

Watts Bar 1

4Q/2013 Plant Inspection Findings

Initiating Events

Significance:  Feb 22, 2013

Identified By: NRC

Item Type: FIN Finding

Failure to Follow Procedure BP-529 “Oversight of Supplemental Personnel”

Inspectors identified a finding of very low safety significance for failure to follow procedure BP-259, “Oversight of Supplemental Personnel,” Rev. 9. Specifically, during the licensee’s review of the vendor instructions for performing maintenance on turbine intercept valve 1-FCV-1-102, the licensee failed to recognize that the vendor instructions were not wholly applicable due to site-specific modifications made on the Electro Hydraulic Control (EHC) system.

Consequently, an EHC system leak was identified on valve 1-FCV-1-102 during power ascension at 61% power that led to a manual turbine trip. The issue was entered into the

licensee’s CAP program as Problem Evaluation Report (PER) 686688. The finding was determined to be more than minor because it affected the design control attribute of the initiating events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Using the Inspection Manual Chapter 0609, “Significance Determination Process,”

Phase 1 worksheet, the finding was determined to have very low safety significance because the condition only affected the initiating events cornerstone and did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. The finding was determined to have a cross-cutting aspect in Human Performance, Work Practices, in that the licensee did not ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety is supported. (H.4(c))

Inspection Report# : [2013007](#) (*pdf*)

Mitigating Systems

Significance:  Sep 27, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to validate Appendix R abnormal operating instructions in accordance with station procedures

An NRC identified Green NCV of Technical Specification 5.7.1, Procedures, was identified for the licensee’s failure to validate Appendix R abnormal operating instructions (AOI) in accordance with station procedures. The issue was entered into the licensee’s corrective action program as problem evaluation report (PER) 787990.

The licensee’s failure to validate time critical operator actions for Appendix R AOIs as required by site procedures was a performance deficiency. The performance deficiency was considered more than minor because if left uncorrected, the issue had the potential to result in the failure to meet design bases operator action times during fire events. The significance of this finding was determined to be of very low safety significance (Green) because the identified deficiencies did not adversely affect the ability to reach and maintain safe shutdown. The cause of the finding involved the cross-cutting aspect of whether the licensee takes appropriate corrective actions to address safety issues within the Corrective Action Program component of the Problem Identification and Resolution area.

Specifically, the licensee implemented inadequate corrective actions for PER 637443 which identified that Appendix

R time critical actions were not performed as required by procedure TI-12.19. [P.1(d)] (Section 1R05.01)
Inspection Report# : [2013008](#) (*pdf*)

Significance:  Sep 27, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate compensatory actions to minimize the effects of impaired fire protection equipment on fire safe shutdown

An NRC identified Green NCV of Operating License Condition (OLC) 2.F was identified for the licensee's failure to ensure that established operating requirements (ORs) for the high pressure fire protection (HPFP) system accounted 2 for affected and credited equipment as determined in the fire hazard analysis (FHA) and safe shutdown (SSD) analysis. The issue was entered into the licensee's corrective action program as PER 786848, and implemented Shift Orders FPU-13-018 and 13-071 which required the establishment of fire watches for the affected areas.

The licensee's failure to ensure that established ORs for the HPFP water supply system were supported by the FHA and SSD analysis was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems Cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The significance of this finding was determined to be of very low safety significance (Green) because the affected fixed fire suppression systems would be able to suppress a fire such that no additional equipment important to safety would be affected by a fire. The inspectors determined that no cross cutting aspect was applicable to this performance deficiency because this finding was not indicative of current licensee performance. (Section 1R05.10)

Inspection Report# : [2013008](#) (*pdf*)

Significance:  Jun 30, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to meet a critical drill objective in accordance with the approved fire protection plan

Green. The inspectors identified a Green NCV of the Unit 1 Operating License Condition 2.F for the licensee's failure to implement procedures required for fire protection program implementation in accordance with the approved Fire Protection Plan (FPP). Specifically, the licensee failed to meet a critical objective on April 30, 2013, during a fire drill as required by TVA-SPP-17.16, Conduct and Evaluation of Fire Drills, Revision 0. The licensee initiated problem evaluation report (PER) 742499 to address the inspector-identified deficiency.

The licensee's failure to implement procedures required for fire protection program implementation in accordance with the approved FPP was a performance deficiency. The inspectors reviewed IMC 0612 and determined that the finding was more than minor because the lack of adequate fire drill performance could negatively affect the fire brigade's capability to combat a fire. Using the Initial Characterization of Findings guidance of IMC 0609, the inspectors determined that the finding was of very low safety significance (Green) because the defense-in-depth attribute of the fire brigade was minimally affected. The fire brigade demonstrated the ability to meet the required time for fire extinguishment for the fire drill scenario, and the finding did not significantly affect the ability of the fire brigade to respond to a fire. The finding was directly related to the cross-cutting aspect in the area of Problem Identification and Resolution because of inadequate oversight and self-assessment of fire operations activities, specifically fire brigade training. (P.3 (a)) (See NCV 05000390/2012003, Section 1R05)

Inspection Report# : [2013003](#) (*pdf*)

Significance:  Jun 29, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Corrective Actions to Identify and Evaluate Effects of Harmonics on Degraded Voltage Relay Function

The NRC identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to implement corrective actions to identify and evaluate the effects of electrical system harmonics on safety-related undervoltage relays. This was a performance deficiency. The licensee entered this issue into their corrective action program as Problem Evaluation Reports 515413 and 703444. The licensee also established a preventative maintenance program to monitor motors powered from the 6.9 kilovolt shutdown boards for harmonic distortion until further monitoring and evaluation of harmonic distortion on the 6.9 kilovolt shutdown board degraded voltage relays can be completed.

The 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 systems that respond to initiating events to prevent undesirable consequences. Specifically, at the time of identification, there was reasonable doubt as to whether the degraded voltage scheme would perform as required by the Watts Bar 1 Technical Specifications during design basis conditions. The inspector determined the finding to be of very low safety significance (Green) because the finding was a deficiency affecting the design or qualification of a mitigating structure, system, or component, and the structure, system, or component maintained its operability and functionality. Because the opportunity to identify the impact of harmonics on degraded voltage relay performance occurred in 1993, the inspector determined that no cross-cutting aspect was applicable because the finding was not indicative of current licensee performance.

Inspection Report# : [2013010](#) (pdf)

Significance:  Mar 31, 2013

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to correctly implement procedure for pressurizer pressure channel calibration

A self-revealing (Green) NCV of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, was identified for failure to properly follow plant procedures to perform a surveillance test for calibration of pressurizer pressure channel II. Specifically, the instrument maintenance surveillance test procedure 1-SI-68-6, 18 Month Channel Calibration Pressurizer Pressure Channel II, Loop 1-LPP-68-334 (P-456), Revision 10, was not adequately followed by maintenance personnel during the calibration test. The licensee's failure to correctly implement procedure 1-SI-68-6, 18 Month Channel Calibration Pressurizer Pressure Channel II, Loop 1-LPP-68-334 (P-456), to configure the test equipment in the correct configuration was a performance deficiency. The finding was more than minor because it was associated with the Initiating Events Cornerstone attribute of Human Performance and adversely affected the cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown or power operations. Specifically, the failure to adequately implement SI 1-SI-68-6, 18 Month Channel Calibration Pressurizer Pressure Channel II, Loop 1-LPP-68-334 (P-456), resulted in a reactor trip. The inspectors screened this finding in accordance with IMC 0609, Significance Determination Process, Attachment 4, Phase 1 – Initial Screening and Characterization of Findings, and determined the finding was of very low safety significance (Green) since it did not result in the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The finding directly involved the cross-cutting area of Human Performance, work practices component under the aspect related to proceeding in the face of uncertainty. (H.4 (a))

Inspection Report# : [2013002](#) (pdf)

Significance:  Jan 18, 2013

Identified By: NRC

Item Type: VIO Violation

Inadequate abnormal condition procedure for flood mitigation strategy prior to installation of HESCO barriers

The inspectors identified a Violation (VIO) of Technical Specification (TS) 5.7.1, Procedures, for the licensee's failure to establish an adequate procedure for mitigation of external events, specifically flooding prior to the installation of HESCO barriers in 2009. The inspectors determined that the licensee's failure to comply with TS 5.7.1, "Procedures," was a performance deficiency. Specifically, AOI-7.1, Maximum Probable Flood, was not adequate to prevent the loss of critical safety functions (e.g., emergency power) during a PMF event prior to the installation of the HESCO barriers and other compensatory measures. This procedure, in part, is used to maintain the established license basis for compliance with 10 CFR 50, Appendix A, General Design Criteria 2, "Design Bases for Protection Against Natural Phenomena." Failure to establish adequate procedures for flood mitigation results in a failure to maintain adequate protection against natural phenomena in accordance with the licensing basis of the plant.

This performance deficiency was considered more than minor because it was associated with the protection against external factors attribute of the Reactor Safety/ Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, prior to the installation of the HESCO barriers and other compensatory measures, Abnormal Conditions procedure, AOI 7.1, "Maximum Probable Flood," was not adequate to prevent the loss of Emergency Power during a PMF event. Loss of emergency power would lead to core and/or spent fuel pool inventory damage. The combination of the event frequencies and types of rainfall events which would over-top earthen dams leading to the loss of emergency power resulting in core damage has an impact of low to moderate safety significance. The NRC concluded that the significance of the finding is preliminarily of low to moderate safety significance (White). The inspectors determined that no cross-cutting aspect was applicable.

Inspection Report# : [2012009](#) (*pdf*)

Inspection Report# : [2013009](#) (*pdf*)

Inspection Report# : [2013011](#) (*pdf*)

Significance: N/A Jan 18, 2013

Identified By: NRC

Item Type: VIO Violation

Failure to report unanalyzed condition related to external flooding

The inspectors identified a VIO of 10 CFR 50.72(b)(3)(ii)(B), "Immediate Notification Requirements for Operating Nuclear Reactors," for failure to report within eight hours an unanalyzed condition that significantly degraded plant safety. Specifically, the licensee failed to notify the NRC upon discovery that a postulated PMF would result in the overtopping of earthen dams not previously assumed in the plant design. The failure to report this unanalyzed condition resulted in the NRC not being made aware of a condition which would have resulted in additional NRC review. Specifically, the failure to notify the NRC within eight hours of discovery of an unanalyzed condition that significantly degraded plant safety and resulted in an unacceptable change to the facility or procedures. The inspectors determined an evaluation for cross-cutting aspect was not applicable because this is a traditional enforcement violation.

Inspection Report# : [2012009](#) (*pdf*)

Inspection Report# : [2013009](#) (*pdf*)

Inspection Report# : [2013011](#) (*pdf*)

Significance: Y Jan 18, 2013

Identified By: NRC

Item Type: VIO Violation

Failure to maintain an adequate abnormal condition procedure to implement the flood mitigation strategy

The inspectors identified an violation (VIO) of Technical Specification 5.7.1, Procedures, for the licensee's inability

to demonstrate that the required Stage I and Stage II activities could be performed within 27 hours as required by AOI-7.1, Maximum Probable Flood. The licensee's failure to adequately demonstrate the ability to realign plant systems into their flood mode configuration using AOI-7.1, Maximum Probable Flood, within the time frame required by TRM 3.7.2 and Watts Bar UFSAR Section 2.4, which could directly lead to the inability to remove decay heat from the reactor core resulting in core damage, was a performance deficiency. This performance deficiency was considered more than minor because it was associated with the Protection Against External Factors attribute of the Reactor Safety/ Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the inability to realign plant systems into their flood mode configuration within the required time frame could directly lead to the inability to remove decay heat. The combination of the seismic and rainfall event frequencies and types of rainfall events which would lead to flooding above site grade and the inability to realign plant systems into their flood mode configuration within the 27-hour required time frame could directly lead to the inability to remove decay heat from the reactor core resulting in core damage which has an impact of substantial safety significance. The NRC concluded that the significance of the finding is of substantial safety significance (Yellow).

The cause of the finding had a cross-cutting component of Resources in the area of Human Performance with an aspect of ensuring that personnel, equipment, procedures, and other resources were available and adequate to assure nuclear safety. Specifically, inadequacies in those procedures, equipment, and personnel training necessary to realign plant systems within the required time frame to cope with all anticipated external flooding events. (H.2 (d)) (Section 1R01.3)

Inspection Report# : [2012009](#) (pdf)

Inspection Report# : [2013009](#) (pdf)

Inspection Report# : [2013011](#) (pdf)

Significance: G Jan 18, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to adequately protect safety-related equipment during flood mode preparation

The inspectors identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to adequately protect safety-related equipment during flood mode preparation. The licensee's failure to adequately protect safety-related equipment during flood mode preparation as implemented by AOI-7.1, Maximum Probable Flood, was a performance deficiency. This performance deficiency was considered more than minor because it was associated with the Protection Against External Factors attribute of the Reactor Safety/Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the TACF was incapable of preventing water damage, during a PMF event, to both trains of important equipment, specifically the thermal barrier booster pumps (TBBPs), necessary for coping with the PMF impact on Unit 1. Without the TBBPs and with reactor coolant pump (RCP) seal injection lost, there is no engineering assurance that RCP seal damage would not occur, leading to an RCP seal loss of coolant accident (LOCA). The NRC concluded that a potential loss of RCP seal cooling during Mode 4 conditions with the RCP pumps stopped would be bounded by the probability of a small break loss of coolant accident (1.5E-3 per NUREG/CR-6928, "Industry-Average Performance for Components and Initiating Events at U.S. Commercial Nuclear Power Plants"). The rationale for the lower RCP seal failure probability was based on: 1) lower RCS pressure affecting seal ring extrusion, 2) lower RCS temperature affecting popping seal failure, and 3) lower RCS temperature affecting seal ring binding. This technical issue did not reduce the risk of the AOI-7.01 issue (AV 05000390/2012009-03) because under a hypothetical sustained loss of core cooling, core damage ultimately would occur regardless of whether the RCP seals failed or not. Following the Regulatory Conference, the analysts reviewed the vendor information and agreed with TVA's RCP seal failure analysis insights that the original probabilities of RCP seal integrity loss in the NRC risk analysis could be

assumed as conservative. As a result, the staff determined that it was appropriate to apply an order of magnitude reduction to the RCP seal failure probability used in the original Phase 3 analysis, and the finding is appropriately characterized as Green.

This finding has a cross-cutting aspect in the Work Practices component of the Human Performance area because it was directly related to the licensee not ensuring adequate supervisory and management oversight of engineering design work activities associated with a plant design change to protect the TBBPs during certain flood events. (H.4 (c)). (Section 1R01.4)

Inspection Report# : [2012009](#) (*pdf*)

Inspection Report# : [2013009](#) (*pdf*)

Significance: G Jan 18, 2013

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to correct conditions adverse to quality related to IPS CKV-040-0604 and IPS 3A and 3B sump pumps

The inspectors identified two examples of an NCV of the 10 CFR 50 Criteria XVI, "Corrective Action," for failure to correct conditions adverse to quality for the intake pumping station (IPS) CKV-040-0604, pump 3B, discharge check valve which resulted in it being non-functional for an extended period of time, and both the IPS 3A and 3B sump pumps, which resulted in the pumps remaining in a degraded condition for an extended period of time. The licensee's failure to maintain these components in accordance with the requirements of the augmented in-service testing program and WB-DC-40-29, Flood Protection Provisions, were performance deficiencies. The performance deficiencies were determined to be more than minor because, if left uncorrected, would lead to a more significant safety concern.

Specifically, internal flooding of the IPS mechanical equipment room housing the train A essential raw cooling water (ERCW) strainers could occur. The inspectors performed a Phase 1 evaluation per IMC 0609, Attachment 4, and determined that the finding was potentially risk significant because it involved the degradation of equipment specifically designed to mitigate a seismic, flooding, or severe weather initiating event (e.g., seismic snubbers, flooding barriers, tornado doors). Consequently a Phase 3 analysis was performed by a Senior Reactor Analyst. The analyst determined the finding was of very low safety significance, Green. These findings directly involved the cross-cutting area of Human Performance under the Work Practices component, in that, the licensee failed to provide adequate supervisory and management oversight to ensure corrective actions were taken to maintain the functionality of IPS equipment for extended periods of time. (H.4 (c)) (Section 1R01.5)

Inspection Report# : [2012009](#) (*pdf*)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

Last modified : February 24, 2014