UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8931

October 24, 2003

Tennessee Valley Authority
ATTN: Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT - NRC PROBLEM IDENTIFICATION AND RESOLUTION PROGRAM INSPECTION REPORT 05000327/2003009 AND 05000328/2003009

Dear Mr. Scalice:

On September 26, 2003, the NRC completed a team inspection at your Sequoyah 1 and 2 reactor facilities. The enclosed report documents the inspection findings, which were discussed on September 26, 2003, with Mr. Purcell and other members of your staff.

This inspection was an examination of activities conducted under your licenses as they relate to the identification and resolution of problems and compliance with the Commission's rules and regulations and the conditions of your operating licenses. Within these areas, the inspection involved selected examination of procedures and representative records, observations of activities, and interviews with personnel.

On the basis of the sample selected for review, there were no findings of significance identified by the inspectors during this inspection. The team concluded overall that problems were acceptably identified, evaluated and resolved within the problem identification and resolution program. However, some deficiencies were identified in the implementation of the program. These included: unclear or incomplete corrective actions; lack of thoroughness evaluations; and inconsistent categorization of program items. Additionally, two licensee identified non-cited violations are listed in Section 4OA7 of this report. If you contest these non-cited violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Sequoyah.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS.index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Stephen, J. Cahill
Reactor Projects Branch 6
Division of Reactor Projects

Docket Nos. 50-327, 50-328
License Nos. DPR-77, DPR-79

Enclosure: Inspection Report 05000327/2003009; 05000328/2003009
w/Attachment

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-327, 50-328
License Nos:	DPR-77, DPR-79
Report No:	50-327/03-09, 50-328/03-09
Licensee:	Tennessee Valley Authority (TVA)
Facility:	Sequoyah Nuclear Plant, Units 1 & 2
Location:	Sequoyah Access Road Hamilton County, TN 37379
Dates:	September 8 - 12 and September 22 - 26, 2003
Inspectors:	B. Holbrook, Lead Inspector, Senior Reactor Inspector, Browns Ferry Nuclear Plant D. Forbes, Physical Security Inspector, Region II R. Monk, Resident Inspector, Browns Ferry Nuclear Plant R. Telson, Resident Inspector, Sequoyah Nuclear Plant
Approved by:	S. Cahill, Chief Reactor Projects Branch 6 Division of Reactor Projects

Enclosure

Summary of Findings

IR 05000327/2003-009, 05000328/2003009; on 9/08/2003 - 9/26/2003; Tennessee Valley Authority, Sequoyah Nuclear Plant, Units 1 and 2, annual baseline inspection of the identification and resolution of problems.

The inspection was conducted by an NRC Senior Reactor Inspector, two Resident Inspectors, and a Physical Security Inspector. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

Two violations of very low safety significance, which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and corrective actions are listed in Section 4OA7.

Identification and Resolution of Problems

The team determined that, overall, the licensee was effective at identifying problems, entering them into the corrective action program (CAP) for resolution, and implementing corrective actions to prevent recurrence. However, there were several examples where the documentation of problem evaluation reports (PERs) was not clear, concise, or comprehensive. The team had to seek out plant personnel knowledgeable of some problems to gain a clear understanding of the issue in order to assess if the corrective actions identified were adequate. The inspection team did identify a significant improvement in the quality of PER development and documentation during recent months when compared to older PERs, indicating increased management and supervisory attention to overall PER quality.

Senior management involvement in the problem identification and resolution (PI&R) program was evident in the daily management review committee meeting, where all PERs were reviewed. The licensee's threshold for identifying problems was low as evidenced by the large number of PERs identified. The number of PERs met the licensee's goal for problem identification. However, due to the large number, backlog presented a challenge and did not meet the licensee's goals. The team did not identify any significant problems due to the backlog. The team also did not identify any adverse conditions which were not in the CAP for resolution.

Licensee audits and assessments critically assessed PI&R activity and identified improvement needs. Prioritization and evaluation of problems were generally effective and consistent with risk and safety significance; however, there were some examples where evaluations were not thorough and detailed. Corrective actions specified for problems were generally adequate; although some minor examples were identified where the corrective actions were not complete, or not comprehensive.

Long term equipment problems continue to challenge plant staff and unit operation. This was most evident for safety related chillers and plant electrical breakers. Some corrective actions for chiller problems and component performance were not timely. The overall system health of safety related chillers, since the last PI&R inspection in December 2001, has declined. However, slight improvement was noted for specific components. The trending element of the CAP was not always effective in identifying potential adverse trends. The corrective actions for balance-of-plant equipment issues were not as detailed, rigorous, or effective in correcting problems as with safety related equipment.

Based on interviews conducted during the inspection, workers at the site feel free to raise issues with their management and to input them into the problem identification and resolution program.

Report Details

4. OTHER ACTIVITIES (OA)

4OA2 Problems Identification and Resolution

a. Effectiveness of Problem Identification

(1) Inspection Scope

To determine if problems were being properly identified and entered into the CAP for resolution, the inspectors reviewed PERs from an approximate two year period since the last PI&R Inspection for issues across the reactor safety cornerstones. The team also conducted a more detailed system review focused on systems identified in the licensee's listing of top ten risk reduction worth systems and top ten risk achievement worth systems. The systems selected were also identified as systems important to mitigating accident conditions. The systems selected for review were the auxiliary feedwater system (AFW), essential raw cooling water system (ERCW), and the emergency diesel generators (EDGs). To determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution, the inspectors reviewed PERs, selected work orders (WOs), planned modifications, and system health reports associated with the systems.

The inspectors conducted a walkdown, with the responsible system engineer, of accessible portions of the above systems to determine if deficiencies existed that had not been entered into the CAP. Discussions with the system engineer and plant personnel were conducted to assess overall system health and performance and to determine if known deficiencies were being entered into the CAP.

Selected audits and self-assessments were reviewed to determine if identified issues were entered into the CAP for resolution. CAP status tracking and performance trending data were reviewed to determine if there was any significant change in the rate of PER generation and to assess the licensee's actions with respect to abnormal trends. Open items in the Employee Concerns Program (ECP) backlog were reviewed for timeliness of review, closure, significance and issue disposition.

The inspectors reviewed personnel contamination reports, safeguards event reports, and licensee identified deficiencies associated with emergency preparedness to verify that they were appropriately entered into the licensee's CAP. The team also reviewed licensee actions in response to non-cited violations from NRC inspection reports; corrective actions taken for licensee event reports; and actions with respect to operating experience items to ensure they were assessed for inclusion into the CAP.

The inspectors also reviewed items in the physical protection cornerstone to determine if problems were being properly identified, characterized, and resolved. The team identified PERs and safeguards event reports for security deficiencies and evaluated the items to determine if the licensee was trending deficiencies appropriately. Selected licensee corrective action program documents associated with this program area were reviewed and are listed in the attachment.

The team also reviewed licensee security self assessments from 2001 and 2002 as well as Nuclear Assurance Department safeguards audits from 2002 and 2003. The effectiveness of these assessments and audits was evaluated by comparing the assessment and results against self-revealing and NRC-identified issues. While reviewing licensee corrective actions, problems identified for security activities were evaluated against the requirements contained in the Sequoyah Physical Security and Safeguards Contingency Plan, and referenced licensee procedures. Specific documents reviewed are listed in the attachment.

(2) Assessment

The team determined that the licensee was effectively identifying problems and entering them into the CAP for resolution. This was evidenced by the large number of PERs identified and their low threshold, the importance of issues being identified and documented, and the relative few deficiencies being identified by external organizations. The number of PERs met the licensee's internal goals for problem identification. However, due to the large number of PERs initiated, the backlog of PERs presented a challenge and did not meet the licensee's internal goals. The team reviewed the scope of the backlog and did not identify any significant problems that were attributable to the backlog.

During the inspection team's review and walkdown of the accessible portions of the AFW, ERCW, and EDG systems, the team did not identify any significant conditions adverse to quality. The system engineers tracked deficiencies and were familiar the overall system health and long term performance of their systems. For example, the EDGs have been classified Yellow (Red, Yellow, White and Green monitoring scale) in the System Health report for the past 10 quarters partially due to a problem with the pressure control valves (PCVs) in the air start system that was identified in November 2002. At times, a PCV will open and result in a spurious uncontrolled blowdown of the air start receiver. A design change implemented to correct the problem was not completely successful. While the PCV problem was not a current operability concern, it kept the EDG system in a declined performance status so the system engineer had rated the system health as Yellow. The system engineer also had developed a checklist to monitor PCV performance and maintained a list of system deficiencies, improvement issues, and proposed system design changes to address long standing performance issues. He also had provided operations personnel with interim guidance until another corrective action could be implemented. The PCV problem is documented as an open "B" level PER. The team considered this effective oversight of the recurring problem in the licensee's CAP.

The inspection team identified a significant improvement in the quality of PER development and documentation during recent months when compared to older PERs reviewed during the inspection. PER quality improvement has been a recent goal and focus area for site management. The observed improvements were indicative of this increased management and supervisory attention. However, the team identified examples where PER documentation was not clear or concise. Frequently the inspection team had to seek out knowledgeable personnel to gain a better understanding of the issue in order to assess the adequacy of the corrective actions

planned or taken. When one PER was closed to an existing PER, or when PERs were combined, the problem descriptions were not always clearly carried forward. The inspection team did not identify any significant issues which were deleted or dropped. However, the team identified this as a licensee challenge to ensure corrective actions would correct the appropriate problem.

The team verified that issues and deficiencies raised by audits and self-assessments were appropriately entered into the CAP. Self-assessments were critical, detailed, and identified items to correct or improve programs and processes. One particularly good assessment was the Sequoyah Reliability Improvement Plan dated July 30, 2003. The "Plan" was a work in progress and was expected to develop as it progressed. It addressed five areas (Operations, Maintenance and Modifications, Engineering, Outage and Scheduling, and Management) and was developed to improve the declining performance of Unit 2, which has experienced six reactor trips and two forced outages since the spring of 2002, and to ensure that Unit 1 does not experience similar issues. The team noted implementation of immediate and long term actions and that an extensive assessment of the CAP with suggested improvements was forthcoming.

The Operating Experience (OE) samples reviewed by the team indicated that OE items were given appropriate consideration by plant personnel. OE items were captured in PERs and received management review during the daily review of PERs. Items were appropriately screened and, if required, incorporated into programs and processes. Items resulting from the Employee Concerns Program (EPC) were reviewed, classified, and entered into the CAP for resolution in accordance with SPP-3.1.

The inspection team identified some deficiencies with implementation of CAP procedure requirements for conducting trend analysis. For example, a sort of the PER database for torque issues for the previous two years identified more than 100 different PERs for both safety related and non-safety related equipment. The problems included over-torquing, possible under-torquing (cause unresolved) and torquing with unclear procedure guidance. Although most of these PERs were level "D" or "C" and did not require corrective actions to prevent recurrence, the licensee credited trend analysis as the means to identify adverse performance or common causes to be corrected. The inspectors observed that a trending PER had not been initiated and no previous actions had been taken to strengthen the torquing process.

The team determined that the licensee was effective at identifying security problems at an appropriately low level and entering them into the CAP. The team did not identify any security deficiencies that had not been previously identified by the licensee and identified in a PER. Assessments and audits were generally of sufficient depth and identified issues similar to those that were self-revealing.

b. Prioritization and Evaluation of Issues

(1) Inspection Scope

Licensee special purpose procedure (SPP)-3.1 contained four classifications of PER significance: “A” level was the most significant, usually safety related and requiring a formal root cause analysis; “B” level was considered significant, required further evaluation, and may require a formal root cause determination based upon management decision; “C” level was for routine problems warranting additional corrective evaluation and action; and “D” level was for issues that could be quickly resolved/closed and trended or routine problems which were adequately addressed by immediate actions or the work control process.

The team reviewed a sampling of PERs to determine if issues were classified and resolved in accordance with the requirements of procedure SPP-3.1. The team attended the licensee’s management review committee (MRC) meeting to observe the final classification assignment for emerging PERs. The team reviewed root cause analyses and apparent causes for PER items to assess the quality, adequacy, and thoroughness of the evaluations. In addition, the team assessed the corrective action items resulting from the cause determinations to determine if procedure requirements were met to correct the problem and to prevent recurrence if required. The cause codes identified in the PERs were compared to the identified apparent cause or root cause analyses determination to determine if the causes were correct and that the causes were adequately addressed by the corrective action item. Selected audits and self-assessments were reviewed by the team to determine if problems were developed into PERs. Also, the review was to determine if the PERs were correctly classified in accordance with procedure guidance and that corrective action items were completed as described in the corrective action plan. Documents reviewed are listed in the attachment.

(2) Assessment

In the area of Problem Evaluation, the team found that the licensee generally performed appropriate evaluations of problems identified in the CAP process. However, some deficiencies were noted in evaluating the effects of continued plant operations in off-normal conditions. Examples of this include: 1) operation with the #7 heater drain tank level control valve 'dogged' which reduced the secondary plant's ability to withstand a condensate system transient resulting in a reactor trip: 2) operation of a cooling water valve with excessive manual torque which broke the valve allowing it to isolate cooling water to the stator resulting in a reactor trip: 3) operation with a combination of leaking High Pressure Stop Valves to the main feed (MF) pumps and isolated MF pump recirculation valves which often result in additional operator actions and equipment challenges following MF water isolations.

During interviews with various levels of plant personnel the team found that personnel had received feedback on problems they had identified as well as on self-assessment and audit findings.

The team also determined that PERs were generally categorized correctly. However, there were several examples where the team determined a higher level or more rigorous evaluation was more appropriate and may have been more effective in resolving the problem. Examples included:

- C level PER 02-002372, Main Generator Loose Frame Foot Bolting, was initiated for a Unit 1 turbine/generator vibration problem. It stated that all accessible Frame Foot Bolting (79 of 100) was checked by hand. All bolts on the North Side (43 of 50) were found to be hand tight (vice the vendor recommended 800 ft/lbs). No immediate action was documented. Since this was a “C” level PER, no root cause was performed and it received less rigor and management oversight. Neither the PER nor corrective action addressed the reason for the loose bolting and no documentation in the CAP indicates it was ever resolved.

  The inspectors noted the generator is not covered under the Quality Assurance program of 10 CFR 50, Appendix B and has no safety related function and this was therefore not a violation of regulatory requirements.

- C level PER 03-006554-000, documented that the 1A ERCW supply header was opened in order to replace a section of piping. A significant quantity of silt was present, starting about 5 feet from valve 1-FCV-67-147 and increasing so that the 24" pipe was half full. The silt problem revealed a condition contrary to findings associated with corporate “A” level PER 02-000203-000 that identified the need for overall program reevaluation based on raw water corrosion control deficiencies. The silt also contradicted a ultrasonic examination of ERCW piping that indicated no significant silt accumulation.

  While the presence of silt was identified, the deficiency was not placed into the above context and, as such, did not provide a complete and accurate identification of this problem. As a “C” level PER, it was not explicitly evaluated for all potential problems. During this inspection, the inspectors determined that valve 1-FCV-67-147 is a unit crosstie valve, is normally closed, and has no safety function. The inspection team concluded that opening the valve such that safety related components would be affected, would be highly unlikely and presented no safety concern.

- C level PER 02-005524-000, noted that the No. 1 reactor coolant pump (RCP) on U2 failed to start and did not start on a second attempt after having instrumented various contacts on the RCP breaker. The pump started on a third attempt. The apparent cause was characterized as a high resistance in the control wiring of the closure circuit or mechanical binding of the breaker or closing coil, but a cause could not be proven during troubleshooting.

Development of a corrective action plan was delayed with the following justification: “RCPs 1 and 3 are presently running and of course will remain running until the next refueling outage or forced outage. Therefore the start circuit issue does not affect nuclear safety or personnel. Based on this, it is acceptable to extend the corrective action plan development.” This did not consider that emergency procedure FR-C.1, Inadequate Core Cooling, identified specific conditions requiring the starting of RCPs. Due to the “C” level classification of this PER, it received less rigor and management oversight and this aspect was not considered. The inspection team noted that placing the RCPs in service with an unresolved problem has not had an adverse consequence.

- D level PER 03-010200, documented that the Emergency Gas Treatment System (EGTS) had to be placed in service without prior planning and this caused Unit 2 to enter an unplanned LCO. Based on Condition Classification Criteria of SPP-3.1, this PER should have been a “C” level since an unplanned LCO entry occurred.

The inspection assessed the licensee’s use of Root Cause and Apparent Cause analysis and the quality, depth, and focus of the analysis. Identification of the causes of some deficiencies was not thorough and detailed. The evaluations were not always reassessed using more current information. Examples include the following:

- PER 02-012966-000, identified a problem with an EDG engine air start pressure control valve (PCV) that bled down the air start receiver for approximately 10 seconds during an EDG start, creating the potential concern for the receiver to fall below the TS limit of 210 psig. The root cause section of the PER indicated that a Kepner-Tregoe analysis was performed. Based upon a test document provided, no blow down events could be replicated and the PER concluded “Therefore, the possible causes are considered highly unlikely.” PCV induced blowdown events have occurred multiple times since, but the root cause analysis had not been updated to reflect that the events continue to occur. The licensee had addressed each problem. The inspection team determined that there was no EDG operability concern since the problem only affected one train of the air system.

- PER 02-009749, identified a problem with the air regulators for the Motor Driven Auxiliary Feedwater control valves. In the PER, there was a lengthy description of the desired valve air setting, the current valve settings, and that a study had recommended that an additional 20% air pressure above the vendor’s specifications be applied. Missing from the description was that the vendor expressed concern with repeated stressing of the diaphragm housing bolts while the valves cycled. This PER was deemed a condition adverse to quality (GL 91-18) issue and required a Functional Evaluation (FE). The FE took into consideration the low number of valve cycles. However, nothing was communicated to Operations regarding the vendor’s concern with valve cycling and there was no tracking system for the number of valve cycles.

c. Effectiveness of Corrective Actions

(1) Inspection Scope

The inspectors reviewed PERs to assess the adequacy of the corrective actions applied to the PER adverse conditions. Inspectors also reviewed WOs, audits, and self-assessments to evaluate the effectiveness of corrective actions, and to determine if the timeliness met the licensee's problem identification and resolution requirements, including corrective actions to address common cause or generic concerns. The PERs selected included the system PERs and WOs discussed in report section 4OA2.a(1), as well as a selection of human performance PERs attributed to operations, engineering, and maintenance personnel. The inspectors reviewed the corrective actions taken in response to seven NCVs documented in NRC inspection reports between December 2001 and September 2003 to verify CAP procedure requirements were met and that actions were thorough and comprehensive. The inspectors selected a sampling of the 25 oldest PERs to verify that the basis for the delay in correcting the identified problems was valid and that extensions were approved and justified as required by the CAP procedure. A sampling of deleted PERs were reviewed to assess the basis for the deletion and if the deletion was appropriate for the issue. Documents reviewed are listed in the attachment.

(2) Assessment

The inspection team determined that the licensee's corrective actions were generally effective in resolving equipment deficiencies. However, there were examples where the corrective actions were not totally effective or timely in resolving issues. The trending element of the CAP was not always effective in identifying potential adverse trends. The corrective actions for balance-of-plant equipment issues were not as detailed, rigorous, or effective in correcting problems as with safety related equipment. Examples where the corrective actions were not totally effective or timely in resolving issues included the following:

- An NCV was documented during the last PI&R inspection in December 2001, for the failure to promptly identify and correct long-standing problems with safety-related chillers. During this inspection, the inspection team identified that a high level of effort has been expended to improve these chillers. However, performance of the chillers has continued to decline as evidenced by the number of functional failures (2, 3, and 4 respectively in the previous 3 quarters), the continued decrease in the system health declining from yellow to red, the incomplete corrective actions from PER 00-011349-000, dated 12/12/2000, and the length of extensions of other outstanding PERS's. The inspectors noted that some small performance improvement had occurred in certain components of the chiller systems. The licensee continued to implement design changes and to work on their long term corrective action plan for system improvement.

- The inspection team noted that between January 2002 and July 2003, there were approximately 85 FME-related PERs, including one "A" level and two "B" level PERs. The inspectors noted that the "A" level PER did not document any

immediate actions and did not contain any evidence of a briefing or stand-down to express concern to workers. Following a discussion with the inspection team, a briefing sheet was presented to craft departments expressing a concern for FME controls and reminder of program requirements. The inspection team determined that the actions discussed in the "A" level PER were detailed, thorough, and when completed could resolve the broad range of FME problems. However, the licensee had missed many opportunities to previously strengthen the FME program in response to the previous large number of PERs. The inspectors concluded that the current licensee plans to address FME program deficiencies would likely be effective, but previous CAP efforts to develop comprehensive corrective actions had not been timely or effective.

- The team noted that between January 2002 and August 2003, there were approximately 45 PERs associated with breaker problems. Most of the problems resulted from poor vendor workmanship and quality control and licensee receipt inspection. Some breaker problems were identified after being placed in service but most were discovered on new or newly rebuilt breakers before being placed in service. Most of the PERs were "C" and "D" level. The licensee had initiated "B" level PER 01-009568 in late 2001, and had revised the PER seven times to include newly identified problems. The inspection team noted that on July 23, 2003, the licensee met with the vendor to discuss breaker problems and to address overall quality improvement.

  The inspection team determined that, even though the vendor was actively involved with onsite actions to correct problems, the CAP program was not very effective in raising the breaker problem to a higher level of management attention. This was evidenced by the CAP documentation indicating that a senior management meeting occurred in July 2003, after a number of PERs had been written on similar and repeat problems since late 2001. The actions outlined in the June 2003, PER, such as: 1) TVAN representatives will conduct onsite visits at the vendor's facility to work with assemblers and perform spot inspections: 2) actions to strengthen the receipt inspection program: 3) improve the quality checklist by including TVAs specific checks: 4) increased quality assessments may have resolved many of the problems sooner.

The inspection team reviewed the licensee response to multiple self-assessments that identified that the quality of apparent and root causes was not improving. Over a given period of time, the quality would improve, but then fluctuate. The licensee had initiated extensive retraining to improve root and apparent causes in 2001. The inspection team determined that some PER actions to improve root and apparent causes were unclear, closed by methods not normally used, and some were not acted upon. Examples included the following:

- Self-assessment SQN-SIT-03-001, 2002, identified that 26% of apparent and root causes reviewed did not meet management's expectations. As a result PERs were initiated to address the deficiencies. "D" level PER 02-014206-000 was initiated for the chemistry department because three of four analyses reviewed did not meet management's expectations. The inspectors noted that

the apparent causes were worker duties improperly focused or insufficient and management follow-up or monitoring of activities did not identify the problem. The inspectors noted that the PER was closed with no action taken.

- PER 02-014204-000, "D" level was issued for operations (five of ten analyses did not meet managements expectations) and was closed after the analyses were corrected and the root cause coordinator was informed of his shortcomings.

- PER 03-002423-000, "C" level resulted from a Nuclear Assurance audit and identified that the quality of root causes showed some improvement in some areas, however, the performance trend has reached a plateau and is not showing continued improvement. The PER identified seven corrective actions. All were addressed and closed via E-mail. Site management informed the inspectors that E-mail was not the normal expected method to address corrective actions.

The inspection team noted that the long standing equipment problems included safety and non-safety related balance-of-plant equipment. Non-safety related equipment issues caused the majority of the six recent reactor trips on Unit 2 and have been the major challenge to recent unit operation. These systems were outside the 10 CFR 50, Appendix B program and are not considered significant conditions adverse to quality. Examples where the corrective actions for balance-of-plant equipment issues were not as detailed, rigorous, or effective as with safety related equipment included the following:

- Feed water pump steam stop valves that do not fully close, feed water pump minimum flow valves that do not cycle properly, a load cell/switch on a spent fuel pool crane that is obsolete and indicating ½ the actual load, and known problems with fans and dampers of a containment ventilation system. The inspection team noted that some corrective actions for these long standing problems indicate a design change or unit outage may be required and repair implementation may be delayed for an extended time. The licensee generally had long term fixes planned or proposed fixes in review to address the problems.

d. Assessment of Safety-Conscious Work Environment

(1) Inspection Scope

The inspection team reviewed numerous audits, assessments, PERs, WOs, and other corrective action documents and held discussions with numerous personnel at various levels in the organization to assess if a work environment existed that was conductive to the identification of nuclear safety issues. The team also examined the licensee's ECP tracking document and files and discussed the program requirements with the administrator to determine if issues affecting nuclear safety were being appropriately addressed.

(2) Assessment

The inspection team determined that workers at the site felt free to raise safety concerns. Personnel stated that they would not hesitate to raise nuclear safety issues to their management. They also understood and believed that they could raise issues without fear of retaliation by their management. Workers stated that the use of direct supervision was their preferred approach to raising issues, but would not hesitate to use other mechanisms such as the ECP or the NRC. The inspection team did not identify any concerns related to safety conscious work environment.

40A3 Event Followup

1. (Closed) LER 50-327/2002-001-00, Westinghouse Electric Corporation Error Results in Nonconservative Steam Generator Level Setpoint:

This LER documented that Westinghouse determined that the demonstrated accuracy calculation for low-low level trip setpoint narrow range span did not account for the measured bias associated with the differential pressure created by the steam flow past the mid-deck plate in the moisture separator section of the steam generator. The licensee documented this problem in the corrective action program as PER 02-002298-000. The inspectors reviewed the LER and verified no safety design margins had been exceeded. No findings of significance were identified.

2. (Closed) Licensee Event Report (LER) 50-328/2003-001-00, Reactor Trip Signal as a Result of a Low-Low Steam Generator Level.:

This LER documented a January 1, 2003, Unit 2 reactor trip signal on steam generator Loop 2 low-low level. There was no pump or valve operation because the unit was shutdown in Mode 5. The licensee determined that technicians had bypassed the steam generator low level alarms instead of low-low level trips. This was because information contained in the procedure was too generic. The licensee documented this problem in the corrective action program as PER 03-000003-000. The inspectors reviewed the LER and no findings of significance were identified.

3. (Closed) LER 50-328/2003-004-00, Reactor Trip From A Neutral Over-Current Condition On The 2B Hotwell Pump and a Failure to Perform a Technical Specification Required Action:

This LER documented that, following the reactor trip, the dose equivalent iodine exceeded technical specification (TS) limits. TS required sampling of the reactor coolant system every 4 hours until the activity is within limits. The licensee determined that one of the samples was not taken within frequency. The sample was taken about 1 hour 35 minutes late. The licensee determined that the cause of the TS violation was a narrow turnover scope that was not specifically tracking the sampling frequency relative to the TS action.

This event was determined to be of very low safety significance (Green), by the Significance Determination Process (SDP) because the sampling was completed later and determined to be within specifications. The inspectors determined that licensee actions taken or planned were reasonable. This issue constitutes a violation of very low safety significance that is not subject to enforcement action in accordance with Section IV of NRC's Enforcement Policy. The licensee entered this event into the corrective action program as PER 03-002422-000. This LER is discussed in Section 40A7.

4. (Closed) LER 50-328/2003-005-00, Reactor Trip From Spurious Turbine Vibration Trip Signal:

This LER documents an equipment failure that resulted in a reactor trip. Plant personnel had opened a drawer to place a vibration trip cutout switch in the cutout position. When the drawer was closed, a spurious vibration trip signal was generated. The licensee determined that exposed wire conductors in the drawer had shorted with another conductor causing the problem. The exposed conductors were repaired and the vibration trip relay was disabled. The licensee entered this event into the corrective action program as PER 03-0012538. The inspectors reviewed the LER and no findings of significance were identified.

5. (Closed) LER 50-328/2003-006-00, Failure to Meet Technical Specification Limiting Condition for Operation Action Time for the Component Cooling System:

This LER documented that the common spare component cooling system (CCS) pump, that was supplying the B-train loads, was removed from service for maintenance and the 1B-B CCS pump was aligned to supply the B-train loads. Personnel later determined that the 1B-B CCS pump does not auto start from a Unit 2 safety injection signal. At the time of discovery, Unit 2 had already exceeded the LCO action time of 72 hours. Maintenance was expedited and the spare pump was later returned to service. The licensee determined the cause was that operators did not fully understand the TS applicability relative to the CCS equipment alignment. This event was determined to be of very low safety significance (Green), by the Significance Determination Process (SDP) because the redundant systems and pumps were available and had no impact on plant operation either in normal or off-normal conditions. The inspectors determined that licensee actions taken or planned were reasonable. This issue constitutes a violation of very low safety significance that is not subject to enforcement action in accordance with Section IV of NRC's Enforcement Policy. The licensee entered this event into the corrective action program as PER 03-005924. This LER is discussed in Section 40A7.

4OA6 Meetings, Including Exit

The inspectors presented the inspection results to Mr. R. Purcell, Site Vice President and other members of the licensee management and staff at the conclusion of the inspection on September 26, 2003. The licensee acknowledged the findings presented.

The lead inspector asked the licensee's management whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

4OA7 Licensee Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and are violations of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600 for being dispositioned as an NCVs.

1. Unit 2 Technical Specification 3.4.8 requires, in part that, specific activity of the primary coolant shall be limited to less than or equal to 0.35 microcuries/gram Dose Equivalent I-131. The applicability for Modes 1, 2, 3, 4, and 5 is with the specific activity of the primary coolant greater than 0.35 microcuries/gram Dose Equivalent I-131, perform the sampling and analysis required of item 4a of table 4.4-4 until the specific activity of the primary coolant is restored to within its limits. Table 4.4-4 requires that sampling be performed once per 4 hours, whenever the specific activity exceeds 0.35 microcuries/gram. Contrary to this, on March 10, 2003 sampling of the Unit 2 reactor coolant was not completed within the four hour time requirement. This finding was of very low safety significance because the sampling was conducted approximately 1 hour 35 minutes late and was within Technical Specifications limits. The licensee entered this into the corrective action program as PER 03-002422-000.

2. Unit 2 Technical Specification 3.7.3 Requires at least two independent component cooling water loops shall be Operable in Modes 1, 2, 3, and 4. With only one component cooling water loop Operable, restore at least two loops to Operable status within 72 hours or be in at least Hot standby within the next 6 hours and in Cold Shutdown within the following 30 hours. Contrary to this, on April 24 through 26, 2003, (approximately 67 hours) a Unit 1 pump aligned for a Unit 2 loop of cooling would not receive an automatic start signal from Unit 2 for all accident conditions and the loop should have been considered inoperable. This finding was of very low safety significance because the pump that would not receive an automatic start signal was already running and additional pumps were available and operable to provide more than adequate cooling capacity. The licensee entered this into the corrective action program as PER 03-005924.

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

R. Beecken, Vice President, Nuclear Support
H. Butterworth, Senior Manager
M. France, TVA Corporate Security
D. Kulisek, Plant Manager.
C. Kent, Chemistry Manager
G. Michell, Pinkerton, General Manager
R. Proffitt, Nuclear Engineer
R. Purcell, Site Vice President
R. Rogers, Engineering Design Manager
P. Salas, Licensing and Industry Affairs Manager
B. Schnetzler, TVA Corporate Security Manager
M. Tipton, Security Supervisor
D. Thompson, Acting Security Manager

NRC Personnel

V. McCree, Director, Division of Reactor Projects
S. Cahill, Chief, Branch 6, Division of Reactor Projects

ITEMS OPENED AND CLOSED

Closed

50-327/2002-001-00	LER	Westinghouse Electric Corporation Error Results in Nonconservative Steam Generator Level Setpoint (Section 40A3.1)
50-328/2003-001-00	LER	Reactor Trip Signal as a Result of a Low-Low Steam Generator Level (Section 40A3.2)
50-328/2003-004-00	LER	Reactor Trip From A Neutral Over-Current Condition On The 2B Hotwell Pump and a Failure to Perform a Technical Specification Required Action (Section 40A3.3)
50-328/2003-005-00	LER	Reactor Trip From Spurious Turbine Vibration Trip Signal (Section 40A3.4)
50-328/2003-006-00	LER	Failure to Meet Technical Specification Limiting Condition for Operation Action Time for the Component Cooling System (Section 40A3.5)

Attachment

PARTIAL LIST OF DOCUMENTS REVIEWED

Procedures Reviewed

Number	Description/Title
NADP-3	Managing the Operating Experience Program
ODM-1.0	Conduct of Operations
ODM-3.7	Operator Work Arounds
OPDP-1	Conduct of Operations
SPP-1.0	Concerns Resolution
SPP-1.3	Plant Access and Security
SPP-1.6,	TVAN Sef Assessment Program
SPP-2.2	Administration of Site Technical Procedures
SPP- 3.1	Corrective Action Program
SPP- 6.1	Work Order Process Initiation
SPP- 6.5	Foreign Material Exclusion
SPP-9.7	Corrosion Control Program
BP- 250	Corrective Action Program Handbook

0-TI-CEM-043-016.5, Support Systems - Sampling Methods
0-PI-DXX-000-704.1, Degradation Monitoring Program for Raw Water Systems
0-TI-SXX-000-146.0, Program for Implementing NRC Generic Letter 89-13
0-PI-CEM-067-712.0, Essential Raw Cooling Water Microbiologically Induced Corrosion/Mollusk Control
AOP-M0.1, Loss of Essential Raw Cooling Water

Audits, Self-Assessments, and Trend Reports

Sequoyah Reliability Improvement Plan, Rev. 5
Audit Report No. SSA0106, Security Safeguards Information and Fitness For Duty (FFD) Programs, December 21, 2001
Audit Report No. SSA0205, Security Safeguards Information and Fitness For Duty (FFD) Programs, December 12, 2002
Audit Report No. SA-NSS-03-003, Nuclear Security Self Assessment, August 15, 2003
Sequoyah Physical Security Plan/Contingency Plan, Revision 8
Oversight Analysis Report Ending December31, 2003
Audit Report No. SSA0204, Engineering Functional Area Audit
Audit Report No. SSA0301, Fire Protection and Loss Prevention
Operations Analysis of PERs, January, February and June, 2003
Assessment of SG Replacement CAP Trend Analysis
Assessment of Maintenance-Modifications CAP Trend Analysis, January, February and June, 2003 Assessment of Engineering CAP Trend Analysis, January, February and June, 2003
Assessment of RADCHEM CAP Trend Analysis, January, February and June, 2003

Assessment No. NA-CH-01-002 Nuclear Assurance Assessment of the TVAN Clearance Program found that corrective actions to prevent recurrence (for clearance problems) have not always been effective and effectiveness reviews have not been performed for level B PERs.

PER's Reviewed for Security Related Issued

Safeguards Event Report 02-3-114
Safeguards Event Report 02-4-134

02-013160	Security Equipment Issue	02-003485	Security Equipment Issue
02-001132	Control of Safeguards	02-005700	Security Equipment Issue
02-009718	Security Equipment Issue	02-009213	Security Equipment Issue
02-014931	Security Equipment Issue	02-006857	Security Equipment Issue
02-012935	Security Equipment Issue	02-006919	Security Equipment Issue
02-003447	Security Equipment Issue	02-014922	Security Equipment Issue
02-013161	Security Equipment Issue	03-001787	Security Equipment Issue
02-009491	Improper Badge Entry	03-010733	Posting of Response
03-011371	Review of Commitments	03-010767	Vehicle Escort
03-011458	Equipment Testing	03-011467	Equipment Testing
03-011468	Equipment Testing	03-011470	Equipment Testing
03-010020	Equipment Observation		

PER's Reviewed for Main and Auxiliary Feedwater Problem

01-003219	Vibration issues on U1 TDAFW pump
02-009676	Effect of recirc valve on operability
02-013543	Caulking on control cabinets
02-013515	Flow modifier
02-015116	Sump switches
03-011953	1A Main Feed Pump spinning 1000 rpm post Unit trip
03-002634	1A Main Feed Pump running dead-headed causing seal failures
03-001708	All Main Feed Pumps spinning post Unit trip
03-002665	2B Main Feed Pump speed control (400 rpm swings)
03-002740	2B Main Feed Pump speed control
03-002314	Speed control in manual of U2 TDAFW

PERs Reviewed for EDG

01-007184	PCV valve problems
01-010452	EDG failed to start
02-001424	EDG failed to start
02-003722	EDG failed to start during testing
02-012966	PCV valves blew down air receiver
03-008109	PCV blew down
03-009465	Replace PCV
03-009416	OE assessment identified lack of cable inspections
03-012611	EDG oil leak

PER's Reviewed for ERCW

02-000203	Continuing raw water corrosion control deficiencies indicate the need for overall program re-evaluation
03-006554	Silt observed in 1A ERCW supply header when opened in order to replace supply piping
03-008909	A throughwall leak not associated with a weld was discovered on 8 inch ERCW piping

Non-cited (NCV), Licensee Identified (LIV) Violations and PERs Reviewed

PER 02-005087	(LIV 50-328/ 2002-02-03) Unintended closure of suction valve 2-FCV-62-132 to operating 2B-B CCP resulting in destruction of pump
PER 02-000281	(LIV 50-327, 328/ 2001-05-05)
PER 02-003222	(NCV 50/327, 328/ 2001-05-03) Potential violation of intent of procedure SPP-2.2, step 3.1.1.A, administrative guidance for procedure change
PER 02-003543	NRC identified that pre-fire plans do not contain for fire brigade incident commander on potential effects that fire suppression or smoke removal efforts may have on required fire safe shutdown operator actions
PER 02-003550	(NCV 50-327, 328/2002-03-02)
PER 02-003552	NRC identified weaknesses in operator understanding and familiarity with fire protection AOP-N.01 and -N.08
PER 02-003645	(NCV 50-327/ 2002-03-01) Failure to provide adequate protection for cables to redundant SSD components
PER 02-001183	(LIV 50-327, 328/ 2002-02-04) ERCW piping leak downstream of valve 1-67-537A in 1A CS room; 4" of water discovered on floor
PER 02-003735	(LIV 50-327, 328/ 2002-02-04) ERCW piping downstream of 2A-A EDG below minimum wall thickness requirements
PER 03-001577	(NCV 50-327, 328/ 2003-03-01) Ventilation permits were not logged into the shield building tracking sheet and the square inches were not added to the total areas open
PER 03-003612	(NCV 50-327, 328/ 2003-03-01) Failure to provide adequate instructions for controlling shield building breach
50-327/2001-05-04	(LIV) Failure to follow clearance procedure - clearance order closed without refilling 1A-A CS HX
50-327, 328/2001-05-05	(LIV) Inadequate instruction to ensure piping adjacent to valve 1-FCV-63-8 was full of water following maintenance
50-328/2002-02-03	(LIV) Failure to follow procedure - Incorrect position of valve 2-FCV-62-132, charging pump suction
50-327, 328/2002-02-04	(LIV) Inadequate guidance defining the elements and standards of an effective cavitation program
50-327/2002-03-01	(NCV) Failure to provide adequate protection for cables to redundant SSD components
50-327, 328/2002-03-02	(NCV) Inadequate procedural guidance for implementing abnormal operating procedures for plant fires
50-327, 328/2003-03-01	(NCV) Inadequate instructions for controlling shield building breaches

PER's Reviewed for Maintenance Preventable Functional Failures

02-015333	Vibration on 480V Board Room 2B-B AHU
02-011061	480V Breaker loose wire
02-010113	Vibration on Penetration Room B AHU
03-003715	RWST Level Indicators
03-009117	Containment Vacuum Breaker
03-000211	Vibration on 480V Board Room 2B-B AHU
03-002422	#7 HDT LCV diaphragm failure
03-004344	Bad jumper to spare breaker
03-004025	TCV for B 6.9Kv Board chiller

PER's Review for Torquing Issues

01-000485	Emergency Diesels
02-001249	Emergency Diesels
02-013611	PK Studs
02-014067	Aux Bldg Crane
02-014333	EBR A Chiller
03-000698	Emergency Diesels
03-005652	RSG #4 Lower Lateral Bumper Pad
03-007489	PK Studs

PERs Reviewed for Chiller Issues

00-011349	All Safety Related Chillers
01-008319	SDR A Chiller
02-010285	EBR A Chiller
02-013072	EBR A Chiller
02-013824	Dunham Bush Chillers
02-014333	EBR A Chiller
03-000185	MCR A Chiller
03-001586	MCR A&B Chiller (overlapping failures)
03-007073	MCR A AHU
02-000542	480V Board Room 1B AHU
02-003157	480V Board Room Chillers (all)
03-009919	480V Board Room Chiller 1B

PER's and Miscellaneous Documents Reviewed

01-005036	MOV 2-FCV-70-156 thermal overloads opened on May 29, 2001
01-009247	MOV 0-FCV-070-0198-B thermal overloads opened while performing MOVATS testing on or about October 12, 2001.
01-011549	LIV 50-327/2001-05-05, 1A CS heat exchanger discovered not full of water
02-002217	Closed to PER 02-001183-000
02-006086	(LER 2002-03) Level A-RC, May 31, 2003, Unit 2 Reactor Trip due to Turbo-Generator Trip from Stator Water Cooling Failure

02-006114 (LER 2002-03) Level B-RC, Cracked Disc on Unit 2 Stator Cooling Water Heat Exchanger Shutoff Valve 2-VLV-024-0531
02-09486 Adverse trend in the number of NRC violations and findings for the last two years
02-005524 Level C - On 5/16/02 the No. 1 RCP on U2 failed to start when the handswitch was placed to start. The pump did not start on the second attempt while engineering was present at the breaker after having instrumented various contacts.
02-02298 Westinghouse design error SG low-low level
03-001708 Main Feed Water Pump Stop Valves
03-002634 Main Feed Water Pump Recirc Valves
03-012670 Rx Trip Breakers
03-010200 Containment Vent
03-003340 SFP Load Cell
03-05924 Failure to enter TS LCO 3.7.3
03-02580 Failure to meet TS LCO 3.4.8
03-02422 Failure to repair and return to service valve 2-LCV-0060190A
03-00003 Unit 2 reactor trip while shutdown
03-004354 While resetting a supervisory turbine trip module on 4/12/2003, the turbine tripped from "Turbine High Vibration Turbine Trip," which initiated a reactor trip. The turbine trip controls were in "cutout" and therefore a turbine trip should not have been initiated.
03-002422 Failure to repair and return to service 2-LCV-006-190A valve in a timely manner increased the risk of continued U2 operation from condensate system transients.
03-012875 During performance of NRC inspection 2003-09 (Problem Identification and Resolution), the NRC identified closure of PER 02-003645-000 without completion of specified CA.

System 067 3rd Quarter FY03 Status Report, Essential Raw Cooling Water
Performance Indicator Report, Quarters 1-3, 2003
NRC GL 89-13 Service Water System Problems Affecting Safety-Related Equipment
B87 931104 002 TVAN Calculation, ASME Section XI Inservice and Augmented Valve Identification for the Second 10 Year Interval
Letter to NRC, Subject - Sequoyah (SQN), Browns Ferry (BFN), and Watts Bar (WBN) Nuclear Plants - Response to Generic Letter (GL) 89-13, Service Water System Problems Affecting Safety-Related Equipment, Dated January 26, 1990
Letter to NRC, Subject - Sequoyah Nuclear Plant (SQN) - Revised Program and Status Update Regarding NRC Generic Letter (GL) 89-13 - "Service Water System Problems Affecting Safety-Related Equipment"
Memo from GL 89-13 Coordinator on September 24, 2003, addressing questions regarding silt found in the ERCW system
01-005035 Perform 0-MI-EMV-317-146.0 and MI-11.2C on MOV 2-FCV-70-156 to troubleshoot thermal overloads opening on May 29, 2001.

<u>Temporary Modifications Reviewed</u>

0-03-011-018	03/26/03	Aux Boiler Fuel Oil Supply strainer addition
1-03-026-047	06/09/03	Revision of turbine eccentricity zero point alarm
1-03-029-057	06/14/03	Trip function of Stator Ground Relay disabled

2-03-014-003	04/11/03	Furmanite (leak repair) of AFW valve
2-03-018-067	05/09/03	2TCV-67-109 ERCW flow to 2D-B CRDM Cooler failed open
2-03-015-047	04/13/03	Remove Turbine Vibration Trip relay

PER's Reviewed for Reactor Trips:

02-008460	Trip on undervoltage condition on 2 RCP busses (Breaker spurious closure during rack in)
03-002313	Secondary valve in long term off-normal position
02-006086	Loss of Stator Cooling Water due to broken Henry Pratt valve
02-015494	Grounded motor on #3 RCP

PER's Reviewed for Breaker Problems

01-009568	Vendor material conditions	01-009435	ERCW breaker problem
01-011634	Parts missing	02-003290	Assembly problem
02-001039	New breaker assembly problem	03-009947	Failed test
02-004132	Spare breaker found damaged	02-001383	New breaker assembly problem
02-004576	Linkage problem	02-006377	ERCW breaker problem
02-006809	Cracked insulator	02-005444	Breaker problem
02-005516	Assembly problem	02-009900	Assembly problem
02-009002	Assembly problem	02-012681	Assembly problem
02-010344	Assembly problem	02-010567	No spare breakers
02-015035	Water in breaker	03-011386	Receipt inspection ID problem
03-000369	Failed to open	03-008335	Breaker not trip
03-001396	Tripped free	03-003369	Damaged breaker
03-003426	Charging spring problem	03-003637	Failed to discharge
03-005396	Charging motor failure	03-006015	Alignment problem
03-007495	Inadequate tolerance	03-007728	Inadequate tolerances
03-008296	Multiple problems	03-008549	Moc switch problem
03-010054	Assembly problem		

PERs reviewed for Root Cause and Apparent Cause

02-014206	Apparent causes not adequate
02-014204	Apparent causes not adequate
02-014312	Apparent causes not adequate
02-014205	Apparent causes not adequate
02-014311	Actions resulting form engineering self-assessment
03-002423	Root causes not showing continued improvement

PERs reviewed for FME

02-003855	EIP data indicates weak knowledge of FME
02-010042	12 PERs associated with FME in past year
02-000278	FME in main oil system
02-002864	FME in refuel cavity

02-004161	FME in Unit 2 condenser
02-004257	FME in feedwater heater
02-004487	FME in Unit 2 reactor
02-004769	FME in drains
02-005184	FME in ice condenser
02-006792	FME in lower containment
02-010813	FME log for spent fuel pool area inaccurate
02-009894	FME log for spent fuel pool inaccurate
03-007973	FME discovered in Unit 1 reactor vessel
03-009344	Unit downpower due to FME
03-000005	FME identified in CRDM area
03-000564	FME (rag) found in EDG oil scavenging pump
03-002099	FME found in piping
03-002811	RCP 1-2 found with tape over flywheel baffles
03-003219	Inadequate FME during grinding near spent fuel pool
03-004086	FME (leather glove) in spent fuel pool
03-007401	Work on generator exciter without FME controls
03-007973	FME in Unit 2 reactor vessel
03-008035	FME found in ice condenser
03-008986	24 FME PERS identified following Unit 1 outage assessment

<u>PERs reviewed for GL 91-18 Degraded Conditions</u>

98-001574	Westinghouse setpoint methodology
00-004645	Containment pressurization due to air line leak
01-010210	PRT LT not calibrated
01-011309	MCR Overhead duct qualification
02-014754	TDAFWP Room Sump Design Basis