



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

August 14, 2012

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

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT  
05000390/2012003

Dear Mr. Shea:

On June 30, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Watts Bar Nuclear Plant, Unit 1. The enclosed inspection report documents the inspection results which were discussed on July 18, 2012, with Mr. D. Gronek and other members of the Watts Bar staff.

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

Two unresolved items (URIs) and two NRC identified findings of very low safety significance (Green) were identified during this inspection.

These findings were determined to involve violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Watts Bar 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 the Watts Bar Nuclear Plant.

J. Shea

2

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 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/**

Scott M. Shaeffer, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Docket Nos.: 50-390  
License No.: NPF-90

Enclosure: NRC Inspection Report 05000390/2012003  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

J. Shea

2

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 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/

Scott M. Shaeffer, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Docket Nos.: 50-390  
License No.: NPF-90

Enclosure: NRC Inspection Report 05000390/2012003  
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

X PUBLICLY AVAILABLE      ☐ NON-PUBLICLY AVAILABLE      ☐ SENSITIVE      X NON-SENSITIVE  
ADAMS: ☐ Yes      ACCESSION NUMBER: \_\_\_\_\_      X SUNSI REVIEW COMPLETE

OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:DRS	RII:DRP	RII:DRS	
SIGNATURE	Via email	SMS /RA for/	Via email	Via email	Via telecom	Via email	
NAME	RMonk	KMiller	TLighty	PHiggins	JHanna	AVargas	
DATE	08/13/2012	08/13/2012	08/13/2012	08/13/2012	08/13/2012	08/13/2012	
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII:DRP	RII:DRP					
SIGNATURE	JDH /RA/	SMS /RA/					
NAME	JHamman	SShaeffer					
DATE	08/13/2012	08/13/2012					
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY      DOCUMENT NAME: G:\DRP\RPB6\WATTS BAR\REPORTS\2012\003\WATTS BAR 2012003.DOCX

J. Shea

3

cc w/encl:  
D. E. Grissette  
Site Vice President  
Watts Bar Nuclear Plant  
Tennessee Valley Authority  
Electronic Mail Distribution

Ann Harris  
341 Swing Loop  
Rockwood, TN 37854

David H. Gronek  
Plant Manager  
Watts Bar Nuclear Plant, MOB 2R-WBN  
Tennessee Valley Authority  
Electronic Mail Distribution

D. K. Guinn  
Manager, Licensing  
Watts Bar Nuclear Plant, ADM 1L-WBN  
Tennessee Valley Authority  
P.O. Box 2000  
Spring City, TN 37381

E. J. Vigluicci  
Assistant General Counsel  
Tennessee Valley Authority  
Electronic Mail Distribution

Gordon P. Arent  
New Generation Licensing Manager  
Watts Bar Nuclear Plant, EQB 1B-WBN  
Tennessee Valley Authority  
P.O. Box 2000  
Spring City, TN 37381

County Mayor  
P.O. Box 156  
Decatur, TN 37322

County Executive  
375 Church Street  
Suite 215  
Dayton, TN 37321

Tennessee Department of Environment &  
Conservation  
Division of Radiological Health  
401 Church Street  
Nashville, TN 37243

J. Shea

4

Letter to Joseph Shea from Scott Shaeffer dated August 14, 2012

SUBJECT: WATTS BAR NUCLEAR PLANT - NRC INTEGRATED INSPECTION REPORT  
05000390/2012003

Distribution w/encl:

C. Evans, RII

L. Douglas, RII

OE Mail

RIDSNRRDIRS

PUBLIC

RidsNrrPMWattsBar1 Resource

RidsNrrPMWattsBar2 Resource

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No.: 50-390

License No.: NPF-90

Report No.: 05000390/2012003

Licensee: Tennessee Valley Authority (TVA)

Facility: Watts Bar Nuclear Plant, Unit 1

Location: Spring City, TN 37381

Dates: April 1 through June 30, 2012

Inspectors: R. Monk, Senior Resident Inspector  
K. Miller, Resident Inspector  
T. Lighty, Project Engineer (Section 1R17)  
P. Higgins, Senior Reactor Inspector (Section 1R17)  
A. Vargas, Reactor Inspector (Section 1R17)  
T. Su, Trainee

Approved by: Scott M. Shaeffer, Chief  
Reactor Projects Branch 6  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000390/2012-003; 04/01/2012 – 06/30/2012; Watts Bar, Unit 1; Fire Protection, Flood Protection Measures, Identification and Resolution of Problems, and Evaluation of Changes, Tests, or Experiments, and Permanent Plant Modifications.

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional inspectors. Two Green findings were identified, which involved non-cited violations (NCVs) of NRC requirements. The significance of most findings is identified by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP); the cross-cutting aspect was determined using IMC 0310, "Components Within the Cross-Cutting Areas." Findings for which the SDP 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" Revision 4, dated December 2006.

### A. NRC-Identified Findings and Self-Revealing Findings

#### Cornerstone: Mitigating Systems

- Green The inspectors identified a Green NCV of 10CFR50 Appendix B Criterion XVI for failure to identify that the 1A auxiliary charging pump (ACP) was degraded based on previous questionable testing results. The inspectors determined that no acceptable testing had been performed which verified the functionality of 1A and 1B ACP until March 23, 2012. During subsequent testing, only the 1B ACP met its acceptance criteria. This system relies on the capability of these pumps to support Technical Requirement 3.7.2, Flood Mode Protection Plan.

The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the 1A ACP was unable to perform its function in the event of severe external flooding for > 1 year. The inspectors performed a Phase 1 evaluation per Inspection Manual Chapter 0609, Attachment 4 and determined that the finding was potentially risk significant due the degradation of equipment specifically designed to mitigate external events (e.g., flooding mitigation). Consequently a Phase 3 analysis was performed by a Senior Reactor Analyst. The analyst determined that the risk significance of the issue was very low (i.e.,  $\Delta\text{CDF} < 1.0\text{E}-7$ ). The dominant sequence was a significant flooding event which would require the licensee to implement their Flood Mode Mitigation strategy, with the subsequent failure of a single train of ACP pumps for the system. The finding directly involved the cross-cutting area of human performance under the supervisory and management oversight of work activities component, in that, the failures of the ACPs were left unresolved for an extended period of time over a number of failed tests. (H.4(c)). (Section 4OA2)

Enclosure

- Green. The team identified a Green non-cited violation (NCV) of 10 Code of Federal Regulations (CFR) Part 50, Appendix B, Criterion III, "Design Control", for the licensee's failure to maintain steam generator blowdown (SGBD) isolation valves 1-FCV-1-181, 182, 183, and 184 in the environmental qualification (EQ) program. Removing the valves from the EQ database resulted in internal components (lower bottom gasket and reed switch) in the SGBD valves exceeding their qualified life and replacement intervals as stated in the licensee's existing EQ and revised EQ calculations. The licensee entered this issue into their corrective action program as problem evaluation report (PER) 495239 and service request (SR) 562298, and performed additional analyses and evaluations to provide reasonable assurance of operability of components.

The team determined that the failure to maintain SGBD isolation valves 1-FCV-1-181, 182, 183, and 184 in the EQ program, which resulted in two subcomponents in these valves exceeding their qualified life and replacement interval, is a performance deficiency. In addition, the licensee failed to perform an adequate functional evaluation to confirm operability of these valves after the NRC identified that the reed switch was not included in the original functional evaluation. The revised EQ calculation performed by the licensee to address the lower bottom gasket indicated the reed switch had exceeded its qualified life of 13.5 years; however, this was not addressed in the licensee's functional evaluation until identified by the NRC. This performance deficiency was more than minor because it affected the Mitigating System Cornerstone attribute of design control to ensure the availability, reliability, and capability of safety systems that respond to initiating events to prevent undesirable consequences. In addition, this performance deficiency also closely parallels Inspection Manual Chapter 0612, Appendix E, example 3.j because the error resulted in a condition where there was a reasonable doubt of the operability of safety related components as a result of the revised EQ calculation. The team screened this finding in accordance with NRC IMC 0609, "Initial Screening and Characterization of Findings," Attachment 4, Phase 1, and determined the finding was of very low safety significance (Green). The team determined that no cross-cutting aspect was applicable because this finding was not indicative of current licensee performance. (Section 1R17)

B. Licensee-Identified Violations

None.



## **REPORT DETAILS**

### **Summary of Plant Status**

Unit 1 operated at or near 100 percent rated thermal power (RTP) for the entire reporting period.

#### **1. REACTOR SAFETY**

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### **1R01 Adverse Weather**

##### **.1 Review of Offsite and Alternate AC Power System Readiness**

###### **a. Inspection Scope**

Inspectors verified plant features, interviewed control room personnel, and reviewed procedures for operation and continued availability of offsite and alternate AC power systems and determined they were appropriate. Inspectors reviewed the licensee's procedures and interface agreements affecting these areas and the communications protocols between the northeast area dispatcher and the control room to verify that the appropriate information is exchanged when issues arise that could impact the offsite power system and the alternate AC power system. Documents reviewed are listed in the attachment.

###### **b. Findings**

No findings were identified.

#### **1R04 Equipment Alignment**

##### **.1 Partial System Walkdowns**

###### **a. Inspection Scope**

The inspectors conducted three equipment alignment partial walkdowns, listed below, to evaluate the operability of selected redundant trains or backup systems with the other train or system inoperable or out of service. The inspectors reviewed the functional system descriptions, Updated Final Safety Analysis Report (UFSAR), system operating procedures, and technical specifications (TS) to determine correct system lineups for the current plant conditions. The inspectors performed walkdowns of the systems to verify that critical components were properly aligned and to identify any discrepancies which could affect operability of the redundant train or backup system. Documents reviewed are listed in the attachment.

Enclosure

- Partial walkdown of alignment for residual heat removal (RHR) pump 1B-B while RHR pump 1A-A out of service (OOS) for maintenance
- Partial walkdown of alignment for containment spray (CS) pump 1B-B while CS pump 1A-A OOS for maintenance
- Partial walkdown of 1B component cooling system (CCS) pump while 1A CCS pump OOS for planned maintenance

b. Findings

No findings were identified.

1R05 Fire Protection

Fire Protection Tours

a. Inspection Scope

The inspectors conducted tours of the nine areas important to reactor safety, listed below, to verify the licensee's implementation of fire protection requirements as described in the Fire Protection Program, Nuclear Power Group Standard Programs and Processes (NPG-SPP)-18.4.6, Control of Fire Protection Impairments, NPG-SPP-18.4.7, Control of Transient Combustibles, NPG-SPP-18.4.8, Control of Ignition Sources (Hot Work). The inspectors evaluated, as appropriate, conditions related to: (1) licensee control of transient combustibles and ignition sources; (2) the material condition, operational status, and operational lineup of fire protection systems, equipment, and features; and (3) the fire barriers used to prevent fire damage or fire propagation. This activity constituted nine inspection samples.

- A RHR pump room, B RHR pump room
- A CS pump room, B CS pump room
- Turbine-driven auxiliary feedwater (TDAFW) room
- A centrifugal charging pump (CCP) room, B CCP room
- A safety injection pump (SIP) room, B SIP room

b. Findings

No findings were identified.

1R06 Flood Protection

a. Inspection Scope

The inspectors reviewed internal flood protection measures for the intake pumping station (IPS). Flood protection features were examined to verify that features were maintained consistent with the plant design basis. The inspectors also reviewed the licensee flooding study calculation for determining maximum flood level in all building rooms for piping failures in both the essential raw cooling water (ERCW) system and the

Enclosure

fire protection system and confirmed that flood mitigation features such as drains and curbs were not degraded in such a manner as to adversely impact the conclusions of the study. Additionally, inspectors reviewed the performance aspects of the IPS sump pumps as it relates to supporting flooding from external sources. Documents reviewed are listed in the Attachment.

b. Findings

.1 0-CKV-040-0604, 0-PUMP-040-003B discharge check valve

Introduction: The inspectors identified a unresolved item (URI) related to 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, for failure to take timely corrective action on CKV-040-0604, 0-PUMP-040-003B discharge check valve.

Description: During the semi-annual internal flooding inspection, inspectors were verifying the licensee's capability to insure that the intake pumping station (IPS) sump pumps were capable of removing assumed leakage into the ERCW strainer rooms, A train and B train.

This system relies on the capability of two 25 gpm sump pumps in each strainer room to remove leakage from ERCW strainers and fire protection strainers. Additionally, they are credited in the external flooding study to be operable to remove any leakage through the exterior of the building. The pumps discharge through individual check valves into a common pipe which dumps into the sluice trough external to the room. These piping outlets are submerged during the probable maximum flood. Therefore, the individual check valves, in addition to preventing recirculation between the pumps, also prevent flood waters from entering the room. These ERCW strainers are required for operation of the ERCW system A train and the fire protection system A train.

Inspectors reviewed the maintenance history of the check valves to verify that they were being maintained in a manner that would fulfill their operability requirements. These check valves are in the Augmented Inservice Testing (AIST) Program under a two-year test frequency.

Licensee records indicate that on March 8, 2008, 3A sump pump exhibited low flow below the allowable limits of TI-50.021, Intake Pumping Station Strainer Room A Sump Pump A Performance Test, and exhibited bubbling from the opposite sump pump suction 3B, indicating back leakage past check valve CKV-040-0604, 0-PUMP-040-003B discharge check valve. This resulted in problem evaluation report (PER) 139387 and work order (WO) 08-812124. This PER was closed to previously existing PER 128435 dated August 4, 2007, which also was for flow-related issues. WO 08-812124 has not been located and check valve CKV-040-0604 was not entered into the work control process at that time. PER 128435 was an all-encompassing PER for both A train sump pumps 3A and 3B. The next performance of TI-50.021 on March 1, 2009, the 3A sump pump yielded zero flow and the operator noted bubbles coming from the opposite sump pump, which again implicated the opposite train check valve 0-CKV-040-0604 as leaking backward past the seat sufficiently to prevent the 3A sump pump from removing water from the sump it shares with the 3B sump pump. WO 09-812234 was written for this

Enclosure

check valve specifically. This WO was performed and its associated post maintenance test was signed off as satisfactory on April 15, 2010. TI 50-021 was performed the next day, April 16, 2010, at which time the 3A sump pump failed on low flow. However, there appeared to be no back leakage of CKV-040-0604. PER 225913 was written as a result of the test failure which closed to WO 110952174 for check valve 0-CKV-040-0606, 0-PUMP-040-003A discharge check valve for apparently being partially stuck shut. On October 19, 2011, in a situation of high demand due to fire pump strainer leakage, the licensee determined that check valve CKV-040-0604 was stuck open sufficiently to render sump pump 3A incapable of lowering level due to back leakage through check valve CKV-040-0604. As a result, service request (SR) 448624 was initiated and resulted in WO 112833360 which is scheduled to work December 11, 2012. On June 18, 2012, TI-50.021 was performed and failed. As such, no satisfactory testing has been shown to verify the functionality of CKV-040-0604 since April 16, 2010. Pending additional information from the licensee which can verify the adequacy of the corrective action for check valve 0-CKV-040-0606, this item is identified as unresolved item (URI) 050000390/2012003-01, Failure to Demonstrate Corrective Actions for check valve 0-CKV-040-0604.

## .2 Intake Structure Sump Pumps 3A and 3B

Introduction: The inspectors identified a URI related to 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, for failure to take adequate corrective actions to ensure the reliability of A train sump pumps 3A and 3B.

Description: During the semi-annual internal flooding inspection, inspectors were verifying the licensee's capability to insure that the IPS sump pumps were capable of removing assumed leakage into the ERCW strainer rooms, A train and B train.

This system relies on the capability of two 25 gpm sump pumps in each strainer room to remove leakage from ERCW strainers and fire protection strainers. Additionally, they are credited in the external flooding study to be operable to remove any leakage through the exterior of the building. These ERCW strainers are required for operation of the ERCW system A train and the fire protection system A train.

Inspectors reviewed the maintenance history of the sump pumps to verify that they were being maintained in a manner that would fulfill their operability requirements. These pumps are in the Augmented Inservice Testing (AIST) Program under a two-year test frequency.

Licensee records indicate that on November 4, 2007, the 3A sump pump was replaced. Each subsequent test following this time frame has exhibited continual decreasing flow below the allowable limits of TI-50.021, Intake Pumping Station Strainer Room A Sump Pump A Performance Test, up until the present. On November 2, 2007, 3B sump pump was replaced with the power leads reversed leading to reverse rotation and low flow. This was not corrected until January 24, 2008. The sump pump tested satisfactorily until January 16, 2011, when the scheduled test per TI-50.022, Intake Pumping Station Strainer Room A Sump Pump B Performance Test, was aborted due to a failed breaker disconnect switch which had been in the work planning system since 2009. On October

Enclosure

19, 2011, in a situation of high demand due to fire pump strainer leakage, the licensee determined that sump pump 3B would not start in local manual control. Additionally, the 3A sump pump was pumping, but all flow was being pumped backward through 3B sump pump. This resulted in an inability of the sumps pumps to remove water from the room. Operator actions were required in this remote structure to stop the level of water rise. Pending additional information from the licensee which can verify the adequacy of the corrective action for IPS sump pump 3B start failure, this item is identified as URI 050000390/2012003-02, Failure to Demonstrate Corrective Actions for IPS Sump Pump 3B.

#### Cables in Underground Manholes

##### a. Inspection Scope

Inspectors directly observed five underground bunker/manholes subject to flooding that contained cables whose failure could disable risk-significant equipment. Specific attributes evaluated were: (1) the cables were not submerged in water; (2) the cables and/or splices appeared intact and the material condition of cable support structures was acceptable; and (3) dewatering devices (sump pump) operation and level alarm circuits were set appropriately to ensure that the cables would not be submerged or were in an environment for which they were qualified. Below are the bunker/manholes that were inspected.

- Manholes 8A, 8B, 7A, 7B, 6A,

##### b. Findings

No findings were identified.

#### 1R11 Licensed Operator Regualification

##### .1 Quarterly Review

##### a. Inspection Scope

On June 12, 2012, the inspectors observed a simulator evaluation for Operations Crew 4 per 3-OT-SRT-AOI-6-1, Loss of LCV-106 and Small RCS Leak, Revision 0. The plant conditions led to a Notification of Unusual Event level classification and an Alert level classification. Performance Indicator credit was taken.

The inspectors specifically evaluated the following attributes related to the operating crew's performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of AOIs, and emergency operating instructions

Enclosure

- Timely and appropriate Emergency Action Level declarations per emergency plan implementing procedures (EPIP) Control board operation and manipulation, including high-risk operator actions Command and control provided by the unit supervisor and shift manager

The inspectors also attended the critique to assess the effectiveness of the licensee evaluators and to verify that licensee-identified issues were comparable to issues identified by the inspector.

b. Findings

No findings were identified.

.2 Review of Crew Retest

a. Inspection Scope

On June 15, 2012, the inspectors observed a simulator evaluation retest for Operations Crew 4 per 3-OT-SRT-H1-2a, Loss of Feedwater Induced Loss of Secondary Heat Sink, Revision 0, due to a crew failure on June 12, 2012. The plant conditions led to a Site Area Emergency level classification. Performance Indicator credit was taken.

The inspectors specifically evaluated the following attributes related to the operating crew's performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of AOIs, and emergency operating instructions
- Timely and appropriate Emergency Action Level declarations per emergency plan implementing procedures (EPIP) Control board operation and manipulation, including high-risk operator actions Command and control provided by the unit supervisor and shift manager

The inspectors also attended the critique to assess the effectiveness of the licensee evaluators, and to verify that licensee-identified issues were comparable to issues identified by the inspector.

b. Findings

No findings were identified.

### .3 Control Room Observations

#### a. Inspection Scope

Inspectors observed and assessed licensed operator performance in the plant and main control room, particularly during periods of heightened activity or risk and where the activities could affect plant safety. Inspectors reviewed various licensee policies and procedures such as OPDP-1, Conduct of Operations, NPG-SPP-10.0, Plant Operations and GO-4, Normal Power Operation.

Inspectors utilized activities such as post maintenance testing, surveillance testing and refueling, and other outage activities to focus on the following conduct of operations as appropriate;

- Operator compliance and use of procedures
- Control board manipulations
- Communication between crew members
- Use and interpretation of plant instruments, indications and alarms
- Use of human error prevention techniques
- Documentation of activities, including initials and sign-offs in procedures
- Supervision of activities, including risk and reactivity management
- Pre-job briefs

#### b. Findings

No findings were identified

### 1R12 Maintenance Effectiveness

#### a. Inspection Scope

The inspectors reviewed the one performance-based problem listed below. A review was performed to assess the effectiveness of maintenance efforts that apply to scoped structures, systems, or components (SSCs) and to verify that the licensee was following the requirements of TI-119, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65, and NPG-SPP-03.4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting 10 CFR 50.65. Reviews focused, as appropriate, on: (1) appropriate work practices; (2) identification and resolution of common cause failures; (3) scoping in accordance with 10 CFR 50.65; (4) characterization of reliability issues; (5) charging unavailability time; (6) trending key parameters; (7) 10 CFR 50.65 (a)(1) or (a)(2) classification and reclassification; and (8) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1).

- Review of service air a(1) plan, Revision 2

Enclosure

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Controla. Inspection Scope

The inspectors evaluated, as appropriate, for the four work activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65 (a)(4); NPG-SPP-07.0, Work Control and Outage Management; NPG-SPP-07.1, On Line Work Management; and TI-124, Equipment to Plant Risk Matrix. This inspection satisfied five inspection samples for Maintenance Risk Assessment and Emergent Work Control.

- Risk assessment for emergent failure of A-A main control room chiller while A-A electric boardroom chiller OOS. Yellow condition.
- Risk assessment for work week 405 with 1A CCS pump and 1A ERCW pump OOS with auxiliary building and control building core drilling
- Risk assessment for work week 406 with 2A emergency diesel generator (EDG) and 1A ERCW pump OOS with core drilling of the main control room habitability boundary
- Risk assessment for work week 410 with 2A EDG, 1A safety injection pump and C-S CCS pump OOS for planned maintenance

b. Findings

No findings were identified.

1R15 Operability Evaluationsa. Inspection Scope

The inspectors reviewed four operability evaluations affecting risk-significant mitigating systems, listed below, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether the compensatory measures, if involved, were in place, would work as intended, and were appropriately controlled; (4) where continued operability was considered unjustified, the impact on TS Limiting Conditions for Operation (LCOs) and the risk significance in accordance with the significant determination process (SDP). The inspectors verified that the operability evaluations were performed in accordance with NPG-SPP-03.1, Corrective Action Program. Documents reviewed are listed in the Attachment.

Enclosure



- Functional evaluation (FE) for PER 154477, Design basis flood impact
- Acceptance evaluation for PER 428258, 1B CS pump power cable bend radius
- FE for PERs 335459 and 369782, Revision 5, for seismic qualification of replacement Heinemann molded case circuit breakers in 120 vac vital instrument power boards
- Past operability evaluation for PER 555292, Loose ERCW strainer 1B flush valve

b. Findings

No findings were identified.

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed selected samples of evaluations to confirm that the licensee had appropriately considered the conditions under which changes to the licensee's Updated Final Safety Analysis Report (UFSAR), or procedures may be made, and tests conducted, without prior NRC approval. The inspectors reviewed evaluations for six changes and additional information, such as drawings, calculations, supporting analyses, the UFSAR, and technical specifications (TS) to confirm that the licensee had appropriately concluded that the changes could be accomplished without obtaining a license amendment. The six evaluations reviewed are listed in the Attachment.

The inspectors reviewed samples of changes for which the licensee had determined that evaluations were not required to confirm that the licensee's conclusions to "screen out" these changes were correct and consistent with 10CFR50.59. The twenty-one "screened out" changes reviewed are listed in the Attachment.

The inspectors evaluated engineering design change packages for 12 material, component, and design-based modifications to evaluate the modifications for adverse effects on system availability, reliability, and functional capability. The 12 modifications are listed below:

- Design change notice (DCN) 54785: Replace Unit 1 RCCAS And Rod Drives
- DCN 52998: Remove Blank Off Plates and Install Dampers to Isolate Unit 2 Annulus From Unit 1 EGTS
- DCN 53216: Add Isolation Devices to Separate Annunciation Circuitry From CLASS 1E Instrumentation
- DCN 53238: Replace Obsolete FCI Flow Switches With New FLT93F Model
- DCN 58263: Replace RHR Sump Strainer Plenum Cover Plate With Cover Plate Using Larger Orifices
- DCN 54102: Remove Isolator From Sense Line Between SDBR Chiller Condenser and TCV
- DCN 54315: Replace Obsolete 0-12CFM Rotameters On Control RM Intake Ventilation RAD Monitors
- DCN 54365: Replace Identified Obsolete MCR Recorders

Enclosure

- DCN 55076: Replace Diesel Generator Battery Chargers With Dual Chargers PER Generator Set
- DCN 55661: Replace Unit 2 B Train General Vent EXH ABSCE Dampers to Recover ABGTS MARGIN
- DCN 58649: Replace 1-MTR-30-175-A
- DCN 57975: Modifications To 1-PCV-3-122/-132

Documents reviewed included procedures, engineering calculations, modification design and implementation packages, WOs, site drawings, corrective action documents, applicable sections of the living UFSAR, supporting analyses, TS, and design basis information. Additionally, the inspectors reviewed test documentation to ensure adequacy in scope and conclusion. The inspectors' review was also intended to verify that all appropriate details were incorporated in licensing and design basis documents and associated plant procedures.

The inspectors also reviewed selected PERs and the licensee's recent self-assessment associated with modifications and screening/evaluation issues to confirm that problems were identified at an appropriate threshold, were entered into the corrective action process, and appropriate corrective actions had been initiated and tracked to completion.

b. Findings

Introduction: The team identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for the licensee's failure to maintain steam generator blowdown (SGBD) isolation valves 1-FCV-1-181, 182, 183, and 184 in the environmental qualification (EQ) program. Removing the valves from the EQ database, resulted in internal components (lower bottom gasket and reed switch) in the SGBD valves exceeding their qualified life and replacement intervals as stated in the licensee's existing EQ and revised EQ calculations. The licensee entered this issue into their corrective action program as PER 495239 and SR 562298 and performed additional analyses and evaluations to provide reasonable assurance of operability of components.

Description: Licensee corrective action document PER 495239, dated February 3, 2012, identifies the SGBD isolation valves as being improperly removed from the EQ program. These valves were removed from the EQ program in 1997, as part of a design change (DCN S-39255-A) which was subsequently cancelled without reinstating the valves into the EQ program. In response to the PER, the licensee reviewed the subcomponents of the valves to determine if the valves remained functional. During this review, the licensee determined that the only subcomponent that had exceeded its replacement interval, and potentially its qualified lifetime, was the lower bottom gasket (5 yr replacement interval, 5.72 years qualified life). As part of a FE for the valves, the licensee performed additional calculations on the gaskets. In these additional calculations the licensee increased the activation energy from 1.14eV to 1.44eV and lowered the service temperature from 250°F to 120-130°F to reflect lower bottom gasket material and to more closely reflect actual plant conditions. The licensee concluded that the gaskets remained within their qualified lifetimes (17 years). Below are the actual

Enclosure

ages of the lower bottom gaskets at the time of their next scheduled replacement (next refueling outage):

- 1-FCV-1-181 (16 years, 3 months, 27 days)
- 1-FCV-1-182 (2 years, 11 months, 7 days)
- 1-FCV-1-183 (16 years, 3 months, 21 days)
- 1-FCV-1-184 (16 years, 3 months, 30 days)

During review of this issue, the NRC inspectors noted that another subcomponent of the valves, the reed switch, also exceeded its qualified lifetime (13.5 years) as documented in the revised EQ calculation for the SGBD isolation valves, but was not addressed in the existing FE. As a result, the licensee performed another FE and additional calculations on the SGBD isolation valves, and concluded that the reed switch remained within its qualified lifetime (30.7 years) after changing the activation energy from .98eV to 1.14eV to reflect the correct material used in the reed switch. The licensee entered this failure to evaluate the acceptability of the reed switch in the original FE into the corrective action program as SR 562298.

Analysis: The team determined that the failure to maintain SGBD isolation valves 1-FCV-1-181, 182, 183, and 184 in the EQ program, which resulted in two subcomponents in these valves exceeding their qualified life and replacement interval, is a performance deficiency. In addition, the licensee failed to perform an adequate FE to confirm operability of these valves after the NRC identified that the reed switch was not included in the original FE. The revised EQ calculation performed by the licensee to address the lower bottom gasket indicated the reed switch had exceeded its qualified life of 13.5 years; however, this was not addressed in the licensee's FE until identified by the NRC. This performance deficiency was more than minor because it affected the mitigating system cornerstone attribute of design control to ensure the availability, reliability, and capability of safety systems that respond to initiating events to prevent undesirable consequences. In addition, this performance deficiency also closely parallels Inspection Manual Chapter (IMC) 0612, Appendix E, Example 3.j, because the error resulted in a condition where there was a reasonable doubt of the operability of safety-related components as a result of the revised EQ calculation. Specifically, the licensee failed to perform an adequate FE to confirm valve operability by not including the reed switch in the evaluation after the revised EQ calculation indicated the reed switch exceeded its qualified life and replacement interval. The deficiencies described above resulted in a reasonable doubt that safety-related equipment could perform their functions. The team screened this finding in accordance with NRC IMC 0609, "Initial Screening and Characterization of Findings", Attachment 4, Phase 1, and determined the finding was of very low safety significance (Green) because it was a qualification deficiency confirmed not to result in the loss of operability or functionality. The team determined that no cross-cutting aspect was applicable because this finding was not indicative of current licensee performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, "Design Control" requires, in part, that "measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings,

Enclosure

procedures, and instructions.” Contrary to the above, in 1997 the licensee inadvertently removed SGBD isolation valves 1-FCV-1-181, 182, 183, and 184 from the EQ program, which resulted in subcomponents (lower bottom gaskets) in these valves exceeding their replacement interval. In addition, the licensee failed to perform an adequate FE to confirm valve operability by not including the reed switch in the evaluation after the revised EQ calculation indicated the reed switch exceeded its qualified life and replacement interval. Because this finding was of very low safety significance and because it was entered into the licensee’s corrective action program as PER 495239 and SR 562298, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy, and designated as NCV 05000390/2012003-03, Failure to Maintain Steam Generator Blowdown Isolation Valves (SGBD) 1-FCV-1-181, 182, 183, and 184 in the Environmental Qualification Program.

#### 1R19 Post-Maintenance Testing

##### a. Inspection Scope

The inspectors reviewed seven post-maintenance test procedures and/or test activities, (listed below) as appropriate, for selected risk-significant mitigating systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform its safety function. The inspectors verified that these activities were performed in accordance with NPG-SPP-06.9, Testing Programs; NPG-SPP-06.3, Pre-/Post-Maintenance Testing; and NPG-SPP-07.1, On Line Work Management.

- WO 113325321, 1-FI-3-147A, AFW flow indication for #3 steam generator
- WO 112744598, 1-FCV-067-0066-A, DG 1A-A hx 1A1/1A2 ERCW sup hdr 1A isol, replace ss1x relay
- WO 112967397, 1-PS-082-0180, Pressure control switch on compressor 1 for EDG engine 1A1 (switch re-calibration)
- WO 112876637, 1-MTR-030-0175-A, RHR pump 1A-A room cooler motor, per master PM 1548V
- WO 113145020, A ABGTS damper 1-FCO-30-146B-A full open adjustment
- WO 112800783, 1-MVOP-072-0034-A, Containment spray pump A recirc flow control valve, per PM 1380V
- WO 10812584-000, Replacement of component cooling system motor 1-MTR-070-0046-A

##### b. Findings

No findings were identified

Enclosure

## 1R22 Surveillance Testing

### a. Inspection Scope

The inspectors witnessed seven surveillance tests and/or reviewed test data of selected risk-significant SSCs, listed below, to assess, as appropriate, whether the SSCs met the requirements of the TS; the UFSAR; NPG-SPP-06.9, Testing Programs; NPG-SPP-06.9.2, Surveillance Test Program; and NPG-SPP-09.1, ASME Section XI. The inspectors also determined whether the testing effectively demonstrated that the SSCs were operationally ready and capable of performing their intended safety functions.

#### In-Service Test:

- WO 112714932, 1-SI-3-902, Turbine driven auxiliary feedwater pump 1A-S quarterly performance test
- WO 112714743, 1-SI-74-901-A, Residual heat removal pump 1A-A quarterly performance test
- WO 112715494, 1-SI-62-901-B, Centrifugal charging pump 1B-B quarterly performance test
- WO 112714885, 1-SI-3-908, Valve full stroke exercising during plant operation – turbine driven auxiliary feedwater

#### Other Surveillances

- WO 112040733, 0-FOR-26-25, 18-month diesel driven fire pump capability test
- WO 113466948, TI- 50-048, Flood mode auxiliary charging pump 1A performance test
- WO 112922653, Control room emergency ventilation system monthly operability test – train A

### b. Findings

No findings were identified

Cornerstone: Emergency Preparedness

## 1EP6 Drill Evaluation

### a. Inspection Scope

On May 17, 2012, the inspectors observed a licensee-evaluated emergency preparedness drill, listed below, to verify that the emergency response organization was properly classifying the event in accordance with emergency plan implementing procedure (EPIP)-1, Emergency Plan Classification Flowchart, and making accurate and timely notifications and protective action recommendations in accordance with EPIP-2, Notification of Unusual Event; EPIP-3, Alert; EPIP-4, Site Area Emergency; EPIP-5, General Emergency; and the radiological emergency plan. In addition, the inspectors

Enclosure

verified that licensee evaluators were identifying deficiencies and properly dispositioning performance against the performance indicator criteria in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline.

- A fire occurs on transformer 1-OXF-203-A, feeding 480VAC unit board 1A requiring a unit down power due to spread of the fire.
- The rotor locks on #1 RCP requiring an automatic reactor trip which does not occur. Neither does the manual reactor trip function resulting in an anticipated transient without scram (ATWS) condition. This leads to a condition requiring a Site Area Emergency declaration.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

The inspectors sampled licensee submittals for the two PIs listed below. To verify the accuracy of the PI data reported during the periods listed, PI definitions and guidance contained in NEI 99-02, Regulatory Assessment Indicator Guideline, Revision 5, were used to verify the basis in reporting for each data element.

- RCS leakage
- Safety system functional failure

4OA2 Identification & Resolution of Problems

.1 Review of Items Entered into the CAP

As required by Inspection Procedure (IP) 71152, Identification and Resolution of Problems, and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily PER summary reports and periodically attending daily PER review meetings.

.2 Semi-Annual Review to Identify Trends

a. Inspection Scope

As required by IP 71152, Identification and Resolution of Problems, the inspectors performed a review of the licensee's corrective action program (CAP) and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on human performance trends, licensee trending efforts, and repetitive equipment and corrective maintenance issues. The inspectors also considered the results of the daily inspector CAP item screening discussed in Section 4OA2.1. The inspectors' review nominally considered the six-

Enclosure

month period of January 2012 through June 2012, although some examples expanded beyond those dates when the scope of the trend warranted.

b. Observations

No findings were identified. However, the inspectors identified that there continues to be a high level of inputs into the system. Some discriminators have been put into the process, for example, housekeeping issues. The licensee continues to close new PERs to older PERs which allows problems to linger for longer periods of time. (See URIs in this report). In the past, PERs could be closed to open WOs; however, this practice has been eliminated in a new revision to the program. This practice has caused significant issues in the past, for example, in the 6.9 kV breaker program as documented in previous inspections reports. The revision to the program went into effect during this reporting period, and it is too soon to evaluate the impact.

.3 Annual Sample: Review of Operator Workarounds

a. Inspection Scope

The inspectors reviewed the operator workaround program to verify that workarounds were identified at an appropriate threshold, were entered into the CAP, and that corrective actions were proposed or implemented. Specifically, the inspectors reviewed the licensee's workaround list and repair schedules, conducted tours, and interviewed operators about required compensatory actions. Additionally, the inspectors looked for undocumented workarounds, reviewed appropriate system health documents, and reviewed PERs related to items on the workaround list. Documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

.4 Corrective Actions Associated with NCV 05000390/2009005-01, Failure to Implement Analysis for Failed Auxiliary Charging Pumps

a. Inspection Scope

The inspectors reviewed the results of the significance determination process (SDP) from URI 050000390/2012002-04, Failure to Demonstrate Corrective Actions for the Auxiliary Charging Pumps, Integrated Inspection Report (IIR) 050000390/2012002. The SDP resulted in a Green finding.

b. Findings and Observations

Introduction: The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, for failure to identify degraded auxiliary charging pump.

Enclosure

Description: During the review of test data for Auxiliary Charging Pumps, inspectors determined that no acceptable testing had been performed which verified the functionality of the auxiliary charging pumps (ACPs) 1A and 1B. Based on the inspectors questioning of the existing test criteria and results, the licensee decided to retest the 1A and 1B pumps. On March 23, 2012 these pumps were tested and only the 1B ACP met its acceptance criteria, and the 1A ACP failed. This system relies on the capability of these pumps to support Technical Requirement 3.7.2 Flood Mode Protection Plan.

Analysis: The performance deficiency was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the 1A ACP was unable to perform its function in the event of severe external flooding for > 1 year. The inspectors performed a Phase 1 evaluation per Inspection Manual Chapter 0609, Attachment 4 and determined that the finding was potentially risk significant due the degradation of equipment specifically designed to mitigate external events (e.g., flooding mitigation). Consequently a Phase 3 analysis was performed by a Senior Reactor Analyst. The analyst determined that the risk significance of the issue was very low (i.e.,  $\Delta CDF < 1.0E-7$ ). The dominant sequence was a significant flooding event which would require the licensee to implement their Flood Mode Mitigation strategy, with the subsequent failure of a single train of ACP for the system. The finding directly involved the cross-cutting area of human performance under the supervisory and management oversight of work activities component, in that, the failures of the ACPs were left unresolved for an extended period of time over a number of failed tests. (H.4(c)).

Enforcement: 10 CFR 50 Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality such as malfunctions, are promptly identified and corrected. Contrary to the above, the licensee failed to identify that the 1A pump was degraded based on previous questionable testing results. Because this violation was of very low safety significance and was entered into the licensee's CAP (PER 529468), this violation is being treated as an NCV consistent with the NRC Enforcement Policy: NCV 05000390/2012003-04, Failure to Identify Degraded Auxiliary Charging Pump and Initiate Corrective Actions.

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

Enclosure



These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings were identified.

4OA6 Meetings, including Exit

Exit Meeting Summary

On July 18, 2012, the resident inspectors presented the quarterly inspection results to Mr. Dave Gronek, Plant Manager, and other members of the licensee staff. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

4OA7 Licensee Identified Violations

None.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

T. Detchemende, Emergency Preparedness Manager  
K. Dutton, Engineering Director  
D. Gronek, Plant Manager  
D. Grissette, Site Vice President  
D. Guinn, Licensing Manager  
E. Higgins, Mechanical/Civil Design Manager  
W. Hooks, Radiation Protection Manager  
D. Hughes, Training Supervisor  
B. Hunt, Operations Support Superintendent  
D. Jacques, Security Manager  
A. Jenkins, Chemistry Manager  
R. Kirkpatrick, Design Engineering Manager  
D. Murphy, Maintenance Manager  
A. Phillips, Operations Support  
W. Prevatt, Operations Manager  
A. Scales, Work Control Manager  
S. Sweet, Licensing Engineer

### **ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened**

050000390/2012003-01	URI	Failure to Demonstrate Corrective Actions for Check Valve 0-CKV-040-0604 (Section 1R06.1).
050000390/2012003-02	URI	Failure to Demonstrate Corrective Actions for IPS Sump Pumps 3A and 3B (Section 1R06.2)

#### **Opened and Closed**

050000390/2012003-03	NCV	Failure to Maintain Steam Generator Blowdown Isolation Valves in the Environmental Qualification Program. (Section 1R17)
050000390/2012003-04	NCV	Failure to Identify Degraded Auxiliary Charging Pump and Initiate Corrective Actions. (Section 4OA2)

Closed

05000390/2011005-03	URI	Failure to Comply with Technical Specification Requirement 3.8.4.14 for Vital Batteries III and IV (See IR 05000390/20120002, Section 4OA3)
050000390/2012002-04	URI	Failure to Demonstrate Corrective Actions for the Auxiliary Charging Pumps (Section 4OA2)

Discussed

None.

**LIST OF DOCUMENTS REVIEWED****Section 1R01: Adverse Weather Protection**

TVA-SPP-10.010, NREC Standard Compliance Processes Shared by TVA's Nuclear Power and Energy Delivery Organizations  
TRO-TO-SOP-30.130, Watts Bar Nuclear Plant (WBN) Grid Operating Guide  
NPG-SPP-07.1.6, On Line Work Control Power System Alerts / Offsite Power  
NPG-SPP-07.1.7, Station Seasonal Readiness  
TI-12.15, 161KV Offsite Power Requirements  
TRO-TO-SOP-30.101, Nuclear Offsite Power Distribution Notification and Call-Out Procedure  
TRO-SPP-30.006, Supervisory Control Data Acquisition (SCADA) and Energy Management System (EMS) Impairment Procedure

**Section 1R04: Equipment Alignment**

SOI-74.01 Residual Heat Removal System  
Dwg 1-47W810-1  
SOI-72.01, Containment Spray System  
Dwg 1-47W812-1  
SOI-70.01 Component Cooling Water System  
Dwg 1-47W859-1

**Section 1R06: Flood Protection Measures**

WB-DC-20-28, Intake Pumping Station Watertight Doors at Elevation 722.0  
Technical Instruction (TI)-50.021, Intake Pumping Station Strainer Room A Sump Pump A Performance Test  
Technical Instruction (TI)-50.022, Intake Pumping Station Strainer Room A Sump Pump B Performance Test  
Technical Instruction (TI)-50.023, Intake Pumping Station Strainer Room B Sump Pump A Performance Test  
Technical Instruction (TI)-50.024, Intake Pumping Station Strainer Room B Sump Pump B Performance Test  
WBN OSG4099 Appendix E, MELB at the Intake Pumping Station  
WO 10-811526

Attachment

WO 09-820527  
 WO 07-820096  
 WO 09-812234  
 WO 110879231  
 WO 110952174  
 WO 112833360  
 WO 08-812662  
 WO 07-820097  
 WO 09-811458  
 WO113208828  
 PER 128435  
 PER 133306  
 PER 225913  
 PER 133307  
 PER 216750  
 FE 42155 R0  
 Dwg 1-47610-40  
 Dwg 1-47W853-11  
 Dwg 3IN221-4

#### **Section 1R17: Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications**

##### 10 CFR 50.59 Evaluations (Sample 6-12)

DCN 52216: Revise EGTS Logic to Handle Post-LOCA Reset of Phase A isolation  
 DCN 52837: Provide Required Documentation and PR'S to Eliminate Pressure Locking and to Regear Valves 1-FCV-63-025 & -026 TO MEET JOG-MOV Program Requirements  
 EDC 52564: Revise Design Basis Documents to Reflect New Worst Case Single Failure Scenario for the EGTS control system  
 EDC 53651: Resolution to PER 12895; Issue Design Documents Based on PER Resolution  
 EDC 54175: Revise N3-30AB-4001 to Incorporate NRC Guidance From Letter (Reference Docket No. 50-440) For ESF Room Coolers When One Train is OOS  
 EDC 56160: Revise N3-30AB-4001 To Incorporate NRC Guidance From Letter (Docket No. 50-440) For SDBR HVAC When One Train Is Out Of Service

##### Screened Out Items (Sample 12-25)

DCN 51659: Incorporate an Increased Actuator Torque Rating For 1-FCV-074-0002 and 1-FCV-074-0008 and Convert 1-FCV-074-0002 TO Limit-Controlled Seating  
 DCN 52608: Provide a Replacement For Obsolete Diesel Generator Speed Switch  
 DCN 52763: Modify The Trim On The 4" MDAFW LCV'S To Gain Closing Margin  
 DCN 53717: SDBR A and MCR A & B Chiller Interface Removal  
 DCN 54826: Replace FCI Level Switches On Accumulators 1-4 With Rosemount Level Transmitters  
 DCN 55190: Revise NESSDS To Change Setpoint For The MCR Chiller Temperature Switches  
 DCN 56486: Re-Route Leaking Section Of HPFP Piping Under SCCW  
 DCN 57980: Replaced Damaged Segment Of Cable 1V2135B  
 DCN 58264: Replace 1-MTR-30-183-A

DCN 58414: Revise MOV Design Output For 1-FCV-72-13 and -34 To Improve Actuator Setup Window  
 MM 59479: Eliminate Flow Path Into Penetration Room From Pipe Chase  
 EDC 53556: Revise Mid-Loop Calculation WBNOSG4-0233 To Clarify When "Time To Boil" Condition Should Start Being Tracked At The Beginning Of Mode 5  
 EDC 54625: Revise Design Output As Required To Reflect The Loading OF 704 TPBARS For Unit 1, Cycle 10  
 EDC 53107: Remove the TS Requirements for the Lower Containment Radiation Monitor Gas Channels  
 EDC 54947: GSDS For Replacement Of 480V EBR Compressor Starters  
 EDC 57303: Replace Obsolete NAMCO EC219 Series Connectors With EC290 Series Connectors  
 EDC 59024: Revise Design Output To Clarify that Valves 0-ISV-070-0524A, 0524B, 0529A And 0529B May Be Used For Throttling To Achieve System Flow Balance And Eliminate The Problem Of Cavitation and/or Vibration Associated With Valve 0-THV-070-0530B Throttling  
 EDC 59301: Provide Additional Bracing To Stiffen AHU To Lower AHU Vibrations  
 EDC 58889: Allow Substitution Of MSSV Disc With An Upgraded Material  
 DCN 53437A: Replace/Add 125-Vdc Vital battery Chargers (TC)  
 EDC 55358: Correct minor Error in PAM Demonstrated Accuracy Calculation 1-LT-3-43 and associated NESSD's (1-L-3-43, -56, -98, & -111)

#### Permanent Plant Modifications (Sample 5-15)

DCN 54785: Replace Unit 1 RCCAS And Rod Drives  
 DCN 52998: Remove Blank Off Plates And Install Dampers To Isolate Unit 2 Annulus From Unit 1 EGTS  
 DCN 53216: Add Isolation Devices To Separate Annunciation Circuitry From CLASS 1E Instrumentation  
 DCN 53238: Replace Obsolete FCI Flow Switches With New FLT93F Model  
 DCN 58263: Replace RHR Sump strainer Plenum Cover Plate with Cover Plate Using Larger Orifices  
 DCN 54102: Remove Isolator From Sense Line Between SDBR Chiller Condenser And TCV  
 DCN 54315: Replace Obsolete 0-12CFM Rotameters On Control RM Intake Ventilation RAD Monitors  
 DCN 54365: Replace Identified Obsolete MCR Recorders  
 DCN 55076: Replace Diesel Generator Battery Chargers With Dual Chargers PER Generator Set  
 DCN 55661: Replace Unit 2 B Train General Vent EXH ABSCE Dampers To Recover ABGTS MARGIN  
 DCN 58649: Replace 1-MTR-30-175-A  
 DCN 57975: Modifications to 1-PCV-3-122/-132

#### Commercial Grade Dedications

G3110-2-223SL - Ball, Roller and Pillow Block Bearings With Shelf Life, Manufactured by SKF USA Inc., Non 50.49 Applications  
 2010-94413 - Flexible Hose Assemblies - System 031  
 2011-94169 - Rectifier, Silicon, Diode, JEDEC 1N5626, 600 V, 3 A, DO-27 Case

Item Equivalency Reviews

PO296842 Vendor Question, Temperature Switch, Electronic, -40 °F TO 350 °F, Fluid Components INTL (FCI) Model FLT93F, For Diesel Generator Exhaust Fan Room SYS 030  
 RFQ25660 Valve, Flow, Solenoid, 125VDC, ASCO P/N HC8320A185, SYS 030  
 RFQ13219 Relays, Control, Electromechanical, Dunham Bush P/N RLY126 AND RLY129, For Dunham Bush Chiller Package  
 RFQ182677 Pressure Regulator, Control Southern Fisher Model 67CFR, 0-125 PSIG

Setpoint Changes

DCN 52834B Setpoint and Calculation Change for 1-FCV-072-0013 and -0034

SAR Change Packages

SAR Change 10-36 Downgraded Valves 1-FCV-1-181, -182, -183, and -184 From Containment Isolation Valves to Steam Generator Blowdown Isolation Valves (DCN 38406) (PER 495239)  
 SAR Change 10-012 Back-Up Cooling Water Supply for ERCW (DCN 53413)  
 SAR Change Package 10-028 Changes in ERCW for dual unit operation (DCN 56341B)

Corrective Action Documents

PER 448378  
 PER 495239 Valves 1-FCV-1-181, 182, 183, and 184, 1/25/12  
 PER 457390 Entry into an LCO for inoperable non-Tech Spec equipment  
 PER 534732, damper 1-BD-31-400 was installed under DCN W-35983 to Pipe Chase Cooler return duct  
 PER 12895, Evaluation of NRC Info Notice 2003-19  
 PER 120736: Operator Monitoring Of EGTS After Phase A Reset  
 PER 91670: EGTS Logic Issues

Procedures

1-PI-OPS-1-PE, Protected Equipment, Rev. 11  
 WB-DC-40-64, Design Basis Events Design Criteria, Rev. 12  
 ES-0.1, Reactor Trip Response, Rev. 24  
 E-0, Reactor Trip of Safety Injection, Rev. 32  
 AOI-13: Loss Of Essential Raw Cooling Water Rev. 40  
 AOI-14: Loss Of RHR Shutdown Cooling, REV. 37  
 AOI-17: Turbine Trip, Rev. 49  
 AOI-25.01: Loss Of 120VAC Vital Instrument Power Boards 1-I OR 2-I, Rev. 32  
 AOI-25.03: Loss Of 120VAC Vital Instrument Power Boards 1-III OR 2-III, Rev. 27  
 AOI-30.2 C.19: Fire Safe Shutdown Room 757-A1, REV. 2  
 AOI-30.2 C.23: Fire Safe Shutdown Room 757-A5, Rev. 4  
 AOI-30.2 C.4: Fire Safe Shutdown Room 772-A2 West, REV. 3  
 AOI-30.2 C.13: Fire Safe Shutdown Room 772-A12, Revision 2  
 SOI-65.02 Emergency Gas Treatment System, Rev. 28  
 SOI-65.02 Emergency Gas Treatment system, Rev. 24  
 NEDP-2 Design Calculation Process Control, Rev. 0001,  
 NPG-SPP-09.4 10CFR50.59 Evaluations of Changes, Tests, and Experiments, Rev. 0005  
 NEPD-22 Operability Determinations and Functional Evaluations, NEDP-22, Rev. 0012  
 NPG-SPP-09.3 Plant modifications and Engineering Change Control, Rev 0006  
 NPG-SPP-12.7 Computer Software Control, Rev 0003

NPG-SPP-01.2 Administrative Site Technical Procedures, Rev. 0004  
 NLDP-5 FSAR Management, Rev 0004  
 TI-39 Reactivity Anomaly Analysis Rev0012  
 TI-7.023 PDMS Power Distribution Measurement Rev 0000  
 TI-65 Breaching the Containment Annulus, ABSCE, or MCRHZ Pressure Boundaries, Rev 0021  
 TI-59 Boron Tables, Rev. 0007  
 TI-61.004 Analysis of Heavy Ice Baskets, Rev. 0004  
 TI-61.002 Evaluation Of Ice Basket Damage, Rev. 0009  
 TI-68.002 Containment Penetrations and Closure Control, Rev.0019  
 TI-128 Post Accident Technical Considerations (TSC), Rev. 0002  
 TI-12.19 Control of Time Critical Operator Actions, Rev. 0002

#### Completed Work Orders

09-817648-000: SD BD Room A/C CHLR A-AERCW in Temperature Ctrl  
 112742284: RHR Pump 1A-A Room Cooler Motor.  
 05-821099-000 Implement DCN D-51659 to modify 1-MVOP-074-0002 to regain margin and meet GL 89-10 Program requirements

#### Calculations

32-9154651-000 - Watts Bar Clean Strainer Head Loss Calculation, Rev 16  
 38-9173031-000 – AES Document PCI-9623-S01 Evaluation of Advanced Design Containment Building Sump Strainers–Watts Bar Unit 1 Structural Margin Assessment Rev 0  
 38-9173037-000 AES Document PCI-9623-S02 Evaluation of Advanced Design Containment Building Sump Strainers Plenum Assembly–Watts Bar Unit 1 Structural Margin Assessment Rev 0  
 EPMRCP120291 – Containment Spray Net Positive Suction Head Calculation, Rev 7  
 EPMRKK101491 – Failure Modes and Effect Analysis for the Containment Spray system, Rev 3  
 MDN1000980011 – Severe Accident Management Guidelines (SAMG) Setpoints and Computational Aids (CAs), Rev 8  
 MDQ00106320060110 – CCP, SIP, CSP, and RHR Pump NPSH Evaluation, Rev 4  
 MDQ00107220060104 – Containment Spray system Hydraulic Analysis, Rev 3  
 EPMSDK110689 – Time Required to Deliver Rated Flow after Receipt of Accident Signal Rev.10  
 EPMJKJ121590 – Analytical Limits for Motor Drive Auxiliary Feedpumps Flow/Differential Pressure Control Loops PDIC-3-122A, -122C, -132A, -132C, rev 3  
 EPMOED070391 – Equations for AFW Pump Performance Curves, Rev 9  
 HCGTBG091981 – Design Parameters for Motor and Turbine Driven AFW pumps Rev 8,  
 WBNAPS2135 Material Aging Calculation for Target Rock Valve Components Rev. 3 and 5  
 WBNOSG4263, Extended Station Blackout Evaluation, Rev. 3  
 WB-DC-40-31.7, Analysis of Category I and II Piping System, Rev 23  
 N3-30AB-4001, Special Op. Section 4.24  
 WBNAPS2135: Material Aging Calculation For Target Rock Valve Components (WBNEQ-SQL-002), REV. 5, DATED 5/18/2012  
 MDQ00006520070121: EGTS Evaluation During controls System Failure, REV. 000  
 1-PDT-3-132A-B Demonstrated Accuracy Calculation for MDAFW Pump Protection Differential Pressure Control Loops, Rev 4  
 EPMJKJ121590 Analytical Limits for Motor Driven Auxiliary Feedwater Pump Flow/Differential Pressure Control Loops PDIC-3-122A, -122C, -132A, and -132C

### Drawings

1-47W811-1 Flow Diagram Safety Injection System Rev.55  
 1-47-W-866-8, Flow Diagram Heating, Cooling and Ventilation Air Flow, Rev. 22  
 47A900-60, Mechanical Heat, Ventilation and Air Conditioning Balancing gate Details, Rev. 3  
 1-47W611-6-1, Electrical Logic Diagram Heater Drains and Vents, Rev. 21  
 1-15E500-1-36, Key Diagram Station Aux Power System, Rev. 36  
 1-47W611-3-2-2, Electrical Logic Diagram Feedwater System, Rev. 33  
 47E235-42: Environmental Data Environment – Harsh Lower Compartment, Rev. 11  
 47E235-76: Environmental Data Environment – Harsh EL 729.0, Rev. 9  
 1-45W600-65-2: Wiring Diagrams INVR and MISC EQPT connection Diagram - Sheet 2, Rev. 32  
 1-45W709-2: Wiring Diagrams Emergency Gas Treatment Schematics Diagram, REV. 11  
 1-47W866-1: Flow Diagram Heating and Ventilation AIR FLOW, REV. 59  
 1-47W866-11: Flow Diagram Heating and ventilation Air Flow, REV. 27  
 10-111152: Outline 200 AMP Switch 480VAC 3 Ø 60 HZ/130 VDC SH. 1 OF 2, REV. C  
 10-111152: Outline 200 AMP Switch 480VAC 3 Ø 60 HZ/130 VDC SH. 2 OF 2, REV. 0  
 20-113948: Ametek Schematic 200A Transfer Switch. 480VAC / 130VDC, SH.1 OF 1, REV. A  
 E-272992 Series D-100 Valve Assembly with Mod. D-100-160 RA Actuator 4" Class 900, Rev 4  
 1-47W803-2 Flow Diagram Auxiliary Feedwater, Rev 59

### Other Documents

DCN S-39255-A Downgrade Valves 1-FCV-1-181, 182, 183 and 184 from Containment Isolation Valves to Steam Generator Blowdown Isolation Valves  
 ANSI/ANS 51.1-1983, Nuclear Safety Criteria for the Design of Stationary Pressurized Water Plants  
 NUREG-0800 Section 19.0, Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors  
 USFAR Section 15.1, Condition I- Normal Operation and Operational Transients  
 3-OT-MSC142, Cycle 20 2010 LOR, Plant Changes, lesson plan, Rev. 20  
 Report NO: 2375, Qualification Test Report Aging, Seismic and Accident Simulation Test Of Target Rock Corporation 1" Solenoid Valve; Model 77CC-001 Per Requirement OF IEEE 323-1974, 3444-1975 And 3821972 Standards, Date 9/26/79  
 Report No: 3563, Qualification Extension Analysis Report Aging, Seismic And Accident Simulation Test Of Target Rock Corporation Project 82AB Series Solenoid Globe Valves Per Requirement Of: IEEE 323-1974, 3444-1975 and 3821972 Standards, Date 9/26/79  
 Report No: 4207, Continuously Energized Solenoid Valve Test, Model 1032110-4, dated 11/2/84  
 Analysis Report 557-1468, Nuclear Equipment Analysis Report Solenoid Valve, Model Number: 1032110-7, Rev. B  
 PM 2188V: Calibration Of Diesel Generator Solid-State Speed Sensing Relay Modules SSA AND SSB, Rev. 11  
 PM 0817W: Periodic Refurbishment of Metrex Model FTVA-400-WAT 4" Temperature Control Valve  
 N3-65-4001: Emergency Gas Treatment System, Rev. 10  
 SER Dated Feb 8, 2011 Watts Bar Nuclear Plant, Unit 1 -Issuance Of Amendment Regarding The Main Control Room Chiller Completion Time Extension (TAC NO. ME3429)



WBN-10-0193 Update the wb1bcna, wb1bcnb, wb1bcnf Beacon-TSM Systems with a New Upgraded Version of Westinghouse's Beacon-TSM Core Monitoring Software, Version 6.6.6 Per Their Instructions, dated 7/27/10

Condition Reports Written as a Result of the Inspection

PER 562307 - Time to boil calc clarification

PER 557262 - TI not identified as procedure in 50.59 applicability determination

PER 557212 - 50.59 Screening Review incomplete answer

SR 567615 - BSL Technical Procedure Audit Trail - NRC Modifications Inspection

SR 562298 - SG Blowdown isolation valves

SR 569161 - Service Temperature Revision

**Section 4OA2: Problem Identification and Resolution**

NPG-SPP-03.1, Corrective Action Program

ODM 15.1, Operator Workarounds, Burdens, Challenges, Control Room Deficiencies, AUO Round Deficiencies

## **LIST OF ACRONYMS**

ACP	auxiliary charging pump
AFW	auxiliary feedwater
AIST	augmented inservice test
AOI	abnormal operating instruction
CAP	corrective action program
CCS	component cooling system
CFR	Code of Federal Regulations
COMS	cold overpressure mitigation system
DCN	design change notice
EDG	emergency diesel generator
EPIP	emergency plan implementing procedure
ERCW	essential raw cooling water
FE	functional evaluation
FPR	fire protection report
FSSD	fire safe shutdown
IMC	inspection manual chapter
IP	inspection procedure
LCO	limiting condition for operation
MDAFW	motor-driven auxiliary feedwater
NCV	non-cited violation
NEI	Nuclear Energy Institute
NPG-SPP	nuclear power group standard programs and processes
NRC	Nuclear Regulatory Commission
OOS	out of service
PER	problem evaluation report
PI	performance indicator
RCS	reactor coolant system
RHR	residual heat removal
RTP	rated thermal power
RWST	refueling water storage tank
SDBR	shutdown board room
SDP	Significance Determination Process
SI	safety injection
SIP	safety injection pump
SIS	safety injection system
SSC	structures, systems, or components
TDAFW	turbine-driven auxiliary feedwater
TI	temporary instruction
TS	technical specifications
TVA	Tennessee Valley Authority
URI	unresolved item
UFSAR	Updated Final Safety Analysis Report
WO	work order