~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

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

June 25, 2013

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT - NRC COMPONENT DESIGN BASES INSPECTION REPORT 05000259/2013007, 05000260/2013007, 05000296/2013007, 05000259/2013404, 05000260/2013404, AND 05000296/2013404

Dear Mr. Shea:

On, April 19, 2013, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Browns Ferry Nuclear Nuclear Plant, Units 1, 2, and 3. The enclosed inspection report documents the inspection results, which were discussed on April 19, 2013, with Mr. Groom and other members of your staff, and with M. Webb on June 3, 2013

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The team reviewed selected procedures and records, observed activities, and interviewed personnel.

Five NRC-identified findings of very low safety significance (Green), were identified during this inspection, and were determined to involve violations of NRC requirements. One of these NRC identified findings is associated with security and is documented in an attachment to this report. The NRC is treating these violations as non-cited violations consistent with section 2.3.2 of the NRC Enforcement Policy. If you contest these violations or the significance of the violations, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-001; 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 Inspector at Browns Ferry.

~~Enclosure(s) transmitted herewith contain(s) SUNSI. When separated from Attachment 2, this transmittal document is decontrolled~~

~~LIMITED INTERNAL~~
~~DISTRIBUTION PERMITTED~~

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.

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). However, because of the security-related concerns contained in the enclosure, and in accordance with 10 CFR 2.390, a copy of Attachment 2 will not be available for public inspection.

The material enclosed herewith contains Security-Related Information in accordance with 10 CFR 2.390(d)(1) and its disclosure to unauthorized individuals could present a security vulnerability. Therefore, the material in attachment 2 will not be made available electronically for public inspection in the NRC Public Document Room or from the PARS component of NRC's ADAMS. If you choose to provide a response and Security-Related Information is necessary to provide an acceptable response, please mark your entire response "Security-Related Information – Withhold from public disclosure under 10 CFR 2.390" in accordance with 10 CFR 2.390(d)(1) and follow the instructions for withholding in 10 CFR 2.390 (b)(1). In accordance with 10 CFR 2.390(b)(1)(ii), the NRC is waiving the affidavit requirements for your response.

Sincerely,

/RA/

Rebecca L. Nease, Chief
Engineering Branch 1
Division of Reactor Safety

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

Enclosure:
Inspection Report 05000259/2013007, 05000260/2013007,
05000296/2013007, 05000259/2013404, 05000260/2013404,
and 05000296/2013404 w/Attachment 1: Supplementary Information
Attachment 2: Security Summary w/Supplementary Information (**OUO**)

cc: (See page 3)

cc w/Encl and Attachments 1 & 2 (OUO):
K. J. Polson
Site Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000, NAB 2A-BFN
Decatur, AL 35609

Mr. M. A. Fencl
Director, Security Operations
Browns Ferry
Tennessee Valley Authority
1101 Market Street, EB 10B-C
Chattanooga, TN 37402-2801

James E. Emens
Manager, Site Licensing
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000, SAB 2B-BFN
Decatur, AL 35609

Mark Findlay
General Manager, Security Operations
Tennessee Valley Authority
1101 Market Street, EB 10B-C
Chattanooga, TN 37402-2801

P. L. Parker
Manager, Site Security Operations
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000, BFT 1C-BFN
Decatur, AL 35609

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, AL 35611-6970

cc w/Encl and Attachment 1 (OUO) Removed)
S. M. Bono
Plant Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

E. W. Cobey
Manager, Corporate Licensing
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

T. A. Hess
Program Manager
Corporate Licensing
Tennessee Valley Authority
Electronic Mail Distribution

Edward J. Vigluicci
Associate General Counsel, Nuclear
Tennessee Valley Authority
Electronic Mail Distribution

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

State Health Officer
Alabama Dept. of Public Health
P.O. Box 303017
Montgomery, AL 36130-3017

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.:	05000259/2013007, 05000260/2013007, 05000296/2013007, 05000259/2013404, 05000260/2013404, and 05000296/2013404
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:	January 28-February 28, 2013 (onsite)
Inspectors:	Shakur Walker, Senior Reactor Inspector (Lead) Geoffrey Ottenberg, Senior Reactor Inspector Robert Patterson, Reactor Inspector Marcus Riley, Reactor Inspector Craig Baron, Accompanying Personnel Stanley Kobylarz, Accompanying Personnel
Approved by:	Rebecca L. Nease, Chief Engineering Branch 1 Division of Reactor Safety

SUMMARY

IR 05000259/2013007, 05000260/2013007, 05000296/2013007, 05000259/2013404, 05000260/2013404, and 05000296/2013404; 1/28/2013–6/3/2013; Browns Ferry Nuclear Plant, Units 1, 2 and 3; Component Design Bases Inspection.

This inspection was conducted by a team of five Nuclear Regulatory Commission (NRC) inspectors from Region II, and two NRC contract personnel. Five Green non-cited violations (NCVs) were identified. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross Cutting Areas" dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated January 28, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" revision 4.

NRC identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green: The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the failure to ensure that post-maintenance and post-modification testing of the high pressure cooling injection (HPCI) pump adequately demonstrated that it could achieve design basis flow within 30 seconds from a cold, non-oil-primed, turbine quick start under design basis conditions. This was a performance deficiency. The test configuration was less limiting than the design basis accident configuration, and the licensee had not verified by calculation or testing that the acceptance criteria in the test was adequate to demonstrate the HPCI pump could perform its function under design basis conditions. The licensee performed an operability review and documented the results in the corrective action program as Problem Evaluation Report 690086.

  The performance deficiency was determined to be more than minor because it affected the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the HPCI pumps. Specifically, using procedure 3-SR-3.5.1.7, the licensee failed to demonstrate that the HPCI pump could achieve the required flow and discharge pressure under accident conditions as required by the design basis. Additional analysis was required to verify system operability. The team used Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," and determined that the finding was of very low safety significance (Green) because the finding was not a design deficiency resulting in the loss of functionality or operability. A cross-cutting aspect was not identified because this performance deficiency has existed since the original design of the plant and was not indicative of current licensee performance. (Section 1R21.2.1)

- Green: The team identified a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," involving the failure to evaluate the effects of a postulated failure of the load center transformer non-safety-related, non-Class 1E cooling fans, which includes the fan power wiring and fan control equipment, on the safety-related Class 1E shutdown board load center transformers and 480V shutdown boards. This was a performance deficiency. The licensee tested the fans and performed an operability evaluation as documented in Problem Evaluation Report 682254 to provide reasonable assurance that the safety-related transformers would not be damaged from postulated failures from the non-safety-related fans and be capable of operating when required for the design basis accident conditions.

  The performance deficiency was determined to be more than minor because the finding affected the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the load center transformers TS1A and TS1B and the 480V shutdown boards 1A and 1B respectively. Specifically, the licensee had not evaluated the effects of the failure of non-safety-related transformer cooling fans, on both the safety-related load center transformer and 480V shutdown board and resulted in a reasonable doubt of operability. The team used Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," and determined that the finding was of very low safety significance (Green) because the finding was not a design deficiency resulting in the loss of functionality or operability. A cross-cutting aspect was not identified because this performance deficiency has existed since November 2004; therefore, not indicative of current licensee performance. (Section 1R21.2.10)

- Green: The team identified a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to perform analyses demonstrating that the degraded voltage relay (DVR) set points specified in technical specifications (TS) would ensure adequate voltage to safety-related equipment. This was a performance deficiency. The licensee entered this issue into their corrective action program as PERs 676678 and 696876. As immediate corrective actions, the licensee performed a sensitivity study to verify that the voltage at the DVR set points specified in TS could provide adequate starting voltage to a sample of limiting safety-related equipment.

  The performance deficiency was determined to be more than minor because it affected the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the 4160 volts alternating current buses. Specifically, the finding challenged the assurance that safety-related loads had adequate motor starting voltage during required

degraded voltage scenarios. The team used Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," and determined that the finding was of very low safety significance (Green) because the finding was not a design deficiency resulting in the loss of functionality or operability. A cross-cutting aspect was not identified because this performance deficiency has existed since 1993 and was not indicative of current licensee performance. (Section 1R21.2.16)

- Green: The team identified a non-cited violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to promptly identify and take corrective actions to address a non-conforming condition adverse to quality related to three faulted strainers in the safety related Emergency Equipment Cooling Water system. This was a performance deficiency. The licensee initiated Problem Evaluation Report 677627 to perform a new operability evaluation since the operability evaluation in Problem Evaluation Report 208636 was found to be inadequate. The licensee concluded that there were no current operability issues.

  The performance deficiency was determined to be more than minor because it affected the Equipment Performance attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the core spray system to respond to initiating events, in that, if left uncorrected could result in the plant not being able to sustain short-term heat removal under specific conditions. The team used Inspection Manual Chapter 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," and determined that the finding was of very low safety significance (Green) because the finding was not a design deficiency resulting in the loss of functionality or operability. The team evaluated the finding for cross-cutting aspects and determined the finding was associated with the corrective action program component of the problem identification and resolution area, because the licensee did not perform a thorough evaluation of identified problems such that the resolutions addressed the underlying causes and extent of condition. [P.1(c)] (Section 1R21.4)

Cornerstone: Security

- Green: A security finding is documented in Attachment 2.

Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Security

1R21 Component Design Bases Inspection (71111.21)

.1 Inspection Sample Selection Process

The team selected risk significant components and related operator actions for review using information contained in the licensee's probabilistic risk assessment. In general, this included components and operator actions that had a risk achievement worth factor greater than 1.3 or Birnbaum value greater than 1 $X10^{-6}$. The sample included 17 components (including one associated with containment large early release frequency and one associated with security documented in Attachment 2). In addition, the team reviewed six operating experience items.

The team performed a margin assessment and a detailed review of the selected risk-significant components and operator actions to verify that the design bases had been correctly implemented and maintained. Where possible, this margin was determined by the review of the design basis and Updated Final Safety Analysis Report (UFSAR) response times associated with operator actions. This margin assessment also considered original design issues, margin reductions due to modifications, or margin reductions identified as a result of material condition issues. Equipment reliability issues were also considered in the selection of components for a detailed review. These reliability issues included items related to failed performance test results, significant corrective action, repeated maintenance, maintenance rule status, Regulatory Issue Summary 05-020 (formerly Generic Letter 91-18) conditions, NRC resident inspector input regarding problem equipment, system health reports, industry operating experience, and licensee problem equipment lists. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the available defense-in-depth margins. An overall summary of the reviews performed and the specific inspection findings identified is included in the following sections of the report. Documents reviewed are listed in Attachment 1.

.2 Component Reviews

.2.1 Unit 3 High Pressure Coolant Injection (HPCI) Pump

a. Inspection Scope

The team reviewed UFSAR, technical specifications (TS), TS Bases, and System Design Criteria (SDC) documents to establish an overall understanding of the design bases of the HPCI Turbine. The team reviewed design calculations to verify the capability of the HPCI turbine and pump to provide the required flow and head under accident conditions, and to verify that the periodic testing was adequate to demonstrate the capability of the components. The team reviewed operating and test procedures related to the component, as well as recently test results to verify the actual performance of the component. The team also performed a detailed walk-down of the component and related equipment, reviewed

HPCI system health reports, and conducted interviews with the system and design engineers to verify the current condition of the component.

b. Findings

Failure to Verify the Capability of HPCI to Achieve Required Flow and Pressure within 30 Seconds Under Accident Conditions

Introduction: The team identified a finding of very low safety significance (Green) involving a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XI, "Test Control," for the failure to ensure that post-maintenance and post-modification testing of the HPCI pump adequately demonstrated that it could achieve design basis flow within 30 seconds from a cold, non-oil-primed, turbine quick start under design basis conditions. The test configuration was less limiting than the design basis accident configuration, and the licensee had not verified by calculation or testing that the acceptance criteria in the test was adequate to demonstrate the HPCI pump could perform its function under design basis conditions.

Description: The team identified a failure to ensure that testing of the HPCI pump adequately demonstrated that it could achieve 5,000 gpm design flow within 30 seconds from a cold, non-oil-primed, turbine quick start under the most limiting accident conditions. Specifically, UFSAR section 6.4.1 stated, "The HPCI controls automatically start the system and bring it to design flow rate within 30 seconds… from receipt of a reactor vessel low-low-water-level signal or a primary containment (drywell) high-pressure signal."

Procedure 3-SR-3.5.1.7, rev. 66, was used for post-maintenance testing following HPCI governor control corrective maintenance, and post-modification testing (excluding pump, impeller, or casing replacement). Procedure step 5.2, "Technical Specification Requirements," stated that the HPCI System achieve 5,000 gpm flow at a minimum discharge pressure 110 psi above reactor pressure within 30 seconds from a cold, non-oil-primed, turbine quick start. Attachment 3 of the procedure, steps 1.0 [20] and 1.0 [22] verified that the required pump flow and discharge pressure were achieved in less than or equal to 30 seconds. However, the test was performed under the following conditions, which are less limiting than the design basis conditions: reactor vessel test pressure of 960 - 1035 psig vs. design basis pressure of 1120 psig; and pump discharge test pressure of 1070 – 1145 psig vs. pump discharge design basis pressure of 1220 psig. The licensee did not have a test or calculation that demonstrated that the test as performed, would verify HPCI pump design basis requirements. This condition was applicable to all three units, as well as the Reactor Core Isolation Cooling (RCIC) pumps for all three units

In response to this concern, on March 3, 2013, the licensee initiated PER 690086, which addressed the HPCI condition, as well as a similar condition affecting RCIC pump testing. In the PER, the licensee concluded that this condition was not an immediate operability concern based on past test results for both HPCI and RCIC being well-within design basis requirements (30 seconds for HPCI), thus providing some margin between the less-liming test conditions and the design basis conditions.

Analysis: The team determined that the licensee's failure to ensure that post-maintenance and post-modification testing of the HPCI pump adequately demonstrated

that it could meet its design basis requirements was a performance deficiency. The performance deficiency was determined to be more than minor because it affected the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the HPCI pumps. Specifically, using procedure 3-SR-3.5.1.7, the licensee failed to demonstrate that the HPCI pump could achieve the required flow and discharge pressure under accident conditions as required by the design basis. Additional analysis was required to verify system operability. The team determined the finding could be evaluated using the Significance Determination Process (SDP) in accordance with Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," both issued June 19, 2012. The finding screened as very low safety significance (Green), because it was a design deficiency that did not result in the loss of functionality or operability. The licensee performed an immediate operability determination that demonstrated the HPCI pumps, as well as the RCIC pumps, could achieve design flow. This operability determination was based on past test results, and was documented in the corrective action program as PER 690086. This finding was not assigned a cross-cutting aspect because the underlying cause was not indicative of current licensee performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Contrary to the above, since plant startup, the licensee failed to ensure that HPCI post-maintenance and post-modification testing verified acceptance limits contained in applicable design documents. The licensee performed an immediate operability evaluation to provide a reasonable expectation of operability based on actual test data. The licensee initiated PER 609086 to evaluate the finding and determine the appropriate final corrective actions. This violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. The violation was entered in the licensee's corrective action program as PER 690086. (NCV 05000259, 260, 296/2013007-01, Failure to Verify the Capability of HPCI to Achieve Required Flow and Pressure Under Accident Conditions)

.2.2 Unit 3 HPCI Steam Isolation Valves (FCV-73-2, FCV-73-3)

a. Inspection Scope

The team reviewed UFSAR, TS, TS Bases, and SDC documents to establish an overall understanding of the design bases of the motor operated HPCI steam isolation valves. The team reviewed design basis calculations, operating procedures, test procedures, and recent test results to verify the capacity of the valves to perform their design functions. The review included the design pressure differential across the motor operated valves and the available voltage to the valve motors under the most limiting conditions. The team also reviewed HPCI system health reports and interviewed the motor operated valve (MOV) engineer to verify the current condition of the components.

b. Findings

No findings were identified.

.2.3 Unit 3 HPCI Turbine Stop Valve and Governor Valve (FCV-73-18, FCV-73-19)

a. Inspection Scope

The team reviewed UFSAR, TS, TS Bases, and SDC documents to establish an overall understanding of the design bases of the HPCI turbine stop valve and governor valve. These valves were provided as part of the HPCI turbine package. The team reviewed HPCI design basis calculations, operating procedures, test procedures, and recent test results to verify the capacity of the valves to perform their design functions. The team also reviewed HPCI system health reports and interviewed the HPCI system and design engineers to verify the current condition of the components.

b. Findings

No findings were identified.

.2.4 Unit 3 HPCI Steam Supply Valve (FCV-73-16)

a. Inspection Scope

The team reviewed UFSAR, TS, TS Bases, and SDC documents to establish an overall understanding of the design bases of the motor operated HPCI steam supply valve. The team reviewed design basis calculations, operating procedures, test procedures, and recent test results to verify the capacity of the valve to perform its design functions. The review included the design pressure differential across the motor operated valve and the available voltage to the valve motors under the most limiting conditions. The team also reviewed HPCI system health reports and interviewed the MOV engineer to verify the current condition of the component.

b. Findings

No findings were identified.

.2.5 Unit 3 Automatic Depressurization System (ADS) Safety Relief Valves (PCV-1-5, PCV-1-19, PCV-1-31)

a. Inspection Scope

The team reviewed UFSAR, TS, TS Bases, and SDC documents to establish an overall understanding of the design bases of the ADS safety relief valves. The team reviewed design basis calculations, operating procedures, test procedures, and recent test results to verify the capacity of the valves to perform its design functions. The team reviewed a design change package addressing the logic for ADS automatic actuation. The team also reviewed system health reports and interviewed the system engineer to verify the current condition of the component.

b. Findings

No findings were identified.

.2.6 Unit 3 RCIC Turbine Driven Pump

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, SDC documents, and Piping and Instrumentation Drawings (P&IDs) to establish an overall understanding of the design bases of the RCIC turbine-driven pump. The team reviewed analyses, procedures, and test results associated with the pumps operation under transient and accident scenarios. In-service Testing results were reviewed to verify pump test acceptance criteria was met and performance degradation would be identified, taking into account set-point tolerances and instrument inaccuracies. The team conducted a detailed walk-down of the pumps to assess the material conditions, and to verify that the installed configuration was consistent with system drawings, and the design and licensing bases. Corrective action history was reviewed to ensure problems were identified and corrected in a timely manner.

b. Findings

No findings were identified.

.2.7 Unit 3 RCIC Turbine Exhaust Check Valve (CKV-580)

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, SDC and P&IDs to establish an overall understanding of the design bases of the RCIC turbine exhaust check valve (CKV-580). Component walk-downs were conducted to verify that the installed configurations would support their design bases functions under accident conditions and had been maintained to be consistent with design assumptions. The team also reviewed vendor documentation, system health reports, and corrective action system documents were reviewed in order to verify that potential degradation was monitored or prevented.

b. Findings

No findings were identified.

.2.8 Unit 3 RCIC Steam Isolation Valves (71-2 & 71-3)

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, SDC and P&IDs to establish an overall understanding of the design bases of the RCIC steam isolation valves (71-2 & 71-3). Specifically, the team reviewed MOV testing, thrust, weak link, and differential pressure calculations. The team also reviewed preventive maintenance records regarding lubrication of valve linkage to ensure that both valve was properly greased. In addition, the team reviewed the vendor manual to ensure vendor documentation was up to date,

and a sample of condition reports were reviewed to ensure problems were identified and corrected.

b. Findings

No findings were identified.

.2.9 Units 1 & 2 Control Bay Chillers

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, SDC and P&IDs to establish an overall understanding of the design bases of the. The team reviewed the cooling specifications, design bases information and supporting calculations to identify system flow requirements. The team reviewed the procedures and results of the chiller inspections and cleanings, flow balancing and trending to verify that degraded conditions were being appropriately addressed. Component related PERs, corrective maintenance activities, and system health reports were reviewed to evaluate the licensee's capability for detection, monitoring, and correcting potential degradation. A field walk-down was performed with the system engineer to assess observable material conditions and verify that the system configuration was consistent with the design basis assumptions, system operating procedures, and plant drawings.

b. Findings

No findings were identified.

.2.10 4160 – 480V Shutdown Board 1A Load Center Transformer TS1A

a. Inspection Scope

The UFSAR was reviewed to establish an overall understanding of the design bases of the shutdown board 1A load center transformer TS1A. The team reviewed load flow and short circuit current calculations to determine the maximum load and short circuit current requirements and vendor documents to verify that transformer ratings were in conformance with the design analyses. The team also reviewed the coordination and protection calculation for the transformer and the shutdown board to verify the adequacy of transformer protection. The team reviewed surveillance tests on the transformer feeder breaker for adequacy of results in accordance with the design basis setting requirements. The team reviewed transformer cooling fan operation and preventive maintenance procedures to verify the capability to satisfy the basis load requirement. The team reviewed Service Requests (SR) and PERs for recurring issues affecting reliability. The team reviewed alarm response procedures for the transformer to assess the adequacy of operator actions. The team performed a walk-down of the installed equipment to assess the observable material conditions, to verify transformer nameplate data, to determine whether the installed configuration is consistent with design documents including drawings and calculations, and to assess the presence of hazards.

b. Findings

Failure to Evaluate the Effects of the Failure of Non-Class 1E Load Center Transformer Cooling Fans on the Class 1E 4160-480V Load Center Transformers and 480V Shutdown Boards

Introduction: The team identified a finding of very low safety significance (Green) involving a NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the failure to evaluate the effects of a postulated failure of the non-safety-related (non-10 CFR 50.49-qualified, non-Class 1E) shutdown board transformer cooling system (which includes the fans, fan power wiring, and fan control equipment) on the safety-related (10 CFR 50.49 qualified, Class 1E) shutdown board load center transformers and 480V shutdown boards.

Description: The team reviewed design change notice 51216, which was initiated to perform electrical work for Browns Ferry Unit 1 Recovery (including work to replace the supply transformers to the shutdown boards). The transformers are located in a harsh high energy line break (HELB) environment outside primary containment and were seismically and environmentally qualified by the vendor, ASEA Brown Boveri, for 1000 kVA for post-accident LOCA and HELB conditions. The TVA staff provided the team with an additional environmental qualification analysis for operating the transformer for up to 1330 kVA (with the shutdown board transformer cooling system operating), to meet the requirements for design basis load flow for post-accident conditions. However, TVA classified the shutdown board transformer cooling system (hereinafter referred to as transformer cooling system) as non-safety-related, which cannot be credited during accident scenarios.

The team found that TVA General Design Criteria Document, BFN-50-727, "Environmental Qualification," Section 5.1.1, stipulated, "… the evaluation of safety equipment in a harsh environment shall consider effects of all associated devices whether in a mild or harsh environment, safety-related or not (C/R BFNBEII1167)." On review of design change notice 51216, the team found that contrary to this requirement, the licensee did not consider and evaluate potential adverse effects of a postulated failure of the non-safety transformer cooling system on the safety-related load center transformer power circuits with the postulated failure of the and the safety-related 480V shutdown board, which powers the transformer cooling system.

The team questioned operability of the shutdown transformers to perform their intended design function. On March 1, 2013, TVA engineering provided a functional evaluation that provided reasonable assurance that the 480V shutdown boards were adequately protected by the safety-related fuse that isolates the shutdown board power from the non-safety-related circuits up to the load center transformer control panel. On April 17, 2013, TVA provided additional information and an engineering evaluation that provided reasonable assurance that the safety-related load center transformers would not be adversely affected by the postulated failure of the transformer cooling system and would be capable of operating as required for the design basis accident conditions.

Analysis: The team determined that the licensee's failure to evaluate the effects of a postulated failure of the non-safety-related shutdown board transformer cooling system, on the safety-related load center transformers TS1A and TS1B and the 480V shutdown boards as required by the licensee's General Design Criteria Document was a

performance deficiency. The finding also applies to 480V shutdown board transformers TS2A, TS2B, TS3A and TS3B in units 2 and 3. The performance deficiency was determined to be more than minor because the finding affected the Design Control attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and operability of the load center transformers TS1A and TS1B and the 480V shutdown boards 1A and 1B respectively. Specifically, prior to the inspection, TVA had not evaluated the effects of the failure of non-safety-related shutdown board transformer cooling system on both the safety-related load center transformer coils and connections and also on the fan's safety-related power source that was provided from the 480V shutdown board. This resulted in a reasonable doubt of operability of the transformers to perform their intended design function. The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," both issued June 19, 2012. The finding screened as very low safety significance (Green) because it was a design deficiency that did not that did not result in the loss of functionality or operability. This finding was not assigned a cross-cutting aspect because the issue has existed since November 2004, and the underlying cause was not indicative of current licensee performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures and instructions. Contrary to the above, from November 2004 to March 1, 2013, the licensee failed to appropriately translate the specific design attributes of the shutdown board transformer cooling system into design specifications during a replacement modification. This resulted in the failure to evaluate the effects of the postulated failure of non-safety-related equipment and circuits located in a harsh environment on the safety-related Class 1E shutdown board transformers TS1A and TS1B and Class 1E 480V Shutdown Boards 1A and 1B. The licensee provided additional information, which included engineering evaluations, that provided reasonable assurance that the safety-related load center transformers would not be adversely affected by the postulated failure of the non-safety-related shutdown board transformer cooling system and would be capable of operating when required for the design basis accident conditions. This violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. This violation was entered in the licensee's corrective action program as PER 682254. (NCV 05000259, 260, 296/2013007-02, Failure to Evaluate the Effects of the Failure of Non-Class 1E Load Center Transformer Cooling Fans on the Class 1E 4160-480V Load Center Transformers and 480V Shutdown Boards)

.2.11 Unit 3 HPCI Turbine Exhaust Instrumentation (PI-73-21; PS-73-22A/B)

a. Inspection Scope

The UFSAR, mechanical control diagrams, elementary drawings and wiring diagrams, and design criteria documents were reviewed to establish an overall understanding of the design bases of HPCI Turbine Exhaust Instrumentation. The team reviewed the setpoint and scaling calculation for PT-73-21 and PI-73-21A to verify the required acceptance band for the instruments. The team reviewed the setpoint and scaling document to determine the required setpoint for pressure switch PS-73-22A/B. The team reviewed recent preventive maintenance calibration tests to verify the adequacy of

results in accordance with the design basis requirements. The team reviewed SRs and PERs to identify any recurring issues affecting reliability. The team performed a walk-down of the installed equipment to assess the observable material conditions, to verify instrument data, to determine whether the installed configuration is consistent with design documents including drawings and calculations, and to assess the presence of hazards.

b. Findings

No findings were identified.

.2.12 Unit 3 HPCI Steam Line Instrumentation (PDIS 073-1A/B; PT-73-4)

a. Inspection Scope

The UFSAR, mechanical control diagrams, elementary drawings and wiring diagrams, and design criteria documents were reviewed to establish an overall understanding of the design bases of HPCI steam line instrumentation. The team reviewed the setpoint and scaling calculation for PT-73-4 and PI-73-4 to verify the required acceptance band for the instruments. The team reviewed the setpoint and scaling document to determine the required setpoint for pressure switch PS-73-1A. The team reviewed recent preventive maintenance calibration tests and surveillance procedures to verify the adequacy of results in accordance with the design basis requirements. The team reviewed SRs and PERs to identify any recurring issues affecting reliability. The team performed a walk-down of the installed equipment to assess the observable material conditions, to verify instrument data, to determine whether the installed configuration is consistent with design documents including drawings and calculations, and to assess the presence of hazards.

b. Findings

No findings were identified.

.2.13 Unit 3 RCIC Turbine Exhaust Instrumentation (PT-71-12; PS-71-13A/B)

a. Inspection Scope

The UFSAR, mechanical control diagrams, elementary drawings and wiring diagrams, and design criteria documents were reviewed to establish an overall understanding of the design bases of RCIC Turbine Exhaust Instrumentation. The team reviewed the setpoint and scaling calculation for PT-71-12 and PI-71-12 to verify the required acceptance band for the instruments. The team reviewed recent preventive maintenance calibration tests for the RCIC turbine exhaust pressure instruments to verify the adequacy of results in accordance with the design basis requirements. The team reviewed SRs and PERs to identify any recurring issues affecting reliability. The team performed a walk-down of the installed equipment to assess the observable material conditions, to verify instrument data, to determine whether the installed configuration is consistent with design documents including drawings and calculations, and to assess the presence of hazards.

b. Findings

No findings were identified.

.2.14 Units 1 and 2 Disconnect Fuse Switch 1A; Main DC Supply; and 250V Battery Charger

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, SDC documents, and electrical drawings to establish an overall understanding of the licensee's DC distribution system. The team reviewed the vendor manual for the disconnect fuse switch 1A to verify that the fuse's operating parameters such as voltage and current ratings, interrupting capacity, and fuse curves ensured that the fuses were capable of providing power to the DC distribution panel during accident conditions and that the fuse was properly sized to promote selective coordination and prevent damage to safety related equipment due to faults in the system. The team reviewed DC voltage drop calculations and testing procedures to verify that the shutdown board "A" battery was capable of supplying, and maintaining in an operable status, the required emergency loads for the design duty cycle. A field walk-down of the battery charger, station batteries, and disconnect fuse switch was conducted to observe the material condition of equipment that could affect voltage drop across the DC system. The team also conducted interviews with responsible licensee personnel to answer questions that arose during the inspection pertaining to the preventative maintenance of equipment relied upon to ensure that the 4160 VAC shutdown boards received adequate control voltage.

b. Findings

No findings were identified.

.2.15 Unit 3 Emergency Diesel Generator (EDG) Digital Governor

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, system descriptions, and electrical drawings to establish an overall understanding of the design bases for the EDG digital governor. The team reviewed the modification to replace the EDG governor to a digital control system to verify that the replacement did not introduce new failure modes that placed the licensee in an unanalyzed condition and that the modification package was consistent with the requirements in 10CFR50.59. The team reviewed completed testing procedures to verify that the governor was capable of meeting the requirements specified in TS and the design basis delineated in the UFSAR. The team performed a walk-down to assess the observable material condition and to determine whether the installed configuration was consistent with design documents and to assess the presence of hazards.

b. Findings

No findings were identified.

.2.16 Units 1 and 2 4160V Shutdown Board Bus B

a. Inspection Scope

The team reviewed the plant's TS, UFSAR, system descriptions, and electrical drawings to establish an overall understanding of the design bases for the 4160 VAC emergency shutdown board bus. The team reviewed AC load flow calculations to verify that equipment needed to mitigate a design basis accident had adequate voltage to start and run under accident conditions. The team reviewed functional testing and maintenance procedures to verify that the degraded voltage relays and loss of voltage relays were maintained in an operable condition and operated within the design bases. The team also reviewed uncertainty calculations and completed calibration procedures of the degraded voltage relays to verify that the assumptions in the calculation were conservative with respect to the operation of the relays. A field walk-down of the 4160 VAC shutdown board bus was conducted to assess the observable material condition of the degraded and loss of voltage relays, associated cables, and DC control circuits to determine whether the installed configuration was consistent with design documents and to assess the presence of hazards. The team also conducted interviews with responsible licensee personnel to answer questions that arose during the inspection pertaining to the methodology applied for determining the degraded voltage relay set point.

b. Findings

Failure to Use Worst Case 4160 VAC Bus Voltage in Design Calculations

Introduction: The team identified a finding of very low safety significance (Green) involving a NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to perform analyses demonstrating that the degraded voltage relay (DVR) set points specified in TS would ensure adequate voltage to safety-related equipment.

Description: The purpose of calculation EDQ0057920034, "4.16KV and 480V Busload, Voltage Drop and Short Circuit Calculation," revision 079, was to demonstrate that the design of the Browns Ferry Nuclear Plant Auxiliary Power system was in conformance with the description of the degraded voltage protection configuration described in UFSAR Section 8.4 and to confirm the basis for the degraded voltage set points and time delays. The NRC required all licensees to install degraded voltage protection systems as described in NRC letter dated June 3, 1977, "Statement of Staff Positions Relative to Emergency Power Systems for Operating Reactors." Staff Position 1.a of this letter, which the licensee is committed to in UFSAR Section 8.4.8.1.3, states that the selection of voltage and time set points shall be determined from an analysis of the voltage requirements of the safety-related loads at all onsite systems distribution levels. The DVR settings at Browns Ferry are in accordance with TS Table 3.3.8.1-1 which states the values to be as follows: Allowable Values $\leq$3940 VAC and $\geq$3900 VAC. The nominal trip set point is 3920 VAC.

The team noted that calculation EDQ0057920034 included a methodology that credited non-safety-related load tap changers to improve voltage to the maximum reset set point of 3983 VAC. The TVA methodology of assuming minimum expected grid voltage and

proper operation of non-safety-related load tap changers is acceptable for the purpose of optimizing system voltages for normal operation. However, these assumptions are not appropriate for evaluating the adequacy of the DVR set points with respect to (1) the starting and running voltage requirements of Class 1E motors, and (2) the minimum voltage requirements for the most limiting safety related component as delineated in Staff Position 1.a. The licensee's failure to perform an analysis at the minimum value (3900 VAC) allowed by TS challenged the assurance that postulated voltages greater than 3900 VAC and less than 3983 VAC would be adequate for safety-related equipment to perform their required safety function during degraded voltage scenarios. As a result of this concern, the team lacked reasonable assurance that the DVR set points specified in TS could provide the required motor starting voltages for safety-related loads during required degraded voltage scenarios. The licensee entered this issue into their corrective action program as PERs 676678 and 696876. As immediate corrective actions, the licensee performed a sensitivity study to verify that the voltage at the DVR set points specified in TS could provide adequate starting voltage to a sample of safety-related equipment. As a result of this sensitivity study, 19 MOVs had to be re-evaluated to verify that they were capable of performing their required safety function.

Analysis: The licensee's failure to perform analyses demonstrating that the DVR set points specified in TS would ensure adequate voltage to safety-related equipment as required by the design basis was a performance deficiency. This performance deficiency was more than minor because it affected the Design Control attribute of the Mitigating Systems cornerstone and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of the 4160 VAC buses. Specifically, the finding challenged the assurance that safety-related loads had adequate motor starting voltage during required degraded voltage scenarios. The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," both issued June 19, 2012. The finding was determined to be of very low safety significance (Green) because the finding was not a design deficiency resulting in the loss of functionality or operability. A cross-cutting aspect was not assigned because this performance deficiency has existed since 1993 and was not indicative of current licensee performance.

Enforcement: Title 10 CFR 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis for structures, systems, and components are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, since 1993, the licensee failed to assure that Staff Position 1.a committed to in the UFSAR, was correctly translated into documents used to establish DVR set points. Specifically, Browns Ferry design calculation EDQ0057920034, used to support the TS degraded voltage set points, credited non-safety-related voltage regulation equipment to ensure adequate voltage to all class 1E equipment, in lieu of demonstrating that the set points for the DVRs specified in TS could provide adequate starting voltage to safety-related equipment. The licensee performed a sensitivity study to verify that the voltage at the DVR set points specified in TS could provide adequate starting voltage to a sample of safety-related equipment. As a result of this sensitivity study, 19 MOVs had to be re-evaluated to verify that they were capable of performing their required safety function. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action

program as PERs 676678 and 696876 to address recurrence. (NCV 05000259, 260, 296/2013007-03, Failure to Use Worst Case 4160 VAC Bus Voltage in Design Calculations)

.2.17 Security Uninterruptible Power Supply (UPS) and Standby Diesel

See Attachment 2.

.3 Review of Low Margin Operator Actions

.3.1 Chiller [0-CHR-31-2100]

a. Inspection Scope

The team reviewed safe shutdown procedures, emergency operating instructions, abnormal operating instructions, and operator training material to verify that low margin time critical operator actions could be accomplished as relied upon in design assumptions. The team conducted a walk-down of a limiting safe shutdown procedure to assess if the time critical operator actions required to secure the chiller in a challenging fire event could be successfully accomplished. Equipment necessary to perform procedural steps was verified to be in the correct locations and available to the operators. The team interviewed individuals qualified to the task to ensure training was sufficient to accomplish the task. The team also conducted interviews with members of the operations training staff the past results of exercises of this evolution to identify any past operator failures or challenges to accomplish this activity.

b. Findings

No findings were identified.

.3.2 HPCI Governor Valve (FCV-073-0019)

a. Inspection Scope

The team reviewed safe shutdown procedures, emergency operating instructions, abnormal operating instructions, and operator training material to verify that low margin time critical operator actions could be accomplished as relied upon in design assumptions. The team observed a simulator scenario of a fire event with the potential to disable the high reactor water level trip of HPCI. The team assessed if the time critical operator actions required to terminate HPCI operation to prevent water intrusion into the steam lines could be successfully accomplished within the required time restraints. Procedural interactions were reviewed to ensure operators would appropriately enter the correct procedure based on control room indications. The team interviewed individuals qualified to the task to ensure training was sufficient to accomplish the task.

b. Findings

No findings were identified.

.3.3 HPCI Turbine Steam Isolation Valve (FCV-073-0003)

a. Inspection Scope

The team reviewed safe shutdown procedures, emergency operating instructions, abnormal operating instructions, and operator training material to verify that low margin time critical operator actions could be accomplished as relied upon in design assumptions. The team observed a simulator scenario of a fire event with the potential to disable the high reactor water level trip of HPCI. The team assessed if the time critical operator actions required to terminate HPCI operation to prevent water intrusion into the steam lines could be successfully accomplished within the required time restraints. Procedural interactions were reviewed to ensure operators would appropriately enter the correct procedure based on control room indications. The team interviewed individuals qualified to the task to ensure training was sufficient to accomplish the task.

b. Findings

No findings were identified.

.3.4 250V Battery Charger (CHGA-248-000X)

a. Inspection Scope

The team reviewed safe shutdown procedures, emergency operating instructions, abnormal operating instructions, and operator training material to verify that low margin time critical operator actions could be accomplished as relied upon in design assumptions. The team conducted a walk-down of a limiting safe shutdown procedure to assess if the time critical operator actions required to reset the 250V battery charger during a challenging fire event could be successfully accomplished. Interviews with operators qualified to the task were conducted to ensure training was sufficient to accomplish the task in the required time frame. Equipment necessary to perform procedural steps was verified to be in the correct locations and available to the operators.

b. Findings

No findings were identified.

.4 Operating Experience (Six Samples)

a. Inspection Scope

The team reviewed seven operating experience issues for applicability at Browns Ferry Nuclear Plant. The team performed an independent review for these issues and where applicable, assessed the licensee's evaluation and disposition of each item. The issues that received a detailed review by the team included:

- NRC Information Notice 2010-03, "Failures of MOVs Due to Degraded Stem Lubricant"

- NRC Information Notice 2012-16, “Preconditioning of Pressure Switches Prior to Surveillance Test”

- NRC Information Notice 2012-12, “HVAC Design Control Issues Challenge Safety System Function”

- NRC Information Notice 2011-01, “Commercial-Grade Dedication Issues Identified During NRC Inspections”

- NRC Information Notice 2011-22, “Instrumentation and Control Module Hardware, Configuration, and Procedure Issues”

- NRC Browns Ferry Component Design Bases Inspection (CDBI) Report 05000259, 260, 296/2009008

b. Findings

Failure to Promptly Identify and Correct the EECW Strainers Degraded/Non-Conforming Condition

Introduction: The team identified a finding of very low safety significance (Green) involving a NCV of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” for the licensee’s failure to promptly identify and take corrective actions to address a non-conforming condition adverse to quality related to three faulted strainers in the safety related Emergency Equipment Cooling Water (EECW) system.

Description: During the 2009 NRC CDBI at Browns Ferry (Inspection Report 05000259, 260, 296/2009008), the inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for an inadequate procedure used for flow balancing of the EECW system. That violation stated that the perforated holes in the installed strainers for the EECW system were capable of filtering debris greater than 0.125 inches (1/8 inch); however, allowed debris less than 0.125 inches to pass through into the strainers. The team determined at that time, the inlet throttle valves to the 2A and 2B Core Spray room coolers, 2-THV-067-0551 and 2-THV-067-0594, had disc to seat clearances of less than 0.125 inches. With the clearance less than that of the inlet screen, flow blockage in these valves due to debris passing through the EECW strainers could have occurred resulting in inoperability of these safety related room coolers. In addition, while visually inspecting the EECW strainers, the team identified a number of perforated cone holes that were greater than the 0.125 inches design. Section 10.10 of the UFSAR states that the EECW strainers will have a screen size of 0.125 inches. These strainer cones are created by cutting and bending/folding a sheet with perforated holes into the cone shape. This process results in a seam in the cone where the two sheet edges join. Due to the fabrication process, there were random locations in some of the strainer cones which would allow two of the 1/8 inch holes to line up on opposite sides of the seam such that an opening is formed where the major axis was larger than 1/8 inch but less than 1/4 inch, and the minor axis less than 1/8 inch. In November 2009, the licensee generated PER 208636 in response to the NCV, which concluded that this condition did not constitute a degraded non-conforming condition without specifically addressing the non-conformance to the current licensing and design basis. Corrective action for PER 208636 included initiation of work orders to observe and replace any affected EECW strainer perforated cones, where the fabrication method of the perforated

strainer cone could allow a hole size larger than specified in the UFSAR. By allowing debris greater than the design allowed 1/8 inch, it could impact the Core Spray room cooler valves which were throttled to 1/8 inch. At the time of this inspection, only one of four EECW strainers had been partially corrected.

Based on questions by the inspection team, the licensee initiated PER 677627 to perform a new operability evaluation since it was determined the previous operability evaluation in PER 208636 was inadequate. The licensee concluded that the issue constituted a degraded/non-conforming condition, though there were no current operability issues identified. The licensee's basis in PER 677627, Rev. 1 was that there was no history with clogging of the Core Spray room cooler throttled valves since being re-positioned in 2010 after the condition was identified. Additionally, the licensee stated that the radial gap/clearance around the perimeter of the Alvco globe valve disk for both valves is greater than 1/4"; therefore, any debris that passed through a strainer cone with the larger gap is capable of passing through the valve opening. Furthermore, turbulent system flows in these throttle valves also tends to flush debris and prevent accumulation of these potentially larger particles.

Analysis: The licensee's failure to promptly identify and take corrective actions to address a non-conforming condition adverse to quality related to three faulted strainers in the safety related EECW system was a performance deficiency. The performance deficiency was determined to be more than minor because it affected the Equipment Performance attribute of the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of the Core Spray system to respond to initiating events, in that, it could result in the plant not being able to sustain short-term heat removal under specific conditions and resulted in the reasonable doubt of operability. The team determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 4, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process for Findings At-Power," both issued June 19, 2012. The finding was determined to be of very low safety significance (Green) because the finding was a design deficiency that did not result in the loss of functionality or operability. The inspectors determined that this finding represented current licensee performance and directly involved the cross-cutting area of Problem Identification and Resolution, component of the Corrective Action Program because the licensee did not perform a thorough evaluation of identified problems such that the resolutions addressed the underlying causes and extent of condition. [P.1(c)]

Enforcement: Title 10 CFR 50, Appendix B, Criterion XVI, "Corrective Actions," states in part, that measures shall be established to assure that conditions adverse to quality, such as failures, deficiencies, and non-conformances, are promptly identified and corrected. Contrary to the above, from November 2009 to February 2013, the licensee failed to promptly identify and correct a non-conforming condition adverse to quality, in that three of the strainers on the safety related EECW system allowed greater than the design 1/8" debris to pass through the system, increasing the likelihood of clogging downstream components. The licensee performed an immediate operability evaluation to establish reasonable assurance of operability for the system. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's corrective action program as PER 677647. (NCV 05000259, 260, 296/2013007-04, Failure to Promptly Identify and Correct the EECW Strainers Degraded/Non-conforming Condition)

4OA6 Meetings, Including Exit

On February 28, 2013, the team presented the inspection results to Mr. Jensen and other members of the licensee's staff. On April 19, 2013, the team discussed the results of the inspection with Mr. Groom and members of the licensee's staff, and with M. Webb on June 3, 2013. Proprietary information that was reviewed during the inspection was returned to the licensee or destroyed in accordance with prescribed controls.

ATTACHMENT 1: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel:
Steve Bono, Plant Manager
James Emens, Site Licensing Manager
Kevin Groom, Engineering Team Manager
Tim Mingus, Mechanical Design Lead
Mike Oliver, Site Licensing
Keith Polson, Site Vice President
Don Robertson, Operations
Rick Sampson – Electrical & I&C Lead
Marianne Webb, Site Licensing

NRC personnel
D. Dumbacher, NRC Senior Resident
L. Pressley, NRC Resident Inspector
R. Nease, Chief, Engineering Branch Chief 1, Division of Reactor Safety, Region II

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000259, 260, 296/2013007-01	NCV	Failure to Verify the Capability of HPCI to Achieve Required Flow and Pressure within 30 Seconds Under Accident Conditions (Section 1R21.2.1)
05000259, 260, 296/2013007-02	NCV	Failure to Evaluate the Effects of the Failure of Non-Class 1E Load Center Transformer Cooling Fans on the Class 1E 4160-480V Load Center Transformers and 480V Shutdown Boards (Section 1R21.2.10)
05000259, 260, 296/2013007-03	NCV	Failure to Use Worst Case 4160 VAC Bus Voltage in Design Calculations (Section 1R21.2.16)
05000259, 260, 296/2013007-04	NCV	Failure to Adequately Identify, Evaluate, and Correct the EECW Strainers Degraded/Non-conforming Condition (Section 1R21.4)

LIST OF DOCUMENTS REVIEWED

Licensing Documents
TS, Current
TS Bases, Current
UFSAR, Current
SER and Supplements

Calculations
16NDQ099920080001, Appendix R TMG Analysis for Loss of HVAC, Rev. 1
CD-Q0031-900583, Chiller Seismic Qualification, Rev. 4
MD-Q0031-000022, Control Chilled Water Pump and Valve Sizing, Rev. 1
EDQ0071920444, Setpoint and Scaling Calculation for 1/3-D-71-1A, -1B, Rev. 4
MDQ0001870133, Pressure Relief Valve Sizing, Rev. 6
MDQ0001920018, System Requirements Calculation for Main Steam System, Rev. 5
MDQ0071920479, Analytical Limits for the RCIC Steam Line Isolation, Rev. 6
MDQ007320100031, HPCI Pump NPSH and System Hydraulic Analysis (pump water suction and discharge), Rev. 0
MDQ099920040040, HPCI & RCIC Test Requirements, Rev. 8
MDQ0999980137, Evaluation of Stroke Times of GL89-10 MOVs Equipped with DC Motors, Rev. 16
MDQ3073920407, MOV 3-FCV-73-02, Operator Requirements and Capabilities, Rev. 4
MDQ3073920408, MOV 3-FCV-73-03, Operator Requirements and Capabilities, Rev. 8
MDQ3073920409, MOV 3-FCV-73-16, Operator Requirements and Capabilities, Rev. 9
NDQ0000880019, Flood Level Inside Torus Room, Corner Rooms, and HPCI Room Due to Feedwater Line Break in the Main Steam Valve Vault, Rev. 5
NDQ0999980003, Analytical Limits for RPS/ECCS/LOCA Analysis
EDQ005720020022, 4.16kV and 480V Bus Load, Voltage Drop and Short Circuit Calculation, Rev. 15
ED-Q0057-920034, 4.16kV and 480V Bus Load, Voltage Drop and Short Circuit Calculation, Rev. 80
EDQ1-999-2002-0072, 480V Load Centers, Cable and Bus Protection/Breaker Coordination, Rev. 16
ED-Q0073-900008, Essentially Mild (EM) Calculation for High Pressure Coolant Injection (HPCI) Components, Rev. 30
ED-Q0999-920170, 1(2)-P-71-4, 1(2)-P-71-12, and 1(2)-P-73-4, 1(2)-P-73-21 Setpoint & Scaling Calculation for Pressure Instruments, Rev. 7
EDN0260910062, Uninterruptible Power Supply Loading, Rev. 015
EDQ0057920034, 4.16KV and 480V Busload, Voltage Drop and Short Circuit Calculation, Rev. 079
EDQ0057920034, 4.16KV and 480V Busload, Voltage Drop and Short Circuit Calculation, Rev. 081
EDQ0211890144, 4kv Bus Degraded Voltage relays, Setpoint and Scaling Calculation, Rev. 05
EDQ024820020042, 250V DC Unit Battery Load Study, VD SC and Battery Capacity for LOOP/LOCA, Station Blackout, and Appendix R Analysis for Unit/Shutdown Board Battery, Rev. 044
EDQ024820030002, 4160V Shutdown Board A,B,C,D,3EB 250V DC Battery Load Study, Voltage Drop, and Short Circuit Calculation, Rev. 010

Drawings
0-47E865-4, Flow Diagram Ventilation and Air Conditioning Air Flow, Rev. 67
0-47E866-3, Flow Diagram Heating and Air Conditioning Hot and Chilled Water, Rev. 34
0-45E708-10, Battery Board, Charger, MG Set Connection Diagram, Rev. 021
0-45E709-1, Shutdown Board 250V Battery and Charger Single Line, Rev. 038
0-45E765-8, 4160V Shutdown Aux Power Schematic Diagram, Rev. 017
0-45E765-9, 4160V Shutdown Aux Power Schematic Diagram, Rev. 004
0-731E761-1, Emergency Equipment, Rev. 019
0-731E761-2, Emergency Equipment, Rev. 009
0-47E866-9, Flow Diagram for Chilled Water Circulating Pumps, Rev. 8
0-47E866-3, Flow Diagram Heating & Air Conditioning Hot and Chilled Water, Rev. 34
1-45E749-1, 480V Wiring Diagram Shutdown Board 1A, Rev. 53
1-47E225-117, Harsh Environment Data EL 621.25, Rev. 1
1-45E779-1, Wiring Diagram 480V Shutdown Aux Power Schematic Diagram, Rev. 21
1-47E813-1, Flow Diagram for RCIC, Rev. 35
1-47E859-1, Flow Diagram for EECW, Rev. 83
2-48NI139, Miscellaneous Steel FW & MS Piping Pressure Panel, Rev. 0
3-47E225-100, Harsh Environmental Data Drawing Series Index, Notes & References, Rev. 7
3-45E768-9, Emergency Equipment, Rev. 014
3-47E865-4, Flow Diagram Ventilation and Air Conditioning Air Flow, Rev. 14
3-47E866-7, Flow Diagram Air Conditioning Chilled Water, Rev. 34
3-47E225-103, Harsh Environmental Data EL 519.0, Rev. 9
3-47E610-73-1, Mechanical Control Diagram HPCI System, Rev. 31
3-45N3635-2, Sh. 2, Wiring Diagrams Local Instrument Panels Connection Diagrams, Rev. 6
3-730E928, Sh. 3, Elementary Diagram HPCI System, Rev. 17
3-730E928, Sh. 5, Elementary Diagram HPCI System, Rev. 18
3-45E626-2, Wiring Diagram Reactor Core Isolation Cooling System Schematic Diagram, Rev. 14
3-47E610-71-1, Mechanical Control Diagram RCIC System, Rev. 38
3-45N3635-3, Sh. 3, Wiring Diagrams Local Instrument Panels Connection Diagrams, Rev. 5
3-47E801-1, Flow Diagram – Main Steam, Rev. 32
3-47E811-1, Flow Diagram – Residual Heat Removal System, Rev. 67
3-47E812-1, Flow Diagram – High Pressure Coolant Injection System, Rev. 65
2-47E813-1, Flow Diagram for RCIC, Rev. 51
3-47E813-1, Flow Diagram for RCIC, Rev. 47
3-47E859-2, Flow Diagram for EECW, Rev. 24
D-53467, Aloyco Globe Valves, Rev. 1

Procedures
0-AOI-26-1, Fire Response, Rev. 16
0-AOI-57-1A, Loss of Offsite Power (161 and 500kV)/ Station Blackout, Rev. 84
0-ARP-25-41A, Panel 25-41 0-XA-55-41A, Rev. 0005
0-OI-31, Control Bay and Off-Gas Treatment Building AC System, Rev.139
0-OI-57B, 480V/240V AC Electrical System, Rev. 193
0-SSI-001, Safe Shutdown Instructions, Rev. 14
0-SSI-1-1, Unit 1 Reactor Building Fire EL 519 through EL 565 West of Column Line R4, Rev.15
0-SSI-1-3, Unit 1 Reactor Building Fire El 593 North of Column Line R, Rev. 16
0-SSI-3-2, Unit 3 Reactor Building Fire El 519 thru 565 East of R18, Rev. 20
0-SSI-16, Control Building Fire EL 593 Through EL 617, Rev. 20
0-TI-54, EECW System Operational Flush, Rev. 9

0-TI-54, EECW System Operational Flush, Rev. 10
0-TI-54, EECW System Operational Flush, Rev. 11
0-TI-362, Inservice Testing Program, Rev. 35
1/2-EMU-SMI3-A.4, Procedure for Making 48 Month Relay Calibration on 4KV Shutdown Board, Rev. 8
1-ARP-9-4C, Panel 9-4 RHRSW Temperature Abnormal, Rev. 22
1-EOI-1, RPV Control, Rev. 2
1-EOI-2, Primary Containment Control, Rev. 3
1-EOI-3, Secondary Containment Control, Rev. 2
3-SR-3.6.1.3.5(SD), Valves Cycled During Cold Shutdown, Rev. 13
3-SR-3.6.1.5(RCIC CM), RCIC Check Valve Operability Test During CSD, Rev. 0
3-SR-3.5.3.3, RCIC System Rated Flow at Normal Operating Pressure, Rev. 58
3P-073-0022A-00-01, Review Setpoint & Scaling Document, Rev. 1
3P-073-0022B-00-01, Review Setpoint & Scaling Document, Rev. 1
3P-073-0001A-00-02, Review Setpoint & Scaling Document, Rev. 2
3P-073-0001B-00-02, Review Setpoint & Scaling Document, Rev. 2
3P-071-0001A-00-01, Review Setpoint & Scaling Document, Rev. 1
3P-071-0001B-00-01, Review Setpoint & Scaling Document, Rev. 1
3-SR-3.3.6.1.5(3B/A), High Pressure Coolant Injection System Steam Supply Pressure Low Pressure Calibration, Rev. 3
3-SR-3.3.6.1.2(3B), High Pressure Coolant Injection System Steam Supply Pressure Functional, Rev. 7
3-SR-3.3.6.1.5(4B/B), Reactor Core Isolation Cooling System Steam Supply Low Pressure Calibration (3-PS-071-0001B), Rev. 3
3-SR-3.3.6.1.2(4B), Reactor Core Isolation Cooling System Steam Supply Pressure Low Functional, Rev. 6
3-AOI-64-2b, Group 4 High Pressure Coolant Injection Isolation, Rev. 5
3-OI-1, Main Steam System, Rev. 40
3-OI-73, High Pressure Coolant Injection System, Rev. 53
3-SI-3.2.1, Inservice Testing and Augmented Inservice Testing Valve Performance, Rev. 12
3-SR-3.4.3.2, Main Steam Relief Valves Manual Cycle Test, Rev. 8
3-SR-3.5.1.7, HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure, Rev. 66
3-SR-3.5.1.10, Automatic Depressurization System Simulated Automatic Actuation Test, Rev. 9
EPI-0-231-XMR001, Visual Pressure and Oil Leak Inspection of the 4160/480V Shutdown Board Transformers, Rev. 8
LCI-3-P-71-12, Reactor Core Isolation Cooling System Turbine Exhaust Pressure, Rev. 2
LCI-3-P-73-21, High Pressure Coolant Injection System Turbine Exhaust Pressure, Rev. 2
MCI-0-000-GLV001, Generic Maintenance Instruction For Globe Valves, Rev. 26
MCI-0-000-GTV002, Double Disc, Pressure Seal Gate Valves, Rev. 12
MPI-0-000-ACT001, Preventative Maintenance for Limitorque Operators, Rev. 42
MPI-0-000-CRA001, Maintenance of Monorail Systems, Underhung Cranes and Overhead Hoists, Rev. 47
NEDP-8, Technical Evaluation for Procurement of Materials and Services, Revs. 3, 20, 21

Completed Procedures
0-SR-3.7.4.1, Control Room Air Conditioning System Performance, 4/13/10
0-SR-3.7.4.1, Control Room Air Conditioning System Performance, 2/28/08
0-SR-3.7.4.1, Control Room Air Conditioning System Performance, 10/5/12
0-TI-54, EECW System Operational Flush, 1/8/13
0-TI-54, EECW System Operational Flush, 10/11/12

0-TI-443, HPCI/RCIC Turbine Exhaust Condition Monitoring Plan, 10/16/02
3-SI-4.7.A.2.g-3/71b, Primary Containment LLRT, 4/710
3-SR-3.5.3.3, RCIC System Rated Flow at Normal Operating Pressure, 7/25/12
3-SR-3.5.3.3, RCIC System Rated Flow at Normal Operating Pressure, 1/26/12
3-SR-3.6.1.3.5(SD), Valves Cycled During Cold Shutdown, 2/27/10
3-SR-3.6.1.3.5(RCIC),RCIC System MOV Operability, 1/25/12
3-SR-3.6.1.3.5(RCIC),RCIC System MOV Operability, 10/24/12
3-SR-3.5.1.1(RCIC), Maintenance of Filled Discharge Piping, 1/25/12
3-SR-3.5.1.1(RCIC), Maintenance of Filled Discharge Piping, 5/20/12
3-SR-3.5.1.1(RCIC), Maintenance of Filled Discharge Piping, 6/5/12
3-SR-3.5.3.3(RCIC), RCIC System Rated Flow at Normal Operating Pressure, 1/25/12
3-SR-3.5.3.3(RCIC), RCIC System Rated Flow at Normal Operating Pressure, 10/24/12
3-SR-3.5.3.3(RCIC), RCIC System Rated Flow at Normal Operating Pressure, 7/25/12
3-SR-3.5.1.7(COMP), HPCI Comprehensive Pump Test, Rev. 14, 5/30/12
3-SR-3.4.3.2, Main Steam Relief Valves Manual Cycle Test, Rev. 7, 6/3/12
3-SR-3.5.1.7, HPCI Main and Booster Pump Set developed Head and Flow Rate Test at Rated Reactor Pressure, Rev. 64, 8/8/12
3-SR-3.5.1.8, HPCI Main and Booster Pump Set developed Head and Flow Rate Test at 150 psig Reactor Pressure, Rev. 13, 5/18/12
3-SR-3.6.1.3.5(HPCI), HPCI System Motor Operated Valve Operability, Rev. 23, 9/11/11
3-SR-3.5.1.10, Automatic Depressurization System Simulated Automatic Actuation Test, Rev. 8, 5/17/12
3-TI-428, RCIC RPV Injection Test Brief, 4/13/02
1-PMTI-BF-231.011, Shutdown Transformer TS1A Cooling Fans, Rev. 1, 10/20/04
PMTI-69532-STG005, 3A EDG-Governor Control Upgrade, 2/8/13
STI-15, High Pressure Coolant Injection System, 10/17/76

Completed Work Orders
09-721447-000, RCIC Turbine EGR Actuator, 9/13/09
09-712623-068, Inspect Valve Using Radiography, 4/6/10
09-723997-000, 4KV Shutdown Board A, 10/29/10
112638308, HPCI Turbine Exhaust Pressure PM Calibrate 3-PT-73-21, 3-PX-73-21, 3-PI-73-21A, and 3-PI-73-21B, 2/6/12
112638276, HPCI Turbine Exhaust Pressure High PM Calibrate 3-PS-073-0022B, 2/7/12
112660232, HPCI Turbine Exhaust Pressure High PM Calibrate 3-PS-073-0022B, 2/7/12
112781314, 3-SR-3.3.6.1.5(3B/A), HPCI Sys Steam Supply Pressure Low Cal, 3-PS-73-1A, 2/15/12
113637553, 3-SR-3.3.6.1.2(3B), HPCI Sys Steam Supply Low Pressure Functional, 11/10/12
112638299, PM Calibrate 3-PI-73-4, 3-PT-73-4, 3-PI-73-4A, 3-PX-73-4 and 3-PI-73-4B, 2/7/12
112781299, 3-SR-3.3.6.1.5(4B/B), RCIC Sys Seam Supply Pressure Low Cal 3-PS-71-1B, 8/1/12
113269489, 3-SR-3.3.6.1.2(4B), RCIC Sys Steam Supply Pressure Low Functional, 10/1/12
112836988, Calibrate 3-PT-71-12, 3-PI-71-12A, and 3-PX-71-12, RCIC Turbine Exhaust Pressure, 7/26/12
113515588, Maintenance of Filled RCIC Discharge Piping, 5/20/12
113332584, RCIC System Rated Flow at Normal Operating Pressure, 7/25/12
112687334, RCIC System Rated Flow at Normal Operating Pressure, 1/26/12
110963045, Replacement of D train EECW Strainers, 9/01/2012
110960920, Replacement of D train EECW Strainers, 2/27/2012
111382153, Change Oil in Chilled Water Circulating Pump A, 3/28/2011
112203505, PC LLRT-RCIC Turbine Steam Exhaust, 4/7/12

113597903, Control Room Air Conditioning System Performance, 10/2/12
110710377, 3-SI-4.7.A.2.G-3/71B LLRT-RCIC, 3/6/10
112096996, Verify Packing Gland Torque, 4/22/10
110692565, 4kv Shutdown Board Protective Relaying Calibration Check, 3/4/11
110692568, Relay Functional Check for 4kv Shutdown Board B, 3/11/11
111244904, 4kv Shutdown Board B Loss of Power Logic SYS FT, 3/4/11
111672498, Diesel Generator U2 Load Acceptance Test, 3/23/11
112075153, 4kv Shutdown Board Undervoltage and Time Delay Relay Calibration and FT, 11/21/11
112414638, Shutdown Board A Battery Modified Performance Test, 1/29/12
112414641, 4kv Shutdown Board Degraded Voltage Relay Calibration and FT, 11/21/12
112811378, Shutdown Board A Battery Service Test, 8/1/12
113146159, 4kv Shutdown Board Degraded Voltage Relay Calibration and FT, 7/10/12

Corrective Action Documents Reviewed

PER 631922	PER 257029	PER 417006
PER 677627	PER 169214	PER 667378
PER 208636	PER 589504	PER 668744
PER 605866	PER 362513	PER 490804
PER 381569	PER 379587	SR 688295
PER 208374	PER 382276	SR 688186
PER 621760	PER 615687	SR 521873
PER 631438	PER 329345	SR 665511

Modifications

DCN 51216, BFNP Unit 1 Recovery – Electrical Lead DCN – System 574, Rev. A
DCN 69532, U1,U2, and U3 Diesel Governor Replacement, 2/23/11
EDC 69701, Issue EDC to either eliminate or revise several time critical operator manual actions for Appendix R safe shutdown as appropriate, Rev. A
DCN 700049A, ADS Logic Modification, 6/16/12

Miscellaneous

001, System Health Report – Main Steam, 6/1/12 - 9/30/12
073, System Health Report – High Pressure Coolant Injection, 6/1/12 - 9/30/12
BFN-50-7001, Design Criteria Document, Main Steam System, Rev. 24
BFN-50-7073, Design Criteria Document, High Pressure Core Injection System, Rev. 22
BFN-50-7073, High Pressure Coolant Injection System, Rev. 22
FE 43037, Functional Evaluation for PER 157912, 12/16/08
NRC Information Notice 2010-03, Failures of MOVs Due to Degraded Stem Lubricant
NRC Letter, Issuance of Amendment Regarding Five Percent Uprate, 3/6/07
PDO 690081, Prompt Determination of Operability for PER 690081, 3/6/13
OPL 171.040, RCIC Operation Training Materials, Rev. 19
BFN-50-7071, RCIC System Design Criteria, Rev. 17
BFN-50-C-7101, Tornado Protection Design Criteria, Rev. 3
BFN-50-7030A, Control Bay & Reactor Building Board Rooms Environmental Control Systems, Rev. 13
03-3-IST-071-179, Evaluation Form for ASME Section XI IST Test Results, 9/19/03
03-3-IST-071-179, Evaluation Form for ASME Section XI IST Test Results, 6/24/03
SPP-10.2, Clearance Document 2-075-0006, 4/16/2010
SPP-10.2, Clearance Document 2-075-0017, 4/16/2010
SPP-10.2, Clearance Document 2-064-0002C, 4/16/2010

SPP-10.2, Clearance Document 2-064-0016D, 4/16/2010
SPP-10.2, Clearance Document 2-064-0021, 4/16/2010
PEG PKG No. BVX097C, Procurement Data Sheet Technical Evaluation, 5/25/10
PEG PKG No. PER208636X0, Perforated Cone Fabrication, Rev. 0
BFN-VTD-N990-0020, Trane Air Cooled and Gould Pumps, Rev. 2
VTD-N990-0020, Unit 0 Control Bay Chiller
VTD-A391-0320, Anchor Darling Lift C
BFN-50-7073, Design Criteria Document, High Pressure Coolant Injection System, Rev. 22
BFN-50-7071, Design Criteria Document, Reactor Core Isolation Cooling System, Rev. 17
BFN-50-727, General Design Criteria Document, Environmental Qualification, Rev. 3
BFN-50-728, Design Criteria Document, Physical Independence of Electrical Systems, Rev. 18
VTD-B455-0020, Installation and Maintenance Instructions for ASEA Brown Boveri (ABB) Indoor and Outdoor Dry & Cast Transformers, Rev. 4
Disconnect Fuse Switch 1A Procurement Data Sheet, 5/6/03
NRC Letter to TVA on Degraded Voltage, 6/3/77
U1 and U2 License Amendment Request, 4/9/81
U1 and U2 License Amendments 72 and 75, 9/3/81
U3 License Amendment 52, 3/29/82
U3 License Amendment Request, 12/11/81
Voltage Sensitivity Study (Degraded Voltage Relay lower dropout Allowable Value), 2/4/13
XDF-001, Qualification Maintenance Data Sheets, BFN-1-XFA-213-TS1A, TS1B, TS2A, TS2B, TS3A and TS3B, Rev. 9
BFN-VTD-AS04-0040, ABB Instructions Single Phase Voltage Relays Type 27N Digital Reference Manual
Manual 82340C, EGB-Proportional Governor/Actuator with Hydraulic Amplifier Systems
Manual 82389, 2301A Electronic Load Sharing and Speed Control, Rev. P
98NAM-218021, Material Inspection Form, 7/28/00
BFN-08-0665, PCN 3635 Replace Control Bay Chillers, 4/29/09
BFN-10-0227, RCIC Governor and Flow Controller Obsolescence, 6/29/10
BFN-11-0034, HPCI Steam Admission Valve- Repeated Leakage, 6/1/11
BFN-ENG-F-12-013, Commercial Grade Dedication Process, Rev. 1
JPM 259ap, Operator 3 Manual Actions 0-SSI-16, Rev. 0
NRC Generic Letter 91-05, Licensee Commercial-Grade Procurement and Dedication Programs
NRC Generic Letter 89-02, Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products
NRC Inspection Procedure 43004, Inspection of Commercial-Grade Dedication Programs, 4/25/11
Purchase Order P-98NAM-218021-001, BFN-Control Bay Chillers, 4/4/00
RIMS R06100810709, Verification and Validation Appendix R Manual Actions
RIMS R06100810711, Verification and Validation Appendix R Manual Actions
RIMS R69120120010, Verification and Validation Appendix R Manual Actions
RIMS R69121026006, Verification and Validation Appendix R Manual Actions
Specification Number BF-A/CCHR-050597, Control Building Air Conditioning System Air Cooled Chillers for Browns Ferry Nuclear plant Units 1, 2, and 3, Rev. 4
VR-0210121-1, Dedication Report for Trane Chillers, Rev. 1
10”-150, Anchor/Darling Lift Check Valve, Rev. J

Work Orders in Planning
110960933
112593009
113883180
114130260

Corrective Action Documents (PERs & SRs) Initiated Due to CDBI Activity
Problem Evaluation Reports
PER 674169, 2013 CDBI – No functional test of fan controls for 4kv480V Transformers PER 675233, 2013 CDBI – During CDBI review no NESSDs were found for 3-PI-73-1A
PER 675857, 2013 CDBI – Functional Description Errors in 0-TI-362 (Bases)
PER 675858, 2013 CDBI – Drawing discrepancy
PER 676598, 2013 CDBI – Design Criteria Enhancement
PER 676634, 2013 CDBI – Oil Leak on Either End of HPCI Speed Reducer
PER 676670, 2013 CDBI – Oil Soak Pads on the RCIC Bedplate Governor End
PER 676671, 2013 CDBI – Several Local Control Station Lights Out in the RCIC Quads
PER 676678, 2013 CDBI – BFN Degraded Voltage Methodology
PER 676750, 2013 CDBI – Design Criteria and FSAR Inconsistencies
PER 676826, 2013 CDBI – Bolt missing from cover for 4KV480V Shutdown Board 1A Transformer
PER 677299, 2013 CDBI – Multiple instances of improper ladder storage equipment being secured
PER 677384, 2013 CDBI – Investigate and repair Security Diesel engine oil leakage
PER 677412, 2013 CDBI – Excessive oil, water in the U2 HPCI pit sump
PER 677627, 2013 CDBI – Evaluation for degraded non-conforming condition and operability for PER 208636 may not be adequate
PER 677559, 2013 CDBI – NRC identified – TS1A Transformer
PER 678897, 2013 CDBI – Deficiencies regarding the resolution of a 2009 CDBI NRC identified issue
PER 680316, 2013 CDBI – NRC identified – U1 DCN 51216 Documentation Issues
PER 680788, 2013 CDBI – Operate Fans for 4KV480V Shutdown Board Transformer
PER 682254, 2013 CDBI – NRC identified – EQ Evaluation of transformer loading needed
PER 682299, 2013 CDBI – Remove oil level sight glass and clean [BFN-0-PMP-031-2101, Chilled Water Circulating CHW Pump A]
PER 683071, 2013 CDBI – NRC identified – Evaluate PM testing for 4KV/480V Transformers
PER 683073, 2013 CDBI – OPS AUO Training Enhancement
PER 683094, 2013 CDBI – Acceptance criteria required security Diesel Generator-UPS BATT
PER 683208, 2013 CDBI – Duplicate of SR 682420 - Acceptance criteria for Diesel Generator and UPS Battery
PER 683301, 2013 CDBI – RCIC Test Speed vs. Max Rated Speed
PER 683323, 2013 CDBI – HPCI Test Speed vs. Max Rated Speed
PER 688574, 2013 CDBI – Request for Instrument/Measurement Uncertainty Evaluation
PER 688985, 2013 CDBI – Document Packages Reviewed in BFN Focused Self-Assessment of CGD in BFN-ENG-12-013
PER 689493, 2013 CDBI – “A” EECW cones with openings larger than 1-8th inch
PER 689701, 2013 CDBI – During the closure review process a Work Order page was inadvertently discarded
PER 689795, 2013 CDBI – Self Assessment lacking sufficient OE search
PER 689797, 2013 CDBI – Diesel Generator could not transfer power due to UPS low battery load

PER 689852, 2013 CDBI – NPG Work Control Process may not adequately support identification of DNC
PER 690081, 2013 CDBI – NRC Identified Potential Violation Regarding HPCI IST Instrument Uncertainty
PER 690086, 2013 CDBI – NRC Identified HPCI/RCIC Potential Test Deficiency
PER 690684, 2013 CDBI – Non-conservatism in HPCI TS Surveillance Testing
PER 690690, 2013 CDBI – Non-conservatism in RCIC TS Surveillance Testing
PER 690749, 2013 CDBI – HPCI / RCIC Testing for PU not documented
PER 692441, 2013 CDBI – 0-SR-3.7.4.1(CW) closed with chilled water flows outside the design flows
PER 696876, 2013 CDBI – Degraded voltages used in MOV calculations

Service Requests
SR 672968, During CDBI review no NESSDs were found for 3-PI-73-21A
SR 672985, No functional test of fan controls for 4kv480V Transformers
SR 674439, Function Description errors in 0-TI-362 (BASES)
SR 674456, Drawing discrepancy
SR 674467, Design Criteria enhancement
SR 674886, Several local control station lights out in the HPCI and RCIC quads
SR 674889, BFN Degraded Voltage Methodology
SR 675093, Multiple Instances of Improper Ladder Storage/Equipment Being Secured
SR 675119, Oil leak on either end of HPCI Speed Reducer
SR 675166, Oil soak pads on the RCIC bedplate governor end
SR 675428, Design Criteria and FSAR inconsistencies
SR 675736, Investigate and repair Security Diesel engine oil leakage
SR 675955, Bolt missing from cover for 4KV480V Shutdown Board 1A Transformer TS1A
SR 676071, Excessive Oil/Water in the U2 HPCI Pit Sump
SR 676844, TS1A Transformer
SR 676854, Perform fan bearing lubrication on Security Diesel Engine
SR 677615, Evaluation for degraded non-conforming condition and operability for PER 208636 may not be adequate
SR 678244, Deficiencies regarding the resolution of a 2009 CDBI NRC identified issue
SR 679142, Operate fans for 4KV480V Shutdown Board Transformer
SR 679647, U1 DCN 51216 Documentation Issues
SR 681041, Evaluation of transformer loading needed
SR 681153, Remove oil level sight glass and clean
SR 682157, OPS AUO Training Enhancement
SR 682357, Evaluate PM testing for 4KV-480V Transformers
SR 682420, Acceptance criteria required security Diesel Generator-UPS BATT
SR 682435, Acceptance criteria required security Diesel Generator-UPS BATT
SR 682648, Approved PDO could not stand alone on it's own merit
SR 682907, RCIC Test Speed vs. Max Rated Speed
SR 682781, HPCI Test Speed vs. Max Rated Speed
SR 686951, Need Minor Maintenance WO for OPS test cooling fans for TS1A, TS1B, TS2A, TS2B, TS3A, TS3B
SR 687833, Document Packages Reviewed in BFN Focused Self-Assessment of CGD in BFN-ENG-12-013
SR 687904, Request for Instrument Measurement Uncertainty Evaluation
SR 688186, During the closure review process a Work Order page was inadvertently discarded
SR 688295, “A” EECW cones with openings larger than 1-8th inch
SR 688528, NRC Identified Non-Conservatism in HPCI TS Surveillance Testing

SR 688540, NRC Identified Non-Conservatism in RCIC TS Surveillance Testing
SR 688608, Diesel Generator could not transfer power due to UPS low battery load
SR 688951, NPG Work Control Process may not adequately support identification of DNC
SR 688973, Self Assessment lacking sufficient OE search
SR 689729, HPCI/RCIC Potential Test Deficiency CQS
SR 689762, Potential Violation Regarding HPCI IST Instrument Uncertainty
SR 689859, NRC Identified HPCI/RCIC Testing for PU Not Documented
SR 691485, 0-SR-3.7.4.1(CW) closed with chilled water flows outside the design flows
SR 696353, Degraded voltages used in MOV calculations