



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

May 28, 2012

EA-12-073

Mr. Joseph W. Shea
Manager, Corp. Nuclear Licensing Programs
Tennessee Valley Authority
1101 Market Street, LP 4B-C
Chattanooga, TN 37402-2801

**SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC PROBLEM IDENTIFICATION AND
RESOLUTION INSPECTION REPORT 05000259/2012007, 05000260/2012007
AND 05000296/2012007 AND EXERCISE OF ENFORCEMENT DISCRETION**

Dear Mr. Shea:

On March 1, 2012, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Plant Units 1, 2 and 3. The enclosed report documents the inspection results which were discussed on March 1, 2012, with Mr. Preston Swafford and other members of the site staff. On April 10, and May 14, 2012, re-exit meetings were held via telephone, with Mr. Preston Swafford, Mr. Keith Polson and others.

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 examination of selected procedures and representative records, observations of plant equipment and activities, and interviews with personnel. This inspection also completed the supplemental follow-up review of your corrective actions from the 95002 as required by IP 71152.

On the basis of the samples selected for review, the inspectors concluded that, in general, problems were properly identified, evaluated, and resolved within your corrective action program. However, the inspectors identified examples of issues for which the adequacy and depth of evaluations were not consistent with procedures and expectations. Additionally, inspectors identified procedural adherence problems that have contributed to the failure to correct some issues. We recognize that management plans to place an additional focus in this area to complement current actions to improve the corrective action program.

The enclosed inspection report discusses a finding that has the potential to be of greater than very low safety significance (Green) resulting in the need for further evaluation to determine significance and therefore, the need for additional NRC action. As described in Section [4OA2.e(2)] of the enclosed report, the finding is associated with a failure to implement procedure changes in support of a design control notice. Although this finding has

potential safety significance, it did not represent an immediate safety concern. The finding does not present a current safety concern because the licensee subsequently revised procedures, conducted training, and demonstrated to inspectors that operators have acquired an adequate level of proficiency to implement the Safe Shutdown Instruction (SSI) methodology to mitigate plant events should they occur. This finding is being assessed based on the best available information, including influential assumptions, using the applicable Significance Determination Process (SDP). The final resolution of this finding will be conveyed in separate correspondence.

The finding is also an apparent violation of NRC requirements and is being considered for escalated enforcement action in accordance with the Enforcement Policy, which can be found on the NRC's Web site at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

In addition, the report documents four NRC-identified findings of very low safety significance (Green). Three of these findings were determined to involve violations of NRC requirements. Two licensee-identified violations of very low safety significance (Green) are also listed in this report. However, because of the very low safety significance of these findings and because they have been entered into your corrective action program, the NRC is treating them as non-cited violations (NCVs), in accordance with Section 2.3.2 of the NRC Enforcement Policy. The one NRC-identified issue which was not determined to be a violation of NRC requirements is documented as a finding because you did not follow your programs and procedures regarding addressing NRC commitments. If you contest any NCV or finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspectors at the Browns Ferry Nuclear Plant. If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II; and the NRC Resident Inspector at Browns Ferry Nuclear Plant.

The enclosed report also documents multiple non-compliances for which the NRC is exercising enforcement discretion in accordance with Section 9.1 of the NRC Enforcement Policy, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)." These non-compliances are associated with your implementation of the requirements and standards of Browns Ferry Operating License Conditions 2.C(13), 2.C(14) and 2.C(7), for Units 1, 2, and 3, respectively; and 10 CFR 50.48, "Fire Protection." These violations were identified by the licensee, and are violations of NRC requirements. The inspectors have screened these violations and determined that they warrant enforcement discretion per the Interim Enforcement Policy Regarding Enforcement Discretion for Certain Fire Protection Issues and Section 11.05 (b) of IMC 0305.

J. Shea

3

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if any, will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the 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 By Leonard D. Wert For/

Victor M. McCree
Regional Administrator

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

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

Enclosure: Inspection Report 05000259/2012007,
05000260/2012007, and 05000296/2012007
w/Attachment: Supplemental Information

cc w/encl: (See page 4)

J. Shea

3

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Sincerely,

/RA By Leonard D. Wert For/

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cc w/encl: (See page 4)

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J. Shea

4

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TVA

5

Letter to Joseph W. Shea from Victor M. McCree dated May 28, 2012

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RESOLUTION INSPECTION REPORT 05000259/2012007, 05000260/2012007
AND 05000296/2012007 AND EXERCISE OF ENFORCEMENT DISCRETION

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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: 05000259/2012007, 05000260/2012007, 05000296/2012007

Licensee: Tennessee Valley Authority (TVA)

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

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

Dates: February 6, 2012 through March 1, 2012

Inspectors: G. Wilson, Senior Project Engineer, Team Leader
L. Cain, Senior Resident Inspector, Vogtle
C. Kontz, Senior Project Engineer
R. Rodriguez-Rolon, Senior Reactor Inspector
N. Childs, Resident Inspector, Crystal River
L. Pressley, Resident Inspector, Browns Ferry
M. Riches, Operations Engineer
J. Montgomery, Reactor Inspector

Approved by: George T. Hopper, Chief
Reactor Projects Branch 7
Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000259/2012007, 05000260/2012007; 05000296/2012007, 02/06/2012 – 03/01/2012; Browns Ferry Nuclear Plant, Units 1, 2, and 3; Identification and Resolution of Problems.

The inspection was conducted by two senior project engineers, one senior resident inspector, one senior reactor inspector, two resident inspectors, one operations engineer and one reactor inspector. Three Green NCVs, one Green finding, and one Apparent Violation (AV) were identified. The significance of most findings is indicated by its color (Green, White, Yellow, Red) using the Significance Determination Process in Inspection Manual Chapter (IMC) 0609, Significance Determination Process (SDP). The cross-cutting aspect was determined using IMC 0310, Components Within the Cross-Cutting Area. Findings for which the Significance Determination Process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

Identification and Resolution of Problems

The inspectors concluded that, in general, problems were properly identified and prioritized by station personnel. The threshold for initiating Service Requests (SRs) or Problem Evaluation Requests (PERs) was appropriately low, as evidenced by the types of problems identified and the number of PERs entered annually into the Corrective Action Program (CAP). However, the inspectors determined that the adequacy and depth of evaluations generally were not consistent with procedures and expectations. Since the last problem identification and resolution (PI&R) inspection, licensee management increased focus and attention on the quality of root and apparent cause determinations, but the inspectors identified continued weaknesses in this area. The inspectors also identified examples of effectiveness reviews that lacked the rigor to support the conclusions for the issues being addressed and the need for improvement in the trending of issues. When identified, the licensee entered these issues into the CAP.

Operating experience usage generally was found to be acceptable and integrated into the licensee's processes for performing and managing work and plant operations. The inspectors determined that, overall, audits and self-assessments were thorough but not as self-critical as necessary to bring about a desired culture change. The inspectors identified weaknesses in the independent quality assessments and self-assessments selected for review and concluded that there was room for improvement in the thoroughness of the self-assessment program.

Based on discussions and interviews conducted with plant employees from various departments, the inspectors concluded that station personnel generally felt free to raise safety concerns and use the CAP. However, the number and content of anonymous PERS, combined with plant employee interview comments, led the inspectors to conclude that some station personnel do not have full confidence that the CAP will correct issues or that there will not be any retaliation towards them from management or from fellow workers for raising issues through the CAP. Station personnel confirmed that they would find an alternate avenue to raise a concern (e.g., a co-worker, a different supervisor/manager, or the employee concerns program (ECP)). Despite efforts to address safety culture issues at the site, the inspectors concluded that the lack of full confidence in the CAP has contributed to a decline in the safety culture since the last PI&R inspection. Although safety culture issues continue to exist, station personnel have indicated that they have a strong sense of duty to ensure the safety of the plant.

Enclosure

Cornerstone: Mitigating Systems

TBD. The inspectors identified an apparent violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to adequately implement requirements contained in procedure NPG-SPP-09.3 "Plant Modifications and Engineering Change Control". Specifically, the licensee failed to adequately identify and perform required training for implementation of four new Safe Shutdown Instructions (SSI) in support of a Design Change Notice (DCN) implementation. The licensee entered this finding into the corrective action program (PER 507721) and adequate procedural guidance was restored following licensee procedure revisions, training and demonstration to inspectors that operators had acquired an adequate level of proficiency to implement the new SSI methodology.

This finding is more than minor because it is associated with the protection against external events attribute of the Mitigating Systems cornerstone and it affected the cornerstone objective to prevent undesirable consequences from initiating events, such as fire. Because the finding could not be screened as very low safety significance (Green), nor its safety significance determined prior to issuing the inspection report, it is being characterized as "To Be Determined (TBD)." The finding does not present an immediate safety concern because the licensee has subsequently performed procedure revisions, training and demonstrated to inspectors that operators have acquired an adequate level of proficiency to implement the new SSI methodology to mitigate plant events should they occur.

The team determined the cause of this finding was directly related to the cross-cutting aspect of Work Coordination in the Work Control component of the Human Performance area because the licensee did not adequately incorporate actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. This contributed to the failure to conduct a training needs analysis (TNA) for the new SSI procedures and perform adequate operator training prior to procedure implementation. [H.3.(b)] (Section 40A2.e(2))

Green: The inspectors identified an NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to establish procedures appropriate to the circumstances for combating plant fires. Specifically, four new Safe Shutdown Instruction (SSI) were established which contained multiple procedural deficiencies. The licensee entered this finding into the corrective action program (PER 507721) and adequate Safe Shutdown Instructions were restored following procedure revisions.

This finding is more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and it affected the cornerstone objective of protection against external events such as fire to prevent undesirable consequences. The finding was assigned a Low degradation rating and screened as very low safety significance (Green) in step 1.3.1 of IMC 0609 Appendix F, attachment 1, Application of Fire Protection SDP Phase 1 Worksheet. The team determined the cause of this finding was directly related to the cross-cutting aspect of Work Coordination in the Work Control component of the Human Performance area because the licensee did not adequately incorporate actions to address the impact of the work on different job activities and the need for work groups to maintain interfaces with offsite

Enclosure

organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. This contributed to the failure to identify deficiencies with the new SSI procedures prior to procedure implementation. [H.3.(b)] (Section 40A2.e(2))

Green: The inspectors identified a Green non-cited violation of 10 CFR 50 Appendix B, Criteria XVI, Corrective Action, for the licensee's failure to assure conditions adverse to quality associated with the establishment and implementation of four new Safe Shutdown Instructions (SSI) were promptly identified and corrected. Specifically, the inspectors identified instances where previously identified issues with SSIs were either not entered into the corrective action program, corrective actions were not implemented, or the corrective actions were ineffective in addressing the identified issue. The licensee entered this finding into the corrective action program (PER 505551) and adequate procedural guidance was restored following licensee procedure revisions, training and demonstration to inspectors that operators had acquired an adequate level of proficiency to implement the new SSIs.

This finding is more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and it affected the cornerstone objective of protection against external events, such as fire, to prevent undesirable consequences. The finding was assigned a Low degradation rating and screened as very low safety significance (Green) in step 1.3.1 of IMC 0609 Appendix F, attachment 1, Application of Fire Protection SDP Phase 1 Worksheet. This finding was directly related to the cross-cutting aspect of Thorough Evaluation of Identified Problems in the Corrective Action Program component of the Problem Identification and Resolution area because the licensee did not thoroughly evaluate identified problems such that the resolutions addresses the causes and extent of conditions of the issues. [P.1.(c)] (Section 40A2.e(2))

Green. The inspectors identified a Green finding (FIN) for the licensee's failure to follow procedure NPG-SPP-03.3, Rev.001, "NRC Commitment Management." Specifically, the procedure states, in part, that each responsible organization ensures commitment implementation/completion occurs as scheduled. Contrary to this requirement, the licensee's commitment to verify the accuracy and adequacy of completed Inspection Procedure (IP) 95002 corrective actions had not been performed adequately. The licensee entered this issue into the corrective action program as PERs 510126 and 510161.

The performance deficiency (PD) associated with this finding was the failure of licensee personnel to follow procedures regarding managing NRC commitments. The finding is greater than minor because, if left uncorrected, the finding would have the potential to lead to a more significant safety concern. Specifically, the failure to assess the adequacy of corrective actions can lead to problems not being properly corrected. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very low safety significance (Green) because the finding did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time, or screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross cutting aspect in the area of Human Performance because the licensee did not ensure supervisory and management oversight of work activities associated with the commitments made to the NRC,

Enclosure

which resulted in the commitments not be tracked or monitored to ensure completion. [H.4(c)] (Section 4OA2.a(3))

Green. The inspectors identified a Green NCV of Browns Ferry Operating License Conditions 2.C(13), 2.C(14) and 2.C(7), for Units 1, 2, and 3, respectively, for the licensee's failure to establish adequate compensatory measures for non-conforming fire barriers, in accordance with the approved fire protection program (FPP). Specifically, the licensee failed to establish continuous fire watches for non-conforming fire barriers in the Intake Pumping Station (IPS), after discovering that the barriers were not credited in the site's approved FPP. The licensee initiated PER 509589 to document this condition and enter it into the corrective action program. The licensee also established a continuous fire watch, in accordance with the FPP.

The licensee's failure to establish adequate compensatory measures for non-conforming fire barriers, as required by their approved fire protection program, is a PD. The finding is more than minor because it is associated with the Reactor Safety Mitigating Systems cornerstone attribute of protection against external factors (i.e., fire) and it affects the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events. Using the guidance of IMC 0609, Appendix F, "Fire Protection Significance Determination Process," inspectors determined that the PD represented a finding of very low safety significance (Green). Inspectors determined that the cause of this finding has a cross-cutting aspect in the Corrective Action Program component of the Problem Identification and Resolution (PI&R) area, in that it was directly related to the licensee not thoroughly evaluating problems, such that the problem was properly classified and evaluated for operability [P.1(c)] (Section 4OA2.a(3))

Violations of very low safety significance (Green), identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and associated corrective actions are listed in Section 4OA7 of this report.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution

a. Assessment of the Corrective Action Program (CAP)

(1) Inspection Scope

The inspectors reviewed the licensee's CAP procedures which described the administrative process for initiating and resolving problems primarily through the use of problem evaluation reports (PERs) and service requests (SRs). To verify that problems were being properly identified, appropriately characterized, and entered into the CAP, the inspectors reviewed PERs that had been issued between November 2010 and January 2012, including a detailed review of selected PERs associated with the following risk-significant systems: Emergency Diesel Generators (EDGs), Emergency Equipment Cooling Water (EECW), High Pressure Injection Coolant Injection (HPCI), and Residual Heat Removal Service Water (RHRSW). Where possible, the inspectors independently verified that the corrective actions were implemented as intended. The inspectors also reviewed selected common causes and generic concerns associated with root cause evaluations to determine if they had been appropriately addressed. To help ensure that samples were reviewed across all cornerstones of safety identified in the NRC's Reactor Oversight Process (ROP), the inspectors selected a representative number of PERs that were identified and assigned to the major plant departments, including emergency preparedness, health physics, chemistry, and security. These PERs were reviewed to assess each department's threshold for identifying and documenting plant problems, thoroughness of evaluations, and adequacy of corrective actions. The inspectors reviewed selected PERs, verified corrective actions were implemented, and attended meetings where PERs were screened for significance to determine whether the licensee was identifying, accurately characterizing, and entering problems into the CAP at an appropriate threshold.

The inspectors conducted plant walk-downs of equipment associated with the selected systems and other plant areas to assess the material condition and to look for any deficiencies that had not been previously entered into the CAP. The inspectors reviewed PERs, maintenance history, completed work orders (WOs) for the systems, and reviewed associated system health reports. These reviews were performed to verify that problems were being properly identified, appropriately characterized, and entered into the CAP. Items reviewed generally covered a two-year period of time; however, in accordance with the inspection procedure, a five-year review was performed for selected systems for age-dependent issues.

Control room walk-downs were also performed to assess the main control room (MCR) deficiency list and to ascertain if deficiencies were entered into the CAP. Operator Workarounds and Operator Burden screenings were reviewed, and the inspectors verified compensatory measures for deficient equipment which were being implemented in the field.

Enclosure

The inspectors conducted a detailed review of selected PERs to assess the adequacy of the root-cause and apparent-cause evaluations of the problems identified. The inspectors reviewed these evaluations against the issues discussed in the PERs and the guidance in licensee procedure NPG-SPP-03.1.6, "Root Cause Evaluation" and NPG-SPP-03.1.5, "Apparent Cause Evaluation." The inspectors assessed if the licensee had adequately determined the cause(s) of identified problems, and had adequately addressed operability, reportability, common cause, generic concerns, extent-of-condition, and extent-of-cause. The review also assessed if the licensee had appropriately identified and prioritized corrective actions to prevent recurrence.

The inspectors reviewed selected industry operating experience items, including NRC generic communications to verify that they had been appropriately evaluated for applicability and that issues identified through these reviews had been entered into the CAP.

The inspectors reviewed site trend reports to determine if the licensee effectively trended identified issues and initiated appropriate corrective actions when adverse trends were identified.

The inspector's reviewed licensee audits and self-assessments, including those which focused on problem identification and resolution programs and processes, to verify that findings were entered into the CAP and to verify that these audits and assessments were consistent with the NRC's assessment of the licensee's CAP. The inspectors attended various plant meetings to observe management oversight functions of the corrective action process. These included PER Screening Committee (PSC) meetings and Corrective Action Review Board (CARB) meetings.

Documents reviewed are listed in the Attachment.

(2) Assessment

Identification of Issues

The inspectors determined that the licensee was generally effective in identifying problems and entering them into the CAP and there was a low threshold for entering issues into the CAP. This conclusion was based on a review of the requirements for initiating PERs as described in licensee procedures NPG-SPP-03.1, "Corrective Action Program," management's expectation that employees were encouraged to initiate PERs for any reason, and the relatively few number of deficiencies identified by inspectors during plant walkdowns not already entered into the CAP. Site management was actively involved in the CAP and focused appropriate attention on significant plant issues.

Based on reviews and walkdowns of accessible portions of the selected systems, the inspectors determined that most system deficiencies were being identified and placed in the CAP. However, there were five issues identified by inspectors during system walkdowns which were not previously identified or entered in the CAP. The following is a summary of the issues identified by the inspectors during plant walk-downs and

Enclosure

through the course of the inspection which have now been entered into the CAP. These issues were screened in accordance with Manual Chapter 0612, "Issue Screening," and were determined to be of minor significance and not subject to enforcement action in accordance with the NRC's Enforcement Policy.

- Electrolyte existed around the edges of vent caps associated with the EDG batteries. PER 502263 documented this discrepancy.
- A cracked gage glass was identified on the 'D' EDG lube oil cooling water outlet temperature indicator. PER 502258 documented this discrepancy.
- Housekeeping associated with the 3C EDG engine sump being extremely dirty was noted in stark contrast to all other EDG engine sumps. PER 502252 documents this discrepancy.
- Several items in the turbine building were not constrained and were in close proximity to scram sensitive equipment. These items included metal carts, metal trash cans, and ladders which were subsequently constrained or removed. The licensee initiated several PERs (507721, 506041, 506050, 506056, 506060, 506067, and 506078) that document these issues.
- Multiple housekeeping issues in the Unit 2 HPCI room existed with the potential to affect the HPCI pump operability. The inspectors followed up on these items and discovered that only the scaffolding had been removed and no seismic evaluation had been performed on the remaining items. The licensee initiated PER 510424 to document the failure to respond to the potential threat to the Unit 2 HPCI. All items in question were subsequently removed and seismic evaluations were performed, which determined the items in question did not pose an operability concern.

Trending was generally effective in monitoring equipment performance; however, the inspectors identified a continued weakness in this area. During the last PI&R inspection it was documented that the software used to identify trends was less than fully effective due to its limitations. The licensee is continuing to correct this issue. Trending PER's continue to rely on an informal process of "knowledge trending" whereby members of the CARB or the PSC recognize similarities with past issues or events. In addition, the inspectors identified inconsistencies in applying trend codes to PERs because of the subjectivity written into the procedure. For example, there were a high number of anonymous PERs submitted in 2011 that indicated a potential decline in the safety conscious work environment (SCWE) at the station. However, due to the inconsistency in applying the trend codes, no adverse trend was identified. The trend wasn't identified until an external organization noted it and recommended that an analysis be completed. The Nuclear Safety Monitoring Panel also failed to identify the adverse trend associated with the number of anonymous PERs. The licensee initiated SR 513678 to document this issue.

Prioritization and Evaluation of Issues

Based on the review of PERs sampled by the inspection team during the onsite period, the inspectors concluded that problems were generally prioritized and evaluated in accordance with the licensee's CAP procedures as described in the PER severity level determination guidance in NPG-SPP-03.1, "Corrective Action Program." Each PER was assigned a severity level by the PER Screening Committee meeting, and adequate consideration was given to system or component operability and associated plant risk.

A variety of formal causal-analysis techniques were used to evaluate PERs depending on the type and complexity of the issue consistent with procedures NPG-SPP-03.1.5, "Apparent Cause Evaluations," and NPG-SPP-03.1.6, "Root Cause Analysis". The inspectors determined that, in general, the adequacy and depth (rigor) of root cause and apparent cause analyses were not consistent with station procedures or expectations. The inspectors determined that root cause analysts were inexperienced in root cause analysis based on the lack of rigor in the evaluations reviewed, and the site lacked an effective mentoring program to supplement the departure of those that individuals that were more experienced in this area. The inspectors concluded that this area was a challenge to the station as it continues to work towards improving the CAP while managing the high workload.

The inspectors identified performance deficiencies associated with the licensee's evaluation of issues which were screened in accordance with Manual Chapter 0612, "Issue Screening," and were determined to be of minor significance and not subject to enforcement action in accordance with the NRC's Enforcement Policy.

- The root cause analyses for PER 362340 and PER 362395 did not develop adequate corrective actions to prevent recurrence (CAPRS) and were rejected by the CARB. The root cause for PER 153438 developed inadequate CAPRs, and PER 223536 did not follow the root cause analysis procedure in evaluating the corrective actions for a similar event in PER 153438. SR 513966 documented this discrepancy.
- PER 460397, regarding the inoperability of CAS/SAS 3911 repeater speaker, was initiated in November 2011 but had no corrective action plan in place as of February 8, 2012. NPG-SPP-03.1.7, Section 3.1 states that corrective action plan development should be completed in ten days for "C" Level PERs. The licensee entered this issue into the CAP as PERs 503990, 503993, and 504001.
- The inspectors reviewed PER 368764 associated with NCV 2011004-04, Unit 3 Loss of Shutdown Cooling during Primary Containment Isolation System Relay Replacement. The inspectors identified issues with the Root Cause Evaluation for PER 368764:
 - A corrective action was not listed for the Direct Cause. NPG-SPP-3.1.6 states, "For a human performance direct cause, the corrective actions should address the individual behavior modification." The issue was entered into the CAP as SR 509736.

Enclosure

- All of the actions listed for the third contributing cause (CC-3) were enhancement actions, which is not in accordance with NPG-SPP-3.1.6 guidance. NPG-SPP-3.1.6 states that at least one corrective action should be initiated for each direct cause and contributing cause. The licensee initiated PER 502098 to address this issue.
- The enhancement actions for CC-3 were to share lessons learned from this event with various departments. This would have ensured that the staff reviewed the lessons learned. However, the inspectors noted that there were no actions to ensure that the lessons learned would have been shared with future staff. The licensee added three new actions to PER 368764 (CA-024, CA-025, and CA-026) to ensure information sharing with future staff.

Effectiveness of Corrective Actions

Based on a review of corrective action documents, interviews with licensee staff, and verification of completed corrective actions, the inspectors determined that overall, corrective actions reviewed as part of this inspection were timely, commensurate with the safety significance of the issues, and effective, in that conditions adverse to quality were corrected and non-recurring with the exception of those issues identified in this report. Overall, SCAQ, corrective actions directly addressed the cause and effectively prevented recurrence in that a review of performance indicators, PERs, and effectiveness reviews demonstrated that the SCAQ had not recurred. However, a finding was identified for the licensee not correcting a SCAQ which is discussed in the findings section of this report. Effectiveness reviews for CAPRs were sufficient to ensure corrective actions were properly implemented and were effective. However, the inspectors concluded that effectiveness reviews needed improvement.

The inspectors identified performance deficiencies which were screened in accordance with Manual Chapter 0612 and were determined to be of minor significance and not subject to enforcement action in accordance with the NRC's Enforcement Policy.

- The Inspectors identified that PERs 4362340 and 362395, associated with emergency diesel generator issues, were screened by the CARB and found to have inappropriate and/or incorrect CAPRs listed, with no SR generated to document this condition as required by procedure. Subsequently, the licensee initiated SR 513966 to document this discrepancy.
- PER 362340, Action 362340-027, which was listed as a CAPR, stated, in part, that the action was to "initiate a SR." This action was inappropriate and did not meet the definition of a CAPR in accordance with licensee CAP procedures. SR 513978 documented this discrepancy.
- Effectiveness Review BFN PI-S-11-008 did not analyze each CAPR for PER 153438 to determine whether the actions did not address the condition. The assessment determined that the corrective actions were ineffective, but did not document the reasons for the ineffectiveness, and merely stated other PERS and interview

Enclosure

statements. PER 340768 was initiated to document the ineffectiveness of the CAPRs and it closed corrective actions to PER 223536 to track resolution of the issues. However, the statements and conclusions in PER 340768 were not adequately supported. SR 510796 documented this discrepancy.

- Effectiveness Review BFN-LIC-S-11-033 and BFNPI-S-12-017 utilized the number of violations of procedure NPG-SPP-03.21 as a performance metric, instead of identifying why the procedural violations were recurring and whether or not new corrective actions needed to be implemented. The licensee determined that because no violations of regulatory requirements had recurred since implementation of the current corrective actions for the Nuclear Fatigue Rule, performance had been successful. SR 514215 documented this discrepancy.
- The corrective actions for PER 235338 regarding the HPCI Isolation were to determine what relay contact booting methods were available and to implement use of an appropriate method to improve boot effectiveness and reliability. Inspectors identified that maintenance personnel were initially briefed on the corrective actions for the booting issue on September 22, 2010. However, no further briefings or updates to training had been performed. The licensee failed to perform corrective actions to implement a sustained training methodology for a condition adverse to quality. PER 504504 was initiated to document the issue and to revise lesson plan MTE153.001 HFA Relay Maintenance to incorporate lessons learned from PER 235338.

(3) Findings

- (i) Introduction: The inspectors identified a Green finding for the licensee's failure to follow procedure NPG-SPP-03.3, "NRC Commitment Management." Specifically, the procedure stated, in part, that each responsible organization ensures commitment implementation/completion occurs as scheduled. Contrary to this requirement, the licensee's commitment to verify the accuracy and adequacy of completed 95002 actions were not performed adequately.

Description: The NRC completed a 95002 inspection on October 22, 2010, for a Yellow finding associated with failing to meet regulatory requirements of 10 CFR 50, Appendix R, Section III.G, and a White finding for failing to comply with Technical Specifications 5.4.1.a, "Procedures." As part of the licensee's response to these findings, the licensee submitted a Supplemental Reply To Notice of Violation; EA-090307 which documented nine commitments to the NRC to ensure corrective actions were appropriate to drive the issues to conclusion. Commitment seven stated that the licensee would verify the accuracy and adequacy of completed 95002 action items. This commitment contained three subparts to (1) utilize a 95002 Problem Evaluation Report action verification form, (2) utilize a closure review board, and (3) perform quarterly quality assurance assessments of corrective actions. The licensee utilized procedure NPG-SPP-03.3, and the Maximo software for the management, maintenance, and tracking of the NRC commitments. The procedure stated that a responsible organization for each commitment be identified, and that each responsible organization ensures commitment implementation/completion occurs as scheduled. However, the inspectors identified that

Enclosure

corrective action twenty-five (CA-25) and the quarterly quality assurance assessments of the completed 95002 corrective action items were not completed as committed by the licensee. Additionally, the quality assurance (QA) group, the responsible organization, was not tracking commitment seven subpart three as required. The commitment was loaded into the Maximo software program as one commitment and not separated into three commitments, therefore, the responsible organizations could not track and monitor completion of the subparts of the commitment. The assessments that the QA organization completed and provided no independent assessment verification of corrective action closure activities. The assessments were not performed in accordance with procedural expectations and the licensee did not ensure the adequacy and effectiveness of the 95002 corrective actions. The licensee entered this issue into the corrective action program as PERs 510126 and 510161.

Analysis: The failure of licensee personnel to follow procedure NPG-SPP-03.3 was a PD. The finding was greater than minor because, if left uncorrected, the finding would have the potential to lead to a more significant safety concern. Specifically, the failure to assess the adequacy of corrective actions can lead to problems not being properly corrected. Using Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to have a very low safety significance (Green) because the finding did not result in a loss of system safety function, an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time, or screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect in the area of Human Performance because the licensee did not ensure supervisory and management oversight of work activities associated with the commitments made to the NRC which resulted in the commitments not being tracked or monitored to ensure completion. [H.4(c)]

Enforcement: This finding does not involve enforcement action because no violation of regulatory requirements was identified. Because this finding does not involve a violation and has very low safety significance (Green), it is identified as: FIN 05000259, 260, 296/2012007-01, "Failure to Follow NRC Commitment Management Procedure." The licensee placed this issue in its corrective action program as PERs 510126 and 510161.

- (ii) Introduction: The inspectors identified a Green NCV of Browns Ferry Operating License Conditions 2.C(13), 2.C(14) and 2.C(7), for Units 1, 2, and 3, respectively, for the licensee's failure to establish adequate compensatory measures for a non-conforming condition, in accordance with the approved fire protection program. Specifically, the licensee failed to establish continuous fire watches for non-conforming fire barriers in the Intake Pumping Station (IPS), after discovering that barriers were not credited in the site's approved FPP.

Description: In 2009, the licensee committed to transition their fire protection licensing basis to comply with 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805." During the transition process, on May 20, 2011, the licensee identified that the barriers located in the IPS (Fire Area (FA) 26) were not credited in the site's FPP. The IPS contains redundant trains of RHRSW and EECW pumps. The IPS has eight RHRSW pumps and 4 EECW pumps. These pumps are grouped into four separate

Enclosure

compartments (A, B, C, D). The 'A' and 'C' rooms were credited as Train 1, and the 'B' and 'D' rooms were credited as Train 2. BFN's Appendix R Safe Shutdown Analysis requires three RHRSW pumps and two EECW pumps to achieve and maintain safe shutdown. Since the fire barriers were not credited, they do not meet the separation criteria of 10 CFR 50, Appendix R, Section III.G.2. Upon identifying that the barriers in the IPS were not credited, the licensee entered the condition into their corrective action program as PER 372194.

The inspectors noted that PER 372194 did not contain any details regarding the implementation of compensatory measures. The BFN Fire Protection Report, Volume 1, Part 1, Section 9.3.11.G, "Fire-Rated Assemblies," stated that with one or more of the required fire-rated assemblies and/or sealing devices inoperable, establish a continuous fire watch on one side of the affected assembly if no fire detection is available to protect either side of the inoperable barrier. After questioning the licensee, and performing a walkdown of the IPS, inspectors determined that the licensee had not established the appropriate compensatory measures, as required by the FPP. The licensee initiated PER 509589 to document this condition and enter it into the corrective action program. The licensee also established a continuous fire watch, in accordance with the FPR.

Analysis: The licensee's failure to establish compensatory measures for non-conforming fire barriers, as required by their approved FPP, is a PD. The finding is more than minor because it is associated with the Reactor Safety Mitigating Systems cornerstone attribute of protection against external factors (i.e., fire) and it affects the cornerstone objective of ensuring the reliability and capability of systems that respond to initiating events. Specifically, failure to establish compensatory measures for non-conforming fire barriers adversely affected the fire confinement capability defense-in-depth (DID) element because the lack of compensatory measures did not provide equal or better protection than the non-conforming fire barrier. Because this issue relates to fire protection, the inspectors used the guidance in IMC 0609, Appendix F, "Fire Protection Significance Determination Process," to determine the significance of this finding. The inspectors determined that this finding was in the Fire Confinement safe shutdown (SSD) category. Since the PD was a minor defect that had little to no effect on the barriers' fire endurance, the degradation level was categorized as Low (in accordance with IMC 0609, Appendix F, Attachment 2, Table A2.1).

Inspectors determined that the cause of this finding had a cross-cutting aspect in the CAP component of the PI&R area, in that it was directly related to the licensee not thoroughly evaluating problems, such that the problem was properly classified and evaluated for operability. Specifically, the licensee failed to recognize that barriers separating redundant safe-shutdown trains were non-conforming, and thus, required compensatory measures [P.1(c)].

Enforcement: Browns Ferry Units 1, 2, and 3 Operating License Conditions 2.C(13), 2.C(14), and 2.C(7), respectively, requires that the licensee implement and maintain in effect all provisions of the approved FPP as described in the Final Safety Analysis Report (FSAR) for Browns Ferry as approved in the safety evaluations dated December 8, 1988; March 31, 1993; April 1, 1993; November 2, 1995; April 25, 2007, and Supplement dated November 3, 1989. The FSAR Section 10.11, "Fire Protection

Systems,” states that Volume 1 of the FPR is the licensing basis for the Browns Ferry fire protection program. The FPR, Volume 1, Part 1, Section 9.3.11.G, “Fire-Rated Assemblies,” states that with one or more of the required fire-rated assemblies and/or sealing devices inoperable, establish a continuous fire watch on one side of the affected assembly if no fire detection is available to protect either side of the inoperable barrier.

Contrary to the above, the licensee failed to establish a continuous fire watch for non-conforming barriers located in the IPS, beginning on May 20, 2011, in accordance with the FPR, Volume 1, Part 1, Section 9.3.11.G. Upon discovery, the licensee appropriately declared the fire barriers in the IPS as non-conforming, and established applicable compensatory measures in accordance with Section 9.3.11.G of the FPR. At the time of the exit meeting, the licensee planned to implement a design change to identify and label penetration seals, perform minor rework on a small number of penetration seals, and subdivide the RHRSW pump rooms into separate fire zones/areas. Because this finding is of very low safety significance (Green), and was entered into the licensee’s corrective action program as PER 509589, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000259, 260, 296/2012007-02, Failure to Establish Adequate Compensatory Measures for Non-Conforming Fire Barriers.

b. Assessment of the Use of Operating Experience (OE)

(1). Inspection Scope

The inspectors examined the licensee’s use of industry operating experience to assess the effectiveness of how external and internal operating experience data was used to prevent similar or recurring problems at the plant. In addition, the inspectors selected operating experience documents (e.g., NRC generic communications, 10 CFR Part 21 reports, licensee event reports, and plant internal operating experience items), which had been issued since 2010 to verify whether the licensee had appropriately evaluated each notification for applicability to the Browns Ferry plant, and whether issues identified through these reviews were entered into the CAP. The inspectors checked if operating experience was appropriately incorporated into cause evaluations and integrated into plant operations through pre-job briefs and other activities. Documents reviewed are listed in the Attachment.

(2) Assessment

Based on a review of documentation related to the review of operating experience issues, the inspectors determined that the licensee was generally effective in screening operating experience for applicability to the plant. Industry OE was evaluated by plant OE Coordinators and relevant information was then forwarded to the applicable department for further action or informational purposes. OE issues requiring action were entered into the CAP for tracking and closure. In addition, operating experience was included in all root cause evaluations in accordance with licensee procedure NPG-SPP-02.3.

c. Assessment of Self-Assessments and Audits

(1). Inspection Scope

The inspectors reviewed audit reports and self-assessment reports, including those which focused on problem identification and resolution, to assess the thoroughness and self-criticism of the licensee's audits and self assessments, and to verify that problems identified through those activities were appropriately prioritized and entered into the CAP for resolution in accordance with licensee procedures NPG-SPP-03.1.11, "NPG Self Assessment Program," and NPG-SPP-03.1.12, "NPG Benchmarking Program."

(2) Assessment

The inspectors determined that, in general, the scope of assessments and audits were adequate. Self-assessments were generally detailed as evidenced by findings consistent with the inspectors' independent review. However, self-assessment results were not as self-critical as necessary to affect desired safety culture changes. The inspectors verified that PERs were created to document all findings and areas for improvement resulting from the self-assessments, and verified that actions had been completed consistent with those recommendations. Generally, the licensee performed evaluations that were technically accurate. Site trend reports in general, were thorough and a low threshold was established for evaluation of potential trends, as evidenced by the PERs reviewed that were initiated as a result of adverse trends.

The inspectors identified performance deficiencies associated with the licensee's self-assessment program. These issues were screened in accordance with Manual Chapter 0612 and determined to be of minor significance and not subject to enforcement action in accordance with the NRC's Enforcement Policy.

- The independent BFN QA assessments of 95002 corrective actions tended to be very superficial and provided no independent verification of corrective action closure activities. Assessments were not performed in accordance with procedural expectations and no template was utilized to conduct the assessment to ensure adequacy and effectiveness of 95002 corrective action closure activities. This issue is documented in SRs 508686, 508226 and 507702.
- One QA Auditor qualification card was missing the 'Certified By' signature. SR 509234 documents this discrepancy.
- The 2011 and 2012 'Master Assessment Schedules' did not indicate, via signature page, that the schedules had been reviewed and approved by the QA General Manager as required by procedure. SR 511714 documents this discrepancy.
- The format of the quarterly 'Resource Loaded Integrated Assessment Schedule' did not provide for adequate assurance that the scheduled assessments were actually completed. SR 511714 documents this discrepancy.

- Some of the templates specified on the Resource Loaded Integrated Assessment Schedule had not been developed and approved (e.g. ZC02). SR 511714 documented this discrepancy.

d. Assessment of Safety Conscious Work Environment

(1). Inspection Scope

The inspectors randomly interviewed 25 on-site workers regarding their knowledge of the corrective action program at Browns Ferry and their willingness to write PERs or raise safety concerns. The interviews also were conducted to determine if any conditions existed that would cause employees to be reluctant to raise safety concerns. The inspectors reviewed the licensee's Employee Concerns Program (ECP) and interviewed the ECP manager. Additionally, the inspectors reviewed a sample of ECP issues to verify that concerns were being properly reviewed and identified deficiencies were being resolved and entered into the CAP when appropriate.

(2) Assessment

Based on interviews conducted with individuals from several organizations, the inspectors determined that generally, employees felt free to raise safety concerns and all personnel interviewed were knowledgeable of the different avenues available for raising safety concerns. In addition, station management demonstrated an open and collaborative attitude in assessing issues that were raised by station personnel, even when done anonymously, and took actions to address the issues. However, the amount of anonymous PERs generated concerned the inspectors as to why individuals would not attach their names to issues they identified. During the interviews, the inspectors attempted to gain an understanding of this issue and identified common themes from the worker comments, but did not attempt to validate the worker perceptions due to the limited sample used for this inspection. The common themes of worker perceptions are as follows:

- CAP affects not only work life but also home life because people work and live together and therefore are reluctant to write PERs on their fellow coworkers.
- CAP doesn't fully address the issues because of a lack of resources. The insufficient resources don't allow the site to apply thorough evaluations to each issue as there is a perceived sense of urgency to move on to the next issue.
- CAP doesn't apply the right priorities to issues, it needs work.

Based on these common themes and the amount of anonymous PERs and their content, there is indication that some of the station's personnel do not appear to have full confidence that the corrective action program will correct issues or that there will not be any retaliation towards them from management or from fellow workers for raising issues. The team concluded that although individuals felt free to raise safety issues, the lack of confidence in the CAP indicates the site's SCWE needed improvement. The inspectors

Enclosure

have identified that there has been a continuing problem that has existed in this area for the past four years despite the licensee's continued implementation of various corrective actions. The licensee has documented this issue in the CAP as SR 514356.

(3) Findings and Observations

No findings were identified, however the inspectors made one observation.

In September 2008, the licensee initiated PER 153438 which identified that the station's safety culture was oriented toward production and schedule achievement versus the consistent attainment of safety. The licensee determined that this was a SCAQ and initiated four CAPRs. These CAPRs included conducting a senior management retreat to align core values; establishing strategic focus areas and objectives; establishing a governance structure and process to assist in integrating and prioritizing station initiatives; developing and implementing a formal concerted communication plan to instill management's focus on safety and adherence to high standards.

In April 2010, the licensee initiated a PER 223526 which also identified that the site was continuing to struggle with safety culture issues. This issue was also considered to be a SCAQ and the licensee initiated five CAPRs to correct this issue that included establishing a leadership development training program to strengthen accountability, formalizing the leadership development training program as a sustainable program, developing a procedure for conservative decision making; modifying the long range budget process to include risk significance in decision process; and developing and implementing equipment reliability strategies for remaining critical components.

The inspectors noted that in 2011 the licensee continued to identify safety culture issues as evidenced by the number of anonymous PERS generated throughout the year. The licensee hired an independent investigator to evaluate the issues, and the independent investigator determined that although employees would report nuclear safety and quality issues through some avenue, some were, in fact, somewhat chilled regarding their willingness to report issues using the CAP. The investigation also concluded that some of the employees preferred to identify issues anonymously. The licensee initiated PER 438063 in November 2011 which determined that there had been a decline in safety culture and initiated multiple corrective actions that are currently still in progress.

e. 95002 Supplemental Inspection Follow-up

(1) Inspection Scope

During the week of February 13-17, 2012, the inspectors conducted a follow-up inspection of the corrective actions associated with the 95002 supplemental inspection completed in October 2010. The inspectors reviewed the changes to the licensee's Safe Shutdown Instructions implemented since October 2010.

(2) Findings

- (i) Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to establish appropriate procedures for combating plant fires.

Description: DCN 69957 implemented one of several risk reduction modifications included in the corrective action plan developed to address deficiencies identified during the 2009 Triennial Fire Protection Inspection (IR 2009009 ML #100201056). DCN 69957 installed a new three-hour fire barrier in the Intake Tunnel Structure. As part of the design change, the existing fire area (Fire Area 25) was divided into four separate fire areas (25-1, 25-2, 25-3, and 26). The licensee developed SSIs for each of these new fire areas: 0-SSI-25-1, 0-SSI-25-2, 0-SSI-25-3, and 0-SSI-26. During review of the SSI procedures, the inspectors identified multiple examples procedural technical deficiencies associated with the new procedures.

Example 1 – Containment vent paths not isolated

The inspectors determined that SSIs 25-1, 25-2, 25-3 and 26 contained inadequate guidance to support the safe shutdown analysis strategy for achieving and maintaining safe shutdown. The SSIs assumed, in part, a containment overpressure condition would be present to ensure adequate net positive suction head (NPSH) existed for the operation of the RHR pumps when elevated temperatures exist in the suppression pool. As a result, the new SSIs directed unloading the controller (FCV-84-20) for the normal containment vent path to prevent depressurizing containment. However, the inspectors determined that the new procedures did not identify the following valves which also provided a potential vent path for containment during a fire event.

- Alternate Containment Vent Controller - FCV 84-19
- Reactor Building Floor Drains valves - FCV 77-2A and FCV 77-2B
- Reactor Building Equipment Drain valves - FCV 77-15A and FCV 77-15B

Example 2 – Improper Technical Basis Document References

The inspectors determined that some of the technical bases for steps in the SSIs were incorrectly referenced. Attachment 1, "Technical Basis Document," of 0-SSI-001, "Safe Shutdown Instruction," contained the basis for specific actions taken to achieve safe shutdown. Each technical basis was identified by a unique identifier (TBD-XX) which was cross-referenced in the SSIs. The inspectors identified instances where the TBD identifier attached to specific steps or statements within an SSI was incorrect. For example, procedures 0-SSI-25-2, 0-SSI-25-3, and 0-SSI-26 contained a note, prior to step 3 in each of the procedures, listing the instruments credited for use in the respective fire areas. The TBD identifier for these instruments, suppression pool level and temperature, was cross-referenced to TBD-82. TBD-82 listed an unrelated basis concerning the main steam line drains instead of the instruments listed in the procedure. Discussions with the licensee determined that TBD-81 was the correct cross-reference, which explained the importance of monitoring suppression pool level during a fire event.

Enclosure

Example 3 – Improper Procedure Step Sequencing

The inspectors identified an instance where procedure steps were improperly sequenced. Step [12] of Section 2.0 of procedure 0-SSI-25-1 directed the starting of the RHRSW Pump C2 when suppression pool cooling was required. Subsequently, Step [16] of Section 2.0 directed actions be taken to verify that 0-FCV-067-0049 was de-energized and closed. However, the TBD cross-reference (TBD 105) for step 16 required that closure of 0-FCV-067-0049 must occur before the RHRSW pumps were placed into service to ensure RHRSW flow was not diverted into the EECW system.

Example 4 – Inadequate Integration with EOIs

The inspectors identified logistical problems not addressed by the current revision of the new SSIs (0-SSI-25-2, 0-SSI-25-3, and 0-SSI-26). Statements in both the Safe Shutdown Analysis and DCN 69957 indicated that the new SSIs were designed to be implemented concurrently with each unit's operating procedures (i.e., OIs, AOIs, and EOIs). A note at the front of the new SSIs expanded on this statement and added that in the case where directions conflict between the SSIs and other plant procedures, the SSIs will take precedence. However, no guidance existed which described how this integration would be implemented or how the conflicts would be recognized. A potential conflict would exist when the main control room (MCR) operators were directed to perform actions in the EOIs and/or AOIs, while the local operators concurrently performed actions associated with the attachments to the SSIs. The Control Room Supervisor (CRS) for each unit maintained one copy of the SSIs. The CRS was to provide the MCR operators step-by-step directions while the field operators independently performed SSI attachments. The inspectors noted that no guidance existed which informed the MCR operators when the EOI actions conflicted with the local operator actions until the local operators reported completion of specific sections of the attachments. For example, during performance of the SSIs where decay heat is removed by the suppression pool, EOI-2, "Containment Control," directed the initiation of Suppression Pool Cooling in accordance with Appendix 17 when suppression pool temperature exceeded 95°F. The SSIs, via attachments, directed the field operators to ensure major loads that could spuriously start were isolated and tripped to prevent overloading the EDG due to starting an RHR pump. However, no guidance existed in either Appendix 17 or the new SSIs which informed the MCR operator that starting an RHR pump could result in overloading the EDG prior to all the spurious loads being isolated and tripped. The licensee conducted a subsequent review of the new SSIs during February 16-17, 2012, in response to the concerns raised by the NRC inspectors. This review identified several additional issues with the new SSI procedures including:

- operator manual actions that had not been incorporated into the SSIs,
- several instances with incomplete actions in some of the steps, and
- several additional instances of the wrong technical basis cross-referenced to steps in the new SSIs.

Analysis: The licensee's failure to establish appropriate procedures for combating plant fires was a PD. This finding is more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and it affected the cornerstone objective of protection against external events such as fire to prevent undesirable consequences. Specifically, the failure to adequately establish procedures for combating plant fire events affected the licensee's ability to respond to a plant fire. Following review of additional information pertaining to the specific time of exposure for this finding, the finding was reassessed and assigned a Low degradation rating and screened as Green in step 1.3.1 of IMC 0609 Appendix F, attachment 1, Application of Fire Protection SDP Phase 1 Worksheet.

The team determined the cause of this finding was directly related to the cross-cutting aspect of Work Coordination in the Work Control component of the Human Performance area because the licensee did not adequately incorporate actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. This contributed towards the failure to identify deficiencies with the new SSI procedures prior to procedure implementation. [H.3.(b)].

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances. Contrary to the above, the licensee failed to establish procedures appropriate to the circumstances for combating plant fires. Specifically, on September 23, 2011, the licensee established four new procedures, 0-SSI-25-1,-2,-3 & 26, "Safe Shutdown Instructions," which were not appropriate to the circumstances because each SSI procedure contained multiple procedural deficiencies. The violation occurred on September 23, 2011, and existed for 150 days. The licensee entered this violation into the corrective action program (PER 507721) and adequate Safe Shutdown Instructions were restored following licensee procedure revisions. Because this violation was of very low safety significance and was entered into the corrective action program, this violation is being treated as an NCV consistent with the NRC Enforcement Policy. This finding is identified as NCV 05000259, 260, 296/2012007-03, Failure to Implement Appropriate Safe Shutdown Instructions.

- (ii) Introduction: The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criteria XVI, Corrective Action, for the licensee's failure to assure conditions adverse to quality associated with the establishment and implementation of four new SSIs were promptly identified and corrected.

Description: Design Change Notice (DCN) 69957 implemented one of several risk reduction modifications included in the corrective action plan (CAP) developed to address deficiencies identified during the 2009 Triennial Fire Protection Inspection (IR 2009009 ML #100201056). Procedure NPG-SPP-09.3, "Plant Modifications and Engineering Change Control," detailed the actions to be taken to implement DCN 69957. DCN 69957 installed a new three-hour fire barrier in the Intake Tunnel Structure. As part of the design change, the existing fire area (Fire Area 25) was divided into four separate

Enclosure

fire areas (25-1, 25-2, 25-3, and 26). The licensee developed SSIs for each of these new fire areas: 0-SSI-25-1, 0-SSI-25-2, 0-SSI-25-3, and 0-SSI-26. The inspectors identified multiple examples of conditions adverse to quality related to the new SSI procedures. During review of these procedures, the inspectors identified instances where previously identified issues with these procedures were either not entered into the corrective action program, corrective actions were not implemented, or the corrective actions were ineffective in addressing the identified issue.

Failure to enter issue into the Corrective Action Program

- An NRC inspector identified an issue during a previous site visit related to the adequacy of the SSIs. The issue concerned the failure of 0-SSI-25-1 and 0-SSI-26 to adequately address the potential to divert flow from the RHRSW system through a cross-tie with the EECW system. While procedure change requests were submitted to address the NRC-identified issue, it was never entered into the corrective action program as required by the licensee's corrective action procedure.

Closure of Problem Evaluation Reports (PERs) without appropriate corrective actions

- PER 465091 requested a re-validation of the new SSIs to ensure procedure coordination with the EOIs. The only corrective action assigned to the PER was an unrelated corrective action of "Develop training on SSIs", following which the PER was closed out. The licensee did not provide documentation to indicate that a revalidation of the SSI procedures had been performed.
- PER 470323 requested that a determination of whether the level of training for the recent SSI revisions was appropriate and if recent changes to procedures governing Change Management would result in a different level of training. The description of the action taken indicated that a comparison was done between the procedures governing change management (BP-242 and NPG-COO-01.2), but failed to address the request concerning the appropriateness of the training on the latest SSI revisions. The PER was subsequently closed out without addressing the SSI training issue.

Analysis: The licensee's failure to assure conditions adverse to quality associated with the establishment and implementation of SSIs were promptly identified and corrected was a PD. This finding is more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and it affected the cornerstone objective of protection against external events, such as fire, to prevent undesirable consequences. Specifically, the failure to correct issues associated with procedures for combating plant fire events affected the licensee's ability to respond to a plant fire. Following review of additional information pertaining to the specific time of exposure for this finding, the finding was assigned a Low degradation rating and screened as Green in step 1.3.1 of IMC 0609 Appendix F, attachment 1, Application of Fire Protection SDP Phase 1 Worksheet.

The team determined the cause of this finding was directly related to the cross-cutting aspect of Thorough Evaluation of Identified Problems in the Corrective Action Program component of the Problem Identification and Resolution area because the licensee did not thoroughly evaluate identified problems such that the resolutions addresses the causes and extent of conditions of the issues. [P.1.(c)].

Enforcement: 10 CFR 50, Appendix B, Criteria XVI, states, in part, that measures shall be established to assure that conditions adverse to quality, such as deficiencies with procedure establishment and implementation, are promptly identified and corrected. Contrary to the above, the licensee failed to assure conditions adverse to quality associated with the establishment and implementation of SSIs were promptly identified and corrected. Specifically, on multiple occasions as noted above, following the implementation of Procedures 0-SSI-25-1,-2,-3 & 26, "Safe Shutdown Instructions," on September 23, 2011, the licensee failed to adequately identify and correct deficiencies associated with the establishment and implementation of the procedures. The licensee entered this violation into the corrective action program (PER 505551) and adequate procedural guidance was restored following licensee procedure revisions, training and demonstration to inspectors that operators had acquired an adequate level of proficiency to implement the new SSI methodology. Because this violation was of very low safety significance and was entered into the corrective action program, this violation is being treated as an NCV consistent with the NRC Enforcement Policy. This finding is identified as NCV 05000259, 260, 296/2012007-04, Failure to Identify and Correct Deficiencies Associated with Safe Shutdown Instructions.

(iii) Apparent Violation for the Failure to Follow Prescribed Procedures

Introduction: The inspectors identified an apparent violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the licensee's failure to adequately accomplish the requirements contained in NPG-SPP-09.3, "Plant Modifications and Engineering Change Control." Specifically, the licensee failed to adequately identify and perform required training for implementation of four new Safe Shutdown Instructions (SSI) in support of a Design Change Notice (DCN) implementation.

Description: DCN 69957 implemented one of several risk reduction modifications included in the corrective action plan developed to address deficiencies identified during the 2009 Triennial Fire Protection Inspection (IR 2009009 ML #100201056). NPG-SPP-09.3, "Plant Modifications and Engineering Change Control," detailed the actions to be taken to implement DCN 69957. DCN 69957 installed a new three-hour fire barrier in the Intake Tunnel Structure. As part of the design change, the existing fire area (Fire Area 25) was divided into four separate fire areas (25-1, 25-2, 25-3, and 26). The licensee developed SSIs for each of these new fire areas: 0-SSI-25-1, 0-SSI-25-2, 0-SSI-25-3, and 0-SSI-26. These new SSIs incorporated a new implementation strategy. The SSIs for the other fire areas (1 through 24) relied on a strategy of self-induced station blackout (SISBO) and were implemented as stand-alone procedures with prescriptive requirements detailing the actions necessary to achieve safe shutdown in each of the fire areas. The new SSIs developed for Fire Areas 25-1, 25-2, 25-3, and 26 departed from the SISBO strategy and relied on the operators' ability to evaluate plant symptoms

Enclosure

and to use each unit's operating instructions (OIs), abnormal operating instructions (AOIs), and emergency operating instructions (EOIs) concurrently with the new SSIs. These additional procedures were to provide supplemental required actions based on the specific fire scenario to achieve and maintain safe shutdown using all available safety systems. This new implementation strategy relied heavily on operator knowledge of the technical basis for the actions within each of the SSIs.

During review of the SSI procedures, the inspectors identified multiple examples of the licensee's failure to meet the requirements of 10CFR50 App B Criterion V, "Instructions, Procedures and Drawings" for accomplishing activities in accordance with procedures. The inspectors noted that the licensee failed to properly implement NPG-SPP-09.3 "Plant Modifications and Engineering Change Control", resulting in the failure to adequately identify and perform required training for implementation of the SSI procedures for fire areas 25-1, 25-2, 25-3 and 26.

The following lists the relevant licensee forms used to identify and track procedures requiring development and/or revision to support DCN implementation as well as to identify any training needs associated with the procedure changes.

- Form NPG-SPP-09.3-5, "Modification Impact Review Form – Operations,"
 - Steps 8 and 9 provided a mechanism to identify procedures requiring revision before return to operation (RTO) and before final closure of the DCN, respectively. The inspectors found that the completed form for DCN 69957 identified that revisions for the SSIs associated with Fire Areas 25-1, 25-2, 25-3, and 26 were required and were signed off as completed on September 27, 2011, and September 29, 2011, respectively.
 - Step 9 of form NPG-SPP-09.3-5 also provided a block to identify if training was required to support either RTO or closure of the DCN. A "yes" answer triggered the completion of form NPG-SPP-09.3-13, "Modification Training Notification," to evaluate the need to develop revised operations training to support implementation of the DCN (see below). The inspectors found that the completed form identified that a training evaluation was required and was signed off as completed on September 29, 2011.
- Form NPG-SPP-09.3-13, "Modification Training Notification," served as a notification to the training department of the need to evaluate the DCN for training related to the revision/development of plant procedures. It was the responsibility of the Site Training Manager to complete.
 - Step 9 of this form was signed off by the Operations Procedure Manager as completed on August 29, 2011, indicating that the training needs had been evaluated.
 - A Change Management Plan (CMP) was developed in accordance with COO-SPP-01.2, "Change Management," to track the completion of DCN 69957. The

CMP also identified that a training needs analysis was required to address the new SSI procedures.

Form NPG-SPP-09.3-13, along with the associated CMP, identified that an evaluation of training needs was required as part of implementing the new SSIs. However, the inspectors noted that the licensee did not provide documentation to verify that a training needs analysis (TNA) ever occurred. Discussions with the Site Training Manager indicated that the individual assigned to perform the TNA decided independently that nothing in the new SSIs impacted the existing learning objectives associated with training on Safe Shutdown and decided that a TNA was not required.

The inspectors also determined that the licensee did not follow the systems approach to training process in evaluating the adequacy of training provided to the operations staff in connection with the implementation of the new SSI procedures. Specifically, the licensee failed to perform training analysis on the impact of the implementation of the new SSI procedures. Procedure NPG-SPP-17.2, "Analysis Phase," step 3.2.3.B.4 identified new procedures as one of the instances when performance of a TNA should be considered. However, the licensee did not provide TNA documentation for this DCN. Prior to implementation of the new SSI procedures, the only training identified on form NPG-SPP-09.3-13 relating to the new SSIs was training that had been previously developed prior to the changes in the SSIs. This training consisted of one slide which made mention of the four new SSI procedures in the "Welcome to Requal" presentation during the Cycle 4 Licensed Operator Requalification (LOR) training week and a training dispatch, OPS-TD-2011-005. This training dispatch, which was approved on August 1, 2011, and routed to the operators one day before the new SSIs went into effect on September 13, 2011, was found by the inspectors to have only provided a listing of the new SSI procedures. The training dispatch included the following one-sentence statement concerning the new implementation strategy, which when compared to the description of the new procedure strategy in the DCN is neither correct nor complete.

*"For SSIs 0-SSI-25-1, 0-SSI-25-2, 0-SSI-25-3, and 0-SSI-26, EOIs will be used concurrently with these SSIs **if EOI entry conditions have been met.**"*
[emphasis added]

The inspectors noted that the instructor tasked with performing the TNA independently determined that a TNA was not required since the affected learning objectives were not impacted by the changes to the new SSI procedures. This determination was not brought before the Curriculum Review Committee (CRC) for concurrence as required by procedure NPG-SPP-17.2 step 3.2.2.B.3.

The inspectors conducted inspection observations of crew performance during simulator scenarios. The inspectors observed a simulator exercise designed to implement procedure 0-SSI-26. This was the only simulator training the operators had received on implementation of the new SSIs. The inspectors observed that the crew demonstrated a lack of familiarity with the new SSIs. The inspectors noted that the procedures had been in effect for over five months prior to this inspection. One crew member did not understand that the "TBD" identifiers listed before each step cross-referenced specific technical basis for the actions contained in the step. Several of the crew members needed to be instructed on the location of the technical bases (i.e., 0-SSI-001). The crew was coached to postpone entering the EOIs when valid entry conditions existed until all ten-minute SSI actions were completed. However, this implementation strategy was not described in the new SSIs and was never addressed during the previous operator training. The inspectors determined that the previous training in the operations training dispatch (OPS-TD-005-2011) directed the operators to enter the EOIs when entry conditions were met. Following closure of the main steam isolation valves (MSIVs), the crew attempted to control reactor pressure manually within a specific pressure band by cycling the main steam relief valves (MSRVs). The crew was coached to not take manual control of the MSRVs. However, during a subsequent simulator observation following additional training in response to inspectors concerns, the inspectors were informed that the operators were being given inappropriate instruction and taking manual control of reactor pressure was the appropriate action. The simulator exercise terminated at the point where the SSI ten-minute actions were completed (i.e. prior to delayed entry into the EOIs), so the crew members were never exposed to conditions where integration with procedural actions outside the SSIs would occur, even though this was the major difference in implementation strategy between the new SSIs and the existing SSI procedures. The inspectors noted that a training evaluation had never been performed to determine the scope and objectives of these scenarios. Development of this training was in response to corrective action in PER 465091 generated from a previous inspection issue which only stated "Develop training on SSIs".

In response to the concerns raised by inspectors, the licensee performed additional training with plant operators addressing the new SSIs. The inspectors observed the additional training and operator performance during a simulator scenario directly following the training. Although this training specifically instructed operators to be cognizant of the initial time critical actions contained in the SSIs, the inspectors observed that the operators failed to complete all the time critical actions within the required time. The licensee evaluators did not address the time critical aspect of the crew's performance until the issue was brought to their attention by the inspectors. Following a discussion between the inspectors and the evaluators concerning, the licensee remediated the crew and required the crew to re-perform the scenario. These observations supported the inspectors concerns that initial training on the SSIs had been inadequate and affected operators' level of knowledge and proficiency with the implementation of these procedures.

Analysis: The licensee's failure to adequately accomplish the requirements contained in procedure NPG-SPP-09.3 "Plant Modifications and Engineering Change Control" during the implementation of DCN 69957 was a PD. This finding is more than minor because it is associated with the protection against external events attribute of the Mitigating

Enclosure

Systems cornerstone and it affected the cornerstone objective to prevent undesirable consequences from initiating events, such as fire. Specifically, the failure to adequately identify and perform required training for implementation of procedures for combating plant fire events affected the licensee's ability to respond to a plant fire. The team attempted to assess the significance using IMC 0609, Appendix F, "Fire Protection Significance Determination Process" and assigned the finding a Moderate Degradation rating. Since a multiple fire area assessment effort for this type of finding was beyond the intended scope of the fire protection SDP Phase 2 analysis, the finding was forwarded to the senior reactor analysts for review. Because the finding could not be screened as Green, nor its safety significance determined prior to issuing the inspection report, it is being characterized as "To Be Determined (TBD)." The finding does not present an immediate safety concern because the licensee has subsequently performed procedure revisions, training and demonstrated to inspectors that operators have acquired an adequate level of proficiency to implement the new SSI methodology to mitigate plant events should they occur.

The team determined the cause of this finding was directly related to the cross-cutting aspect of Work Coordination in the Work Control component of the Human Performance area because the licensee did not adequately incorporate actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. This contributed to the failure to conduct a TNA for the new SSI procedures and perform adequate operator training prior to procedure implementation. [H.3.(b)].

Enforcement: 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. Contrary to the above, the licensee failed to adequately accomplish the requirements contained in procedure NPG-SPP-09.3 "Plant Modifications and Engineering Change Control" during the implementation of DCN 69957. Specifically, on September 23, 2011, the licensee implemented Procedures 0-SSI-25-1,-2,-3 & 26, "Safe Shutdown Instructions," without identifying and performing adequate operator training. The violation occurred on September 23, 2011, and the condition existed for 150 days. The licensee entered this violation into the corrective action program (PER 507721) and adequate procedural guidance was restored following licensee procedure revisions, training and demonstration to inspectors that operators had acquired an adequate level of proficiency to implement the new SSI methodology. Pending determination of the finding's final safety significance, this finding is identified as AV 05000259, 260, 296/2012007-05, Failure to Properly Implement the Requirements of the Plant Modifications and Engineering Change Control Procedure.

4OA3 Follow-Up of Events

- a. (Closed) Licensee Event Report (LER) 05000259, 260, 296/2010-001-00: Unit 1, 2, and 3 Appendix R Safe Shutdown Instruction Procedures Contain Incorrect Operator Manual Actions

(1) Inspection Scope

On August 9, 2010, the licensee submitted an LER documenting the discovery of procedural inadequacies. These inadequacies could prevent operators from achieving and maintaining safe shutdown (SSD) of the plant in the event of a postulated fire.

The inspectors performed a detailed review of the information related to the LER. Inspectors reviewed documents, performed walkdowns, and discussed the event with plant personnel to gain an understanding of the event. The inspectors assessed the licensee's compensatory measures and corrective actions to determine if they were adequate.

(2) Findings

Introduction: The licensee identified a noncompliance with Technical Specification 5.4.1.a for the failure to provide adequate procedural guidance. Specifically, the licensee's SSI procedures for fires in certain areas did not contain two actions needed to achieve and maintain SSD.

Description: On August 9, 2010, the licensee submitted LER 2010-001-00, describing a condition that could have prevented the fulfillment of the safety function of structures or systems that were needed to shutdown the reactor and maintain it in a safe shutdown condition. During a review of design input calculations in support of the NFPA 805 transition from the 10 CFR 50 Appendix R licensing basis, it was discovered that two 4kV breakers that should be tripped and/or tripped and isolated during certain Appendix R fires were not identified in the calculation summary. These omissions led to required operator manual actions (OMAs) to achieve and maintain SSD from being included in certain SSIs. These OMAs were necessary to prevent spurious load additions on the credited EDG during certain Appendix R fires. Without operator action to trip these breakers, spurious actuations could add loads on the credited EDG beyond what has been analyzed. The licensee determined that this condition was applicable to FAs 01-03 and 02-03. If operators do not take prompt action to remedy the EDG overload for postulated fires in these areas, and the EDG fails, the credited power source would not be available to power the credited RHR pumps.

Upon discovery, the licensee entered the condition into the corrective action program, and issued interim operator action requirements to trip and/or trip and isolate the appropriate breakers during applicable SSI entry conditions. These interim actions have since been replaced by permanent incorporation into the appropriate SSI steps.

Analysis: The licensee's failure to provide adequate procedural guidance in accordance with Technical Specification 5.4.1.a, was a PD. This finding was more than minor because it was associated with the reactor safety mitigating system cornerstone attribute of protection against external events (i.e., fire). Failure to provide adequate procedural guidance affects the reactor safety mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because this issue relates to fire protection, and this non-compliance was identified as a part of the site's transition to NFPA 805, this issue is being dispositioned in accordance with Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" of the NRC Enforcement Policy.

In order to verify that this non-compliance was not associated with a finding of high safety significance (Red), inspectors reviewed qualitative and quantitative risk analyses performed by the licensee. These risk evaluations took ignition source and target information from the ongoing BFN fire PRA to demonstrate that the significance of the non-compliances were less than Red (i.e. ΔCDF less than $1E-4/yr$). The inspectors also performed walkdowns to verify key assumptions were applicable.

Based on the ignition frequency of fire sources in the affected areas, combined with the probability of non-suppression for those fire scenarios, inspectors determined that the significance of this non-compliance was less than Red. Inspectors also noted that the values in the licensee's quantitative analysis are conservative, in that they used screening values instead of more detailed values. This provided additional confidence that this non-compliance was not associated with a finding of high safety significance (Red).

The inspectors determined that this non-compliance did not have a cross-cutting aspect because it did not represent current licensee performance.

Enforcement: Technical Specification 5.4.1.a. requires that written procedures shall be established, implemented, and maintained covering the activities in NRC Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2. Regulatory Guide 1.33, Appendix A, Section 6.v, requires procedures for combating emergencies such as plant fires. Procedure 0-SSI-1-3, "Unit 1, Reactor Building Fire EL 593 North of Column Line R," Revision 6 & 0-SSI-2-3, "Unit 2 Reactor Building Fire EL 593 North of Column Line R," Revision 8, specified the licensee's fire emergency response for a major disabling fire. Embodied within these requirements is the requirement that the procedures are adequate.

Contrary to the above, Procedure 0-SSI-1-3, "Unit 1, Reactor Building Fire EL 593 North of Column Line R," Revision 6 & 0-SSI-2-3, "Unit 2 Reactor Building Fire EL 593 North of Column Line R," Revision 8, were inadequate. Specifically, on August 9, 2010, the licensee discovered that certain SSIs did not include required OMAs to achieve and maintain SSD. These OMAs were necessary to prevent spurious load additions on the credited EDG during certain Appendix R fires. This non-compliance has existed since August 28, 2003. The licensee entered this finding into the corrective action program (PER 243955) and the licensee has incorporated the appropriate steps into the affected SSIs.

Enclosure

Because the licensee committed to adopt NFPA 805 and change their fire protection licensing bases to comply with 10 CFR 50.48(c), the NRC is exercising enforcement and reactor oversight process (ROP) discretion for these issues in accordance with the NRC Enforcement Policy, Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" and Inspection Manual Chapter 0305. Specifically, these issues were identified and will be addressed during the licensee's transition to NFPA 805, they were entered into the licensee's corrective action program, immediate corrective action and compensatory measures were taken, they were not likely to have been previously identified by routine licensee efforts, they were not willful, and they were not associated with a finding of high safety significance (Red).

LER 05000259, 260, 296/2010-001-00: Unit 1, 2, and 3 Appendix R Safe Shutdown Instruction Procedures Contain Incorrect Operator Manual Actions, is now closed.

b. (Closed) Licensee Event Report (LER) 05000259, 260, 296/2011-010-00: DC Ammeter Cables Not Adequately Isolated

(1) Inspection Scope

On December 27, 2011, the licensee submitted an LER documenting the discovery of a condition where non-safety related ammeters were installed in several safety-related battery board circuits without electrical isolation. Due to this lack of isolation between Class 1E and Non-Class 1E circuits, a fire affecting a non-safety related circuit could render safety-related equipment unavailable.

The inspectors performed a detailed review of the information related to the LER. Inspectors reviewed documents, performed walkdowns, and discussed the event with plant personnel to gain an understanding of the event. The inspectors assessed the licensee's compensatory measures and corrective actions to determine if they were adequate.

(2) Findings

Introduction: The licensee identified a non-compliance with 10 CFR Part 50, Appendix R, Section III.G.2 for the failure to meet the requirements for protection of associated non-safety circuits. Specifically, the licensee failed to provide adequate circuit protection for associated non-safety circuits, and/or to institute protection methods for these circuits in accordance with the separation criteria specified in 10 CFR Part 50, Appendix R, Section III.G.2. These protection methods include the use of spatial separation, passive fire barriers, fire detection, and automatic fire suppression.

Description: On December 27, 2011, the licensee submitted LER 2011-010-00, describing a condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety. During a review of the Appendix R design basis in support of the NFPA 805 transition from the 10 CFR 50 Appendix R licensing basis, the licensee discovered that the control room ammeters for Battery Boards 1, 2, and 3 were electrically connected to the safety related 250V DC bus at the

battery boards without electrical isolation. These ammeters were identified as Non-Class 1E (not safety related).

The 250V DC system is an ungrounded system. The ammeter cable is connected to the 250V DC system's positive terminal. In a scenario where the 250V DC Battery Board system negative becomes grounded at the same time the ammeter cable has a fault to ground, the cable could auto-ignite anywhere along the cable's length from the ground fault location back to the battery source. This could result in a fire in one FA propagating a fault which could cause a secondary fire in another FA. This secondary fire could adversely impact safety-related equipment that is required to achieve and maintain SSD.

The licensee determined that this condition was applicable to all 3 units. The licensee initially determined that the FAs of concern are FA 16 (Control Bay), FA 17 (Battery and Battery Board Room 1), FA 18 (Battery and Battery Board Room 2), FA 19 (Battery and Battery Board Room 3), and FA 26 (Turbine Building). FA 26 contains Battery and Battery Board Rooms 4, 5, and 6. After further evaluation the licensee determined that, for postulated fires in the FAs of concern, except for FA 16, the potential fault current cannot cause the temperature required to result in auto-ignition of the cables. However, the licensee determined that postulated fires in FA 16 that cause cable faults could reach the auto-ignition temperature of the cable, and could cause the fire to propagate to a secondary location. Further, the licensee concluded that these cable faults could occur as a result of a postulated fire in FA 16 due to the presence of cables that are wired to both, the 250V DC system positive and the system negative.

In reference to Appendix R associated circuits, Design Criteria BFN-7200C required that associated circuits that share a common enclosure with an Appendix R required circuit must be protected by the use of a fuse or breaker. Upon discovery that the ammeter circuit did not contain any electrical isolation, the licensee entered the condition into the corrective action program. At the time of discovery, compensatory measures, in the form of fire watches, were already in place for the affected FA, due to previously identified non-compliances.

Analysis: The licensee's failure to meet the requirements for protection of associated non-safety circuits was a PD. This finding was more than minor because it was associated with the reactor safety mitigating system cornerstone attribute of protection against external events (i.e., fire). Specifically, not providing adequate circuit protection for associated non-safety circuits, or protecting these circuits in accordance with the separation criteria specified in 10 CFR Part 50, Appendix R, Section III.G.2 affects the reactor safety mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because this issue relates to fire protection, and this non-compliance was identified as a part of the site's transition to NFPA 805, this issue is being dispositioned in accordance with Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" of the NRC Enforcement Policy.

In order to verify that this non-compliance was not associated with a finding of high safety significance (Red), inspectors reviewed qualitative and quantitative risk analyses performed by the licensee. These risk evaluations took ignition source and target

Enclosure

information from the ongoing BFN fire PRA to demonstrate that the significance of the non-compliances were less than Red (i.e. Δ CDF less than $1E-4/yr$). The inspectors also performed walkdowns to verify key assumptions were applicable.

Based on the ignition frequency of fire sources in the affected areas, combined with the probability of non-suppression for those fire scenarios, inspectors determined that the significance of this non-compliance is less than Red. Inspectors also noted that the values in the licensee's quantitative analysis were conservative, in that they used screening values instead of more detailed values. This provided additional confidence that this non-compliance was not associated with a finding of high safety significance (Red).

The inspectors determined that this non-compliance did not have a cross-cutting aspect because it did not represent current licensee performance.

Enforcement. 10 CFR Part 50.48(b)(1) requires that all nuclear power plants licensed to operate prior to January 1, 1979, must satisfy the applicable requirements of 10 CFR Part 50, Appendix R, Section III.G.

Appendix R, Section III.G.2, applies to the ability to achieve and maintain hot shutdown from the MCR during a fire. It stated, in part, that where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of three means of protecting cables to ensure that one of the redundant trains is free of fire damage shall be provided. Design Criteria BFN-7200C referenced the requirements of Appendix R, Section III.G.2, with respect to associated non-safety circuits of concern. BFN-7200C stated, "All circuits that share a common enclosure with an Appendix R required circuit must be designed such that a postulated fire in a fire zone other than where the common enclosure is located will not propagate and damage a required circuit in the common enclosure." Additionally, BFN-7200C stated that this requirement shall be accomplished by protecting all circuits with a fuse or breaker.

Contrary to the above, the licensee did not meet the requirements of Design Criteria BFN-7200C, or 10 CFR 50, Appendix R, Section III.G.2. Specifically, on October 25, 2011, the licensee discovered that the circuits for non-safety related control room ammeters did not contain any electrical isolation. This condition could result in a fire located within one FA propagating a fault which could cause a secondary fire within another FA. This secondary fire could adversely impact safety-related equipment that is required to achieve and maintain SSD. This condition has existed since initial plant startup for all 3 units. The licensee entered this finding into the corrective action program (PER 452185). At the time of discovery, compensatory measures, in the form of fire watches, were already in place for the affected FA, due to previously identified non-compliances.

Because the licensee committed to adopt NFPA 805 and change their fire protection licensing bases to comply with 10 CFR 50.48(c), the NRC is exercising enforcement and ROP discretion for these issues in accordance with the NRC Enforcement Policy, Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" and Inspection Manual Chapter 0305. Specifically, these issues were identified and will be addressed during the licensee's transition to NFPA 805, they were entered into the licensee's corrective action program, immediate corrective action and compensatory measures were taken, they were not likely to have been previously identified by routine licensee efforts, they were not willful, and they were not associated with a finding of high safety significance (Red).

LER 05000259, 260, 296/2011-010-00: DC Ammeter Cables Not Adequately Isolated, is now closed.

4OA5 Other Activities

(1) Inspection Scope

In March 2009, the licensee committed to transition their fire protection licensing basis to comply with 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805." During the 95002 supplemental inspection conducted in 2010, this commitment was characterized by the licensee as one of the corrective actions to resolve safety significant violations of the site's FPP that were identified by NRC inspectors in 2009. These violations were documented in NRC Inspection Reports 05000259, 260, 296/2009009 (ML100201056), and 05000259, 260, 296/2010007 (ML103370638). Because these corrective actions were heavily fire protection focused, the NRC supplemented the PI&R inspection team with additional fire protection inspectors to review the licensee's corrective actions with respect to the site's FPP and NFPA 805 transition process.

During the transition period, the licensee submitted multiple LERs documenting the discovery of unanalyzed conditions related to their FPP. The conditions discovered included failure to protect redundant trains of SSD equipment, SSA deficiencies, and failure to provide adequate procedural guidance to ensure SSD. Additionally, the licensee identified several non-compliances that did not meet the 10 CFR 50.72 and 50.73 reportability criteria, but were tracked for resolution in the CAP as PERs. These items represented non-compliances with the licensee's current FPP licensing basis. In accordance with the licensee's CAP and the NRC Enforcement Policy, compensatory measures were implemented, as appropriate, and corrective actions were developed to address the issues. Some of the corrective actions included design changes and procedure revisions. Furthermore, these non-compliances are tracked by the licensee's NFPA 805 transition process for resolution.

For plants that have committed to transition to comply with 10 CFR 50.48(c), the NRC will normally exercise enforcement discretion for a violation of 10 CFR 50.48(b) (or the requirements in a fire protection license condition) involving a problem in an area such as engineering, design, implementing procedures, or installation if the violation meets certain criteria.

Enclosure

The inspectors performed a review of information contained in, and associated with the LERs and PERs. The inspectors also reviewed qualitative and quantitative risk analyses performed by the licensee to verify that none of the non-compliances were associated with a finding of high safety significance (Red). Additionally, the inspectors performed walkdowns to verify key assumptions were applicable. The inspectors also assessed the adequacy of the licensee's compensatory measures and corrective actions.

The details of the LERs that the licensee submitted are discussed and dispositioned in Section 4OA3 of this report.

(2) Findings

Introduction: The licensee identified multiple non-compliances associated with implementation of the BFN FPP. These program requirements were described in Browns Ferry Units 1, 2, and 3 Operating License Condition 2.C(13), 2.C(14), and 2.C(7), respectively; as well as Title 10 of the *Code of Federal Regulations (10 CFR)* Part 50, Appendix R, Sections III.G.2 and III.G.3, and Technical Specifications.

The licensee identified non-compliances for the failure to protect redundant trains of structures, systems and components, located in the same FA, needed to achieve post-fire SSD, as required by 10 CFR Part 50, Appendix R, Sections III.G.2 and III.G.3. These non-compliances affected redundant SSD trains located in multiple FAs. The licensee identified that the cables had not been protected by one of the methods specified in 10 CFR Part 50, Appendix R, Section III.G.2.

The licensee also identified a non-compliance for the failure to provide adequate procedural guidance, as required by Technical Specification 5.4.1.a. Specifically, the licensee's SSIs for fires in certain areas did not contain all actions needed to achieve and maintain SSD.

The following findings/violations that affect 10 CFR 50.48 were identified by the licensee and are a violation of NRC requirements. These findings/violations have been screened and determined to warrant enforcement discretion in accordance the NRC Enforcement Policy, Section 9.1, " Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" and Inspection manual Chapter 0305.

Description: Beginning in 2009, as a part of the site's NFPA 805 transition process, the licensee identified multiple examples of conditions where redundant SSD trains located in multiple FAs did not meet the separation criteria specified in 10 CFR Part 50, Appendix R, Section III.G.2. These protection methods include the use of spatial separation, passive fire barriers, fire detection, and automatic fire suppression. The details of these non-compliances were described in the PERs listed below:

- 372194, "FPR Justification on Intake Pumping Station Barriers"
- 229734, "NFPA 805 – Multiple Spurious Operation"
- 422371, "Cables 3ES4077-II and 3ES4604-II routed in Fire Area 19"
- 468127, "Appendix R – Spurious Start on A1 RHRSW Pump"
- 493807, "Appendix R Cable Routing Error – RHRSW Pump C1"

Enclosure

- 259787, "Potential To Drain ECCS Loops in Appendix R Fire"
- 424389, "Fire Induced Multiple Spurious Operation Enforcement Discretion"
- 245385, "Fire Induced Circuit Damage Potentially Resulting In Inability to Manually Operate MOV"
- 245386, "Fire Induced MOV Circuit Failure Potentially Resulting in Valve Damage"

The licensee determined that fires in certain areas could potentially lead to conditions that adversely impact the ability to achieve and maintain SSD, due to the lack of separation of components and associated circuits. These conditions include auto-isolation of Reactor Core Isolation Cooling (RCIC), automatic start of an RHRSW pump with no flow path, and the drain down of credited emergency core cooling system (ECCS) loop piping. Upon discovery, the licensee implemented compensatory measures, including issuing procedure changes, and posting roving fire watches in FAs of concern.

Additionally, in 2009, as a part of the site's NFWA 805 transition process, the licensee identified a condition where the Appendix R SSIs did not contain the correct steps needed to restore the Unit 3 Control Bay Chillers to service. The Unit 3 Control Bay Chillers were credited for Appendix R safe shutdown for all FAs, except FA 16. The chillers were credited to provide control bay ventilation for the FAs that are affected. For these areas, the 480V breakers supplying the chillers would trip on undervoltage due to interruption of normal (offsite) power to the 4KV Shutdown Boards. Because of this condition, the breakers must be manually reclosed. The licensee determined that the SSIs did not contain the steps to manually reclose the required breakers. The details of this non-compliance was described in the PER listed below:

245502, "Appendix R Manual Actions for U3 Control Bay Chillers"

Upon discovery, the licensee issued interim operator action requirements to reset the appropriate breakers during applicable SSI entry conditions. These interim compensatory actions were replaced with compensatory actions by the issuance and incorporation of revisions to all of the SSIs to reset the Unit 3 Control Building Chiller 3A & 3B power supply breakers.

Analysis: The issues discussed above, which described failures to meet the requirements of Browns Ferry Units 1, 2, and 3 Operating License Condition 2.C(13), 2.C(14), and 2.C(7), respectively; as well as 10 CFR Part 50, Appendix R, Sections III.G.2 and III.G.3, and Technical Specifications, were performance deficiencies. These findings were more than minor because they were associated with the reactor safety mitigating system cornerstone attribute of protection against external events (i.e., fire). Specifically, failing to meet the requirements of the site's FPP affects the reactor safety mitigating systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because these issues relate to fire protection, and these non-compliances were identified as a part of the site's transition to NFWA 805, these issues are being dispositioned in accordance with Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)" of the NRC Enforcement Policy.

Enclosure

In order to verify that these non-compliances were not associated with a finding of high safety significance (Red), inspectors performed a review of qualitative and quantitative risk analyses performed by the licensee. The quantitative risk evaluations took ignition source and target information from the ongoing BFN fire PRA to demonstrate that the significance of the non-compliances were less-than-Red. The inspectors also performed walkdowns to verify key assumptions were applicable. The inspectors reviewed the significance of each individual issue, and not the aggregate of all the issues combined.

Based on the ignition frequency of fire sources in the affected areas, combined with the probability of non-suppression for those fire scenarios, inspectors determined that these were non-compliances less-than-Red (i.e. Δ CDF less than $1E-4/yr$). Inspectors also noted that the values in the licensee's quantitative analysis were conservative, in that they used screening values instead of more detailed values. The screening values made bounding assumptions, such as conservatively assuming failure of certain fire mitigating systems and strategies. This provided additional confidence that these non-compliances were not associated with a finding of high safety significance (Red).

Enforcement: 10 CFR Part 50.48(b)(1) requires that all nuclear power plants licensed to operate prior to January 1, 1979, must satisfy the applicable requirements of 10 CFR Part 50, Appendix R, Section III.G.

Appendix R, Section III.G.2, applies to the ability to achieve and maintain hot shutdown from the MCR during a fire. It stated, in part, that where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of three means of protecting cables to ensure that one of the redundant trains is free of fire damage shall be provided. The three acceptable methods described in Appendix R, Section III.G.2 for maintaining one of the redundant trains in the same fire area free of fire damage are based on the use of physical barriers, spatial separation, and fire detection and an automatic fire suppression system.

Appendix R, Section III.G.3, applies to the ability to achieve and maintain hot shutdown from an emergency control station during a fire. It states, in part, that alternative of dedicated shutdown capability and its associated circuits, independent of cables, systems or components in the area, room, zone under consideration should be provided where the protection of systems whose function is required for hot shutdown does not satisfy the requirement of Appendix R, Section III.G.2.

Additionally, Technical Specification 5.4.1.a. requires that written procedures shall be established, implemented, and maintained covering the activities in NRC Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2. Regulatory Guide 1.33, Appendix A, Section 6.v, requires procedures for combating emergencies such as plant fires. The licensee's SSIs specified the licensee's fire emergency response for a major disabling fire.

Contrary to the above, the licensee did not meet the requirements of 10 CFR Part 50, Appendix R, Section III.G.2. Specifically, the licensee did not protect the cables of redundant systems or equipment necessary to achieve and/or maintain hot shutdown conditions from the MCR from fire damage by one of the means described in 10 CFR Part 50 Appendix R, Section III.G.2 (i.e., use of spatial separation, passive fire barriers, and fire detection and an automatic fire suppression system).

Also contrary to the above, the licensee did not meet the requirements of 10 CFR Part 50, Appendix R, Section III.G.3. Specifically, the licensee did not provide alternative shutdown capability where the protection of systems did not meet the requirements of Appendix R, Section III.G.2.

Also contrary to the above, the licensee's SSI procedures for all but one FA were inadequate. Specifically, the SSIs did not include the steps needed to restore the Unit 3 Control Bay Chillers to service.

These non-compliances were discovered as a part of the licensee's NFPA transition process, and entered into the corrective action program. Because the licensee committed to adopt NFPA 805 and change their fire protection licensing bases to comply with 10 CFR 50.48(c), the NRC is exercising enforcement and ROP discretion for these issues in accordance with the NRC Enforcement Policy, Section 9.1, "Enforcement Discretion for Certain Fire Protection Issues (10 CFR 50.48)." Specifically, these issues were identified and will be addressed during the licensee's transition to NFPA 805, they were entered into the licensee's corrective action program, immediate corrective action and compensatory measures were taken, they were not likely to have been previously identified by routine licensee efforts, they were not willful, and they were not associated with a finding of high safety significance (Red).

Additionally, in reviewing the items that the licensee discovered during the NFPA 805 transition process, inspectors determined that issues associated with recirculation seal failure and scaffolding blockage met the criteria to be characterized as minor violations. These items were documented in the following PERs:

260964, "Recirc Seal Failure/Leakage during Appendix R"
338795, "Scaffold Blocking Appendix R Exemption"

These examples of failures to comply with the requirements of the site's FPP were determined to be violations of minor significance that are not subject to enforcement action in accordance with the NRC's Enforcement Policy.

40A6 Meetings, Including Exit

On March 1, 2012, the inspectors provided the results of the inspection to Mr. Preston Swafford, Senior Vice President and Chief Nuclear Officer, and other members of the licensee staff. On April 10, and May 14, 2012, re-exit meetings were held via telephone, with Mr. Preston Swafford, Mr. Keith Polson and other members of the licensee staff.

Enclosure

The inspectors asked the licensee whether any materials examined during this inspection should be considered proprietary. The licensee confirmed that all proprietary information was returned during the inspection.

4OA7 Licensee Identified Violations

The following violations of very low safety significance (Green) were identified by the licensee and constituted a violation of NRC requirements which met the criteria of Section 2.3.2 of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as Non-Cited Violations.

- (1) 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" states, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. BFN procedure NPG-SPP-03.1.9, Rev. 0002, which is a subset of the site's corrective action procedure NPG-SPP-03.1, Rev. 0002, stated, in part, that a PER cannot be closed that has identified a degraded or non-conforming condition until the corrective actions to resolve the degraded or non-conforming condition are completed.

Contrary to the above, the licensee closed two PERs (177130, 243955) that were generated during the site's NFPA 805 transition process, based on the implementation of compensatory measures. The permanent corrective action for these non-conformances (transition to NFPA 805) has not been completed. Using IMC 0609, Attachment 4, Phase 1, "Initial Screening and Characterization of Findings," inspectors determined the violation was of very low safety significance (Green) because it was not a design or qualification deficiency, did not result in the loss of any system safety function and was not risk significant due to seismic, flooding or severe weather. This violation was documented in the licensee's corrective action program as PER 503024.

- (2) 10 CFR 50.72(b)(3)(ii)(B) states, in part, the licensee shall notify the NRC as soon as practical and in all cases within eight hours of the occurrence of any event or condition that results in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety. Additionally, 10 CFR 50.73(a)(2)(ii)(B) requires licensees to submit a Licensee Event Report (LER) within 60 days after discovery of any event or condition that results in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety.

Contrary to the above, on February 5, 2011, the licensee identified that they had failed to recognize that six unanalyzed conditions discovered during the site's NFPA 805 transition process were reportable conditions (see Section 4OA5 of this report). Consequently, the licensee failed to make an eight-hour report as required by 10 CFR 50.72, and submit LERs within 60 days, as required by 10 CFR 50.73. This finding was considered as traditional enforcement because it had the potential for impacting the NRC's ability to perform its regulatory function. The NRC has characterized this violation as a Severity Level IV NCV in accordance with Section 6.9 of the NRC Enforcement Policy. This violation was documented in the licensee's corrective action program as PERs 505749, 505750, 505751, and 505752. Additionally, the licensee

Enclosure

made an eight-hour report, and at the time of the exit, planned to submit LERs for the unanalyzed conditions.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

W. Baker; Operations Superintendent
C. Boschetti, Site Quality Assurance Manager
S. Bono, Plant Manager
T. Cleary, Vice President Regulatory Recovery
J. Davenport, Site Licensing
G. Doyle, 95003 Team Manager
M. Durr, Engineering Director
J. Emens, Licensing Manager
V. Furr, PRA Program Manager
C. Guey, PRA Senior Manager
S. Kelley, Work Control Manager
D. Matherly, Performance Improvement Manager
B. McBay, Maintenance Manager
R. Norris, Radiation Protection Manager
M. Oliver, Site Licensing
K. Polson, Site Vice President
M. Rasumssen, Acting Operation Manager
F. Ross, Fire Protection Program Manager
J. Shea, Manager Corporate Licensing
P. Summers, Director Safety & Licensing
M. Wilson, Director Training

NRC

G. Guthrie, Chief, Reactor Projects Branch 6
T. Ross, Senior Resident Inspector Browns Ferry Nuclear Plant
C. Stancil, Resident Inspector, Browns Ferry Nuclear Plant
P. Niebaum, Resident Inspector Browns Ferry Nuclear Plant
L. Pressley, Resident Inspector Browns Ferry Nuclear Plant

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000259, 260, 296/2012-007-01	FIN	Failure to Follow NRC Commitment
Management		Procedure (Section 40A2.a(3))

05000259, 260, 296/2012-007-02	NCV	Failure to Establish Adequate Compensatory Measures for Non-Conforming Fire Barriers (Section 4OA2.a(3))
05000259, 260, 296/2012-007-03	NCV	Failure to Implement Appropriate Safe Shutdown Instructions (Section 4OA2.e(2))
05000259, 260, 296/2012-007-04	NCV	Failure to Identify and Correct Deficiencies Associated with Safe Shutdown Instructions (Section 4OA2.e(2))
<u>Opened</u>		
05000259, 260, 296/2012-007-05	AV	Failure to Properly Implement the Requirements of the Plant Modifications and Engineering Change Control Procedure (Section 4OA2.e(2))
<u>Closed</u>		
05000259, 260, 296/2011-010-00	LER	DC Ammeter Cables Not Adequately Isolated (Section 4OA3)
05000259, 260, 296/2010-001-00	LER	Unit 1, 2, and 3 Appendix R Safe Shutdown Instruction Procedures Contain Incorrect Operator Manual Action (Section 4OA3)

LIST OF DOCUMENTS REVIEWED

Procedures

1-EOI-1, RPV Control, Rev. 0
1-EOI-2, Primary Containment Control, Rev. 11
1-EOI Appendix-12, Primary Containment Venting, Rev. 01
MCI-0-000-GTV002, Double Disc, Pressure Seal Gate Valves, Rev. 0
MCI-0-000-GTV002, Double Disc, Pressure Seal Gate Valves, Rev. 1
MCI-0-000-GTV002, Double Disc, Pressure Seal Gate Valves, Rev. 2
MCI-0-000-GTV002, Double Disc, Pressure Seal Gate Valves, Rev. 3
MCI-0-000-GTV002, Double Disc, Pressure Seal Gate Valves, Rev. 4
NETP-107, Medium Voltage Motor Testing and Maintenance Program, Rev 4
NPG-COO-SPP-01.2, Change Management, Rev. 0001
NPG-SPP-02.3, Operating Experience Program
NPG-SPP-03.1, Corrective Action Program, Rev 2
NPG-SPP-03.1.4, Corrective Action Program Screening and Oversight, Rev 3
NPG-SPP-03.1.5, Apparent Cause Evaluations, Rev 2
NPG-SPP-03.1.6, Root Cause Analysis, Rev 2
NPG-SPP-03.1.7, PER Actions, Rev 2
NPG-SPP-03.1.9, PER Closure, Rev 2
NPG-SPP-03.1.11, NPG Self-Assessment Program
NPG-SPP-03.1.12, Benchmarking Program
NPG-SPP-03.1.13, Corrective Action Program Basis, Rev 1
NPG-SPP-03.21, Fatigue Management and Work Hour Limits, Rev 3
NPG-SPP-03.3, NRC Commitment Management, Rev. 1
NPG-SPP-03.4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting,
Rev 0
NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Rev. 0005
NPG-SPP-17.2, Analysis Phase, Rev. 0004
1-OI-73, High Pressure Coolant Injection System, Rev. 22
2-OI-73, High Pressure Coolant Injection System, Rev. 89
3-OI-73, High Pressure Coolant Injection System, Rev. 51
QADM-3.3, Quality Assurance Oversight of NRC Inspection Plan Preparation and
Implementation
0-SSI-001, Safe Shutdown Instructions, Rev. 0009
0-SSI-25-1, Intake Pumping Station El. 550, Cable Tunnel to Fire Door 440, RHRSW Pump
Room B, RHRSW Pump Room D, Rev. 0000
0-SSI-25-2, RHRSW Pump Room A, Rev. 0000
0-SSI-25-3, RHRSW Pump Room C, Rev.0000
0-SSI-26, Turbine Bldg, Turbine Bldg Side of Cable Tunnels to Door 440, and Radwaste
Building, Rev.0000
0-SSI-26, Turbine Bldg, Turbine Bldg Side of Cable Tunnels to Door 440, and Radwaste
Building, Rev.0003
0-SSI-25-1, Verification and Validation Appendix R Manual Actions, Rev 000 (PIC 70276)
0-SSI-25-2 Verification and Validation Appendix R Manual Actions, Rev 000 (PIC 70276)
0-SSI-25-3, Verification and Validation Appendix R Manual Actions, Rev 000 (PIC 70276)
0-SSI-26, Verification and Validation Appendix R Manual Actions, Rev 000 (PIC 70276)

1-SR-3.3.6.1.2(3B), HPCI System Steam Supply Low Pressure Functional, Rev. 4
 1-SR-3.3.6.1.2(4B), RCIC System Steam Supply Pressure Low Functional Test, Rev. 3
 2-SR-3.3.6.1.2(3B), HPCI System Steam Supply Low Pressure Functional, Rev. 6
 2-SR-3.3.6.1.2(4B), RCIC System Steam Supply Pressure Low Functional Test, Rev. 5
 3-SR-3.3.6.1.2(3B), HPCI System Steam Supply Low Pressure Functional, Rev. 7
 3-SR-3.3.6.1.2(4B), RCIC System Steam Supply Pressure Low Functional Test, Rev. 5
 3-SR-3.3.6.1.6(4), RCIC Time Delay Relay Calibration, Rev. 15
 3-SR-3.8.1.9(3A), Diesel Generator 3A Emergency Load Acceptance Test, Rev. 18
 0-TI-360, Containment Leak Rate Programs, Rev. 0032
 0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting, Rev 37

Drawings

DWG 0-E-4704, HPCI Skid Drawing, Rev. 0
 DWG 0-44E330, Misc. Handling Hoists, Rev. 0
 DWG W9724917, Double Disc Gate Valve for SMB-2-60 Actuator, Rev. D
 DWG W9825057-1, Double Disc Gate Valve with Smart Stem for SMB-2-60 Actuator Rev. C
 DWG 0-47W216-51, "Fire Protection – 10 CFR 50 Appendix R Fire Area Compartmentation and Zone Drawings"
 DWG 3-47W216-55, "Fire Protection – 10 CFR 50 Appendix R Fire Area Compartmentation and Zone -El. 565.0, 593.0"
 DWG 0-47W216-56, Fire Protection – 10 CFR 50 Appendix R Fire Area Compartmentation and Zone Drawings-El. 593.0 & 586.0"
 0-47W216-57, "Fire Protection – 10 CFR 50 Appendix R Fire Area Compartmentation and Zone Drawings-El. 621.25 & 617.0"

Maintenance Work Orders

09-726236-000, 2-FCV-074-0067
 09-727665-000, 2-FCV-074-0067
 09-726241-000, 2-CKV-074-0068
 WO 111148387, U2 HPCI – WO for Replacing Diaphragm on 2-PCV-073-0018C
 WO 113239029, Pressure transmitter sensing line is not firmly attached to support
 WO 112507920, Check for correct thrust bearing installation in 3-PMP-073-0029 HPCI booster pump

Problem Evaluation Requests (PERs)

150500	447011	210437	387930	362340	235338
218493	368764	465224	400507	362395	144253
223543	414541	456963	401096	362897	214592
474861	474873	474917	401687	364318	214593
362854	364318	276790	403366	368764	214594
276792	375793	274840	334925	371369	
330306	382508	318557	347291	371903	
319247	357431	470350	438063	372659	
423702	460397	116989	153438	381569	
144253	146171	147128	223536	384022	
175435	224634	228565	344673	387931	
235338	239313	246674	401109	401394	
372659	408067	436575	449638	399973	

503340	503343	503347	461511	390763
503899	504504	505472	320853	415242
381569	424389	509676	446750	416593
419532	259787	509650	225727	423569
362340	245386	509645	271338	440359
465214	177130	509604	289186	444045
362395	493807	507893	292514	453210
465214	468127	507867	292968	455611
243132	452185	340768	293928	467838
384677	422371	419406	301505	214602
386435	338795	488043	320853	344212
435440	260964	436497	322640	3270097
362640	245385	392846	332437	293928
322569	243995	477242	341057	514067
153462	229734	488060	341094	510168
435962	245502	401088	342877	510168
433833	372194	440359	349966	512397
434867	512379	481046	354160	498331
435479	510424	322569	356996	214592
435485	510120	372594	361542	220850
372194	465091	470323	489482	490747
492670	492671	492672	492675	492957
493660	493636	493751	493818	493919
493921	65935	84090	147128	228565

Service Requests (SRs)

382989, D3 EECW pump thrust bearing high temperature
427148, New PMs Created and Activated without Maintenance Manager Concurrence
434208, Contingency WO to Clean DG 3A HX
462975, WO to refurbish the B1 RHRSW pump after the scheduled replacement
469503, Conduct a Training Self-Assessment Snapshot for SSI Revision Training
471363, Unable to perform schedule SI per schedule. 0-SI-3.2.4(DG C)
507606, Pressure transmitter sensing line is not firmly attached to support
506190, Operator Actions for Containment Sump Isolation Valve Not in SSIs
506312, Training needs analysis incorrectly labeled *** 2012 PI&R ***
506316, Inappropriate closure of a PER action (470323) *** 2012 PI&R ***
506926, ** PI&R** NRC Identified Issue for Not Initiating a TNA
507062, Engineering Calc that Drove SSI Changes Did Not Evaluate EOI Operation Conflicts
507717, ***PI&R 2012*** Feedback documentation for previous training on SSI's
507730, Errors in SSI Procedures
507783, SSI procedure implementation
507916, *** PI&R 2012*** Identified Issue with Simulator Training Sessions
507947, ***2012 PI&R*** Insufficient copies of the SSI procedure

Self-Assessments and Audits

BFN-PI-S-12-017

BFN-LIC-S-11-003

BFN-PI-S-11-008

BFN-LIC-S-11-002

First Quarter 2011 BFN Assessments

Fourth Quarter 2011 BFN Assessments

QA-BF-11-010, BFN-QA-Oversight Report for Period 1/1/11 through 3/31/11

QA-BF-11-016, BFN-QA-Oversight Report for Period 4/1/11 through 6/30/11

QA-BF-11-020, BFN-QA-Oversight Report for Period 7/1/11 through 9/30/11

QA-BF-11-001, BFN-QA-Oversight Report for Period 10/1/10 through 12/31/10

QA-BF-12-004, BFN-QA-Oversight Report for Period 10/1/11 through 12/31/11

Personnel Access Data Systems and Fitness-For-Duty Programs- Audit dtd. March 20, 2009

SSA0901, TVA NPG Group Wide- Access Authorization (AA), Behavioral Observation Program,

SSA0903, Browns Ferry Nuclear Plant- Correction Action Program Audit dtd. April 14, 2009

SSA1103, TVA Quality Assurance-NPG-Browns Ferry Nuclear Plant-Corrective Action-Site

Audit dtd. February 17, 2011

SSA1102, Access Authorization (AA)/Fitness For Duty (partial) Audit dtd. January 24 to

February 04, 2011

Second Quarter 2011 BFN Assessments

Third Quarter 2011 BFN Assessments

PRA Risk Evaluations

BFN-0-12-010, "Risk Evaluation For PER 243955"

BFN-0-12-11, "Risk Evaluation For PER 260964 Recirculation Pump Seal Leakage"

BFN-0-12-012, "Risk Evaluation For PER 424389 HPCI Steam Line Drain Valves"

BFN-0-12-013, "Risk Evaluation For PER 452185, Control Room Ammeter Cables For Battery Boards Not Properly Fused/Isolated (Common Enclosure Issue)"

BFN-0-12-014, "Risk Evaluation For PER 424389 RCIC Steam Line Drain Valves"

BFN-1-12-015, "Risk Evaluation For Reactor Head Vent Line Drain Valves Spuriously Open"

BFN-0-12-017, "PRA Risk Evaluation For PER 372194-RHRSW/EECW Fire Barriers"

BFN-0-12-018, "Risk Evaluation For PER 338795 Grating In RHR HX Rooms"

BFN-0-12-019, "Risk Evaluation For PER 259787-Potential To Drain ECCS Loops In Appendix R Fire"

BFN-0-12-020, "Risk Evaluation For PER 424389 SDV Vent And Drain Valves Fail To Close"

BFN-1-12-021, "Risk Evaluation For PER 245385 (MOV Torque/Limit Switch Bypass)"

BFN-1-12-022, "Risk Evaluation For PER 422371 Cables 3ES4077-II And 3ES4064-II"

BFN-0-12-023, "Risk Evaluation For MSIV Failure"

BFN-0-12-024, "Risk Evaluation For PER 424389 Issue #3"

BFN-0-12-029, "Risk Evaluation For PER 424389 Items #1 And #2-Single And Multiple Hot Shorts Cause Control Rod Failure"

BFN-0-12-033, "Risk Evaluation For ECCS Keep Fill System Failure"

BFN-0-12-034, "Risk Evaluation For PER 424389-Multiple Spurious Operation of Breaker Control Circuit"

BFN-0-10-117, "7 MSO Scenarios Identified"

Other

BFN-VTD-YA02-0020, Yale LTP & LTG Trolley Hoist Parts and Instruction Manual
 BFN 2011 QA Audits
 BFN-2010-OTG-035, Needs Analysis Worksheet – Additional Training for Persons Making Changes to EOLs, AOlS, and SAMGs, Rev.0
 Browns Ferry NSCMP Meeting Agenda dated 2/10/2012
 Control Room Deficiencies List as of January 14, 2012
 DCN W40657A, Replace HPCI 3-FCV-73-16
 DCN W39936A, Replace HPCI 2-FCV-73-16
 DCN 69957-PIC70276, Turbine Building Fire Area Changes, Rev. A
 DCN 70019, “Resolve Cable Tray Separation Issues by Installing Barriers Between Affected Cable Trays”
 DCN 70054, “Elimination of Operator Manual Actions in Fire Area 22”
 DCN 70011, “Install Incipient Detection in the Electric Board Rooms”
 Design Basis Document BFN-50-7067, Emergency Equipment Cooling Water (EECW) System, Rev 18
 Design Basis Document BFN-50-7023, Residual Heat Removal Service Water (RHRSW) System, Rev 17
 ED-Q-0999-2003-0048, Rev. 13, Unit 1, 2, and 3 Appendix R Manual Action Requirements, Rev. 013
 Engineering Response to 4-ton Chain Hoist with Trolley
 ESP110.011,
 ESP070.202A, Engineering Training – Mechanical /Programmatic Appendix R / Fire Protection Reviews, Rev. 0
 FCV-073-0016 – HPCI Turbine Steam Supply Valve timeline
 Letter - TVA to NRC, October 29, 2010, Subject: Supplemental Information Related to the Reply to Notice of Violation: EA-09-307
 LER 50-259/2009-004-00, HPCI Found Inoperable During Condensate Header Level Switch Calibration and Functional Test
 LER 50-260/2010-004, HPCI Isolation during Time Delay Relay Calibration
 LER 50-260/2010-005, HPCI System Isolation Experienced During Performance of HPCI Steam Supply Low Pressure Functional Test
 LER 50-296/2011-001-00, Loss of Shutdown Cooling (RHR)
 LER 50-296/2011-001-01, Loss of Shutdown Cooling (RHR)
 LER 50-260/2010-001-00, Condition Prohibited by Tech specs when Two ECCS Loops Became Inoperable
 Licensed Operator Requalification Training 2011– Cycle 3 Training Package
 Licensed Operator Requalification Training 2011– Cycle 4 Training Package
 List of Cancelled HPCI WO’s
 Maintenance Rule (a)(1) plan for RHRSW Tunnel Piping, Rev 3
 Maintenance Rule (a)(1) plan for EECW Pumps, Rev 1
 Maintenance Rule CDE #1049, 3-FCV-074-0048, Shutdown Cooling Suction Valve
 MDQ099920060011, Transient NPSH / Containment Pressure Evaluation of RHR and Core Spray Pumps, Rev. 05
 MR CDE’s 1044, 1075,
 MTE 153.001, Maintenance Training – Electrical, HFA Relay Maintenance, Rev. 0
 OPL171.038, Licensed Operator Requalification Program – Diesel Generators and Standby Auxiliary Power Systems, Rev. 19

OPL173S149, Simulator Exercise Guide, "Loss of Offsite Power, Fire in Unit Reactor Building, SSI-9," Rev. 3

OPL173SSSI26, Simulator Exercise Guide, "Loss of Off-Site Power, SSI-25-1, SSI-25-2, SSI-25-3, and SSI-26," Rev. 1

OPL173SSSI26, Simulator Exercise Guide, "Turbine Building Fire and entry into 0-SSI-26," Rev. 3

OPS-TD-2011-004, BFN Operations Training Dispatch – Enhancements Made to Safe Shutdown Instructions (SSIs)

OPS-TD-2011-005, BFN Operations Training Dispatch – Safe Shutdown Instruction Changes, August 1, 2011

OPS-TD-2011-005, BFN Operations Training Dispatch – Safe Shutdown Instruction Changes, September 12, 2012

RHRSW / EECW Electronic System Notebook

RHR System Monitoring Plan

SC 10-09 Part 21 (7-1-10)

SSI 25-1 Validation TBDs, 02/17/2012

SSI 25-2 Validation TBDs, 02/17/2012

SSI 25-3 Validation TBDs, 02/17/2012

SSI 26 Validation TBDs, 02/17/2012

Specifications for Yale Hoists, YPB-6, dated June 2006

Supplemental Reply to Notice of Violation; EA-09-307

System Health Report, RHRSW/EECW – 3rd Quarter 2011

System Health Reports, (6/1/2011 - 9/30/2011) High Pressure Coolant Injection, Units 1, 2 & 3

TNA-2010-E012-TTG, Needs Analysis Worksheet – Training on Making Appendix R changes, Rev.0

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TVA Form 41039, R-A-S-C-A-L Change Management Plan – Installation of Turbine Building Fire Barrier

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UFSAR Chapter 10.9, RHRSW System

UFSAR Chapter 10.10, EECW System

UFSAR, 6.4.1 High Pressure Coolant Injection System, Amendment 24

ACRONYMS

AOI- Abnormal Operating Instruction
AV- Apparent Violation SDP- Significance Determination Process
CA- Corrective Action
CAP- Corrective Action Program
CAPR- Corrective Action To Prevent Recurrence
CARB- Corrective Action Review Board
CCA- Cross-cutting Aspect
CDF- Core Damage Frequency
CRC- Curriculum Review Committee
CMP- Change Management Plan
CR- Control Room
CRS- Control Room Supervisor
DC- Direct Current
DCN- Design Change Notice
DID- Defense In Depth
ECCS- Emergency Core Cooling System
ECP- Employee Concerns Program
EDG- Emergency Diesel Generator
EL- Elevation
EECW- Emergency Equipment Cooling Water
EOI- Emergency Operating Instruction
FA- Fire Area
FIN- Finding
FPP_ Fire protection Plan
FPR- Fire Protection Report
FSAR- Final Safety Analysis Report
HPCI- High Pressure Core Injection
IMC- Inspection manual Chapter
IPS- Intake Pumping Station
IR- Inspection Report
IP- Inspection Procedure
LER- Licensee Event Report
LOR- License Operator Requalification
MCR- Main Control Room
MSIV- Main Steam Isolation Valve
MSRV- Main Steam Relief Valve
NCV- Non Cited Violation
NPSH- Net Positive Suction Head
NRC Nuclear Regulatory Commission
OE- Operating Experience
OI- Operating Instruction
OMA- Operator manual Actions
PARS – Publicly Available Records
PD- Performance Deficiency
PER- Problem Evaluation Request
PSC- PER Screening Committee

QA- Quality Assurance
RCIC reactor Core IsolationCooling
RHRSR- Residual Heat Removal Service Water
ROP- Reactor Oversight Program
RTO- return To Operation
SAT- Systems Approach To Training
SISBO- Self-Induced Station Blackout
SDP- Significance Determination Process
SCAQ- Significant Condition Adverse To Quality
SCWE- Safety Conscious Work Environment
SR- Service Request
SSI- Safe Shutdown Instruction
SSD- Safe Shtdown
TBD- To Be Determined
TNA- Training needs Analysis
TS- Technical Specifications
WO- WorkOrder