



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
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ATLANTA, GEORGIA 30303-8931

September 9, 2005

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

SUBJECT: SEQUOYAH NUCLEAR POWER PLANT - NRC PROBLEM IDENTIFICATION  
AND RESOLUTION (PI&R) INSPECTION REPORT 05000327/2005009 AND  
05000328/2005009

Dear Mr. Singer:

On August 12, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Power Plant, Units 1 and 2. The enclosed inspection report documents the inspection findings, which were discussed on August 12, 2005, with Mr. R. Douet and other members of your staff.

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

On the basis of the sample selected for review, overall the team concluded that problems were being properly identified, documented, evaluated, and corrected. However the team identified several isolated examples where corrective actions did not appear appropriate, were not accurately documented, or were not completely carried out. The team observed that the quality of Problem Evaluation Report documentation has improved since the last NRC biennial PI&R inspection. The team did observe that there continues to be some lingering technical problems with the electronic document management eCAP program, more than a year after it was placed in service.

TVA

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Sincerely,

*/RA/*

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

Docket No.: 50-327, 50-328  
License No.: DPR-77, DPR-79

Enclosure: Inspection Report 05000327/2005009 and 05000328/2005009  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

TVA

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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: 05000327/2005009 and 05000328/2005009

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant

Location: Sequoyah Access Road  
Soddy-Daisy, TN 37379

Dates: July 25, 2005 - August 12, 2005

Inspectors: C. Julian, Team Leader  
M. Speck, Resident Inspector  
K. VanDoorn, Senior Reactor Inspector  
B. Holbrook, Senior Reactor Inspector  
J. Wiebe, Senior Reactor Inspector, RI

Approved by: S. Cahill, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000327/2005009, IR 05000328/2005009; 07/25/2005 - 08/12/2005; Sequoyah Nuclear Power Plant, Units 1 & 2; Problem Identification and Resolution.

The inspection was conducted by three Region II reactor inspectors, a resident inspector, and one Region I reactor inspector. No findings were identified during this inspection.

### Identification and Resolution of Problems

The team determined that the licensee was identifying plant deficiencies at an appropriately low level and effectively entering them into their corrective action program. The team also determined that the licensee was prioritizing and evaluating issues properly. The team identified several isolated examples where corrective actions did not appear appropriate, were not accurately documented, or were not completely carried out. Overall, the team found the effectiveness of corrective actions to be acceptable. The team observed that the quality of Problem Evaluation Report (PER) documentation has improved since the last NRC biennial PI&R inspection, but further improvements could be made. There continue to be lingering technical problems with the Electronic Corrective Action Program (eCAP) electronic document management program more than a year after it was placed in service. The team concluded, however, that the licensee was generally providing an effective corrective action program.

On the basis of interviews conducted during this inspection, the inspectors determined that workers at the site felt free to put safety concerns into the corrective action program. The inspectors concluded that the employee Concerns Resolution program was functioning acceptably but the inspectors observed that there was a work backlog.

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## REPORT DETAILS

### 4. OTHER ACTIVITIES (OA)

#### 4OA2 Identification and Resolution of Problems

##### a. **Effectiveness of Problem Identification**

###### (1) Inspection Scope

The team reviewed items selected across the span of plant activities to determine if problems were being properly identified, characterized, and entered into the corrective action program for evaluation and resolution. Specifically, the team reviewed approximately 425 problem evaluation reports (PERs) from 11,080 that had been issued during the inspection review period of September 1, 2003, to June 30, 2005. The team examined PERs and work orders (WOs) associated with the Reactor Protection System, Emergency Core Cooling System, Residual Heat Removal System, Ice Condenser System, Emergency Gas Treatment System, Radiation Monitoring System, 480V and 6.9kV Shutdown Power System, and the Main Control Room, 6.9 kV Shutdown Board Room, and Electric Board Room Air Conditioning Systems. The team reviewed PERs associated with radiological protection and emergency preparedness events, problems, and deficiencies. The team reviewed operating experience resolution documents, and employee Concerns Resolution activities. The team also reviewed licensee corrective action trend reports, PER effectiveness reviews, as well as Nuclear Assurance department audits and surveillances from the review period. The team evaluated these items to determine the licensee's threshold for identifying problems.

The team conducted system walkdowns to verify that observed problems were being properly identified. All members of the team also attended the licensee's various Plan of the Day and Management Review Committee meetings to observe how site management implemented the initial phase of the corrective action program.

###### (2) Issues

The team determined that the licensee was effective at identifying problems at an appropriately low threshold and entering them into the corrective action program. Only in the System Status Report for Emergency Gas Treatment System, were two instances identified where repetitive equipment problems did not result in the initiation of a PER. However, these problems were already being addressed.

The inspectors observed that there are lingering technical problems with the new eCAP computerized corrective action system which have not been corrected despite repeated attempts for over a year. The system is cumbersome and not everyone in the plant can initiate a PER due to the lack of computer access, passwords, and training on operating the system. The licensee also stated that they are considering implementing a process for initiating an anonymous PER. Although a paper PER initiation form can be printed, there are no paper forms readily available and no locations or drop boxes to deposit a completed form.

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**b. Prioritization and Evaluation of Issues****(1) Inspection Scope**

The team reviewed Procedure SPP-3.1, Corrective Action Program, Revision 8, Business Practice document BP 250, Corrective Action Program Handbook, Revision 8, and various other supporting documents to determine the various licensee requirements for prioritizing and evaluating issues. The team then reviewed selected PERs to ensure that PER level classifications, operability determinations, reportability determinations, degraded and non-conforming condition determinations, cause evaluations, and selection of proper corrective actions were consistent with the significance of the problem described. The team reviewed a sample of PERs as described in paragraph a(1) above. The team also reviewed a sample of PERs associated with NRC findings, non-cited violations of regulatory requirements, and Licensee Event Reports issued during the selected review period. Specific items reviewed are listed in the attachment.

**(2) Issues**

The team determined that PER level classifications were consistent with established procedures and that licensee audits and self-assessments generally confirmed that conclusion. The team further determined that operability, reportability, degraded or non-conforming condition determinations and cause evaluations were also consistent with SPP-3.1.

At one Management Review Committee (MRC), meeting inspectors observed that PER 86552 contained an unclear problem description of corroded sump pump isolation valves in the Essential Raw Cooling Water (ERCW) intake structure. The MRC downgraded the PER from level C to D and returned it for revision due to a mis-stated operability concern. When the PER subsequently passed through MRC again, the inspectors observed that the problem description was clearer but still incorrectly listed the valves as part of the ERCW system when they should be part of the floor drain system.

Inspectors concluded that various problems with electrical circuit breaker performance still need attention. The inspectors observed a root cause critique meeting for level B PER 80797 on continuing performance problems with various kinds of electrical circuit breakers. This PER was initiated by the Nuclear Safety Review Board pointing out the need to take a broad look at circuit breaker problems. The inspectors observed that the Sequoyah Root Cause Analysis Grading Checklist was not directly applicable to the Common Cause analysis technique used on this PER. The licensee recognized this and was considering implementing a checklist for this technique.

The inspectors observed that there had been many time extensions granted on PER actions in the past. The licensee had recently recognized this and revised procedures to require an escalating level of approval for successive extensions.

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PER 78863 identified the need for multiple changes to Abnormal Operating Procedures (AOPs) for loss of offsite power discovered during an Emergency Preparedness training exercise of March 17, 2005. The actions to complete the procedure changes had been extended to September 16, 2005. The inspectors questioned if changes to important procedures, such as AOPs, should take so long to complete. Operations management indicated that the procedure change would be rescheduled for early completion.

**c. Effectiveness of Corrective Actions**

(1) Inspection Scope

The team reviewed the same selected sample of PERs to verify that the specified corrective actions were effective in fixing the problems described. The team also reviewed documented results of MRC effectiveness reviews for completed PERs and observed an MRC effectiveness review meeting and a Plant Health committee meeting. Specific items reviewed are listed in the attachment.

(2) Issues

Based on a review of numerous corrective action plans and their implementation, the team found, for the most part, that the licensee's corrective actions were effective. Effectiveness reviews and audits were generally of good depth and correctly identified issues similar to those raised during previous NRC inspections. However, the team did identify several corrective action deficiencies.

The Electronic Corrective Action Program (eCAP) system has problems with filing attachments to PERs. This causes the system not to be able to retrieve attachments and thus lose prompt access to documentation of corrective actions. The problem has been documented since 8/12/2004 (PER 66958) and was originally scheduled for correction 3/31/2005. Several attempts have been made to fix the problem but were not completely successful. This deficiency can cause the staff to lose confidence in the system and not provide attachments to PERs. NRC expressed similar concerns with the TVA eCAP problems in the last Watts Bar PI&R inspection report, 50-390/2005006, dated March 17, 2005.

The inspectors observed several examples of unclear, incomplete, or inaccurate documentation in PERs. There were similar comments in the last NRC Sequoyah PI&R inspection report 50-327,328/2003009, issued 10/24/03. However the inspectors noted that there had been improvements in documentation quality since the last inspection and improvement could be seen between 2003 and 2005 vintage PERs:

a. PER 71060 was written for a failure to immediately borate when a boron concentration reduction occurred following entry into Mode 6. This is related to Licensee Event Report (LER) 1-2004-002. The documentation of the corrective action taken to prevent recurrence was so general that one could not tell what procedure changes were made.

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b. PER 20212 dealt with an unsuccessful attempt to start an ERCW pump for post-maintenance testing (PMT) following circuit breaker and control switch replacement. The PER documentation did not describe the troubleshooting, repairs or resolution of the problem. The inspectors learned that actual work included visual inspection and extensive troubleshooting, work instruction revisions, a second PMT that failed, and additional technical support and troubleshooting. Finally, a replacement breaker was installed and tested successfully.

c. PER 80535, identified a problem with a Unit 1 reactor trip breaker that, when given a close signal, attempted to close then immediately opened. The Root Cause Analysis identified that two different breakers had exhibited similar failures in the same breaker cubicle during three different outages (2000, 2004, and 2005). These causes had not been definitely corrected, the PER was still open, and additional troubleshooting activities were scheduled during the 2006 spring outage. The breaker is meeting its design safety function to open and is being tested bimonthly. The inspectors noted that the review and analysis did not contain any assessment or discussion on the important operational implications of the breaker's ability to close when needed. Under certain plant conditions, the reactor trip breakers must be closed before the operators can re-set the safety injection block signal and feedwater isolation signals. Engineering personnel informed the inspectors that these actions were discussed and assessed during the PER review but that the discussions were not documented.

NRC inspectors observed several examples of corrective actions that do not appear appropriate or had not been completely executed:

a. PER 24617 dealt with a turbine building sump discharge effluent radiation monitor RM-90-212 being found during surveillance to have its trip point set too high by a factor of 100. PER action 24617-003 directed Chemistry to include this occurrence in the Annual Effluent Report to the NRC due to the radiation monitor being inoperable for greater than 30 days as required by Technical Specification 6.8.4.f.1 and Offsite Dose Calculation Manual (ODCM) 1.1.1. However the "Action Taken" description states, "Evaluation of setpoint error and corresponding releases indicated that no ODCM violations occurred. Monitor was determined NOT to be inoperable for greater than 30 days based on evaluation. Monitor was inoperable for approximately 2 days during functional evaluation."

The ODCM requires reporting an inoperability of greater than 30 days or a failure to take grab samples during the inoperability (ODCM deviation). The Action Taken states that an evaluation found that the monitor was only inop for two days but did not include an explanation of the basis for reaching that conclusion. The licensee could not locate any other documentation that indicated why the issue was not reportable. The licensee initiated PER 87449 promptly to investigate this matter and to take corrective action.

b. B Level PER 77234 concerns a Unit 2 reactor trip caused by maintenance workers inadvertently tripping two circuit breakers by dropping a panel cover. Action Description 77234-023 directs "issue a Site-Wide Briefing to reinforce management's expectations for incorporating tribal knowledge into procedures using this event as an example of

where incorporating tribal knowledge could have prevented a plant event.” The Action Taken just re-states the Action Description and the Action Attachment File Name states “Bulletin-PentaGen- Industrial Safety Performance 051905”. The inspectors reviewed the attached Bulletin and found that it dealt with accident prevention and did not address management expectations for incorporating tribal knowledge into procedures. Therefore the directed action was not accomplished. The licensee initiated PER 87502 to correct this issue.

c. PER 31322, was initiated to address an operating experience issue from Browns Ferry that identified a problem with General Electric HFA relay coil spools that were subject to aging with portions breaking off and potentially keeping the relay from performing its safety function. The closed PER did not document how the work was completed or its current status. In response to inspectors’ questions about the current work status, the licensee identified that Action Item 8 had been closed even though nine compartments on shutdown board 1B-B had not been inspected. Also, Action Item 10, to initiate WOs to replace any HFA relay whose coil spool was not made of Tefzel or initiate preventive maintenance items to periodically inspect non-Tefzel coil spools, was closed with work not completed. The licensee initiated PER 87474 to correct these problems.

d. PER 66228, identified a problem with a Unit 2 6.9kV breaker indicating light for RHR pump 2B. The indicating light being extinguished meant that contacts on the control switch were open and the RHR pump breaker would not close on demand. The PER indicated that the lack of light indication for the breaker did not draw operators’ attention to the fact that there was a problem. The inspectors noted that a previous PER, 27270, dated October 2003, was to review operating experience from Browns Ferry that stressed the importance of understanding breaker light indications, breaker switch positions, and the interrelationship with respect to breaker operability. One action for PER 27270 was to revise breaker inspection procedures to verify switch position, but the PER took no action on communicating the importance of breaker light indications. The operating experience information was not communicated to plant staff which could have prevented the event described in PER 66228.

e. PER 76030, dated February 2005, identified that the high-power trip setpoints for both units were changed in midsummer 2004 and some alarm response procedures were not updated. PER 62131, dated May 2004, identified the same apparent problem. One action for PER 62131 was to evaluate for possible procedure/simulator impacts and revise accordingly. The PER closure documentation contained no attachment that could be used to verify that the action was completed correctly. The PER was closed in August 2004, with apparently some actions not completed.

f. PER 21094, identified a problem with missing records associated with licensed operator reactivation prior to assuming duties. A PER action was to review licensee procedures and make revisions necessary to correct the problem. The action was closed stating that the records were left in an empty office and lost but that procedures in place were adequate and no revisions were needed.

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The problem occurred due to not following the procedures for the control of the documents but no further action was taken to prevent recurrence.

The inspectors did not identify any more than minor equipment performance issues from the above described deficiencies.

d. **Assessment of Safety-Conscious Work Environment**

(1) Inspection Scope

The 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 conducive to the identification of nuclear safety issues. Inspectors also examined the licensee's employee Concerns Resolution Program records and discussed the program with the implementer to determine if issues affecting nuclear safety were being appropriately addressed.

(2) Issues

The team determined that workers at the site felt free to raise safety concerns. Personnel stated that they do not hesitate to raise nuclear safety issues to their management without fear of retaliation by their management. The wide spectrum of PER documented issues supported this conclusion. The team had no indication during this inspection of individuals being inhibited from identifying problems using the corrective action process.

Inspectors concluded that the Concerns Resolution Program was functioning acceptably, but that there was a backlog of work to be done in the program. There were no technical safety issues identified that were lingering without attention in the program.

The inspectors reviewed the last two Nuclear Assurance (NA) assessments of the CAP program performance. The management organization is appropriately responding to NA by initiating PERs and taking corrective actions.

4OA6 Meetings

Exit Meeting Summary

On August 12, 2005, the inspectors presented the inspection results to Mr. R. Douet and other members of his staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

**SUPPLEMENTAL INFORMATION**

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee personnel:

T. Cornelius, Emergency Preparedness  
T. Cosby, Maintenance Support Manager  
R. Douet, Site Vice President  
M. Gillman, Operations Manager  
J. Hamilton, Site Support Manager  
Z. Kitts, Licensing Engineer  
D. Kulisek, Plant Manager  
B. Marks, Manager, Emergency Services  
J. McGuire, Program Manager, Nuclear Assurance  
R. Newby, Concerns Resolution Manager  
P. Pace, Licensing and Industry Affairs Manager  
M. Palmer, Outage and Scheduling Manager  
K. Parker, Maintenance and Modifications Manager  
R. Richie, Chemical/Environmental Manager  
R. Rogers, Engineering Manager  
P. Sawyer, Radiation Protection Manager  
J. Smith, Site Licensing Supervisor  
J. Thomas Design Engineering Manager  
K. Whittenburg, Communications Consultant

NRC personnel:

S. Cahill, Branch Chief, Region II  
S. Freeman, Senior Resident Inspector, Sequoyah

**LIST OF DOCUMENTS REVIEWED**PERs Initiated as a Result of this Inspection

86775 Tin Whiskers, clarify attachment to PER 81118  
87474 - HFA relays  
87449 - Effluent report  
87502 - Unit 2 trip  
87672 - EGTS recurrence issues  
85151 - OPS re-activation of licensing documentation  
87933 - Inadequate documentation for PER 70987

Selected Problem Evaluation Reports (PERs)

86945 Grid disturbance resulting in electrical power swings on both Units  
15702 Problem concerning logging EDGE unavailability time  
25083 Unexpected results during molded case breaker testing  
27050 Visual inspection of an HFA relay problem  
27673 Root causes of PER 02-0125591 and 02-010111 were graded as 78%  
31869 Unit 2 tripped  
33629 PER incorrectly closed  
62131 Annunciator response procedures not revised  
63941 Procedure deficiency for jumper removal  
65735 Molded case circuit breaker aging problem  
67228 Organization and management decisions - Siemens breakers  
67963 PER effectiveness review  
70383 CAP timeliness and quality  
70384 PER quality not meeting goals  
70385 Extent of condition and similar events  
72939 Review of PER closure during the U1C13 outage  
76030 Setpoint change to high power trips  
79197 PER closure problems  
79298 PER closure problems  
86522 ERCW sump valves are rusted  
80518 Unit 1 reactor trip  
80733 Maintenance and mods adverse trend on CAP performance  
80797 NSRB issued PER to review breaker programs  
85145 PER classification problems  
85620 Organizational trust, response to Self Assessment SQN-SIT-05-006  
85622 Questioning attitude, response to Self Assessment SQN-SIT-05-006  
01192 Actions taken have been ineffective to address CAP weaknesses  
27168 Local leak rate test failures  
27976 Raw Cooling Water Booster Pump failures  
31540 Poor scheduling lead to challenges to defense in depth  
68805 Tolerance for degraded equipment conditions

81669 Divider Barrier Seal cut  
 81686 Local leak rate test failures  
 83084 Outage clearance problems

PER's Reviewed associated with NRC Identified Items

20373 1B centrifugal charging pump tagged out of service when ERCW 1B header was tagged, NCV 2003/006-05  
 20585 Work week manager failed to update PSA color, NCV 2003/006-05  
 21094 Problem with licensed operator reactivation paperwork, NCV 2003/006-03  
 22355 PORV block valves on both units were closed with EWR and no risk assessment, NCV 2003/006-04  
 24833 Draindown of Unit 2 RCS to the midloop condition, NCV 2003/006-06  
 26422 Unit 1 generator tripped while performing main turbine overspeed test, NCV 2003/006-07  
 63941 Jumper left in circuit following maintenance, LIV 2004-03  
 64477 Failure of Unit 2 LCP protection set 4 rack 13, Eagle 21 malfunction, NCV 2004/004-001  
 68218 Unexpected loss of VCT level on Unit 1, NCV 2004/004-003  
 02-013504 Wrong oil added to 2A-A ERCW strainer, LIV 2003-06  
 02-013637 Wrong oil placed in 2A-A ERCW strainer, LIV 2003-06  
 03-011298 Wrong oil added to 2A-S TDAFW pump, LIV 2003-06  
 03-009567 Wrong oil in DG 1A2 Engine, LIV 2003-06  
 61626 BB Electric Board Room chiller trip due to unauthorized work, NCV 2004/003-001  
 60182 NRC identified improper storage of ISFSI components on pad, NCV 2004/009-001  
 66902 Missed opportunity to identify cracks on aux bldg crane, NCV 2004/009-002  
 20732 & 20588 Inservice Inspection procedure did not adequately address gaps and clearances for supports, NCV 2003/006-02  
 28224 & 27268, RWST level instruments failed high due to freezing, NCV 2003/006-08 and LER 2-2003-002

PERs Reviewed Associated With LERs

77234 U2 Reactor trip when breakers inadvertently tripped, LER 2-2005-001  
 80518 U1 Reactor trip on Auto Stop Oil failure, LER 1-2005-001  
 71060 U1 boron low in Mode 6, LER 1-2004-002  
 33325 & 33278 Reactor Trip inadvertent main transformer sudden pressure relay operation, LER 1-2004-001

Audits, Self-Assessment

Nuclear Assurance Assessment Report NA-CH-03-001, Corrective Action Program  
 Nuclear Assurance Assessment NA-CH-04-003, TVAN Corrective Action Program  
 Nuclear Assurance Quarterly Oversight Report-August 21 through December31, 2004, and Annual Assessment of Quality Assurance Program Implementation Effectiveness  
 Nuclear Assurance Quarterly Oversight Report - January 1 through April 19, 2005  
 Nuclear Assurance Oversight Report for the Period of January 1, 2005 through March 31, 2005, NA-SQ-05-03  
 Nuclear Assurance TVAN-Wide-Audit Report NO. SA0304  
 Self-Assessment, SQN-SIT-03-006, Corrective Action Program

Self-Assessment, SQN-SIT-05-007, Corrective Action Program - Focused on NRC Module 71152

Self-Assessment Final Report, SQN-OPS-04-001, Corrective Action Program Effectiveness in Operations

Nuclear Assurance-Oversight Report for Period August 21, 2004 through December 31, 2004, NA-SQ-05-01

Nuclear Assurance Assessment - NA-SQ-04-02

CRP-LIA-04-001, 2004 Operating Experience Program Self-Assessment

OIG Audit Report 2004-036F, Concerns Resolution Program-TVA Nuclear 2004

OIG Audit Report 2004-036F, Concerns Resolution Program-Sequoyah Nuclear Plant 2004

Sequoyah response to Nuclear Assurance Assessment NA-CH-04-003

Self Assessment SQN-SIT-05-006, Evaluation of SQN Nuclear Safety Culture

PER's Reviewed for System 099, Reactor Protection System

17029 Unit 2 bypass RTB failed during testing

19974 Unit 1 inaccurate work document

20404 Unit 2 feedwater regulating valve did not respond as expected during a test

20734 Unit 2 RTB problem

24747 Unit 2 entered AOP, due to Eagle 21 malfunction

25088 Reactor trip and feedwater isolation signal generated during testing

25427 Spare RTB tripped during testing

25444 Unit 2 trip breaker contact alignment problem

27381 Missed a procedure step during testing

27717 Unit 2 circuit board failure

33629 PER 25088 closed in error and new PER generated

34368 Eagle 21 failure

60449 Unit 2 TSP failure

60452 Unit 2 TSP alarm

60456 Unit 2 protective set IV TSP failure

64396 Unit 2 LCP card failure

64477 Unit 2 LCP card failure

69045 New EPT board failure

69367 Unit 1 universal board failure

70900 A reactor trip breaker would not close

70711 Unit 2 TSP card failures

70741 Unit 1 TSP failure in rack 1-R-7

71617 Unit 2 protective set 3 trouble flashing

71845 Unit 2 wrong circuit board installed

72765 Unit 2 protective set 3 LCP failure

72771 Unit 2 protective set 3 lockup

80113 Question concerning LCO during WO process

80535 A reactor trip breaker opens

80555 Switch left in wrong position during work

80683 Reactor trip breaker failure to latch



Work Orders Reviewed for System 099

98-4568 Reactor trip bypass breaker repair  
 99-3192 RTB problem  
 00-1462 RTB solenoid sticking  
 00-1924 RTB damage found  
 00-9854 RTB has missing parts  
 01-7600 Modify RPB control relay  
 01-9478 Repair RTB latch  
 02-3927 Replace RTB arc suppressor  
 03-4021 RTB has low trip force  
 03-19348 Work on a breaker 52H switch  
 04-72378 Repair Unit 2 Eagle 21 malfunction  
 04-782116 Unit 2 eagle 21 malfunction  
 04-782150 Repair TSP failure  
 04-782797 Install Unit 2 circuit board  
 04-783480 Unit 2 LCP failure

PER's Reviewed for System 201, Low Voltage Power

25639 Board transfer problem  
 26135 During racking a shutdown board breaker, charging motor would not stop running  
 27538 Review of arc flash requirements and time to operate breakers per EOPs  
 33759 Damaged flood barrier around electrical board  
 60871 Arc flash tool concern  
 61294 A breaker failed an overload test  
 62706 2B 480v ERCW MCC alternate feeder breaker not functional  
 63737 480v shutdown board loading  
 67779 Energized drop cord  
 67793 Methods to track Technical Specification 3.8.3.1 and 3.8.3.3 entries  
 68985 Breaker failure  
 68987 Missed functional failure and potential for others  
 69465 Inspection identified a damaged breaker  
 69817 Fan labeling and noun name problems  
 70265 Possible PCB residue  
 71165 Problem determining operability of offsite power  
 71328 Foreign material in a breaker compartment  
 72696 Water coming in through conduit  
 75566 Incorrect breaker labeling  
 76066 Breakers exceeded an inspection extension date  
 77476 Shutdown board 1A2A load swing  
 81675 CRDM breaker 2B tripped

Work Orders Reviewed for System 201

00-1924 Perform inspection of a breaker  
 00-2017 Inspect breaker for damage  
 00-2144 A breaker tripped free on closing  
 00-2444 Inspect the breaker to determine cause of failure

00-9482 Remove parts from spare RTB and install on Unit 2 spare RTB  
 00-9854 Breaker damage found during inspection-repair  
 01-7600 Modify DB-50 breaker  
 01-9478 Replace breaker catch mechanism

PER's reviewed for System 202, Medium Voltage Power

1786 Problem with transformer sprinkler light indications  
 6132 Problem with transformer sprinkler light indications  
 14220 Problem with transformer sprinkler light indications  
 19987 Review the ability to wave end device testing following maintenance  
 20212 ERCW pump motor tripout alarm  
 22002 Problem with transformer sprinkler light indications  
 22700 Received motor tripout on pump P-B ERCW  
 24587 Annunciator setpoint problem  
 24704 Lighting board transfer switch problem  
 25017 6.9kv shutdown breaker racking problem  
 25108 Increased number of reportable safety system actuations  
 25636 6.9kv breaker trip  
 26036 Control wire strands not under a set screw  
 26037 Breaker not meeting response time  
 26624 Spare breaker acceptance criteria failure  
 27059 Problem with transformer fire protection light indications  
 34116 ERCW MB pump trip  
 60198 Missing part on a shutdown board breaker  
 60199 Siemens breaker problems  
 64539 Fuse clip problem  
 65059 Unit 2 ERCW MCC breaker fail to close  
 65164 Shutdown board breaker for ERCW P-B failed to close  
 65825 1B-B containment spray pump breaker failure  
 71149 Unit 1 start bus failed to transfer  
 71485 Unit 1 containment spray breaker problem  
 71724 Breaker problems  
 72085 Unit 1 shutdown board 1A-A test breaker failure  
 74489 Relay target amp setting different from setting sheet  
 78029 6.9 kv common board loss of control power  
 78171 A Siemens breaker failed receipt inspection  
 78968 Spare breaker has missing parts  
 81618 6.9kv bus bolts over torqued  
 82016 Unit 2 6.9 kv breaker trip  
 82999 Breaker B-026 discrepancies found during shop inspection  
 84070 Diesel generator cable to shutdown bus exceeded test requirements  
 85306 Bus 1A 6.9kv normal feeder breaker trip coil problem

Work Orders Reviewed for System 202

02-968 ERCW pump breaker and hand switch replacement  
 02-5453 ERCW pump breaker and hand switch replacement  
 02-5817 Problem with transformer sprinkler light indications

02-14218 Check problem with transformer sprinkler light indications  
 02-32078 Check problem with transformer sprinkler light indications  
 03-14877 Troubleshoot transformer sprinkler light indications  
 03-22002 Check problem with transformer sprinkler light indications  
 04-770593 ERCW pump breaker problem  
 04-771281 Troubleshoot lighting board switch problem  
 04-774689 Repair breaker missing parts  
 04-780278 Swap Unit 1 6.9 kv breaker on shutdown board 1A-A  
 04-782385 Investigate Unit 1 containment spray breaker trip  
 05-770340 Replace defective lugs and missing retainers  
 05-772819 Work on control power converter  
 05-774663 Investigate breaker trip

PERs Reviewed for System 63, Safety Injection System

23817 U2C12 containment debris  
 81304 U2C13 containment debris  
 81555 Debris in U2 SG#4 enclosure  
 20584 U2C12 debris inside polar crane wall  
 31497 Worker signed on to only 1 of 2 necessary clearances to replace U2 RWST heaters  
 27268 RWST level enclosure deficiencies  
 31517 inadvertent water transfer from U1 RWST to U2 RWST  
 83459 SI pump reliefs leaking  
 23110 1BB SI pump failed Section XI test  
 75483 Boric acid on SI pump seal areas  
 70762 Borated water leak 1-VLV-63-557  
 27978 Borated water leak 1-VLV-62-720  
 27244 Borated water leak 2-FCV-63-152  
 20916 Borated water leak 2-VLV-63-615  
 20674 U2 forced outage leakage exam observations  
 20569 Borated water leak 2-FCV-63-26  
 34063 Borated water leak 1-FCV-63-157  
 71038 Borated water leak 1-VLV-63-553  
 31880 Borated water leak 2-FCV-63-25  
 70761 Borated water leak 1-FCV-63-70  
 69773 Borated water leak 2-FCV-63-48  
 85481 Injection valve packing leakage  
 82645 Injection valve packing leakage  
 63984 Injection valve packing leakage  
 62738 Injection valve packing leakage  
 34063 Injection valve packing leakage  
 28067 Injection valve packing leakage  
 20689 Injection valve packing leakage  
 27252 Borated water leak work order problems  
 24231 Grinnell valve stem nuts loose  
 62716 Repeat maintenance of mechanical seals

77826 Solenoid valves having abnormally high usage  
 73869 Numerous areas of missing insulation  
 71445 Containment sump flow isolation valve would not open  
 72135 2B Pen room cooler low flow

PERs Reviewed for System 74, Residual Heat Removal System

21077 Borated water leak 2-FCV-74-24  
 31321 Borated water leak 2-VLV-74-531  
 74809 Borated water leak Various Valves  
 74493 Borated water leak Various Valves  
 20571 Pre-RHR outage borated water leak  
 20159 Output of temp monitor unstable  
 84378 ECCS pump room floor clogged weep holes  
 31417 Failed to enter LCO on both RHR pumps  
 24872 RCS temp increased above 285 degrees after RHR placed in service  
 17056 RHR heat-up rate exceeded 100 degrees  
 20487 RHR operating procedure question  
 21148 Failed to enter LCO when placing RHR in service  
 20546 U2C12 ice condenser debris  
 27960 U2 debris found inside polar crane wall  
 68650 Low ERCW flow in 2A RHR pump room cooler  
 82604 2A RHR pump abnormal noise  
 27603 Section of Unit 2 penetration room flooded  
 27625 Water flowing from 2A RHR heat exchanger room floor drain  
 71004 Design temperature limit changed  
 71522 Valve manipulations caused contamination outside posted area

PERs Reviewed for System 311, Control Building HVAC System

21010 MCR chiller operability delayed  
 84079 A Shutdown Board Room chiller compressor tripped  
 61083 1A 480V Board Room chiller tripped/lost freon  
 68950 B Shutdown Board Room chiller failed to restart  
 71484 A Shutdown Board Room chiller TCV failed  
 73841 B Shutdown Board Room tripped/TCV failed  
 68613 Shutdown Board Room AHU fan motors failed  
 65263 2A 480V Board Room AHU fan vibration  
 71838 B Shutdown Board Room inoperable  
 69078 Six MR functional failures on SDBR chillers  
 65280 Wrong fuses in B SDBR chiller control panel  
 69780 PM revisions without System Engineering review  
 77888 A Electric Board Room chiller vibrations  
 62115 Low flow on B CREVS  
 69777 B MCR oil TCV failure  
 70358 B MCR chiller high pressure oil hangers  
 70135 B MCR chiller tripped  
 19740 B MCR chiller maintenance extended six times  
 24235 B MCR chiller maintenance extended

74332 Maintenance not performed in assigned frequency  
 76159 B MCR chiller AHU dampers bound  
 27878 MCR unnecessary LCO/MR time  
 63252 Installation of ground on MCR chiller control system  
 63168 Incorrect train identification  
 64547 Ground wires not installed in chiller mod  
 63102 Transformer leads for chiller control panel mod are mislabeled  
 63094 Clearance tag on incorrect valve  
 61460 Communications problem with digital controller  
 71435 Chiller terminals not identified  
 65752 Post testing maintenance deficiencies  
 65037 Work order not performed as scheduled  
 62209 Chiller equipment failure during PMT  
 24594 Chiller electrical compartment missing covers  
 20192 Chiller oil cooler outlet temp high  
 68880 Clams in electric board room chiller

PERs Reviewed for System 313, Auxiliary Building HVAC System

67713 'A' Electric Board Room chiller freon leak  
 65727 BB Shutdown Board Room TCV failure  
 27995 480V Board Room supply fan 1A-2B high vibrations  
 64375 Shutdown Board Room 1BB AHU motor bearing functional failure  
 28393 Replace MCR A chiller oil cooler TCV  
 60826 Vital Bat Rm IV pressure greater than MCR  
 25392 High vibrations on 480V Board Room 2B-B AHU  
 77086 No alarm response procedures for digital chiller control mod  
 73354 Evaluate need for alarm response procedures  
 78475 2B 480V Board Room chiller tripped  
 77994 2B 480V Board Room chiller tripped  
 77314 2B 480V Board Room chiller inop  
 16383 Results of PER 981237 Effectiveness Review  
 69078 Trend PER for Shutdown Board Room chiller failures  
 67983 Safety related chiller resets  
 62864 Board jumper problem on chiller control upgrade  
 65198 Some CRDM A/C units have wrong bearings  
 66597 1B CRDM Air A/C unit compressors failed  
 20538 125 Volt Battery Room fan bad bearing  
 20342 Improper scheduling of preventive maintenance  
 61003 Water leaking from valve vault room to Aux Building  
 21061 Electric Board Room chiller freon leak  
 67964 Electric Board Room freon leak  
 21001 Shutdown Board Room chiller freon leak  
 25712 Auxiliary Building chiller tripped twice  
 20897 Shutdown Board Room chiller would not start  
 26777 480V Board Room chiller freon leak

PER's Reviewed for System 61, Ice Condenser System

17042/32518/71284/82389 Baskets weighed less than the minimum analytical limit  
 20546/21301/72053/72903/83064 Debris left in ice bed  
 20446 Condenser back draft damper found closed  
 20518 Ice basket damage was identified  
 20542 Condenser back draft damper annunciator came in and cleared  
 20630 Condenser back draft damper found closed  
 24195 Ice bed temperature switches in alarm  
 25087 Condenser back draft damper alarm  
 25208 Check valve leak rate failure  
 25331 Glycol chiller disconnect switch found open  
 25463 Air handling defrost timers found improperly set  
 25608 Preventive maintenance scheduled after environmental qualification due date  
 25638 Glycol system valve stroke time greater than acceptable  
 27360 Glycol valves did not perform as required  
 29453 Floor monitoring cables not adequate for long term use  
 60749 Condenser back draft damper alarm  
 67190 Insulation degradation and corrosion  
 69493 Unplanned LCO for valve that would not stroke  
 69739 Glycol expansion tank low-low low level alarm  
 70871 Two Ice Condenser door seals have small tears  
 71380 Basket vertical ligaments broken  
 71441 Five baskets found heavy  
 71498 Boron from ice melt leaking through ceiling  
 71682 Ice bed temperature detectors damaged  
 72236 Ice machine glycol cylinders excessive leakage  
 72626 Floor monitoring system alteration not properly documented  
 75098 Testing changes not adequately reviewed  
 82536 Borax solution does not meet acceptance criteria  
 82408 Craft not following procedure for packing ice  
 82409 Five baskets requiring servicing missed  
 82575 Yellow plastic used in Ice Condenser posed debris risk  
 83269 Inlet door with incorrect hinge pin

PERs Reviewed for System 65, Emergency Gas Treatment System

00-007785 Annulus vacuum system recurrent damper problems  
 02-013522 Hole found in EGTS fan flexible discharge duct  
 03-010200 Problems with Unit 1 annulus fan dampers and annulus vacuum fan  
 03-010357 Unit 2 annulus vacuum fan indicating switch problem  
 03-010996 Duct access panel found unlatched  
 03-013356 Debris found in flow element  
 03-014018 Elapsed time meter failed  
 25191 Tear in EGTS ductwork  
 03-010769/04-000447/24360 Annulus pressure control degraded  
 03-011493/33963 Annulus vacuum fan flow switch problems  
 03-008880 Annulus vacuum fan suction dampers leaking air  
 21234 Inappropriate use of 10 minute hold time for functional evaluation

PERs Reviewed for System 90, Radiation Monitors

20233 Alarm 1-RA-400B Shield Bldg. Vent malfunction  
 24245 Alarm 1-RA-400B Shield Bldg. Vent malfunction  
 03-15959 Alarm 1-RA-400B Shield Bldg. Vent malfunction  
 24617 0-RM-90-212A setpoint found at 7.40e+04 instead of 7.40e+2  
 26052 Maintenance Rule functional failure of 2-RM-90-400A, Shield Building Exhaust  
 70654 Minimum required sample flow rate could not be achieved  
 76916 Particulate filter not installed in 1-RM-90-400 as required  
 82707 During PMTs it was discovered that the suction isolation valve was closed  
 77446 During lifting clearance it was discovered that the suction valve was closed  
 84902 Maintenance Rule functional failure of 1-RM-90-400, Shield Building Exhaust  
 19759 Unplanned entry into ODCM 1.1.2 Action 42  
 20566 Rad Monitors 0-RA-134B and 141B inoperable and ODCM 1.1.1 action 32 entered  
 20925 Alarm 1-RA-400B Shield Bldg. Vent malfunction  
 21316 Shield Bldg Ventilation monitor sample pump trip  
 25291 0-RM-90-126 declared inoperable due to rad monitor pump tripping  
 25543 Alarm 1-RA-400B Shield Bldg. Vent malfunction  
 26307 Alarm 1-RA-400B Shield Bldg. Vent malfunction  
 66167 2-RM-90-106 failed causing unplanned entry into LCOs 3.3.3.1 and 3.4.6.1.

Work Orders Reviewed for System 90

WO 04-772209 Take ambient temperature data on 1-RE-090-0400A power supply  
 WO 04-772210 Take ambient temperature data on 1-RE-090-0400A power supply

PERs Reviewed for Emergency Preparedness Issues

33682 Improvement items identified during the March 23, 2004 Orange Team REP drill  
 20576 The radio for REP communications located in the RADCON lab is not working  
 21057 HP Radio in the RadCon Lab had to be turned all the way up to be audible  
 24205 Repeat problem with EPIP procedure revisions  
 03-010688 Problem with EPIP procedure revisions  
 24236 Continued failure to repair REP radio  
 03-015918 REP Radio in RadCon Lab  
 25802 Issues identified during the 10/17/03 REP drill  
 26306 Issue identified during actual ALERT on 8/28/2003  
 60220 Trend PER for Pager tests  
 61309 Set points on Post Accident Radiation Monitors are higher than the EAL values  
 78915 Chem Lab is without vital power in Loss of Offsite Pwr

Work Orders Reviewed for Emergency Preparedness Issues

TPS WO #03-046437-000-001 REP radio in RadCon lab malfunction

Exercise Evaluations Reviewed

REP Drill on 8/18/2004  
 Graded Exercise on 6/23/2004  
 Off-Year REP Exercise on 3/16/2005

PERs Reviewed for Radiation Control Issues

28279 RadWorkers not following radiological controls during U2C12 outage  
 03-16521 Workers entered U-2 690' pipe chase on wrong RWP  
 62244 Individual exited gatehouse and went home with Electronic Dosimeter  
 64393 Person crossed a Radiography Boundary during the initial set up phase  
 64734 Contaminated nylon sling found in the Service Bldg clean tool room  
 65650 Trend PER for not signing out on RWPs and not reporting dose rate alarms  
 68353 Worker failed to sign out on his RWP  
 71635 Employee received both a dose and a dose rate alarm and failed to exit area  
 71595 Worker exceeded his RWP dose limit  
 71524 Worker received dose rate alarm and failed to notice upon exiting the RCA  
 72323 Pallet of chain hoists with purple paint on the loading dock by the Laborer Shop.  
 74749 Worker received a dose rate alarm on his Electronic Dosimeter  
 75039 Possible trend of inappropriate release of material from the RCA  
 75400 Trend PER for radworker performance during outage  
 80415 Discovery of purple-painted tools in unauthorized areas of the plant  
 81947 Worker failed to notice dose alarm and leave the area  
 82833 Unexpected dose rates in the Unit 2 Annulus during fuel transfer  
 82998 Individual received 5 electronic dosimeter alarms and did not immediately report  
 83091 Individual was on the wrong RWP and received a dose rate alarm. He failed to notify radiation protection of this alarm  
 83211 Individual was on wrong RWP, received dose rate alarm and did not immediately notify RadCon

PER's Reviewed For Operating Experience

25619 Generic operating experience review for inaccurate work documents  
 25625 Review Westinghouse Technical Bulletin 99-05, R1, Breaker Minimum Trip Force and Seismic Enhancements  
 25865 Generic review of WBN PER  
 26602 Generic review of operating experience for logic power supply  
 27270 Generic review of BFN PER breaker light indications  
 28280 Review of General Electric Technical Information Letter 1378-1  
 31532 Generic review of NRC EN 40364  
 62154 Review of operating experience OE-18349, HFA relay cracking  
 63333 Review of operating experience OE- 40804  
 65735 Review Westinghouse Technical Bulletin (TB-04-13) molded case circuit breakers  
 68143 Review Westinghouse Technical Bulletin TB-04-17, Tyco relay issues  
 69552 Generic Review of BFN PER  
 70310 Review of Westinghouse Info Gram, IG-04-6, RTB test pushbutton problems  
 70386 Generic review of WBN and BFN PERs  
 75417 Generic review of operating experience OE-19727



77817 Generic review of operating experience, labeling problems  
 79274 Review of Watts Bar White finding for silting in raw water systems

Procedures, Instructions, Guidance Documents, and Operating Manuals

SPP-3.1, Corrective Action Program, Rev. 8  
 SPP-1.6, TVAN Self-Assessment Program, Rev. 12  
 SPP-7.1, On Line Work Management, Rev. 6  
 SPP-6.0 Maintenance and Modification, Rev. 2  
 SPP-6.1 Work Order Process Initiation, Rev. 4  
 SPP-6.6 Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10 CFR 50.65, Rev. 8  
 SPP-7.0 Work Management, Rev. 1  
 SPP-9.0, Engineering, Rev. 3  
 BP 250 Corrective Action Program Handbook, Rev. 8  
 TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10 CFR 50.65, Rev. 17  
 0-TI-SXX-000-001.0, Conduct of System Engineering  
 0-TI-SBR-000-001.1, Breaker Testing and Maintenance Program  
 0-TI-OPS-000-063.0, Sensitive Equipment Control  
 MMDP-1, Maintenance Management System, Rev. 8  
 NEDP-12, System Component Health, Equipment failure Trending, Rev. 5  
 NADP-3, Managing the Operating Experience Program, Rev. 6  
 NEDP-20, Conduct of the Engineering Organization, Rev. 6

Miscellaneous Documents Reviewed

CAP Self-Assessment SQN-SIT-05-007, list of PERs  
 CAP Top Ten Problem List and Actions  
 Checklist for proper PER closure  
 HFA Relay Action Plan for Inspection and Repair  
 System Status Report, System 099, Reactor Protection System  
 System Health Report Card, System 099, Year 2005  
 System Status Report, System 201, Low Voltage Power, July 19, 2005  
 System Health Report Card, System 201, Year 2005  
 System Status Report, System 202, Medium Voltage Power, July 19, 2005  
 System Health Report Card, System 202, Year 2005  
 System Health Report Cards and Status Report for System 65, Emergency Gas Treatment  
 System Health Report Cards and Status Report for System 61, Ice Condenser  
 Meeting Minutes for PER coordinator meetings dated April 19, 2005 and July 21, 2005  
 Technical evaluation for molded case circuit breakers (PER 65735)  
 Effectiveness Review for PER 32427  
 Lesson plan, OPL273C0507, Welcome to Requal  
 Operations Standing Order 04-008, Control of Equipment Dogging Devices  
 Triennial Audit Schedule, 2005-2007  
 Westinghouse Technical Bulletin, TB-04-17 (Tyco Relay Issue)  
 Transmission Information Notice 04-008, possible PCB on relays  
 Radiation Monitoring System Status Report dated July 1, 2005  
 Safety Injection Systems Health Report

Residual Heat Removal Systems Health Report  
Air Conditioning and Chillers System Health Report  
Preventable Functional Failure Data for Systems 63 (SI) and 74 (RHR)  
Integrated Quarterly Trend Reports (2004-2005)

### LIST OF ACRONYMS

AOP	Abnormal Operating Procedure
CAP	Corrective Action Program
ERCW	Essential Raw Cooling Water
LER	Licensee Event Report
MRC	Management Review Committee
NA	Nuclear Assurance
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PER	Problem Evaluation Report
PI&R	Problem Identification and Resolution
PMT	Post Maintenance Testing
Rev.	Revision
SPP	Standard Programs and Processes
TI	Technical Instruction
TS	Technical Specification
TVA	Tennessee Valley Authority
UFSAR	Updated Final Safety Analysis Report
WO	Work Order