

Browns Ferry 2

3Q/2009 Plant Inspection Findings

Initiating Events

Significance:  Oct 04, 2008

Identified By: Self-Revealing

Item Type: FIN Finding

Main Generator Voltage Regulator Relay Failure Results in Unit 2 Reactor Scram

Green. A Green self-revealing finding was identified for inadequate design control and replacement of the 43A relay in the Unit 2 main generator voltage regulator control circuit that resulted in a reactor scram due to a main turbine generator trip from a loss of main generator excitation. The failed 43A relay was subsequently replaced with another model relay better suited to low energy control circuit applications. This finding was entered into the licensee's corrective action program as Problem Evaluation Report 153987.

This finding was greater than minor because it was associated with the Initiating Event Cornerstone attribute of Design Control, 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. The finding was determined to be of very low safety significance (Green) 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 cause of this finding was directly related to the cross-cutting area of Human Performance and the aspect of conservative assumptions and safe actions, because the licensee's design change process was expedited such that important technical considerations regarding equipment reliability and operating experience were not adequately evaluated to ensure optimum relay selection for use in low voltage control circuit applications (H.1.b).

Inspection Report# : [2009002](#) (*pdf*)

Mitigating Systems

Significance:  Jun 30, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to assess and manage shutdown risk associated with outage activities

A Green self-revealing noncited violation of 10 CFR Part 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," was identified for failure to adequately assess and manage shutdown risk associated with maintenance activities. Specifically, on May 2, 2009, the licensee performed a scheduled activity to install the 2A Recirculation Line nozzle plug in the reactor vessel. Installation of this plug isolated the common residual heat removal (RHR) system shutdown cooling (SDC) suction path while SDC availability was assumed in the shutdown risk assessment and had been designated as protected equipment as part of the specified risk management actions.

Shortly after the nozzle plug was installed, the licensee recognized that SDC was no longer immediately available and promptly removed the plug to restore SDC availability. This event was entered into the licensee's corrective action program as problem evaluation report 170184.

This finding affected the Mitigating Systems cornerstone and was determined to be greater than minor because the licensee failed to effectively manage the prescribed significant compensatory measures (i.e. protection of Loop I RHR). The significance of this finding was evaluated using IMC 0609, Appendix G, "Shutdown Operations

Significance Determination Process,” Table 1, “Losses of Control,” and Checklist 7 of Attachment 1, “BWR Refueling Operation with RCS Level > 23” , the inspectors determined that this finding was of very low safety significance (Green) because the event did not result a loss of control per Table 1 of Appendix G, or an actual loss of decay heat removal, and the SDC alignment was restored well within the time to boil, and as such did not require quantification in a Phase 2 or 3 analysis. The cause of this finding was directly related to the cross cutting aspect of work activity coordination in the area of Human Performance, because the licensee failed to adequately evaluate the impact of the work and to communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant performance (H.3.b). (Section 1R13).

Inspection Report# : [2009003](#) (*pdf*)

Significance:  Dec 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Maintain Requalification Examination Integrity

The inspectors identified a non-cited violation of 10 CFR 55.49 for engaging in an activity that compromised, or would have compromised but for detection by the inspectors, the integrity of examinations required by 10 CFR 55.59 that were administered in 2007 and that were planned to be administered in 2008. The examination compromise would have affected the equitable and consistent administration of the operational portion of the requalification annual examination. The inspectors identified that three job performance measures (JPM) sets administered in 2007 contained an unacceptable number of JPMs that had previously been administered during that same examination cycle. The inspectors also identified that the JPMs scheduled to be performed in the last three weeks of the 2008 requalification examination had all been previously administered in the first three weeks of the 2008 requalification examination. When notified of the examination schedule overlap issue, the licensee changed the examination schedule to prevent the overlap issue in 2008 and entered the problem into their corrective action program as problem evaluation report 158635.

This finding is more than minor because if left uncorrected, it could become a more significant safety concern, in that, licensed operators would not be adequately tested to ensure an acceptable knowledge level for performing licensed duties. Using the Licensed Operator Requalification Significance Determination Process, this finding was determined to be of very low safety significance (Green) because the performance deficiency was immediately corrected upon discovery. The cause of the finding was that the licensee did not comply with requirements of TRN-11.10, Annual Requalification Examination Development and Implementation. The finding was related to the cross-cutting aspect of procedural compliance of the work control component of the cross-cutting area of Human Performance (H.4(b)).

Inspection Report# : [2008005](#) (*pdf*)

Significance:  Oct 24, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify an Adverse Trend for Vibration-induced, Failed or Degraded Unit 2 and 3 RHR Hx SW Outlet FCVs

An NRC-identified, Green, non-cited violation of 10 CFR 50, Appendix B, Criterion II, “Quality Assurance Program,” was identified for the licensee’s failure, between April 2000 and January 2008, to carry out the Nuclear Quality Assurance Plan policy in that trend analysis performed on adverse conditions did not result in trend results which identified vibration-induced, failed or degraded residual heat removal (RHR) heat exchanger (Hx) service water (SW) outlet flow control valves (FCVs) as an adverse trend that needed increased management attention. Between April 2000 and January 2008, there were 17 instances of failed or degraded Unit 2 and 3 RHR Hx SW outlet FCVs due to vibration-induced damage entered into the licensee’s corrective action program (CAP). This issue has been identified in the licensee’s CAP as Problem Evaluation report 159606. Corrective actions associated with the vibration-induced damage included actions to replace Units 2 and 3 RHR Hx SW outlet FCVs with the same valves used on Unit 1 and to reconfigure all three units with a smaller bypass valve around the RHR Hx SW outlet FCVs.

This finding was more than minor because it affected the Mitigating System cornerstone objective of ensuring the

reliability of systems that respond to initiating events to prevent undesirable consequences and the cornerstone's attribute of equipment performance. Using the Significance Determination Process, the finding was determined to be of very low safety significance due to the RHR Hx SW outlet FCV occurrences, in which the RHR Hx SW outlet FCVs would not perform their safety function, did not represent an actual loss of a safety function of a single RHR SW train for greater than its Technical Specification allowed outage time. The cause of this finding was directly related to the Trend Performance in the CAP cross-cutting aspect of the Problem Identification and Resolution cross-cutting area, in that, the licensee failed to properly assess information in their CAP to identify the common cause problem of vibration-induced degraded and inoperable RHR Hx SW outlet FCVs.(P.1(b)).

Inspection Report# : [2008007](#) (pdf)

Barrier Integrity

Significance:  Jul 17, 2009

Identified By: NRC

Item Type: NCV NonCited Violation

Standby Gas Treatment Subsystem 'A' Inoperable Beyond the Technical Specification Allowed Outage Time (Section 40A2.a)

• Green. A Green, self-revealing, non-cited violation (NCV) of Technical Specification (TS) limiting condition for operation (LCO) 3.6.4.3, "Standby Gas Treatment (SGT) System", was identified for the licensee's failure to comply with the LCO required actions for one inoperable SGT subsystem due to an inadequate investigation to ensure the system's operability, on November 30, 2008, following a loss of power to one of the three relative humidity heaters. This issue was entered into the corrective action program as Problem Evaluation Report 174597. The cause of the failure of the heater was a failed relay. The relay was replaced and the system was restored to service on June 20, 2009.

The finding is similar to example 2a in Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," in that the example performance deficiency is not minor if Technical Specification limits were exceeded. In accordance with IMC 0612, Appendix B, "Issue Screening," the finding is greater than minor significance because it was associated with the Barrier Integrity cornerstone attribute of Human Performance and adversely affected the cornerstone objective of maintaining the radiological barrier functionality of Standby Gas Trains. Although the licensee ultimately was able to demonstrate that the SGT system could perform its safety function without the charcoal beds and associated heaters, compliance with SGT TS was a prerequisite to providing reasonable assurance that the SGT can protect the public from radionuclide releases caused by accidents or events. 10 CFR 50.36 defines TS limiting conditions for operation as the lowest functional capability or performance levels of equipment required for safe operation of the facility. The SGT TS LCO requirement was not met and therefore the cornerstone objective for functionality as described in the TSs, was not maintained.

In accordance with IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," the finding is determined to be of very low risk significance because the finding only represented a degradation of the radiological barrier function provided by the SGT system. Because this finding is of very low safety significance and has been entered in licensee's corrective action program, the violation is being treated as a non-cited violation. The cause of this finding was directly related to the cross-cutting aspect of thorough evaluation of identified problems in the problem identification and resolution area, because the licensee failed to properly classify, prioritize and evaluate the operability of the SGT system when the heater loss of power annunciator was received [P.1(c)]. (Section 40A2.a)

Inspection Report# : [2009006](#) (pdf)

Emergency Preparedness

Occupational Radiation Safety

Significance:  Jun 30, 2009

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to comply with the requirements of an RWP by entering a posted high radiation area

A Green self-revealing non-cited violation (NCV) of TS 5.4.1, Procedures, was identified for a radiation worker who failed to follow the requirements of RWP 09270081 as required by procedure RCI 9.1, Radiation Work Permits, Rev. 57. The licensee has entered this issue into the Corrective Action Program as Problem Evaluation Report 171375.

This finding is greater than minor because it is associated with the Occupational Radiation Safety Cornerstone attribute of Program and Process (Exposure Control) and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. The finding was evaluated using the Occupational Radiation Safety SDP and determined to be of very low safety significance (Green) because it was not related to ALARA planning, nor did it involve an overexposure or substantial potential for overexposure, and the ability to assess dose was not compromised. The cause of this finding was directly related to the cross-cutting aspect of Work Practices in the area of Human Performance, because the radiation worker failed to use self-checking prior to passing through the swing gate into the posted high radiation area (H.4.a). (Section 2OS1)

Inspection Report# : [2009003](#) (*pdf*)

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: N/A Jul 17, 2009

Identified By: NRC

Item Type: FIN Finding

Browns Ferry PI&R Summary

The team concluded that, in general, problems were identified, evaluated, prioritized, and corrected. The licensee maintained a reasonable threshold for identifying problems as evidenced by the large number of Problem Evaluation Reports (PERs) entered annually into the CAP, management expectation that all personnel are encouraged to initiate a PER for deficiencies noted, and CAP procedures requiring all personnel initiate PERs to document Significant Conditions Adverse to Quality (SCAQs), Conditions Adverse to Quality (CAQs), and potential items for improvement. However, some deficiencies were identified by the inspection team which were not previously entered into the CAP. Generally, the licensee prioritized and evaluated issues, conducted adequate formal root cause evaluations for significant problems, and corrective actions specified for problems were acceptable. Overall, corrective actions developed and implemented for issues were generally effective. However, the team identified some examples where corrective actions were not fully effective.

The team determined that overall, audits and self-assessments were adequate in identifying deficiencies and areas for

improvement in the CAP, and generally, appropriate corrective actions were developed to address these issues. However, the team noted that a significant number of deficiencies were identified through self assessments of the CAP, which was indicative of a program that, while improved, has yet to reach the licensee's own desired level of effectiveness. Specifically, a large number of PERs associated with corrective maintenance work orders were not written even though generation of such PERs was explicitly required by corrective action program procedures.

Based on discussions and interviews conducted with plant employees from various departments, the inspectors did not identify any reluctance by workers to report safety concerns, or utilize the corrective action program.

The team determined that corrective actions implemented, and planned to be implemented, to address the substantive cross-cutting issue in problem identification and resolution identified by the NRC in its annual assessment letter dated March 3, 2008, were appropriate. The team noted that some corrective actions to prevent recurrence associated with the substantive cross-cutting issue problem evaluation report (PER) were improperly implemented and ineffective. Specifically, the corrective action implemented to initiate PERs for all Corrective Maintenance Work Orders (CMWO) was ineffective in that several hundred CMWOs did not have PERs initiated.

Inspection Report# : [2009006](#) (*pdf*)

Significance: N/A Oct 24, 2008

Identified By: NRC

Item Type: FIN Finding

Problem identification Assessment results

The team concluded that, in general, problems were identified, evaluated, prioritized, and corrected. The licensee was adequate at identifying problems and entering them into the corrective action program (CAP) for resolution. The licensee maintained a reasonable threshold for identifying problems as evidenced by the large number of Problem Evaluation Reports (PERs) entered annually into the CAP, management expectation that all personnel are encouraged to initiate a PER for any deficiency noted, and CAP procedures requiring all personnel initiate PERs to document Significant Conditions Adverse to Quality (SCAQs), Conditions Adverse to Quality (CAQs), and potential items for improvement. However, some deficiencies were identified by the inspection team of issues not previously entered into the CAP. Generally, the licensee prioritized and evaluated issues, formal root cause evaluations for significant problems were adequate, and corrective actions specified for problems were acceptable. Overall, corrective actions developed and implemented for issues were generally effective. However, the team also identified examples where corrective actions were not effective.

The team determined that overall, audits and self-assessments were adequate in identifying deficiencies and areas for improvement in the CAP, and generally, appropriate corrective actions were developed to address these issues. Operating experience usage was found to be generally acceptable and integrated into the licensee's processes for performing and managing work, and plant operations. However, the team found examples where operating experience was not adequately addressed.

Based on discussions and interviews conducted with plant employees from various departments, the inspectors did not identify any reluctance by workers to report safety concerns, or utilize the corrective action program.

The team determined that corrective actions implemented, and planned to be implemented, to address the substantive cross-cutting issue in problem identification and resolution identified by the NRC in its annual assessment letter dated March 3, 2008, were appropriate. The team noted that the only corrective action to prevent recurrence for one of the common causes may not be sufficient to prevent recurrence. However, there were several other corrective actions credited from other PERs already implemented to address this common cause which the team considered to be appropriate. Additionally, a root cause evaluation team has been chartered to determine if any other corrective actions should be taken.

Inspection Report# : [2008007](#) (*pdf*)

Last modified : December 10, 2009