

Browns Ferry 3

3Q/2010 Plant Inspection Findings

Initiating Events

Significance:  Sep 30, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to adequately test molded case circuit breakers

The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for failure to establish a preventive maintenance (PM) test program for safety-related molded case circuit breakers (MCCBs) to demonstrate these breakers would perform satisfactorily upon demand. Since initial startup of all three units, the inspectors found that the licensee had not included 612 critical MCCBs, many of them safety-related, in their PM program which resulted in the MCCBs receiving no planned maintenance or testing. The licensee entered this issue into the corrective action program as problem evaluation report (PER) 209095. The licensee's corrective actions included: identifying all critical MCCBs that required preventive maintenance, developing test procedures for these MCCBs, performing testing for all affected MCCBs, and conducting an extent-of-condition review of all safety-related components potentially excluded from the PM program.

This finding was determined to be of greater than minor significance because it was associated with the Protection Against External Factors attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events, such as fire, that challenge critical safety functions during shutdown as well as power operations. Specifically, the lack of a PM program for safety-related MCCBs resulted in no periodic planned maintenance or testing being performed since original installation, which in most cases was over thirty years. Based on operating experience, this could result in a breaker being slow to trip or sticking in the "on" position after an over-current condition. In accordance with IMC 0609, Significance Determination Process (SDP), Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," this finding was determined to require a Phase 3 analysis since the finding represented an increase in the likelihood of a fire caused by an electrical fault at the MCCB compartment with the breaker not opening. A regional Senior Reactor Analyst conducted a Phase 3 SDP analysis, which concluded that the finding was of very low safety significance (Green).

The cause of this finding was directly related to the cross cutting aspect of Appropriate Corrective Actions in the Corrective Action Program component of the Problem Identification and Resolution area, because the licensee did not adequately implement corrective actions to resolve the deficiencies previously identified by PER 131875 regarding certain Westinghouse MCCBs that were not in the PM program [P.1(d)]. (Section 40A5.4)

Inspection Report# : [2010004](#) (*pdf*)

Significance:  Sep 24, 2010

Identified By: NRC

Item Type: FIN Finding

Failure to Implement the Provisions of Preventative Maintenance (PM) Program Which Contributed to a Manual Reactor Scram

Green: The inspectors identified a finding for the licensee's failure to implement the applicable provisions of the Tennessee Valley Authority (TVA) Preventative Maintenance (PM) Program to replace the coil in the solenoid valve controlling the opening of the Unit 3 Condensate Demineralizer bypass valve on the specified PM frequency. Failure of this coil was identified as a contributing cause in Root Cause Analysis for PER 200203, "Unit 3 Manual Scram Due to Lowering Reactor Water Level." This finding was entered into the licensee's corrective action program as PER 245390.

The inspectors determined that the licensee's failure to implement the TVA PM program was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the Initiating Events cornerstone attribute of Equipment Performance, and adversely affected the cornerstone objective to

limit the likelihood of those events that upset plant stability and challenge critical safety functions during at power operations, since failure to implement the provisions of the PM program increased the likelihood of a component failure which contributed to a plant transient. Specifically the failure of the solenoid coil contributed to a reactor trip. The inspectors determined that the finding was of very low safety significance because it did not contribute to both the likelihood of a reactor trip and the likelihood that mitigating equipment or functions were not available. The inspectors determined that this finding directly involved the cross-cutting area of Human Performance, component of Work Practices and aspect of Procedural Compliance because licensee personnel failed to follow the guidance contained in the Preventive Maintenance program resulting in a plant transient. [H.4.b] (Section 40A2.a.3.2)

Inspection Report# : [2010006](#) (pdf)

Significance:  Mar 31, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Operators failed to correctly monitor and assess RPV beltline temperatures during RPV hydrostatic/in-service leak test

The inspectors identified a noncited violation of Technical Specifications (TS) 5.4.1.a for failure to follow surveillance procedure 3-SR-3.4.9.1(2), Reactor Vessel Shell Temperature and Reactor Coolant Pressure Monitoring during In-service Hydrostatic Leak Testing, to ensure all required Unit 3 temperatures were being monitored and verified to meet TS 3.4.9, RCS Pressure and Temperature Limits. Unit 3 reactor operators selected a wrong reactor pressure vessel (RPV) metal temperature to monitor, and the operator and Unit Supervisor (US) failed to recognize that the incorrect RPV temperature being monitored was outside the TS 3.4.9 limits. The licensee subsequently verified all required RPV temperatures were within TS 3.4.9 limits. This issue was entered into the licensee's corrective action program as problem evaluation report (PER) 222844.

This finding was determined to be of greater than minor significance because it was associated with the Initiating Events Cornerstone attribute of Human Performance, and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown. More specifically, the lack of reactor operator attention, and US oversight, during the RPV in-service leak test, resulted in operator errors that adversely affected the operators' ability to monitor and verify RPV metal temperatures were within TS Figure 3.4.9-2 limits to preclude a low temperature overpressure event. The finding was determined to be of very low safety significance according to Inspection Manual Chapter 609.04, Phase 1 - Initial Screening and Characterization of Findings, because it did not actually exceed the TS limit or adversely affect any mitigating systems. The cause of this finding was directly related to the cross-cutting aspect of Human Performance and Error Prevention in the Work Practices component of the Human Performance area, because human performance errors by the control room operators resulted in selecting the wrong RPV metal temperature to monitor and not recognizing this temperature exceeded TS limits [H.4.(a)]. (Section 1R20.1.2)

Inspection Report# : [2010002](#) (pdf)

Significance:  Mar 31, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate surveillance procedure to ensure all relevant RPV metal temperatures were monitored during RPV hydrostatic/in-service leak testing

The inspectors identified a noncited violation of Technical Specifications (TS) 5.4.1.a for failure to establish an adequate surveillance procedure to ensure all relevant reactor pressure vessel (RPV) metal temperatures of all four RPV regions were being monitored during the Unit 3 RPV in-service leak test pursuant with TS Surveillance Requirement (SR) 3.4.9.1, RCS Pressure and Temperature Limits. The licensee subsequently verified all required RPV temperatures were within TS 3.4.9 limits. This issue was entered into the licensee's corrective action program as PERs 223539 and 224778.

This finding was determined to be of greater than minor significance because it was associated with the Initiating Events Cornerstone attribute of Procedure Quality, and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown. More specifically, the procedure used by operators to monitor RCS and RPV temperatures, during the RPV in-service leak

test, lacked sufficient details to ensure all relevant RPV temperatures would be monitored to meet TS SR 3.4.9.1 which could increase the likelihood of a low temperature overpressure event. The finding was determined to be of very low safety significance according to Inspection Manual Chapter 0609, Phase I - Initial Screening and Characterization of Findings, because it did not actually exceed the TS limit or adversely affect any mitigating systems. The cause of this finding was directly related to the cross-cutting aspect of Complete and Accurate Procedures in the Resources component of the Human Performance area because the applicable surveillance procedure lacked sufficient details and guidance to ensure all relevant RPV metal temperatures would be monitored pursuant to TS SR 3.4.9.1 [H.2.(c)]. (Section 1R20.1.3)

Inspection Report# : [2010002](#) (pdf)

Mitigating Systems

Significance:  Sep 30, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to perform functional evaluations for gas identified during venting

An NRC-identified Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” was identified for the licensee’s failure to perform functional evaluations in accordance with procedure NEDP-22, Functional Evaluations, when gas was identified in the High Pressure Coolant Injection (HPCI) System during the Technical Specification required surveillance. The licensee has subsequently performed functional evaluations of the occurrences and entered the issue into their corrective action program as problem evaluation report (PER) 223067.

This finding was considered more than minor because it adversely affected the Mitigating Systems Cornerstone objective of ensuring the availability and reliability of safety systems, and is related to the attribute of Procedure Quality (i.e.- Maintenance and Testing Procedures). Specifically, the failure to perform a functional evaluation or provide adequate justification for not performing one upon identification of gas during venting of the system could affect the operability, availability, and reliability of the HPCI system or could result in missing an opportunity to identify the source of voiding to preclude future inoperability. This deficiency also paralleled Inspection Manual Chapter 0612, Appendix E, Example 4.a, as the licensee routinely did not perform the required functional evaluations. The team assessed this finding using Inspection Manual Chapter 0609, Significance Determination Process, and determined that the finding was of very low safety significance (Green) because subsequent functional evaluations showed that the gas voids did not impact the operability of the HPCI system.

The cause of this finding was directly related to the cross cutting aspect of Evaluation of Identified Problems in the Corrective Action Program component of the Problem Identification and Resolution area, in that the licensee failed to thoroughly evaluate gas voids such that the resolution addressed causes and extent of conditions, as necessary, and included the failure to thoroughly evaluate for operability and reportability conditions adverse to quality. [P.1(c)] (Section 40A5)

Inspection Report# : [2010004](#) (pdf)

Significance:  Sep 24, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Maintenance Procedure for Siemens Horizontal Vacuum Circuit Breakers Circuit Breakers (Section 40A2.a.3.6)

Green: The inspectors identified a non-cited violation of Technical Specification (TS) 5.4.1 for the licensee’s failure to have adequate preventative maintenance procedures for Siemens Horizontal Vacuum Circuit Breakers. Plant procedure EPI-0-000-BKR015, 4KV Wyle/Siemens Horizontal Vacuum Circuit Breaker (Type-3AF) and Compartment Maintenance, Revision 28, did not provide specific guidance for checking the tightness of the closing spring charging motor mounting bolts. As a result, on June 15, 2010 while the 3C RHR pump was in service for

suppression pool cooling, the charging motor in the pump breaker cubicle became detached from its mount. The charging spring failed to recharge and the pump would not have restarted if needed following a trip of the circuit breaker. The licensee reattached the charging motor and restored the 3C RHR pump to service. The licensee also revised procedure EPI-0-000-BKR015 to include instructions for ensuring the charging motor was securely fastened to the circuit breaker. This finding was entered into the licensee's corrective action program as PER 234443.

The inspectors determined that the failure to have an adequate maintenance procedure for circuit breaker maintenance was a performance deficiency. This performance deficiency was more than minor because it was associated with the Mitigating Systems Cornerstone attribute of Procedure Quality and adversely affected the cornerstone objective in that the PM procedure for the breaker did not assure the 3C RHR pump could perform its intended safety functions. The inspectors determined that the finding was of very low safety significance because it did not result in inoperability of a safety function for greater than the allowed technical specification outage time and was not potentially risk-significant due to external events. The inspectors determined that this finding directly involved the crosscutting area of Human Performance, component of Resources and aspect of Complete Documentation because the licensee did not maintain adequate plant procedures for equipment maintenance. Specifically, procedure EPI-0-000-BKR015, Revision 28 did not contain guidance for checking the charging motor bolt tightness resulting in the 3C RHR pump charging motor becoming detached and adversely affecting train operability. [H.2(c)] (Section 4OA2.a.3.6)
Inspection Report# : [2010006](#) (*pdf*)

Significance:  Jun 30, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Inappropriate Use of Waivers to Exceed 10 CFR 26 Work Hour Limitations

The inspectors identified a noncited violation of 10 CFR 26.207(a) for improper execution of the waiver process for authorizing waivers of the "72 hours in any seven day period" work hour limitation required by 10 CFR 26.205(d), for contractors performing risk significant maintenance activities during the Unit 3 refueling outage. These issues associated with the use of work hour control waivers were entered into licensee's corrective action program as problem evaluation reports 161418, 162360, and 162638. As part of their interim corrective actions, the licensee prohibited all future use of waivers without express approval of executive management.

This finding was determined to be more than minor because it was similar to examples 9.a and 9.b. of Inspection Manual Chapter (IMC) 612, Appendix E, Examples of Minor Issues. The significance of the finding was screened by regional management according to IMC 609, Appendix M, Significance Determination Process Using Qualitative Criteria. The finding was determined to be of very low safety significance (Green) based on no observed human performance errors due to worker fatigue which caused a consequential event or adversely affected any risk-significant structures, systems, or components. The cause of this finding was directly related to the cross-cutting aspect of procedural compliance in the Work Practices component of the Human Performance area because the licensee failed to comply with the administrative program requirements for processing waivers of the 10 CFR 26 work hour limitations [H.4(b)].

Inspection Report# : [2010003](#) (*pdf*)

Significance:  Jun 30, 2010

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Unit 3 RCIC System Inoperable Beyond the Technical Specifications Allowed Outage Time

A self-revealing non-cited violation of Unit 3 Technical Specifications (TS) Limiting Condition for Operation 3.5.3, Reactor Core Isolation Cooling (RCIC) System, was identified for the licensee's failure to comply with the TS required actions for an inoperable RCIC system. The RCIC system was inoperable due to missing critical parts in the electronic governor regulator (i.e., EG-R) hydraulic actuator for a period of greater than 14 days, during the time when TS 3.5.3 was applicable between March 14, 2006 and September 12, 2009, without the licensee taking the required TS actions. This issue was entered into the corrective action program as problem evaluation reports 200183 and 224614. The EGR was subsequently replaced and the RCIC system restored to an operable condition, following testing.

This finding was determined to be of greater than minor significance because it was associated with the Equipment

Performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events. Specifically, the RCIC EG-R was missing internal parts that were important for maintaining stable and reliable RCIC flow during reactor pressure vessel (RPV) injection. According to IMC 0609.04, Phase I - Initial Screening and Characterization of Findings, this finding was determined to be of very low safety significance (Green) because the finding did not lead to an actual loss of safety function of the system, nor did it screen as potentially risk significant due to a seismic, flooding, or severe weather-initiating event. The cause of this finding was directly related to the cross cutting aspect of Thorough Evaluation of Identified Problems in the Corrective Action Program component of the Problem Identification and Resolution area, because the licensee did not adequately evaluate the operability of the RCIC system with large flow oscillations of plus/minus 300 gallons per minute during RPV injection [P.1(c)].

Inspection Report# : [2010003](#) (*pdf*)

Significance:  Mar 31, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to effectively maintain performance of the A3 EECW pump as required by 10 CFR

The inspectors identified a noncited violation of 10 CFR 50.65(a)(2) for failure to demonstrate that the performance of the A3 Emergency Equipment Cooling Water (EECW) pump was effectively controlled by preventive maintenance (PM) such that the pump remained capable of performing its intended function. Also due to inadequate evaluations performed after the A3 EECW pump exceeded its Maintenance Rule a(2) performance criteria, goal setting and monitoring were not established as required by paragraph a(1) of the Maintenance Rule. The licensee subsequently declared the EECW system in (a)(1) status and was in the process of developing the required goals and monitoring plan. This issue was entered into the licensee's corrective action program as problem evaluation report 223404.

The finding was determined to be of greater than minor significance because it was associated with the Equipment Performance attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective of ensuring availability and reliability of systems designed to respond to initiating events to prevent undesirable consequences. More specifically, the licensee failed to demonstrate effective control of EECW system availability through appropriate PM. According to NRC Inspection Manual Chapter 0609.04, Phase I - Initial Screening and Characterization of Findings, this finding was determined to be of very low safety significance because it did not lead to an actual loss of a system safety function or screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of this finding was directly related to the cross cutting aspect of Thorough Evaluation of Identified Problems in the Corrective Action Program component of the Problem Identification and Resolution area, because the licensee did not adequately evaluate the causes of the A3 EECW pump unavailability and thereby failed to correctly determine the impact on the 10 CFR 50.65(a)(2) unavailability performance criteria [P.1 (c)]. (Section 1R12)

Inspection Report# : [2010002](#) (*pdf*)

Significance:  Mar 31, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Untimely corrective actions to restore compliance of EECW pump in-service testing with ASME OM code requirements

The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, for failure to promptly recognize, and then correct in a timely manner, non-conforming conditions involving the in-service testing (IST) requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance (OM) of Nuclear Power Plants for the Equipment Cooling Water (EECW) system identified in June 2009. These nonconforming conditions involved the use of flow instrumentation without the proper accuracy, and failure to use the pre-service pump curve when establishing additional IST baseline reference values. The licensee revised the timeliness of their corrective action plans and decided to track this issue as a nonconforming condition. This issue was entered into the licensee's corrective action program as PER 225844.

The finding was determined to be of greater than minor significance because if left uncorrected it could become a more significant safety concern. In-service testing of the EECW system in conformance with the ASME OM Code

provides assurance that degraded pump performance would be promptly detected and corrected. Failing to recognize and resolve these and other IST program deficiencies could lead to untimely detection of EECW pump degradation. According to Inspection Manual Chapter 0609.04, Phase I - Initial Screening and Characterization of Findings, this finding was determined to be of very low safety significance because it did not lead to an actual loss of a system safety function or screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of this finding was directly related to the cross-cutting aspect of Appropriate and Timely Corrective Actions in the Corrective Action Program component of the Problem Identification and Resolution area because the licensee failed to take appropriate corrective actions to restore full compliance with the ASME OM Code requirements in a timely manner [P.1(d)]. (Section 40A2.2)

Inspection Report# : [2010002](#) (*pdf*)

Significance:  Dec 28, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

Violation of Technical Specification 5.4.1 for Failure to Develop Adequate Procedures to Ensure Tornado Depressurization Protection of the Emergency Diesel Generators

The inspectors identified a Green non-cited violation (NCV) of TS 5.4.1 for the failure to have an adequate procedure that would ensure tornado depressurization protection of the emergency diesel generators (EDGs). Abnormal Operating Instruction, 0-AOI-100-7, "Severe Weather," did not provide guidance on how to provide pressure equalization of the EDG building for mitigating atmospheric depressurization associated with tornado conditions that could impact the EDG building ventilation system. The design of the EDG ventilation system intake and exhaust dampers requires the dampers to be manually opened prior to a tornado depressurization event to ensure the EDG building and ventilation system remain intact and operable during and after a tornado. This finding was entered into the licensee's corrective action program as problem evaluation report (PER) 206919. As an immediate corrective action, the licensee added steps to procedure 0-AOI-100-7 to station an operator in the EDG building to perform required manual actions in the event of a tornado warning in the area.

This finding is more than minor because it affects the Mitigating Systems Cornerstone objective of ensuring the availability, reliability, and operability of the EDGs to perform the intended safety function during a design basis event and the cornerstone attribute of Procedure Quality, i.e. Operating (Post Event) Procedures (AOPs). The inspectors assessed the finding using a Phase I Significance Determination Process (SDP) screening which determined a Phase III SDP evaluation was required due to the fact that the finding involved the loss or degradation of equipment specifically designed to mitigate a severe weather initiating event (e.g., tornado doors). The loss of this equipment by itself, during the external initiating event it was intended to mitigate, would degrade two or more trains of a multi-train safety system. A Phase III SDP evaluation was performed in accordance with NRC Inspection Manual Chapter 0609 Appendix A by a regional Senior Reactor Analyst using the NRC Standardized Plant Analysis 3

The inspectors determined that the use of operating experience (OE) information was a significant cause of this performance deficiency. Regulatory Information Summary 2006-03, "Post Tornado Operability of Ventilation and Air Conditioning Systems" as well as an internal licensee OE had raised a similar concern. The licensee was unaware of the vulnerability of the EDG ventilation system to tornado depressurization events until it was brought to their attention by the inspectors. The licensee's failure to use available OE is directly related to the OE component of the cross-cutting area of Problem Identification and Resolution and the aspect of implementing OE through changes to procedures (P.2.(b)).

Inspection Report# : [2009008](#) (*pdf*)

Significance:  Dec 28, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

Violation of 10CFR50, Appendix B, Criterion V for Inadequate Procedure for Emergency Equipment Cooling Water System Flow Balancing

The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to provide adequate guidance in existing procedures utilized for flow

balancing of the emergency equipment cooling water (EECW) system. The EECW system provided the heat sink for station safety-related heat loads including cooling for the residual heat removal (RHR) and core spray (CS) room coolers. The installed strainers on the EECW system are capable of filtering debris greater than 1/8 inch (.125 inches), potentially allowing debris less than 1/8 inch to pass through and clog downstream throttle valves. A clog in the throttle valves would prevent adequate flow from reaching safety-related heat exchangers unless procedural guidance or limitations prevented throttling valves to disk-to-seat clearances of less than 1/8 inch. The existing EECW flow balance procedure was inadequate in that it made no provision in the acceptance criteria to limit or evaluate minimum throttle valve seat/disc clearance, and the subsequent potential for increased flow obstruction, resulting from system flow balancing. This finding was entered into the licensee's corrective action program as problem evaluation reports (PERs) 208374 and 208636. Planned corrective actions included a revision to EECW flow balancing procedures. The inspectors verified and discussed with the licensee existing indications that are available to alert the operator of potential clogging.

This finding is more than minor because it affects the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and operability of the RHR and CS pump room coolers to perform the intended safety function during a design basis event and the cornerstone attribute of Procedure Quality, i.e. Maintenance and Testing (Pre-event) Procedures. The team assessed this finding using the Significance Determination Process (SDP) and determined that the finding was of very low safety significance (Green) because the inspectors found no documented history of an actual loss of safety system function. This finding was reviewed for cross-cutting aspects and none were identified.

Inspection Report# : [2009008](#) (pdf)

Significance:  Oct 09, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

Deficiencies with Emergency Lighting Units

The team identified a Green non-cited violation of Browns Ferry Units 1, 2, and 3 Operating License Conditions 2.C (13), 2.C(14), and 2.C(7), respectively, for the licensee's failure to maintain in effect all provisions of the NRC-approved fire protection program, as described in the Final Safety Analysis Report. The Fire Protection Report (referenced in the Final Safety Analysis Report) requires that measures be established to ensure that conditions adverse to fire protection, such as failures and deficiencies, are promptly identified and corrected. The licensee had not established measures to identify and correct an excessive number of Appendix R emergency lighting unit failures. Specifically, emergency lighting unit failures were not being entered in the corrective action program as problem evaluation reports in order to evaluate and resolve why many of the emergency lighting failures occurred prior to reaching their 6-year replacement date. Additionally, the Fire Protection Report surveillance requirement to replace the Appendix R emergency lighting unit batteries and lamp heads every six years was not being adequately implemented, in that licensee data revealed that several installed emergency lighting units were beyond their 6-year replacement date. The licensee entered this finding into their corrective action program and initiated corrective actions to address these issues.

The licensee's failure to meet the Fire Protection Report requirements to establish measures to identify and correct a condition adverse to fire protection (excessive Appendix R emergency lighting unit failures); and, to implement the Appendix R emergency lighting system replacement program, is a performance deficiency. The finding is more than minor because it is associated with the reactor safety, mitigating systems cornerstone attribute of protection against external factors (i.e., fire). The excessive emergency lighting unit failures affected the objective of ensuring the reliability and capability of operator manual actions during response to initiating events. The team determined that this finding was of very low safety significance (Green) because the operators had a high likelihood of completing the tasks using flashlights. The cause of this finding has a cross-cutting aspect in the Work Control component of the Human Performance area, in that it was directly related to the licensee not planning and coordinating work activities to support long-term equipment reliability, and their maintenance scheduling was more reactive than preventive (H.3 (b))

Inspection Report# : [2009009](#) (pdf)

Significance:  Oct 09, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Establish Adequate Compensatory measures for an Out-of-Service Hose Station

The team identified a Green non-cited violation of Browns Ferry Units 1, 2, and 3 Operating License Conditions 2.C(13), 2.C(14), and 2.C(7), respectively, for the licensee's failure to maintain in effect all provisions of the NRC-approved fire protection program as described in the Final Safety Analysis Report. The Fire Protection Report (referenced in the Final Safety Analysis Report) requires the licensee to establish adequate compensatory measures for degraded or inoperable fire protection equipment. The licensee failed to establish adequate compensatory measures for an out-of-service hose station, in that the staged additional lengths of hose connected to the closest in-service hose station, established as a compensatory measure, did not provide equal or better protection than the out-of-service hose station that it was replacing. The licensee entered this finding into their corrective action program and took immediate action to review all existing fire protection impairment permits for similar problems. The licensee removed the compensatory measure and restored the out-of-service hose station to service.

The licensee's failure to provide compensatory measures of equal or better protection for an out-of-service hose station is a performance deficiency because it did not meet the requirements of the approved fire protection program. The finding was more than minor because it affected the protection against external factors attribute of the mitigating systems cornerstone, in that it impacted manual fire suppression (i.e., fire brigade) capability; and, affected the cornerstone objective of ensuring the availability of systems that respond to initiating events. Since Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," does not provide guidance for assigning a degradation rating to manual fire suppression, this determination was made using qualitative methods which received NRC management review as provided for in Inspection Manual Chapter 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." This finding was determined to be of very low safety significance (Green) because it represented a low degradation of the manual fire suppression function. Although the fire protection impairment permit had been implemented for an out-of-service hose station, the hose station was still functional at the time this issue was identified, because the water supply to the hose station had not been physically isolated. However, the team concluded the fire brigade would have experienced delays in initiating manual fire suppression for a fire in a fire area covered by the impairment. The cause of this finding has a cross-cutting aspect in the Work Control component of the Human Performance area, in that it was directly related to the licensee not planning and coordinating work activities, consistent with nuclear safety, to ensure that adequate compensatory actions were established for an out-of-service hose station (H.3 (a)).

Inspection Report# : [2009009](#) (pdf)

Significance: Y Oct 09, 2009

Identified By: NRC

Item Type: VIO Violation

Failure to Ensure One Train of Cables of Syatems Necessary to Achieve and/or Maintain Post-Fire safe Shutdown is Free of Fire Damage in Accordance With 10 CFR Part 50, Appendix R, Section III.G.

Title 10 of the Code of Federal Regulations (10 CFR), Part 50.48(b)(1) requires that all nuclear power plants licensed to operate prior to January 1, 1979, must satisfy the applicable requirements of 10 CFR Part 50, Appendix R, Sections III.G, III.J, and III.O.

Section III.G requires fire protection of safe shutdown capability.

Section III.G.1 requires fire protection features shall be provided for structures, systems, and components important to safe shutdown. These features shall be capable of limiting fire damage, such that one train of systems necessary for achieving and maintaining hot shutdown conditions is free of fire damage.

Section III.G.2 requires, in part, that where cables and equipment of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located in the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

- a. separation of cables and equipment by a fire barrier having a 3-hour rating; or
- b. separation of cables and equipment by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. Fire detection and automatic fire suppression shall be installed in the fire area; or
- c. enclosure of cables and equipment of one redundant train in a fire barrier having a 1-hour fire rating. Fire detection and automatic suppression shall be installed in the fire area.

Contrary to the above, since the restart of each unit (Unit 2-1991, Unit 3-1995, Unit 1-2007) and as of January 20, 2010, the date of the inspection report, the licensee had not met nor has met, as of the date of this NOV, the requirements of 10 CFR Part 50, Appendix R, Section III.G, in that:

- (i) fire protection features capable of limiting fire damage were not provided for structures, systems, and components important for safe shutdown. Specifically, the Tennessee Valley Authority (licensee) failed to provide fire protection features capable of limiting the fire damage such that one train of systems necessary to achieve and maintain hot shutdown conditions was free from fire damage in Fire Area 8 along with 19 other fire areas designated in the Browns Ferry Fire Protection Report, as required by 10 CFR Part 50, Appendix R, Section III.G.1.
- (ii) where cables and equipment of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located in the same fire area, the licensee did not ensure that one of the redundant trains was free of fire damage by providing one of the following means: (a) a 3-hour rated fire barrier; (b) 20 feet of spatial separation (free of intervening combustibles and fire hazards) with detection and suppression installed in the fire area; or (c) a 1-hour rated fire barrier with detection and suppression installed in the fire area. Specifically, cables associated with the RHRSW Pump A1, RHR Pump 1A, and LPCI injection valve 1-FCV-74-53 in Fire Area 1/Fire Zone 1-4 are some of the many examples in which the licensee failed to ensure that one train of cables of redundant systems or equipment necessary to achieve and maintain hot shutdown conditions, located in the same fire area, outside of primary containment was free of fire damage by one of the means described in 10 CFR Part 50, Appendix R, Section III.G.2.

Inspection Report# : [2010007](#) (pdf)

Inspection Report# : [2009009](#) (pdf)

Significance: **W** Oct 09, 2009

Identified By: NRC

Item Type: VIO Violation

Inadequate Safe Shutdown Instruction Entry Conditions for Appendix R Fire Events

The team identified an apparent violation of Technical Specification 5.4.1.a., in that, the licensee's revision to the safe shutdown instruction entry conditions in December 2008 resulted in inadequate procedural guidance. Specifically, the revision to Procedure 0-SSI-001, "Safe Shutdown Instructions," added an entry condition based on the operator's ability to restore and maintain reactor water level above +2 inches on the narrow range scale, utilizing available equipment. This revision could have delayed or prevented entry into the safe shutdown instructions if reactor water level stayed at or above +2 inches on the narrow range scale. Furthermore, this entry condition was not consistent with the initial plant conditions assumed in the fire protection program safe shutdown analysis. The licensee entered this finding into the corrective action program and revised the entry conditions for the safe shutdown instructions on February 27, 2009, to eliminate the +2-inch reactor vessel water level entry condition.

Failure to meet Technical Specification requirements due to inadequate procedural guidance is a performance deficiency. This finding is more than minor because it is associated with the procedure quality attribute of the mitigating systems cornerstone and the inadequate procedure affected the cornerstone objective of protection against external events such as fire to prevent undesirable consequences. Given the number of fire areas involved, a significance determination process Phase 2 analysis was not performed. A regional senior reactor analyst determined that there were significant obstacles to quantifying the risk of this finding because the methods and tools are not adequate to determine the significance of this finding within the established timeliness goal of 90 days. Therefore, the safety significance of this finding was determined using the guidance and qualitative techniques contained in NRC Inspection Manual Chapter 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." The preliminary significance of this finding was determined to be Greater Than Green, which was reviewed and approved by NRC management. The team determined that this finding did not present an immediate safety concern because the immediate safety hazard no longer existed after the licensee revised the safe shutdown instruction in February 2009. The cause of this finding had a cross-cutting aspect in the Decision Making component of the Human Performance area, in that it was related to the licensee not using conservative assumptions in decision making and not conducting reviews to verify the validity of underlying assumptions and identifying possible unintended consequences (H.1(b)).

Inspection Report# : [2009009](#) (pdf)

Inspection Report# : [2010007](#) (pdf)

Barrier Integrity

Significance: **G** Mar 31, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

New fuel receipt inspection and refueling operations supervised by non-qualified senior reactor operators

The inspectors identified a noncited violation of Technical Specifications 5.4.1.a for the failure to comply with operating procedures for Unit 3 new fuel receipt inspection and refueling operations that required the Fuel Handling Supervisor (FHS) to be trained and certified. During Unit 3 new fuel receipt inspections and refueling operations unqualified senior reactor operators (SRO) were allowed to supervise fuel handling activities. The unqualified SROs were subsequently re-qualified or not allowed to supervise fuel handling activities until qualified. This issue was entered into the licensee's corrective action program as problem evaluation reports 220410 and 220791.

This finding was determined to be of greater than minor significance because it was associated with the Barrier Integrity Cornerstone attribute of Human Performance, and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the use of unqualified FHS(s) to supervise new fuel receipt inspection and core refueling operations would reduce the level of assurance that fuel handling activities were accomplished safely and error free to prevent inadvertent fuel damage. The finding was evaluated and determined to be of very low safety significance using Inspection Manual Chapter 0609, Appendix G, Shutdown Operations Significance Determination Process, Attachment 1, Phase 1 Operational Checklists, Checklist 7, because it did not involve any human performance errors that resulted in fuel assembly damage, inappropriate core alteration, loss of reactor coolant and/or spent fuel pool inventory, or reduction of any safe shutdown mitigation capability. The cause of this finding was directly related to the cross-cutting aspect of Procedural Compliance in the Work Practices component of the Human Performance area because neither the night shift FHS or relief FHS(s) complied with the operating procedure requirements that all personnel supervising new fuel receipt inspections and/or refueling operations must be qualified [(H.4(b)]. (Section 1R20.1.1)

Inspection Report# : [2010002](#) (*pdf*)

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the [cover letters](#) to security inspection reports may be viewed.

Miscellaneous

Significance: SL-IV Jun 30, 2010

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Provide Complete and Accurate Information in LER 0500296/2009-003-00

A Severity Level IV, non-cited violation of 10 CFR 50.9, Completeness and Accuracy of Information, was identified by the inspectors regarding the licensee submittal of Licensee Evaluation Report (LER) 0500296/2009-003-00, Reactor Core Isolation Cooling System Inoperable Longer than Allowed by Technical Specifications, which was determined to not be accurate or complete in all material aspects. Specifically, the LER inaccurately reported the duration in which the system was inoperable, inaccurately reported the availability of redundant systems while the RCIC was inoperable, and did not report a previous event that occurred on the same unit with the same cause as required by 10 CFR 50.73.

Inspection Report# : [2010003](#) (*pdf*)

Last modified : November 29, 2010