



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

December 16, 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: BROWNS FERRY NUCLEAR PLANT - NRC PROBLEM IDENTIFICATION AND
RESOLUTION INSPECTION REPORT NOS. 05000259/2005011,
05000260/2005011 AND 05000296/2005011

Dear Mr. Singer:

On November 18, 2005, the Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry 1, 2 and 3 reactor facilities. The enclosed inspection report documents the inspection results, which were discussed on November 18, 2005, with Mr. Jon Rupert, Mr. Brian O'Grady, 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, compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved selected examination of procedures and representative records, observations of activities, and interviews with personnel. This inspection was a routine biennial inspection of your Corrective Action Program for Units 2 and 3 in the NRC's Baseline Inspection Program. The inspection also evaluated the adequacy of your parallel Corrective Action Program on Unit 1, which is currently involved in significant activities to recover the unit to operational status.

On the basis of the sample selected for review, the team concluded that, in general, problems were properly identified, evaluated, and resolved within both corrective action programs. The inspection also confirmed that you have established and implemented an appropriate corrective action process to support the current activities associated with Unit 1 recovery. However, based on the results of this inspection, the inspectors identified one finding of very low safety significance (Green) with three examples. The examples were determined to involve violations of NRC requirements. However, because of their very low safety significance and because the examples have been entered into your corrective action program, the NRC is treating the finding as a non-cited violation (NCV), in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

If you contest the NCV in this report, you should provide a response with the basis for your denial, within 30 days of the date of this report, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D. C. 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D. C. 20555-0001; and the NRC Resident Inspector at the Browns Ferry Power Station.

In accordance with 10 CFR 2.390 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/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

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

Docket Nos. 50-259, 50-260, 50-296
License Nos. DPR-33, DPR-52, DPR-68

Enclosure: NRC Inspection Report 05000259/2005011, 05000260/2005011,
05000296/2005011
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

cc w/encl:

Ashok S. Bhatnagar
Senior Vice President
Nuclear Operations
Tennessee Valley Authority
Electronic Mail Distribution

Larry S. Bryant, Vice President
Nuclear Engineering
Tennessee Valley Authority
Electronic Mail Distribution

Brian O'Grady
Site Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

Robert J. Beecken, Vice President
Nuclear Support
Tennessee Valley Authority
Electronic Mail Distribution

General Counsel
Tennessee Valley Authority
Electronic Mail Distribution

John C. Fornicola, Manager
Nuclear Assurance and Licensing
Tennessee Valley Authority
Electronic Mail Distribution

Bruce M. Aukland, Plant Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

Glenn W. Morris, Manager
Corporate Nuclear Licensing
and Industry Affairs
Tennessee Valley Authority
Electronic Mail Distribution

William D. Crouch, Manager
Licensing and Industry Affairs
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
201 Monroe St., Suite 700
P. O. Box 303017
Montgomery, AL 36130-3017

Chairman
Limestone County Commission
310 West Washington Street
Athens, AL 35611

Masoud Bajestani, Vice President
Browns Ferry Unit 1 Restart
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Decatur, AL 35609

Robert G. Jones, Restart Manager
Browns Ferry Unit 1 Restart
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Decatur, AL 35609

Distribution w/encl: (See page 4)

TVA

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Distribution w/encl:

M. Chernoff, NRR

E. Brown, NRR

L. Slack, RII EICS

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* S. Cahill per verbal discussion.

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-259, 50-260, 50-296

License Nos: DPR-33, DPR-52, DPR-68

Report No: 05000259/2005011, 05000260/2005011 and
05000296/2005011

Licensee: Tennessee Valley Authority (TVA)

Facility: Browns Ferry Nuclear Plant, Units 1, 2 & 3

Location: Corner of Shaw and Nuclear Plant Roads
Athens, AL 35611

Dates: October 31 - November 4 and November 14 - 18, 2005

Inspectors: S. Shaeffer, Senior Project Engineer (Team Leader first
week)
J. Bartley, Senior Resident Inspector, Watts Bar (Team
Leader second week)
T. Ross, Senior Resident Inspector, Browns Ferry
B. Carrion, Project Engineer

Approved by: Stephen J. Cahill, Chief
Reactor Project Branch 6
Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000259/2005-011, 05000260/2005-011, 05000296/2005-011; 10/31 - 11/4, 11/14 - 18/2005; Browns Ferry Nuclear Plant, Units 1, 2 and 3; Biennial baseline inspection of the problem identification and resolution program and program use on the Unit 1 Recovery Project.

The inspection was conducted by a Senior Project Engineer, two Senior Resident Inspectors and a Project Engineer. The inspection was a routine Reactor Oversight Process (ROP) biennial baseline inspection of the licensee Corrective Action Program (CAP) on the operating Units 2 and 3. The inspection also evaluated the implementation of an independent CAP on the Unit 1 Recovery Project to assess program adequacy and program readiness for integration of Unit 1 into routine ROP baseline inspections. One finding of low safety significance (Green) with three examples was identified. The significance of issues is indicated by the color assigned (Green, White, Yellow, Red) using the Significance Determination Process in Inspection Manual Chapter 0609, Significance Determination Process (SDP). 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.

Identification and Resolution of Problems

Overall, the licensee maintained an effective program for the identification and correction of conditions adverse to quality. Site management was purposely active and involved in the Corrective Action Program (CAP) and focused appropriate attention on significant plant issues. The licensee was effective at identifying problems at a low threshold and entering them into the CAP. In general, the licensee consistently prioritized issues in accordance with their CAP and routinely performed adequate evaluations that were technically accurate and of sufficient depth. However, several issues were identified related to ineffective implementation of corrective actions for previously identified NRC violations and other corrective action issues identified by the licensee.

Formal root cause evaluations for significant conditions adverse to quality were thorough and detailed. Corrective actions developed for lower level root and contributing causes were generally timely, effective, and commensurate with the safety-significance of the issue. Improvement was noted in management oversight to ensure all contributing causes were being adequately considered for broader corrective actions, extent of condition reviews, and enhanced trending.

Self-assessments, audits performed by the Nuclear Assurance (NA) organization, and Multi-site CAP Self-Assessments, were effective in identifying issues and entering them into the CAP. These audits and self-assessments were self-critical and identified substantive issues, numerous lower level problems, and areas that needed improvement. The audits and self-assessments reviewed appeared to be comprehensive and thorough. However, several identified repeat issues from previous self-assessments and audits in which prior corrective actions had proven ineffective. Although new Problem Evaluation Reports (PERs) were issued to address each specific repetitive problem, the licensee did not always clearly delineate the repeat nature of the PER and thereby lost an opportunity to bring additional attention to the problem or take action to determine why the previous corrective actions were ineffective.

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Based on review of the licensee's Concerns Resolution Program (CRP) and discussions conducted with plant employees from various departments, the inspectors did not identify any reluctance to report safety concerns. Increased program usage in conjunction with the increase in Unit 1 recovery activities was being adequately managed. Based on the samples reviewed, the depth of issue evaluations were adequate to address the identified concerns raised to the CRP. Oversight of contractor CRPs was being implemented in an appropriate manner.

The licensee had established and implemented adequate processes and measures for including Unit 1 into the CAP at Browns Ferry. Problem identification thresholds were sufficiently low and management was actively involved in implementation of the program in order to instill consistent expectations and improve program efficiencies. Programmatic trending of Unit 1 PERs was established via an assortment of adverse trend monitoring techniques; however, recurrence monitoring for previously identified potential adverse trends was not being routinely conducted and tended to rely on historical Management Review Committee (MRC) knowledge to recognize recurrence.

Based on the samples reviewed during the inspection, the data did not indicate any significant areas of concern with the current Unit 1 recovery activities. However, the team noted that two notable problems were previously identified by NRC inspections involving inadequate control of torus pipe support welding (PER 77006) and more recently the control of thermal overload design implementation (PER 89577). These NRC identified issues were indicative of deficiencies in the area of licensee self-verification of design and work activities.

In addition, recent problems were observed in the monitoring of Unit 1 recovery activities for potential adverse impact on the operating units. This included an example where the need for an extent of condition review on the operating units was not well communicated, based on an issue identified on Unit 1.

A. Inspector-Identified and Self-Revealing Findings

Cornerstone: Reactor Safety/Initiating Event

- (Green) The inspectors identified a finding involving a non-cited violation (NCV), with three examples, of 10 CFR 50, Appendix B, Criterion XVI, for inadequate implementation of corrective actions for two previously identified NCVs. The previous NCVs were associated with rigging deficiencies that resulted in the drop of a Reactor Building crane trolley and with a human performance error that resulted in the loss of a 480-volt Shutdown Board and inadvertent start of emergency equipment.

The finding was more than minor because it is associated with the Procedure Quality attribute and objective of the Reactor Safety/Initiating Event Cornerstone. In addition, if left uncorrected, this finding would result in a more significant safety concern because the failure to implement the corrective actions for the NCVs would result in more significant safety concerns. This finding was determined to be of very low safety significance because no related examples of significant rigging deficiencies or loss of power to shutdown boards caused by

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relay calibrations have occurred as a result of the inadequate implementation of corrective actions. The cause for all three examples were determined to affect the PI&R crosscutting area.

B. Licensee-Identified Findings

None.

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution

a. Effectiveness of Problem Identification

(1) Inspection Scope

The inspectors reviewed licensee Procedure SPP-3.1, Corrective Action Program, Revision 9, which describes the administrative process for the identification and resolution of problems, and its implementation. The inspectors evaluated the implementation of SPP-3.1 on both the operating Units 2 and 3, as well on the implementation of an independent CAP on the Unit 1 Recovery Project. The inspectors also assessed the readiness of the Unit 1 CAP for future integration of Unit 1 into the NRC's Reactor Oversight Process (ROP) routine baseline inspections.

The inspectors reviewed PERs that had been initiated by the licensee since October 2003 (prior to the last NRC baseline problem identification and resolution inspection conducted in November 2003) to verify that problems were being properly identified, appropriately characterized, screened for adverse trends, and entered into the CAP. Though not limited to, the reviews focused on issues associated with the following risk significant plant safety systems: emergency diesel generator (EDG), Residual Heat Removal Service Water (RHRSW), High Pressure Coolant Injection (HPCI) and the Residual Heat Removal (RHR) system. In addition to the system reviews, the inspectors selected a representative number of PERs that were identified and assigned to the major plant departments which included operations, maintenance, engineering, security, chemistry, health physics, and emergency preparedness.

The inspectors also reviewed completed maintenance work orders (WOs), system health reports, and the Maintenance Rule database for the selected systems to verify that equipment deficiencies were being appropriately entered into the corrective action and Maintenance Rule programs. The inspectors conducted plant walkdowns of equipment associated with the EDG, RHRSW, HPCI, and RHR to assess the material condition and to look for any deficiencies that had not been entered into the CAP. These tours included significant portions of system 74 (i.e., the RHR and low pressure coolant injection (LPCI) system) inside and outside the drywell.

The inspectors reviewed historical control room operator logs to verify that equipment deficiencies, especially those involving the safety systems selected for the focused review, were entered in the CAP. The inspectors also reviewed selected industry operating experience items, including NRC generic communications, to verify that they were appropriately evaluated for applicability and whether issues identified through these reviews were entered into the CAP.

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The inspectors attended plan-of-the-day status and Management Review Committee (MRC) meetings for Unit 1 and Units 2/3 to observe management oversight functions in the corrective action process. The inspectors also interviewed personnel from operations, maintenance, engineering, security, health physics, chemistry, and other site organizations to evaluate their threshold for identifying issues and entering them into the CAP.

The inspectors reviewed licensee audits and self-assessments, focused primarily on the CAP, to verify that findings were entered into the CAP and to verify that these findings were consistent with the NRC's assessment of the licensee's CAP. The inspectors also reviewed the licensee's annual audit schedules for 2003-2005 to verify audits were scheduled and conducted pursuant to NADP-2, Audits, and TVA-NQA-PLN89A, Nuclear Quality Assurance Plan. Furthermore, the inspectors interviewed the acting Nuclear Assurance Manager.

The inspectors reviewed Nuclear Safety Review Board (NSRB) meeting minutes for 2005 to verify that identified problems and issues were entered into the licensee's CAP consistent with the guidance of SPP-3.1, Corrective Action Program. The inspectors also met with the NSRB chairman to discuss issues and problems identified by the NSRB, documentation and resolution of NSRB open items, and use of the CAP to address NSRB issues.

Documents reviewed to support the inspection are listed in the Attachment.

(2) Assessment

The inspectors determined that the licensee was effective in identifying problems and entering them into the CAP. PERs normally provided complete and accurate characterization of the subject issues. In general, the threshold for initiating PERs was very low and employees were encouraged by management to initiate PERs. This was currently evidenced by the approximate 3,500 Unit 2 and Unit 3 PERs expected in 2005 and increased identification levels for Unit 1. Equipment performance issues involving maintenance effectiveness, such as maintenance errors, poor maintenance work practices, and inadequate risk assessments, were being identified at an appropriate level and entered into the CAP. Although several NRC identified PERs were initiated during the inspection for material condition issues, plant tours confirmed that the licensee threshold for identifying material condition issues was low. A variety of licensee-identified potential adverse trend PERs were identified via established CAP trending analysis. The team did not identify any significant adverse trend PERs that had not been identified within the licensee's CAP.

Site management was purposely active and involved in the CAP and focused appropriate attention on significant plant issues. At the MRC meetings, management made frequent modification of PER priorities, PER descriptions, PER root cause determination techniques, and other items to ensure CAP expectations were being implemented.

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The licensee was effective in evaluating internal and external industry operating experience items for applicability and entering issues into the CAP. The team found that communication for internal operating experience between other TVA sites was frequently reviewed and samples indicated that applicable issues were identified at the Browns Ferry site and appropriate followup was being performed. The licensee's program for reviewing and processing operating experience for external sources was also well established. The site also contributed to operating experience databases on a frequent basis to allow other utilities to benefit from Browns Ferry operating experience.

Self-assessments and audits performed by the NA organization and Multi-site CAP Self-Assessments, were effective in identifying issues and entering them into the CAP. These audits and self-assessments were self-critical and identified substantive issues, numerous lower level problems, and areas for improvement. In general, the audits and self-assessments reviewed appeared to be comprehensive and thorough. However, several of these self-assessments and audits identified repeat issues from previous self-assessments and audits in which prior corrective actions had proven ineffective. Although new PERs were issued to address each specific repetitive problem, the licensee did not always clearly delineate the repeat nature of the PER and thereby lost an opportunity to bring additional attention to the problem. Furthermore, the licensee did not recognize the need to initiate a comprehensive PER to evaluate why previous corrective actions for repetitive CAP deficiencies and weaknesses were ineffective. In particular, the most recent NA and Multi-site CAP self-assessments conducted effectiveness reviews of PER 1192 which had been initiated for numerous repeat program deficiencies identified by prior CAP audits (e.g., SSA0304) self-assessments (e.g., NA-CH-03-01). Both of the recent NA and Multi-site CAP self-assessments concluded that corrective actions for these repetitive program area weaknesses and deficiencies have continued to be ineffective. Overall, the ability to perform self critical CAP assessments and enter identified issues into the CAP, was clearly evident. However, corrective actions to resolve persistent self-identified CAP weaknesses and deficiencies remain ineffective. When corrective actions are determined to be ineffective by an effectiveness review, SPP-3.1 directs that a new PER be initiated cross-referencing the old PER. TVA has subsequently initiated a Corporate PER to address this issue for all TVA sites (PER 93710).

Since 2003, the NA organization continued to fully met its biannual functional area audit responsibilities in conformance with the Nuclear Quality Assurance Plan (NQAP). However, some of the audits were delayed and not conducted until very late in their scheduled year. Consequently, the associated reports were not issued until well into the following year.

The NSRB has taken an active role in fulfilling its oversight responsibilities. In particular, each of the NSRB sub-committees appeared to identify, critically probe, track and pursue to closure numerous issues relevant to plant, personnel, and radiological safety. Typically, NSRB issues were identified as either Management Attention Items (MAI) or Recommendations (REC) depending on their relative importance and/or safety significance. With few exceptions, every MAI was verified to have an associated plant

specific PER. Most RECs did not have PERs, and almost all of those that were not associated with a PER did not appear to necessitate one. However, to avoid future confusion and potentially side-stepping the CAP, the licensee has since decided to initiate an PER for every MAI and REC. The licensee subsequently issued PER 93711 to address NSRB oversight concerns that were not always entered in the CAP.

Throughout the inspection, the team evaluated the accessibility and ease of use of the licensee's electronic eCAP system. The team considered the licensee's transition to the eCAP system over the last two year period resulted in improvements to the CAP, in that, previous CAP tracking program output reports were paper intensive and a contributor to inefficiencies identified in the area of issue documentation and ability to perform efficient CAP trending. However, the new eCAP system does have some ongoing issues with response time for accessing data and an inability to modify cause codes after issues have been closed. The licensee was aware of these issues and was taking actions to improve these aspects of system use.

At the Unit 1 MRC on November 2, 2005, PER 90890 was reviewed and discussed. This PER was written to address improperly installed essential equipment cooling water (EECW) system flow elements on Units 2 and 3. However, this PER was not brought to the attention of the Unit 2/3 MRC, and was not adequately reviewed for potential extent of condition considerations. Apparently, based upon a prior understanding, PERs identified by Unit 1 personnel that affect the operating units were not being reviewed by the Unit 2/3 MRC. Since then, PER 90890 was reviewed by the Unit 2/3 MRC. Furthermore, the licensee has decided to have the Human Performance Manager from the operating units attend the Unit 1 MRC to ensure issues affecting Units 2 or 3 receive the proper oversight.

b. Prioritization and Evaluation of Issues

(1) Inspection Scope

Procedure SPP-3.1 defines the licensee's classifications of PER significance: "A" level was the most significant, typically 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 a 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 licensee's process also incorporates PERs designated as non-PERs to account for low level items which are, for example, duplicate to other issues identified in the CAP and therefore do not require followup.

The team reviewed a sampling of PERs to determine if issues were classified and processed in accordance with the requirements of SPP-3.1. The team attended the licensee's MRC meeting to observe the final classification assignment for new PERs. The team reviewed root cause analyses and apparent causes for PER items to assess

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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 analysis 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.

Reviews were conducted 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. While the majority of PERs reviewed were classified as Category D, the sample also included a representative number of Category A, B, C, and non-PERs. The inspectors' review was also intended to verify that the licensee adequately determined the cause of the problems and adequately addressed operability, reportability, common cause, generic concerns, and extent of condition. For significant conditions adverse to quality, the review was also to verify that the licensee adequately addressed the root and contributing causes and appropriately identified corrective actions to prevent recurrence. The team also reviewed the self assessment process concerning the grading of PERs for improvement purposes.

The inspectors reviewed the total preventive maintenance (PM) backlog and performed a detailed review of the PM backlog, PMs in the grace period, and deferred PMs for the EDG, RHR, RHRSW, and HPCI systems. The inspectors also selected numerous deferred and/or extended PMs for system 74 to verify that the impact on environmental qualification (EQ) of critical components (i.e., pumps and motor-operated valves) was adequately evaluated.

Documents reviewed are listed in the attachment.

(2) Assessment

The inspectors determined that, overall, the licensee properly prioritized issues entered into the CAP in accordance with SPP-3.1. Generally, the licensee performed adequate evaluations that were technically accurate and of sufficient depth. Formal root cause evaluations for level A and B PERs were more thorough and detailed than those of lesser categories, as expected. The inspectors did not identify any risk significant issues that had not been appropriately prioritized. However, the inspectors identified several minor problems involving PERs that lacked documentation to support the level D classification. Based on additional reviews into each PER subject matter, the basis for the level D classification was more apparent.

One example was identified regarding weak evaluation of a trend PER. Numerous PERs were written for repetitive problems with scram discharge volume (SDV) vent and drain valves with erratic stroke times outside the established acceptance criteria, but still within the 60 second TS requirement. A trend PER (64603) was written to address this

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persistent problem and was assigned as a level C, Apparent Cause. However, the PER concluded that "the apparent cause is unknown ... no definitive basis can be determined without further evaluation/investigation," and yet the PER was closed. Subsequently, the system and component engineers together appear to have independently determined the apparent cause of the erratic SDV valve stroke times, outside of the CAP. In order to document the continuing trend of erratic stroke times and their apparent cause determination (i.e., sticking air pressure regulator), PER 92704 was initiated by the licensee.

The inspection determined that the licensee's use of Root Cause and Apparent Cause analysis, in general, was of sufficient quality, depth, and focus to identify applicable root causes. The licensee utilized a variety of root cause analysis techniques to determine these causes and their contributors. The team did not identify any specific adverse trends which were not identified by the licensee. Examples of thorough root causes involved resolution of PERs associated with repetitive EDG starting relay failures (70399) and the reactor building crane trolley drop event (70752). However, corrective actions for the latter issue were not well implemented as discussed later in this report.

The total PM backlog (in the grace period) increased almost 50% over the last year from 443 in September 2004 to 636 in September 2005. As of November 2, 2005, there were 40 PM activities that were deferred past the grace period. The inspectors reviewed the deferred PMs and found that they were appropriately screened and evaluated, and did not appear to affect operability or reliability of the systems.

The main reasons for deferral appeared to be manpower restraints and to minimize unavailability for the systems that were close to NRC Performance Indicator thresholds. An informal action plan was in place to lower the backlog. No trend PER was generated, however, the PM program appears to be receiving an appropriate level of management attention.

c. Effectiveness of Corrective Actions

(1) Inspection Scope

The inspectors evaluated a sample of PERs, WOs, self-assessments, licensee audits and operating experience items to verify that the licensee had identified and implemented timely and appropriate corrective actions to address problems. The inspectors verified that the corrective actions were properly documented, assigned, and tracked to ensure completion. Where possible, the inspectors independently verified that corrective actions were implemented as intended. For significant conditions adverse to quality, the review was to verify that effectiveness reviews were adequately performed as required by SPP 3.1. 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. Additional PERs were selected based on their relation to security, emergency preparedness and radiation protection. The inspectors also reviewed the corrective actions taken in response to NCVs documented in NRC inspection reports over the previous two year period to verify CAP procedure requirements were met and that actions were thorough and comprehensive. Selected licensee corrective actions associated with 2004 and 2005 Licensee Event Reports (LER) were also reviewed to confirm the implementation of key corrective actions. A focused review of a number of NCV's associated with the Radiation Protection area was also performed based on the increased number of issues identified over the previous two year period.

The inspectors also performed selected sampling and trend analysis of a variety of CAP program and other corrective action related licensee programs. These included, but were not limited to: Operator work arounds; Temporary Alterations, Maintenance-related functional failures; System Health Reports; and illuminated control room annunciators. The inspectors also reviewed the 50 oldest PERs and WOs 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. The review also verified the adequacy of corrective actions to address equipment deficiencies and Maintenance Rule functional failures of the plant systems that were selected for the focused review as discussed in Section 4OA2.a.

Documents reviewed are listed in the attachment.

(2) Assessment

Overall, corrective actions developed and implemented for problems were timely and effective, commensurate with the safety significance of the issues. Corrective actions developed and implemented for plant equipment problems were generally effective in correcting the equipment deficiencies. The inspectors found that the scope and depth of corrective actions taken by the licensee were appropriate for the severity and risk significance of the problem identified. In general, where repetition had occurred, the licensee's trending program and rework program had identified the failures as such and the licensee had prescribed additional corrective action to address the cause.

Reviews of CAP related areas such as System Health Reports, Operator Work Arounds, control of temporary alterations, etc., indicated that the licensee was actively utilizing these programs to enhance the corrective action process in these specific areas. Once specific corrective actions for these areas were developed, they were re-integrated within the PER system. The team did determine that the System Health Report Card detail and system engineer accountability for key system parameter monitoring could be expanded for certain systems reviewed during the inspection.

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The inspectors reviewed the Reactor Oversight Process (ROP) Plant Issue Matrix and determined that there was an increasing trend of Green level NCVs over the past two years. During the last two years, ten self-revealing and seven NRC identified Green NCVs were documented. All ten of the self-revealing and four of the NRC identified NCVs occurred during the last year. The NRC identified NCVs were evenly spread across the two year period with only one per quarter. The inspectors determined the increasing trend was due to an increase in events or issues that were self-revealing. The licensee also noted the trend and initiated PER 87906 on August 18, 2005, to evaluate the trend and identify corrective actions.

The inspectors reviewed the corrective action aspects of the Maintenance Rule (MR) program implementation. At the time of the inspection, the licensee had portions of seven systems in MR (a)(1) status. The seven affected systems were Radiation Monitoring, Containment, Fuel, 480 V Shutdown Power, RHRSW, EECW, and RHR. The inspectors verified the issues that resulted in the systems being MR (a)(1) were appropriately dispositioned as level B PERs. The inspector also verified a sample of corrective actions. The inspectors also reviewed the functional failures to determine if any were repetitive maintenance preventable functional failures, and, if so, that they were appropriately dispositioned.

In the area of Radiation Protection, the licensee was effective in identifying a broad spectrum of problems at an appropriately low level and entering them into the CAP as PERs. The team reviewed a 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. Based on a review of numerous corrective action plans and their implementation, the team found that the licensee's corrective actions were generally effective in this area.

However, in the reviews, the inspectors identified the following examples of Corrective Action Plans which were not considered to be implemented as intended by the licensee's process:

- C Corrective action number 02 of PER 48336, required the licensee to add an additional procedure step and caution note to Mechanical Corrective Instruction (MCI) MCI-0-082-CLR001, Standby Diesel Engine Water Coolers Disassembly, Inspection, rework, and Reassembly. On February 17, 2004, MCI-0-082-CLR001 was revised accordingly and issued as revision 26. However, this revision omitted adding the caution note that was to ensure mechanics were made aware of the difficulty of torquing the bolting of the emergency diesel engine water cooler in and around the 12 o'clock position due to interferences. The licensee subsequently initiated PER 93692 to correct this deficiency.
- C The evaluation and resolution of frequent problems with Alternate Decay Heat Removal (ADHR) system reliability during the past Unit 2 refueling outage was addressed by PER 80004. The corrective actions specified by this PER did not appear to sufficiently ensure ADHR reliability for future outages. However, the

inspectors determined that, independent of the CAP, several key corrective actions were developed and captured by the outage lessons learned process that could adequately resolve problems with ADHR reliability. The licensee initiated PER 93712 to address this issue of developing corrective actions outside of the formal CAP process.

- C In response to significant audit issue identified by the NA Maintenance Audit (SSA0405), the Unit 1 licensee organization initiated PER 70046 due to multiple problems with the BFN Unit 1 welding program. A root cause was performed and corrective actions were developed. The corrective action to prevent recurrence (CATR) # 70046-001 required the Unit 1 organization to “assign qualified individual (QI) welding engineers to be responsible for completion of all QI activities including verification of welder qualifications prior to welding.” The action taken to complete CATR 70046-001 was “QI certified weld engineers have been assigned and are responsible for completion of all Unit 1 QI inspection activities including verification of welder qualifications prior to welding.” Although, the actions taken to accomplish CATR 70046-001 were not formally instituted by procedure or policy, the licensee did appear to effectively implement the intent of the corrective action by less formalized methods.

These deficiency examples were not considered to represent significant violations of applicable requirements.

(3) Findings

Introduction: The inspectors identified a Green NCV, with three examples, of 10 CFR 50, Appendix B, Criterion XVI, for inadequate implementation of corrective actions for two previously identified NCVs.

Description: The licensee initiated PER 70752 (level B) on October 24, 2004, to determine the causes and implement corrective actions for dropping the old trolley for the 125 ton reactor building crane. The NRC addressed the compliance aspects of this event in Inspection Report (IR) 05000260, 05000296/2004005 and issued NCV 05000260, 296/2004005-02, Inadequate Procedures and Poor Human Performance Resulted in a Drop to the Reactor Building Crane Trolley. The licensee performed a thorough root cause analysis and identified four corrective actions to prevent recurrence. The inspectors identified that two of these corrective actions were not implemented as directed in the PER:

- Corrective action #7 directed that O-TI-412, Work Permits, Appendix F, Temporary Rigging Permit, be revised to add a rigging checklist to be used for lifts. The checklist was to identify the critical lifting/rigging aspects that require verification signature. The corrective action was documented as complete, "O-TI-412 has been revised," on March 30, 2005. The inspectors determined that a checklist was not added to Appendix F. Instead, guidance was added to Appendix F, Section 1.0, Review, Approval, and Installation of Temporary Rigging. This did not meet the intent of the corrective action or provide an equivalent function of a checklist because Section 1.0 is not taken into the field with the Temporary Rigging Permit and thus does not serve as a checklist at the worksite. (Example 1)
- Corrective action #8 directed "Revise guidance for content of WO package to require specific steps and sign offs for: A. Installation of rigging including implementation of any limitations identified by the rigging permit, and B. Verification of rigging and associated softeners after initial loading." This corrective action was documented as complete on December 13, 2004. The inspectors determined that the corrective action taken was to revise WO 04-716728-000, Implement Design Change Notice to upgrade Reactor Building 125 ton crane. No actions were taken to revise any guidance for content of WO packages. The inspectors discussed this corrective action with the root cause team leader and determined the intent of the corrective action was to provide guidance to be put in WO packages in the future and not just WO 04-716728-000. (Example 2)

The licensee initiated PER 69490 (Level C) on September 28, 2004, to determine the cause and implement corrective actions for the normal supply breaker for the 2A 480V shutdown board tripping during the performance of a relay calibration. The NRC addressed the compliance aspects of this event in IR 05000260, 05000296/2004005 and issued NCV 05000260/2004005-04, A Human Performance Error Resulted in the Loss of Safety-Related 480 V Shutdown Board 2A and the Inadvertent Start of ECCS Equipment. The licensee performed an apparent cause determination and identified three corrective actions and two enhancements to correct the condition adverse to quality. Corrective action #3 directed the licensee to evaluate options for work performance and determine how future over-current relay calibrations will be scheduled. The corrective action taken determined that routine calibrations would be done with the breaker open or the associated electrical board out of service. However, no formal corrective action was instituted to revise the calibration procedure or schedule to ensure this would happen. (Example 3)

Analysis: The inspectors determined that the licensee's inadequate implementation of corrective actions for these NCVs was more than minor because it is associated with the Procedure Quality attribute and affected the objective of the Reactor Safety/Initiating Event Cornerstone to limit the likelihood of those events that upset plant stability and challenge critical safety functions during at power operations. In addition, if left uncorrected, this finding would result in a more significant safety concern because the

failure to implement the corrective actions for the NCVs would result in more significant safety concerns by causing structural damage to safety related structures, systems or components or resulting in a plant scram or transient as a result of the loss of a shutdown board. This finding was determined to be of very low safety significance because no related examples of significant rigging deficiencies or loss of power to shutdown boards caused by relay calibrations have occurred as a result of the inadequate implementation of corrective actions. The causes for all three examples were determined to affect the PI&R crosscutting area.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, requires, in part, that conditions adverse to quality be promptly identified and corrected. Contrary to the above, as of November 18, 2005, the conditions adverse to quality identified in PERs 70752 and 69490 were not promptly corrected, in that, the specified corrective actions were not implemented as directed and the corrective actions were documented as complete. Because this failure to comply with 10 CFR 50, Appendix B, Criterion XVI, is of very low safety significance and has been entered into the licensee's corrective action program, as PER 93701, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000260, 296/2005011-001, Three Examples of Inadequate Implementation of Corrective Actions.

d. Assessment of Safety-Conscious Work Environment

(1) Inspection Scope

During technical discussions with members of the plant staff, which included operations, maintenance, engineering, chemistry, health physics, emergency preparedness, and security personnel, the inspectors developed a general perspective of the safety-conscious work environment at the site. The discussions also helped the inspectors determine if any conditions existed that would cause employees to be reluctant to raise safety concerns. The inspectors also reviewed the licensee's CRP which provided an alternate method to the CAP for employees to raise concerns and remain anonymous. The inspectors interviewed the CRP Coordinator and reviewed a select number of CRP reports completed since October 2003 to verify that concerns were being properly reviewed and identified deficiencies were being resolved in accordance with SPP-1.0, Organization and Administration, Revision 2, Appendix D, Concerns Resolution. The licensee's oversight of contractor employee concerns programs were also reviewed to ensure these programs were functioning in accordance with the licensee's CRP expectations and requirements.

(2) Assessment

Based on review of the licensee's CRP and discussions conducted with plant employees from various departments, the inspectors did not identify any reluctance to report safety concerns. The inspectors concluded that licensee management routinely emphasized the need for all employees to identify and report problems using the appropriate methods established within the administrative programs. All of the predominant

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methods established by the licensee, including the CAP, the WO system, and the CRP were readily accessible to all employees.

Increased program usage in conjunction with the increase in Unit 1 recovery activities was being adequately managed overall. However, the inspectors considered the high number of required exit interviews for Unit 1 activities combined with increased CRP volume could stress the Concerns Resolution staff if not properly resource managed. But based on the samples reviewed, the depth of issue evaluations were adequate to address the identified concerns raised to the CRP. The licensee CRP coordinator was periodically monitoring any active cases for the Unit 1 restart vendor organizations. Vendor accessibility to the licensee's CRP was also reviewed and considered an available option for vendor personnel reporting safety concerns. Oversight of contractor employee concerns programs had shown recent improvement in ensuring contractor programs were being implemented in an appropriate manner. Oversight of these programs was considered critical to the Unit 1 recovery effort based on the high percentage of contractors utilized in the recovery project.

e. Implementation of Corrective Action Program to Support Unit 1 Recovery

(1) Inspection Scope

The inspection included reviews associated with implementation of an independent and parallel CAP for the Recovery Project on Unit 1. The licensee implemented a parallel CAP for Unit 1 via the incorporation of a sub-committee forming a Unit 1 MRC. The sub-committee functions the same as the Unit 2 and 3 MRC and conducts daily meetings to evaluate, control, and monitor implementation of the Unit 1 CAP. The purpose of the review was to determine if the licensee has implemented an adequate CAP to support Unit 1 recovery. In addition, the inspection reviewed whether the licensee's CAP was adequately established to support future incorporation of Browns Ferry Unit 1 into the ROP. The ROP is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. The ROP program was designed for evaluation of operating reactors and is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

The team observed a variety of the Unit 1 MRC and other related meetings, discussed program monitoring and trending with CAP personnel, and reviewed existing self-assessments and audits which included Unit 1 activities. A significant portion of the Unit 1 PERs were screened by the team and those issues identified in the Attachment were reviewed in detail to determine the breadth of the Unit 1 CAP. Analysis of PER cause codes for identified corrective action issues was performed to evaluate whether any adverse trends existed. Unit 1 reviews similar to the Unit 2 and 3 reviews described in Sections 4OA2 a. thru 4OA2 d. were also performed. There were no Unit 1 Licensee Events Reports issued over the previous three years for review. Previously identified NRC violations were also reviewed to ensure corrective actions for these issues were being adequately addressed by the licensee.

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Documents reviewed are listed in the attachment.

(2) Assessment

Reviews of the corrective action program for Unit 1 concluded that the licensee had established adequate processes and measures for including Unit 1 into the CAP at Browns Ferry. Problem identification thresholds continued to be notably low and management was actively involved in implementation of the program. Thresholds for PER prioritizations were reasonably well established; however, occasional management upgrading of issues at the MRC was occurring. Based on trend analysis of the PERs reviewed, the team considered that the major types of PERs being identified were consistent with the status of the Unit 1 recovery effort. The inspectors concluded that adequate subject analysis of Unit 1 cause codes was being performed as evidenced by a number of potential adverse trends being identified by the Unit 1 CAP trending group. No significant unidentified adverse trends were identified by the inspectors.

Although programmatic trending of Unit 1 PERs was established via an assortment of adverse trend monitoring techniques, recurrence monitoring for previously identified potential adverse trends was not being routinely conducted and tended to rely on historical MRC knowledge to recognize recurrence. The monitoring of Unit 1 foreign material exclusion (FME) PER issues was an example of diminished monitoring of a previously identified potential adverse trend. The inspectors considered that the continuous nature of these types of issues throughout the Unit 1 recovery process warranted increased focus based on the historical PER data.

Based on the samples reviewed during the inspection, the data did not indicate any significant areas of concern with the current Unit 1 recovery activities. However, the team noted that two notable problems were previously identified by NRC inspections involving inadequate control of torus pipe support welding (PER 77006) and more recently the control of thermal overload design implementation (PER 89577). These NRC identified issues were indicative of deficiencies in the area of licensee self-verification of design and work activities. Licensee-identified PER 88082, Deficiencies with 79-14 pipe supports, weaknesses in quality related installations, further documented problems in this area within the CAP.

In addition, although not significant in number, problems were also observed in the monitoring of Unit 1 recovery activities with potential adverse impact on the operating units. This included an example where the extent of condition review on the operating units was not well communicated. The team concluded that original communication plans for transferring critical information between the operating units and Unit 1 were not currently being well implemented. At the end of the inspection, the licensee acknowledged this concern and were taking actions to improve this interface.

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4OA6 Management Meetings

The inspectors presented the inspection results to Mr. Jon Rupert, and Mr. Brian O'Grady, and other members of licensee management at the conclusion of the inspection on November 18, 2005. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

R. Baron, Unit 1 Nuclear Assurance Manager
R. Beecken, Vice President Nuclear Support
J. Bell, Methods Change and Analysis Manager
M. Bentley, Nuclear Steam Supply Systems Engineer - Lead
P. Byron, Site Licensing
W. Crouch, Nuclear Site Licensing & Industry Affairs Manager
R. DeLong, Engineering Manager
J. Elmerich, Design Engineer
T. Elms, Operations Manager
J. Fornicola, NSRB Chairman
D. Glover, Site Training
L. Hicklen, System Engineer
R. Jones, Unit 1 Restart Manager
J. Kennedy, Human Performance Manager
M. Kerwin, BFN Acting NA Manager
D. Langley, Site Licensing Supervisor
M. Lingenfelter, Electrical and I&C Systems Engineering Supervisor
D. Matherly, Outage and Scheduling Manager
J. McCarthy, Unit 1 Licensing Supervisor
T. McGrath, Operational Readiness
J. Miskall, System Engineer
K. Rackley, Corporate NA Lead
R. Rogers, Maintenance & Modifications Manager
C. Snoddy, EQ Program Coordinator
J. Wallace, Site Licensing

NRC personnel

S. Cahill, Branch Chief, Division of Reactor Projects, RII

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000260, 296/2005-011-001	NCV	Three Examples of Inadequate Implementation of Corrective Actions (Section 4OA2.c(3)).
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Discussed

None.

LIST OF DOCUMENTS REVIEWED

Procedures

<u>Number</u>	<u>Description/Title</u>
BP- 250	Corrective Action Program Handbook
NADP- 3	Managing the Operating Experience Program
NADP- 2	Audits
NEDP-12	System and Component Health, Equipment Failure Trending
ODM- 1.0	Conduct of Operations
ODM- 3.7	Operator Work Arounds
SPP- 1.0	Organization and Administration (Appendix D - Concerns Resolution)
SPP- 1.6	TVAN Self 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 Control
SPP- 9.5	Temporary Alterations
0-TI-412	Work Permits
3-TI-476	VFD Monitoring of Critical Parameters
TVA Safety Procedure 721	Rigging
Concerns Resolution Staff Instruction document	
TVA-NQA-PLN89A,	Nuclear Quality Assurance Plan

Problem Evaluation Reports

PERs identified as a result of the inspection

91995	Excessive amount of foreign material identified by NRC during Unit 3 mid-cycle outage drywell closeout
92154	Inadequate evaluation of OE 18455 via PER 64592 concerning potential HPCI inoperability due to air in suction lines
92362	Concerns with scaffolding in control air header area
92688	No evaluation for large herculite sheet installed since June 2004 for diverting rainwater leakage over 4KV shutdown boardroom
92719	During Unit 3 11/10/2005 startup, concerns over actions taken to address rod block setpoint alarms
92772	WHY staircase evaluation not properly linked to PER evaluation
93701	NRC NCV with multiple examples identified for inadequate implementation of corrective actions.
93692	EDG procedural revision did not adequately incorporate bolt torquing guidance
92704	Document the continuing trend of erratic stroke times and their apparent cause determination (i.e., sticking air pressure regulator)
93712	Implementation of corrective actions for ADHR system outside of CAP

RHRSW system PERs

41758	Radiography determined that disc of 3-CKV-023-0580 is stuck partially open
41912	Document a potential adverse trend for 3-FCV-23-46
47127	D2 RHRSW Pump declared inoperable due to low flow during 2-SI-4.5.C.1(3)
61926	Clamshells found in 3A RHR Pump Seal Heat Exchanger
62976	2B RHR Heat Exchanger MR unavailability exceeded due to planned maintenance
70821	Clam shells found in the 2A RHR heat exchanger
71874	Clam shells found in the 2D RHR heat exchanger
75729	2-CKV-23-581 Radiography failure, and Functional Evaluation 40871
75786	2-CKV-023-0579 Radiography
79450	2-CKV-23-580 found stuck open
80278	2-RFV-0230516 as-found setpoint test failure
80502	2-CKV-23-582 packing leak
80694	PT exams required on 12 Section XI welds, and Functional Evaluation
81124	2-RFV-23-516 As-found test failure
82787	2A RHR heat exchanger clam shell
83244	Unplanned limited condition for operability (LCO) entry
87900	Pinhole leaks - 2B/2D RHRSW Pipe Tunnel, and Functional Evaluation 41195
90456	3A RHR heat exchanger - clamshells
90674	Unplanned LCO entry

RHR system PERs

39779	Valve 2-FCV-74-58 experienced an overthrust condition
80004	The ADHR System is tripping intermittently
81571	Review ORAM S-Fat Tables for ADHR
88770	3C RHR pump motor vibrations high
92048	3D RHR pump motor vibrations in high alarm
92110	3A RHR pump motor exceeded QMDS vibration limit
92111	3B RHR pump motor vibration approached limit

EDG system PERs

02-000274	1D EDG generator cooling water chemistry adverse trend
02-001897	Redundant start circuit on 3B EDG failed to operate
41382	Potential trend for 3C EDG start lockout relays
41533	6 year PM on 3D EDG clearance issues
44208	Movement on 3B battery cell during testing
44281	Multiple 3-RLY-082-D/PFD1 relays failed timing criteria
47620	3A1 and 3B1 VFD cooling water pumps not available during EDG testing
47791	Equipment found out of position during 3A EDG load acceptance test
48442	Loose cable bundles inside 3D EDG electrical control cabinets
61406	Troubleshoot 3EB EDG control switch
66155	Jacket cooling water chemistry specification issues
76651	Water additions to the 1-2D EDG jacket cooling water
90202	3D lube oil cooler temperature indicating high

HPCI system PERs

41820	3-MVOP-73-40 exhibited high thrust and torque readings during MOVAT testing
41875	3-CKV-073-0629 identified as having a leak in the valve body during VT-2 exam
41903	Test instrumentation installed did not meet range requirements
42085	Potential failure trend for valve packing associated with 2-FCV-73-16 (3 previous stem leaks identified)
44440	3-MVOP-73-81 thrust exceeded limit during MOVAT testing
47185	Functional failure of RPV pressure control mode for HPCI on 4/7/2004. 2-FCV-73-36 experienced a motor ground
52240	Unit 2 HPCI was tripped because it auto transferred from the CST to the suppression pool during quarterly surveillance test
56048	Unit 2 HPCI turbine tripped and isolated when given a start signal
67490	Adverse trend on HPCI and RCIC Fenwal temperature switches
70625	HPCI steam line space high temperature switch (2-TS-73-2P) found out of TS tolerance
72934	Unit 2 HPCI piping to 2-LS-75-56A and 56B is not horizontal and air could be trapped resulting in auto transfer
75132	CA #6 for PER 56048 (Unit 2 HPCI isolating automatically) created a PM to replace amphenol during major overhaul. PM was not performed as expected during last Unit 3 outage.
75274	Unit 2 HPCI auto transferred from the CST to the suppression pool
84812	HPCI steam line space high temperature switches (2-TS-73-2B and 2L) found out of TS tolerance

Other PERs

03-004817	Unit 2 HPCI turbine tripped and isolated when given a start signal
03-011998	U3 reactor vessel head was fully de-tensioned with the Reactor Mode Switch in the refuel position
40886	Use of cable ties to hang clearance cards, vice the was string that was formerly used has resulted in problems
43303	Based on a PER review, additional reviews of Unit 1 rigging activities will be performed to ensure identified precursors are reviewed in the aggregate
43629	Foreign material was found inside the suction line at the chilled water pump housing on the Unit 3 reactor feedwater sample station chilled water skid during replacement of the pump
48145	2/25/04 safety audit of rigging program identified several problems including improper general rigging techniques
49224	Historical drawing discrepancies on drawing 2-47E610-84-1
55820	On 3/26/03 the 2A Recirculation Variable Frequency Drive (VFD) tripped which resulted in an unplanned entry into an LCO
61050	5/12/04 safety audit of rigging program identified multiple issues and improper rigging techniques
64906	Unit 2 SCRAM during IRM activities
64926	Erratic operation (spiking) was observed and upscale high/high alarms were received during withdrawal of IRMs
75109	Jan 27, 2005 safety audit of rigging program identified improper use of softeners
75274	Unit 2 HPCI automatically transferred from the condensate storage tank to the suppression pool

76546 2-FCV-069-002 failure (unplanned LCO entry)
 76599 Unit 3 scrambled due to a main generator power load unbalance
 80218 4/11/05 safety audit of rigging program identified multiple discrepancies including
 not using proper rigging techniques and softeners
 83560 6/7/05 safety audit of rigging program identified multiple low level rigging
 deficiencies
 88260 8/25/05 safety audit of rigging program identified several poor rigging practices
 90560 10/05/05 safety audit of rigging program identified several minor rigging
 deficiencies
 44349 Sudden pressure relay isolation valves for Unit 3 main and USS transformers
 47051 Scram discharge volume valve stroke times unsatisfactory
 47563 Two 3/4" bolts on Main Steam loop B pipe support 3-47B400-204 have failed
 48132 Security has identified a potential adverse trend in the number of alarms
 48336 During PMT of D1 Hx on 3D EDG a leak developed due to inadequate torquing
 64063 Scram discharge volume valves' stroke times outside normal values
 68160 Unit 3 PSC head tank check valves experienced multiple failures
 68592 Scram discharge volume valve operability
 69196 3-RM-90-132 declared inoperable due to low sample flow after flush
 73314 Watts Bar Level B PER for 2A-A DG paralleled
 73256 TACF installation reviews not accomplished
 73478 Unqualified TACF signoffs
 73782 EQ Binders not updated within one year of EQIRs
 73925 Unplanned LCO entry - Battery charger 5 failed
 81774 Shunt trip devices out of adjustment on GE AK Breaker Build Ups
 89259 Operations department tolerance for equipment deficiencies
 90890 EECW flow elements installed backwards

NCVs

05000259, 260, 296/200503-02	Failure to Control a High Radiation Area with Dose Rates Greater than 1.0 Rem Per Hour
05000259, 260, 296/200503-03	Failure to Barricade, Conspicuously Post, and Control a High Radiation Area
05000260/2004005-04	A Human Performance Error Resulted in the Loss of Safety-Related 480 Volt Shutdown Board 2A and the Inadvertent Start of ECCS Equipment (PER 69490)
05000259, 260, 296/200405-01	Failure to Demonstrate that the RMOV Board 1B Performance Was Effectively Controlled Per 10CFR50.65 (PER 74450)
05000259, 260, 296/200503-04	Two Examples of Failure to Comply with Radiation Work Permit Requirements
05000260, 296/2004005-02	Inadequate Procedures and Poor Human Performance Resulted in A Drop to the Reactor Building Crane Trolley

05000260/2004004-02	Failure to Comply with Technical Specification 3.3.1.1 to Reduce Unit 2 Power to Less Than 30% RTP When RPS Trip Function Capability to the Turbine Control Valve Fast Closure Circuit Was Not Maintained
05000296/2005002-01	Failure to Follow Clearance Tag Procedure Results in a Reactor Scram

Licensee Event Reports

50-296/2003-001-00	Mode Change Not Allowed by Technical Specifications During Vessel Reassembly
50-260/2003-002-00	High Pressure Coolant Injection (HPCI) Inoperability Due to Loss of Turbine Speed Feedback Signal
50-260/2003-005-00	Unplanned start of diesel generator A and B due to momentary board undervoltage
50-296/2004-002-00	Reactor Scram from Main Turbine Trip from Loss of All Speed Feedback
50-260/2004-002-00	Automatic Reactor Scram During Startup Due To Spurious Upscale Trip On The Intermediate Range Monitors
50-260/2005-001-00	Loss of High Pressure Coolant Injection (HPCI) Discharge Piping Keep-Fill
50-296/2005-001-00	Automatic Reactor Scram Due to False Main Transformer Differential Signal

Root/Apparent cause evaluations

03-010550	Unit 1 MRC subcommittee PER processing issues
70046	Significant audit issue (SSA0405) - BFN Unit 1 Welding Program
85316	Shutdown Board A battery cell voltage low
87188	Incorrect control rod withdrawn during startup
70752	Inadequate Procedures and Poor Human Performance Resulted in A Drop to the Reactor Building Crane Trolley
88082	Deficiencies with Bul 79-14 pipe supports, weaknesses in quality related installations

Maintenance Work Orders

03-005857-000	Ensure the resistance across the MPU is verified at the EGM for U3 HPCI
03-005858-000	Measure and record resistance readings across the U3 RCIC magnetic pick-up speed sensor
03-024181-000	Replace packing in 2-FCV-073-0016 HPCI turbine steam supply valve
03-024181-001	Perform as found MOVAT testing prior to packing replacement on 2-FCV-073-0016 and as-left MOVAT testing
04-710748-000	Measure vibration levels at 2-LS-73-56A and B during a HPCI start
04-710749-000	Measure vibration levels at 3-LS-73-56A and B during a HPCI start
04-711991-000	Install ½ " vent piping on exhaust side of 2-VTV-73-720
04-711992-000	Install ½ " vent piping on exhaust side of 2-VTV-73-722
05-710809-000	Troubleshoot and repair the problem causing the HPCI suction path to swap from the CST to the Torus
05-711051-000	Inspect CONAX seal leads for degradation or damage

PERs Associated with HFA Relays

40817	PER to document cracks found in four relays, and associated Functional Evaluation 41019
41005	Browns Ferry has identified cracks in several GE HFA Relay Coil Spools
43923	Insulation behind contact of HFA relay which supplies power to the voltage regulator drive motor for the "D" D/G
53802	Fast start relay on the "A" D/G was identified as having a small piece of insulation laying to one side
70928	Fuse failure while performing 3-SR-3.3.5.1.6(A1)

PERs Associated with Radiation Protection

44288	Operator received dose rate alarm while entering the Waste Backwash Pump Room (Associated with NCV 05000259, 260, 296/200503-02)
46913	Raw Cooling Water Off-line Radiation Monitor removed from service prematurely
47669	AUO entered a HRA on a non-High Rad RWP and received dose rate alarm (Associated with NCV 05000259, 260, 296/200503-04)
66735	Radioactive material outside of the RCA
69118	Dose rate alarm from waste phase separator
69750	Working on wrong RWP (Associated with NCV 05000259, 260, 296/200503-04)
72449	Inappropriate Technician Practices
72450	Control of Radioactive Material
72725	Emergent High Radiation Area in Radwaste Building (Associated with NCV 05000259, 260, 296/200503-03)
73009	Emergent High Radiation Area Trend
85986	Discrepancies identified in Nuclear Assurance review of administrative documentation and controls of Locked High Rad Areas in the Radwaste Building Waste Packing Area
87545	Radioactive material in the small article monitor
92309	Explosive detector containing a radioactive source (Ni-63) was found outside of the Protected Area

Industry Operating Experience Reports

03-005840	GE SIL 647, voltage underrated Bussman MIN Series fuses
03-008558	Sequoyah Per 03-004354 (B level) turbine trip from high turbine vibration signal
03-011791	Three broken and one bent steam dryer tie rods identified in Browns Ferry Unit 3 during midcycle outage
03-003081	Unit 2 scram on low reactor water level
03-017835	Out-of-calibration trend report for GE radiation elements
81394	Part 21 review for Woodward governor "C" series actuators null voltage drift
64592	Review of OE 18455 for Limerick event where transfer of HPCI suction from CST to suppression pool caused RCIC turbine trip on low pump suction pressure
66009	Review of OE 18127 for degradation of chrome plating in gland areas of turbine shaft
42008	Response to GE SIL 448, Revision 2
66916	Power load unbalance issues
69022	Inadvertent 2B RHR pump start
70643	GE SIL 300 Supplement 1 Review

72670 Unit 3 reactor scram signal initiated from turbine trip (see EN# 41219 and LER 50-296/2004-002-00)
 87178 2C RFP Trip
 Nuclear Experience Review Report (NER) Number 90-1358 for Information Notice 90-65, Recent Orifice Plate Problems

Other Documents

List of PM WO Deferrals/Cancellations/Partial Performance/Revisions for HPCI, RHRSW, RHR, and EDG 1/1/2004-11/2/2005

Unit 2 and 3 System Health Report Cards 2004 and FY 2005 Period 1,2

Task Qualification Standard MMQ006.025, Rigging

Lesson Plan MTS037.002, Rigging Fundamentals

BFR-RMM-04-003, Assessment of Rigging Program and Activities conducted May 2004

Electrical Engineering Design Standard DS-E2.0.2, Single Point Failure for Power Generation Reliability

Mechanical Preventive Instruction (MPI) 0-073-TRB001, High Pressure Coolant Injection (HPCI) Turbine Preventive Maintenance

Mechanical Corrective Instruction (MCI) 0-073-TRB001, HPCI Turbine-Terry Turbine CCS-Disassembly, Inspection, Rework and Reassembly

List of RHR Work Orders Coded S1 and S2

First Semi-Annual TACF Review Audit 2005, including applicable SPP 9.5 TACF Review Forms Qualification Maintenance Data Sheets No. MOT-001, General Electric Motors

BFN Environmental Qualification PM Extensions for RHR pump motors 2-MTR-74-05, 2-MTR-74-16, 2-MTR-74-28, 2-MTR-74-39, and 3-MTR-74-39; and RHR motor operated valve 3-MVOP-74-35

Minutes of Meeting No. 292 of the Browns Ferry Nuclear Safety Review Board, Nov. 2004

Minutes of Meeting No. 293 of the Browns Ferry NSRB, May 4, 2005

Minutes of Meeting No. 294 of the Browns Ferry NSRB, September 9, 2005

Concerns Resolution Staff monthly reports for Units 1,2,and 3 from November 2003 to date

GE Field Deviation Disposition Report ER3-0802, Removal of Broken Browns Ferry Unit 3 Steam Dryer Tie Rods (related to PER 03-011791)

Work request history for EDG 11/2003 through 11/2005

System Health Reports for the RHRSW System from 1st Quarter 2004 through 3rd Period 2005

Performance Evaluation, Self- Assessments, Audits and Nuclear Assessment Section Assessments

Assessment No. NA-BF-03-008 Unit 1 Restart Corrective Action Program

Nuclear Assurance Observation Report 28959, Corrective Action Program implementation and trending Assessment No. NA-CH-03-001, Corrective Action Program Assessment

Browns Ferry System Health Trend Reports for 2004 and 2005

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Audit SSA0502 Radiological Protection and Control Audit Checklist

Audit SSA0406 Engineering Audit Elements and Attributes