank transformer sudden pressure relay. The licensee's investigation determined that the relay had failed and that the transformer had not experienced an actual over pressure event. Actuation of the relay produced an "electrical trouble" unit trip and also initiated the fire protection deluge system for the transformer. The sudden pressure relay is designed to sense changes in the transformer's internal pressure and trips an electrical switch at unsafe rates of pressure rise.

Physical examination of the relay by the licensee's laboratories found that the interior of the relay was covered with an oily, dark residue and the rocker arm pins inside the relay exhibited significant wear similar to fretting. The licensee also discovered that the compression torque on the o-ring that seals the relay housing from the transformer oil, (a factory assembled connection which is not broken or adjusted by the licensee) was significantly less than that specified by the vendor. The relay device had been installed during the Unit 2 outage in 1997. Following the Unit trip the licensee inspected similar relay devices in the switchyard, as plant conditions permitted, and replaced those which exhibited oil leakage or evidence of fretting. The licensee has been working with the relay vendor to determine the cause for the relay failure. PER No. SQ981144PER was initiated to document the trip and post trip evaluation.

The licensee's review and identification of several additional improperly torqued relays, may pose a generic safety issue based on the potential for inducing a loss of offsite power.

c. Conclusion

The licensee conducted a good Unit 2 post trip review of the main bank transformer sudden pressure relay failure.

01.5 Unit 2 Startup

a. Inspection Scope (71707)

On August 30, 1998, the inspectors observed the Unit 2 approach to criticality and other portions of the power ascension, as the unit recovered from the August 27, 1998, trip.

b. Observations and Findings

The inspectors attended the pre-evolution briefings and observed Unit 2 startup activities. The inspectors noted that the briefings were thorough and that potentially distracting activities in the control room were minimized during the approach to criticality. The inspectors noted that operators were challenged with problems with both main feedwater pumps which delayed the power increase. Operators exhibited conservative decision making by holding power at approximately 1.5% until problems with the feedwater pumps were resolved.

Later in the startup, with the unit at approximately 4% power (Mode 2), the unit experienced an unplanned power excursion to approximately 7% power (Mode 1) when a steam dump valve inadvertently failed full open. Operators responded appropriately, closed the steam dump valves from the control room, and manually isolated the failed steam dump valve. As a result of the power excursion, the unit made an approximate four minute unplanned entry into Mode 1. The inspectors reviewed the event with operations management and concluded that all prerequisites for Mode 1 had been completed prior to the unscheduled Mode 1 entry. The inspectors also walked down the steam valve system and did not identify any evidence of system damage. The licensee determined that a loose cam in the steam dump valve operator caused the valve to go full open. The licensee subsequently inspected all the steam dump valves on both units during their extent of condition review. The inspectors verified that, during the unplanned power excursion, Tavg did not decrease to the TS required minimum value for criticality. The licensee initiated PER No. SQ 981155PER to document the inadvertent Mode 1 entry.

c. Conclusion

The Unit 2 startup was thoroughly briefed and carefully executed by operations personnel.

Operator response was good to main feedwater pump problems and a power excursion caused by a failed open steam dump valve during Unit 2 startup.

07 **Quality Assurance in Operations**

07.1 Licensee Self-Assessment Activities (40500)

On August 4, 1998, the inspector attended the Sequoyah Nuclear Safety Review Board (NSRB) meeting at the Sequoyah training center. Subjects discussed during the meeting included:

- Results of the World Association of Nuclear Operators (WANO) review;
- Ice condenser assessment results;
- Pressurizer relief tank sampling problems; and
- May 19 Unit 1 reactor trip review.

The observed NSRB self-assessment activities appeared to be effective.

II. Maintenance

M1 **Conduct of Maintenance**

M1.1 General Comments

a. Inspection Scope (61726 & 62707)

Using inspection procedures 61726 and 62707, the inspectors conducted frequent reviews of ongoing maintenance and surveillance activities. The inspectors observed and/or reviewed all or portions of the following work activities and/or surveillances:

• 1-SI-EDG-082-002.R	Diesel Generator 1B-B Two Year Inspection
• 2-SI-IFT-082-102.B	Functional Test of the Diesel Generator 2B-B Protective Relays
• 2-SI-068-320.3	Channel Calibration of Pressurizer Level Channel III Rack 9, Loop L-68-320 (L-461)
• 1-PI-SFT-003-001.c	TDAFWP Full Flow Test
• 0-SI-SXV-003-209.5	Non-Intrusive Testing of #1 TDAFWP Check Valves
• 0-TI-CEM-000-016.7	Sampling Methods-Miscellaneous Systems

- 1-SI-CEM-018-116.B — Quarterly Chemistry Requirements for Diesel Generator 1B-B Seven Day Fuel Oil Tank and Outside Storage Tanks
- 0-SPPC-078-051.2A — Fuel Pool Temperature Check

In addition to the above activities, the inspectors reviewed the scope and the implementation of the licensee's Unit 2 forced outage plan which was activated as a result of the Unit 2 trip on August 27, 1998.

b. Observations and Findings

Following the Unit 2 trip the licensee implemented a preplanned forced outage work plan. The outage planned activities were estimated to require 75 hours to complete. The forced outage schedule was completed in 77 hours, during which time a total of 52 work orders were completed. The most time intensive evolution was the replacement of pressurizer level transmitter 2-LT-68-320, which the licensee had committed to replace during the first available outage opportunity. The issues related to this pressurizer level transmitter were discussed in IR 50-327, 328/98-07. The replacement and calibration of 2-LT-68-320 is discussed in Section M1.2 of this report.

The inspectors noted that the site's upper management provided extensive oversight and were very visible during the forced outage period. The site vice president personally participated in the containment closeout inspection.

c. Conclusion

The licensee implemented a well-planned forced outage schedule following the Unit 2 trip of August 27, 1998.

M1.2 Calibration of Pressurizer Level Instrument 2-LT-68-320

a. Inspection Scope (62707)

The inspector reviewed the work order, the channel calibration procedure, and the surveillance instruction for replacement and calibration of pressurizer level instrument 2-LT-68-320. Additionally, the inspector observed portions of the calibration pre-job brief, interviewed maintenance personnel, and observed the instrument calibration activity.

b. Observations and Findings

The inspector reviewed the calibration check data for the degraded instrument obtained prior to its removal. Revision 3 of Surveillance Instruction 2-SI-ICC-068-320.3, Channel Calibration of Pressurizer Level Channel III Rack 9, Loop L-68-320 (L-461) was utilized. The inspectors verified that the instrument drift since the last outage was within acceptable limits based on a comparison of the as-left surveillance data

and the as-found surveillance data. The new instrument was calibrated to meet the Rev. 4 as-left criteria, which was based on the correct scaling for the instrument.

The inspector found the work order to contain sufficient detail and, in conjunction with the reviewed calibration and surveillance procedures, found that adequate guidance and precautions were provided to permit satisfactory replacement, recalibration, and testing of pressurizer level instrument 2-LT-68-320.

Through direct observation of portions of the job pre-brief and the instrument calibration activity, and discussions with the individuals involved, the inspector determined the technicians to be adequately trained, knowledgeable and proficient in the necessary skills to successfully accomplish the required corrective maintenance.

c. Conclusion

The licensee's replacement and calibration of the pressurizer level transmitter for instrument 2-LT-68-320 was well performed.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Replacement of Switchyard Coupling Capacitor Voltage Transformers (CCVT)

On June 24, 1998, failure of a switchyard CCVT occurred at Browns Ferry Nuclear Plant. As a result of the TVA's event investigation and subsequent issuance of a Transmission Information Notice, Sequoyah identified and subsequently replaced five suspect CCVTs in the Sequoyah 500 kV switchyard. Replacement of the CCVTs was completed within 18 days following receipt of the notification.

The replacement of suspect CCVTs was a good example of the licensee's effort to improve the reliability of the switchyard.

M2.2 Replacement of Emergency Diesel Generator (EDG) Batteries

a. Inspection Scope (62707)

The inspectors reviewed DCN M13972A related to replacement of EDG batteries and observed installation of the new batteries.

b. Observations and Findings

During this inspection the licensee began implementation of DCN M13972A to replace the existing EDG batteries. The existing batteries were nearing end of life and were being replaced with larger capacity batteries. The new batteries will be rated at 250 amp-hours compared to 100 amp-hours for the old cells.

The 2B-B EDG batteries were the first to be replaced, with the remaining three EDG battery replacements to follow. The battery replacement

involves installation of a temporary battery in the hallway outside the EDG room with cabling routed to the dc distribution panel inside the EDG room. The inspectors verified that the DCN specified that the temporary batteries were seismically supported and that the temporary cables were of the correct size and were routed to meet requirements for train separation.

At the end of the inspection period EDG 2B-B had been connected to its temporary battery and the installation of new battery racks inside the 2B-B EDG room had been completed. The EDG was declared inoperable only during the brief period of time required to disconnect the old battery and connect the temporary battery to the dc distribution panel.

c. Conclusion

The licensee has successfully implemented the initial phase of a DCN to replace the existing EDG batteries.

M2.3 480 Vac Westinghouse Type DS 532 Circuit Breaker Deficiencies

a. Inspection Scope (62707/40500/37551)

The inspectors continued to follow the licensee's corrective measures concerning the failure of a 480 Vac Westinghouse type DS 532 circuit breaker which led to a May 19, 1998, reactor trip. This issue was previously identified as URI 50-327/98-06-02 and further discussed in IR 98-07.

b. Observations and Findings

There are 21 type DS 532 circuit breakers that are presently in service or in standby that are yet to be inspected following the failure of the shutdown bus alternate supply breaker 1A1-A on May 19. Six non-safety related breakers were removed and examined, all exhibited material deficiencies. Maintenance was suspended pending a satisfactory technical resolution to determine inspection, and repair requirements for the DS 532 breakers.

The licensee and Westinghouse confirmed that material deficiencies contributing to the breaker failure included inappropriate adjustment of the arcing and main contacts, degraded closing springs with insufficient low-end force to overcome internal component friction, and bowing of the stationary pole base frame support.

The licensee and Westinghouse determined that, on initial closing of 1A1-A breaker, the contacts would not remain fully closed because the closing cam did not stop in the correct position at the end of the closing cycle. High speed photography of a normal functioning type DS breaker during the closing cycle revealed that the closing cam oscillated from the full closed to a less-than-fully-closed position and ultimately comes to rest at the fully closed position.

The licensee noted that when the low-end force of the closing springs is sufficient to overcome internal friction, the closing cam stops in the correct position and the main contacts remain fully closed. In the failed breaker, the closing springs do not produce sufficient low-end force to overcome the friction. The closing cam and consequently the main contacts come to rest at a position less than fully closed.

The licensee had been adjusting the main contacts without first verifying the position of the closing cam or recharging the closing springs which would have ensured the correct position of the closing cam. This made it appear that the main contacts needed adjustment when, in fact, excessive internal friction or weak closing springs had caused the closing cam to be out of position. Adjusting the contacts under these circumstances resulted in damage to the pole bases and frame.

The licensee identified that testing the breaker after the closing springs had been recharged masked failure of the closing cam to stop in the fully closed position under spring force alone since the charging motor forced the cam into the correct position. This condition was not recognized until the breaker was closed onto a load sufficient to cause arcing on the contacts.

Westinghouse Technical Bulletin ESBU-TB-98-02, was issued on July 22, 1998, in response to DS 532 breaker adjustment problems and recommended revisions to DS maintenance procedures to assist in early detection of weak low end force on the closing springs or increased friction, either of which could result in breaker failure, and to insure against over adjustment of the main contacts which could lead to breaker damage.

The inspector's review of the breaker maintenance procedures identified the following contributors to failure of the subject breaker and to the observed degradation of Type DS 532 breakers:

- Post Maintenance Testing (PMT) guidance was not specific, was inconsistently performed, and was inadequate to verify breaker operability. PMT was documented as complete on the failed breaker following maintenance but it had not been closed onto a load. The licensee concluded that PMT was compatible with industry practice and EPRI guidelines but is making changes. Among those changes are to verify full travel of the operating mechanism on springs only and to collect additional as-left data. An evaluation is also in progress to determine if the breakers can be test-operated under load on a non-critical circuit following maintenance.

- An adequate process for collection and trending of as-found data was not in place to identify degrading circuit breaker material conditions and prevent two similar and consecutive failures of the same circuit breaker. The licensee reported that the maintenance instruction (MI) used to service and test the breakers was being revised to add a section of as-found measurements with as-found acceptance criteria to support trending and the assessment of the adequacy of maintenance.

- Neither MI nor work orders specified which sections of the MI were to be performed. A general statement in the MI stating "reason for performing MI determines sections to be worked" was relied upon. The licensee reported that the instruction was being revised to require the approval of the component or maintenance engineer or general foreman to omit any steps applicable to the breaker type being tested or maintained.

- The MI permitted the foreman or general foreman to authorize steps of the procedure to be performed out of sequence "provided it will not cause the breaker to be returned to service in a degraded condition." Completed maintenance documentation was not specific enough to reconstruct the sequence of MI execution. The licensee reported that the instruction was being revised to designate portions which must be performed in a specific sequence to be effective and to include a final as-left section which must be fully performed after all adjustments are complete. The as-left testing will include verification of full mechanism travel on spring force alone.

- The PER system is used to document material, procedure, and performance deficiencies. This system has been employed to "trend" breaker performance. However, the system does not manage and display data in a fashion which permitted effective trend analysis. Furthermore, lack of adequate as-found acceptance criteria resulted in the ambiguous interpretation of PER trending. The licensee intends to continue to use this system to trend breaker performance for those breakers which fail to meet as-found acceptance criteria and has no specific plans to trend breaker performance beyond the use of the PER system.

The licensee and vendor have taken steps to improve the processes used in testing and maintaining type DS 532 circuit breakers. At the close of this inspection period corrective actions have not been completed and inspection of the remaining DS 532 breakers have not been performed. Unresolved Item (URI 50-327/98-06-02) will remain open pending completion of the inspection, maintenance and testing of the remaining safety related DS 532 breakers.

c. Conclusion

Deficiencies were identified in vendor technical guidance and weaknesses were identified in the licensee's maintenance and testing program for type DS 532 480 Vac circuit breakers.

M2.4 Ice Condenser Lower Plenum Inspection

a. Inspection Scope (61726)

The inspectors conducted a walk-down of the Unit 2 ice Condenser (IC) lower bay and reviewed the licensee's findings during a forced outage.

b. Observations and Findings

The licensee, while conducting a radiation survey of the Unit 2 IC lower bay, discovered several unattended items in the bay including an ice bay suit, a roll of plastic, and a bag containing insulated gloves. PER No. SQ981140PER documented the findings and technical operability evaluation (TOE) 2-98-061-1140 concluded that none of the items posed a credible threat to the operation of the ECCS pumps or to the IC itself.

During a subsequent inspection of the lower IC, the licensee identified and documented three dented ice baskets in PER No. SQ981141PER. The inspectors observed three additional damaged ice baskets during their tour of the lower IC. TOE-2-98-061-1141 was prepared to evaluate the damage to the six ice baskets which consisted of dents, bent ligaments, and some crumpling of the lower portions of the basket. The follow-up of the licensee's efforts to identify, evaluate, and correct damaged ice baskets during the next Unit 2 scheduled outage is being identified as an Inspection Followup Item (IFI 50-328/98-08-02).

Inspectors examined lower IC doors for freedom of movement, flow passages for potential obstructions, and the IC floor for indications of swelling or heaving. The inspectors also evaluated the lower IC for general housekeeping and other signs of material degradation. No deficiencies of the lower IC doors and no visible movement of the IC floor were observed. Clear ice passages dominated the central rows of the IC while heavily frosted passages were observed in the outer two rows. The IC flow passages met the TS requirements concerning flow passage blockage.

A number of outer baskets were frosted to the extent that a visual inspection of their material condition was not possible. A review of licensee documentation revealed that outer baskets were most likely to be frozen in place. Consequently, the inspectors concluded that the outer baskets would have the highest probability of damage, typically caused when attempting to free frozen-in-place baskets. In the area of housekeeping, with the exception of the items already discussed and the periodic appearance of flashlights, pipe clamps, and miscellaneous fittings dropped into ice baskets over the years, housekeeping was considered generally acceptable. The licensee performed a TOE of the items trapped in the ice baskets and concluded that IC operability was not impacted.

c. Conclusion

Deficiencies were observed in IC housekeeping. Practices used to free frozen ice baskets have resulted in minor ice basket damage to Unit 2 IC baskets. Frosting of the outer ice passages was prevalent.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Modifications to Spent Fuel Pit (SFP) Cooling System

a. Inspection Scope (37551)

The inspector reviewed the implementation of DCN M-13274A which involved modifications to the SFP cooling system.

b. Observations and Findings

During this inspection period the inspector observed portions of the implementation of DCN M-13274A and discussed the modifications with the system engineer. The modifications consisted of pipe support function changes and pipe support deletions and additions, replacement of the existing annubar flow elements and flow indicators, and verification of the fit up of the flood mode temporary spool piece following the pipe support modifications. The replacement of the existing annubar flow elements and the flow indicators was a corrective action proposed by the licensee in response to violation (VIO 50-327, 328/97-03-01). The inspector noted that a special SFP strainer seal tool had to be manufactured to ensure isolation of the SFP piping during replacement of the annubar flow elements. Installation of the seal tool over the SFP suction strainer was accomplished manually from the fuel handling bridge by mechanical maintenance personnel.

Verification of the fit up of the flood mode temporary spool piece required the shutdown of both trains of SFP cooling. On July 21, 1998, the licensee conducted a test over a four hour period by shutting down both trains of SFP cooling to verify the heat up rate of the SFP. The test confirmed, what engineering had calculated, that the heat up rate was approximately 2° F per hour. The verification of the fit up of the flood mode temporary spool piece occurred on August 7, 1998. Again, both trains of SFP cooling were shutdown. The evolution, which also included a valve replacement, lasted approximately 11 hours, during which time the SFP temperature increased from 93° F to 108° F.

The inspector observed that the licensee postponed the spool piece fit up evolution three times while questions were resolved concerning the evolution and the associated safety evaluation. The inspector concluded that the delays were appropriate and indicated conservative decision making by the licensee.

c. Conclusion

Modifications to the SFP cooling system were successfully implemented due in part to the thorough evaluation of the DCN by engineering and site management.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) IFI 50-328/97-18-09, Ashcroft Pressure Switch Setpoint Drift: The subject pressure switches provide pressure signals for the turbine run back circuitry and for the auxiliary feedwater actuation circuitry, which are both quality related rather than safety related applications. The pressure switch manufacturer made several modifications to the switch, but the licensee's field testing of the modified switches confirmed that the modifications did not eliminate the setpoint drift problem. The corrective action plan for PER No. SQ972677PER, specified that a DCN for each unit will be developed to correct the problem. The DCNs are scheduled to be implemented during June and December of year 2000, which corresponds to the cycle 10 refueling outage for each unit. Until a successful DCN is implemented, the licensee will continue to calibrate the existing pressure switches every six weeks or as required based on trend drift history.

E8.2 (Closed) LER 50-327, 328/98002, Inadequate Surveillance Testing as a Result of a Misinterpretation of an ANSI Standard: The issue involved the methodology for measurement of air flow velocities in ventilation systems and the licensee's misinterpretation of an ANSI test methodology used to satisfy TS surveillance requirements. The licensee's test procedures did not provide sufficient guidance to ensure testing was conducted using the pitot-tube velocity-traverse at test locations where the air flow velocities exceed 1000 fpm as specified in ANSI N510-1975. The apparatus used to obtain the previous measurements was a hot wire anemometer. The licensee determined that measurements using either the pitot-tube method or the hot wire anemometer were comparable and the difference in accuracy between the two methods was negligible. The inspector verified that the 1989 edition of ANSI N510, supported this interpretation.

The licensee identified this issue through review of an industry event and took prompt corrective action to retest EGTS to the ANSI N510-1975 requirements, pitot-tube method. They determined that EGTS retest results were within the air flow acceptance criteria stated in TS, 4000 cubic feet per minute ± 10 percent.

The inspector concluded that the test method used to measure EGTS air flow velocities did not meet literal compliance with the TS 3.6.1.8. This failure constitutes a violation of minor significance and is not subject to formal enforcement actions.

IV. Plant Support

P1 Conduct of EP Activities

P1.1 Observation of Radiological Emergency Plan (REP) Drill

a. Inspection Scope (82301)

The inspector, in preparation for the November graded exercise, observed portions of the August 12, 1998, REP drill.

b. Observations and Findings

The inspector attended the pre-drill briefing at the Sequoyah simulator and observed the operation's simulator crew respond to the simulated plant emergency. As the drill progressed, the inspector went to the Technical Support Center to observe activities.

c. Conclusion

On August 12, 1998, the licensee conducted an effective REP drill.

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Water In Diesel Fuel Oil Storage Tank

a. Inspection Scope (71750)

The inspectors reviewed the licensee's root cause and corrective actions related to the discovery of water in the 1A-A EDG 7-day tank.

a. Observations and Findings

On April 21, 1998, during performance of 1-SI-CEM-018-116.A, Quarterly Chemistry Requirements for DG 1A-A Seven Day Fuel Oil Tank, the licensee removed approximately 17 gallons of a water/sludge/particulate mixture from the tank. The licensee initiated PER No. SQ980436PER to document a concern with potential fuel degradation and to determine the source of water intrusion. The remaining EDG seven day tanks were subsequently sampled and no accumulation of water was detected.

The licensee concluded that the water intrusion most likely occurred during a fuel oil transfer on January 31, 1998, from an outside storage tank to the EDG 1A-A seven-day tank. That transfer was performed using procedure 0-SO-18-5, Fuel Oil Transfer. The outside storage tanks are known to collect water in their sumps (the lowest point in the storage tank) and, accordingly, 0-SO-18-5 had been revised in November 1996 to require flushing the outside storage tank sump, prior to transfer to the seven day tank, to prevent transfer of sediments and water to the seven day tank.

The inspector reviewed the completed copy of 0-SO-18-5, performed on January 31, 1998, and verified that the flushing evolution was performed. The inspector also reviewed the chemistry sample results for all four EDGs for the last two years. The inspector determined that there has not been a history of water accumulation in any of the seven day tanks. Recent samples taken in July 1998 of the 1A-A seven day tank indicated no accumulation of water.

On July 21, 1998, the inspector discussed the 1A-A EDG seven day tank water accumulation issue with the chemistry manager. The inspector concluded from that discussion, and the review of procedures and chemistry sample results, that the most probable cause of the water accumulation was the transfer of water from the outside storage tank to the seven day tank.

c. Conclusion

Water accumulation in the 1A-A EDG seven day tank was most probably caused when fuel oil was transferred from the outside storage tank to the seven day tank.

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 September 4, 1998. The licensee acknowledged the findings presented.

During the inspection period, the inspectors asked the licensee whether any materials would be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

Bajestani, M., Site Vice President
*Burton, C., Engineering and Support Systems Manager
Butterworth, H., Operations Manager
Gates, J., Site Support Manager
*Freeman, E., Maintenance and Modifications Manager
*Herron, J., Plant Manager
Kent, C., Radcon/Chemistry Manager
*Koehl, D., Assistant Plant Manager
O'Brien, B., Maintenance Manager
*Salas, P., Manager of Licensing and Industry Affairs
*Valente, J., Engineering & Materials Manager

* Attended exit interview

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 40500: Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726: Surveillance Observations
IP 62707: Maintenance Observations
IP 71750: Plant Support Activities
IP 71707: Plant Operations

IP 82301: Evaluation of Exercises for Power Reactors
IP 92901: Followup - Operations
IP 92902: Followup - Maintenance
IP 92903: Followup - Engineering
IP 92904: Followup - Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Type	Item Number	Status	Description and Reference
Opened			
IFI	50-328/98-08-01	Open	Followup on Failure of 2A-A MDAFW Packing, PER No. SQ981142PER (Section O1.4).
IFI	50-328/98-08-02	Open	Followup on Dented Unit 2 IC Ice Baskets, PER No. SQ981141PER, TOE-2-98-061-1141 (Section M2.4).
Closed			
IFI	50-328/97-18-09	Closed	Ashcroft Pressure Switch Setpoint Drift (Section E8.1).
LER	50-327, 328/98002	Closed	Inadequate Surveillance Testing as a Result of a Misinterpretation of an ANSI Standard (Section E8.2).
Discussed			
URI	50-327/98-06-02	Open	Potential Improper Corrective Maintenance Activities Related to Improper Breaker Contact Compression Setting and Inadequate Post Maintenance Testing (Section M2.3).

LIST OF ACRONYMS USED

AFW - Auxiliary Feed Water
ANSI - American National Standards Institute
AUO - Assistant Unit Operator
CCVT - Coupling Capacitor Voltage Transformer
dc - Direct Current
DCN - Design Change Notice
ECCS - Emergency Core Cooling System
EDG - Emergency Diesel Generator
EGTS - Emergency Gas Treatment System
EPRI - Electric Power Research Institute
IC - Ice Condenser
IFI - Inspection Followup Item
IR - Inspection Report
kV - Kilo-Volt
LCO - Limiting Condition for Operation

LER	-	Licensee Event Report
MI	-	Maintenance Instruction
NRC	-	Nuclear Regulatory Commission
NSRB	-	Nuclear Safety Review Board
PER	-	Problem Evaluation Report
PMT	-	Post Maintenance Test
ppm	-	Parts Per Million
REP	-	Radiological Emergency Plan
RP&C	-	Radiological Protection and Chemistry
SFP	-	Spent Fuel Pit
SI	-	Surveillance Instruction
SRO	-	Senior Reactor Operator
TDAFW	-	Turbine Driven Auxiliary Feed Water
TOE	-	Technical Operability Evaluation
TS	-	Technical Specifications
TSC	-	Technical Support Center
TVA	-	Tennessee Valley Authority
URI	-	Unresolved Item
Vac	-	Voltage-Alternating Current
WANO	-	World Association of Nuclear Operators