

Fort Calhoun

4Q/2011 Plant Inspection Findings

Initiating Events

Significance:  Sep 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Incorporate Design Information Into Procedures

The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, for failure to incorporate design information into procedures for operation of the component cooling water system for temporary off-normal system conditions during refueling.

The failure to ensure that the minimum flow assumption contained in calculation FC06700 was incorporated in component cooling water operating procedures is a performance deficiency. This was reasonably within the licensee ability to foresee and correct. The performance deficiency is more than minor as it affected 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. Since the finding affects the safety of the reactor during refueling outages, forced outages, and maintenance outages, it was evaluated using Inspection Manual Chapter 0609, Appendix G. The finding did not require quantitative assessment and therefore is of very low safety significance or green. A crosscutting aspect was not assigned as none were reflective of current plant performance.

Inspection Report# : [2011004](#) (*pdf*)

Significance:  Sep 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Provide Adequate Procedures to Ensure Leak Before Break Commitment

The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V for failure to have adequate instructions, procedures, or drawings including appropriate quantitative or qualitative acceptance criteria to ensure they can detect reactor coolant leakage, as required by the Updated Safety Analysis Report, using the containment dew point instrument or containment sump level instruments.

Title 10 CFR Part 50, Appendix B, Criterion V states, “Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Contrary to this, the inspectors determined that the licensee’s failure to have adequate instructions, procedures, or drawings including appropriate quantitative or qualitative acceptance criteria to ensure they can detect a one gallon per minute leak in four hours was a performance deficiency. This was within the licensee’s ability to foresee and correct. The performance deficiency is more than minor as it affected 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. Since the finding occurred during power operation and included structures, systems, and components where existing Significance Determination Process guidance is not adequate to provide reasonable estimates of the finding significance within the established Significance Determination Process timeliness goal of 90 days, the finding was evaluated using Inspection Manual Chapter 0609, Appendix M, “Significance Determination Process Using Qualitative Criteria.” Using Table 4.1, “Qualitative Decision –Making Attributes for NRC Management Review,” the finding was determined to be of very low safety significance (Green). This finding does not have a crosscutting aspect as the performance characteristic described by a potential crosscutting aspect did not occur within the last three years. Enforcement. Title 10

Inspection Report# : [2011004](#) (*pdf*)

Mitigating Systems

Significance:  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Adequately Design a Reactant Coolant Pump Lube Oil Collection System

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix R, Section III.O for the failure to ensure an adequate seismic design of the reactor coolant pumps oil collection system. The licensee used 2-inch copper pipe with brazed joints in the lube oil collection system. The seismic analysis of the system assumed the use of ASME Section IX during the installation of the system, but no codes or standards were used by the licensee for the brazed joints.

The inspectors determined that the failure to design and install an adequate oil collection system which included provisions for the drain lines to the oil collection tank was a performance deficiency. This finding had a credible impact on safety because the inadequate installation and design of the oil collection systems presented a degradation of a fire confinement component, which had a fire prevention function of not allowing an oil leak. The inspectors determined the finding was more than minor because it impacted the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences, and the related attribute of protection against external factors, such as a fire. The inspectors reviewed Inspection Manual Chapter 0609, Appendix F, and determined the finding was of very low safety significance, because of the low degradation rating of the fire confinement category related to the as found condition of the oil collection piping, the extremely low frequency of reactor coolant pump oil leaks, minor actual reactor coolant pump oil leaks during the past operating cycle, and other area fire protection defense-in-depth features such as automatic fire detection, manual suppression capability, and safe shutdown capability from the main control room. This finding involved a legacy issue associated with a modification for original installation; therefore, there were no assigned cross-cutting aspects.

Inspection Report# : [2011003](#) (*pdf*)

Significance:  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow Scaffolding Procedure

The inspectors identified a noncited violation of Technical Specification 5.8.1.a for failure to follow scaffold specification and construction Procedures SO-M-35 and PED-CSS-12. This led to the licensee declaring a number of emergency core cooling components inoperable and entering technical specification 2.0.1.

The inspectors determined that not following a procedure required by Technical Specification 5.8.1.a was a performance deficiency. The finding was more than minor because if left uncorrected it would have the potential to lead to a more significant safety concern. The licensee routinely failed to perform seismic evaluations of scaffolds erected near safety-related equipment not constructed in accordance with Procedures PED-CSS-12 or SO-M-35 for preconfigured seismic scaffolding. The finding was associated with the Mitigation Systems Cornerstone while the reactor was operating; therefore, Inspection Manual Chapter 0609, Attachment 4 screening checklist was used. The finding was determined to have very low safety significance because it did not involve the total loss of any safety function, and did not contribute to external event initiated core damage accident sequences. The inspectors determined the primary cause of the finding was lack of the licensee's oversight of the scaffolding program. The finding had a crosscutting aspect in the area of human performance, specifically, work practices, in that, the licensee failed to ensure supervisory and management oversight of work activities, including contractors, such that nuclear safety was supported.

Inspection Report# : [2011003](#) (*pdf*)

Significance:  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Provide Procedural Guidance to Replace Or Evaluate Age Degraded Components

A self-revealing noncited violation of Fort Calhoun Technical Specification 5.8.1, "Procedures," occurred due to the failure of the licensee to ensure that adequate procedures were available for maintenance which was conducted on the reactor protective systems power supplies. Specifically, there was no procedural guidance to require replacement of power supplies, or an engineering justification for continued operation, once power supplies exceeded their vendor recommended life, and/or showed signs of failure and degradation.

The inspectors determined that the licensee's failure to provide procedural guidance to evaluate and/or replace age-degraded components was a performance deficiency. This was a result of the licensee's failure to properly implement a required procedure, and was within the licensee's ability to foresee and correct and could have been prevented. This performance deficiency was more than minor because it could be reasonably viewed as a precursor to a significant event, it could lead to a loss of the reactor protective system. The inspectors evaluated this finding using Inspection Manual Chapter 0609, Attachment 4, and determined that this finding was associated with the Mitigating Systems Cornerstone, specifically the primary degraded reactivity control contributor. Because this finding occurred while the unit was operating at full power, the inspectors used Inspection Manual Chapter 0609 to determine its significance. The inspectors determined that the finding represented a qualification deficiency confirmed not to result in a loss of functionality because none of the failures to date prevented a reactor protective systems channel from tripping. Therefore, in accordance with the Phase 1 screening, the finding was of very low risk significance.

This finding had a crosscutting aspect in the area of problem identification and resolution associated with the component of operating experience because the licensee failed to adequately evaluate and communicate relevant internal and external operator experience.

Inspection Report# : [2011003](#) (pdf)

Significance: **W** Apr 15, 2011

Identified By: NRC

Item Type: VIO Violation

Failure to Correct a Degraded Contactor in the Reactor Protective System

During an NRC inspection conducted from January 17 through April 15, 2011, one violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

Contrary to the above, between November 3, 2008, and June 14, 2010, the licensee failed to assure that the cause of a significant condition adverse to quality was determined and corrective actions were taken to preclude repetition.

Specifically, the licensee failed to preclude shading coils from repetitively becoming loose material in the M2 reactor trip contactor. The licensee failed to identify that the loose parts in the trip contactor represented a potential failure of the contactor if they became an obstruction; and therefore, failed to preclude repetition of this significant condition adverse to quality, that subsequently resulted in the contactor failing.

This violation is associated with a White significance determination process finding in the Mitigating Systems Cornerstone.

Inspection Report# : [2011007](#) (pdf)

Significance: **G** Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Inadequate Operating Instruction Results in a Loss of Auxiliary Feedwater."

A self-revealing Green noncited violation of Fort Calhoun Station Technical Specification 5.8.1 occurred for an inadequate procedure for securing auxiliary feedwater flow when feeding the steam generators through the auxiliary feedwater ring. This inadequacy resulted in a complete loss of auxiliary feedwater for approximately three minutes. This was entered into the licensee's corrective action program as Condition Report 2011-0839.

The inspectors determined that the licensee's inadequate operating instruction procedure was a performance

deficiency. This finding was more than minor because it adversely impacted the human performance attribute of the Mitigating Systems Cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors performed the initial significance determination for the inoperable auxiliary feedwater system. The turbine-driven and motor-driven auxiliary feedwater pumps were inoperable for approximately three minutes, while the pump discharge lines were isolated during startup. The non-safety diesel-driven auxiliary feedwater pump remained available. The inspectors used the Inspection Manual 0609, Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings." The finding screened to a Phase 2 significance determination because it involved an actual loss of safety function in the Mitigating Systems Cornerstone. A Region IV senior reactor analyst performed a Phase 2 significance determination and attempted to use the pre-solved worksheet from the "Risk Informed Inspection Notebook for Fort Calhoun Station," Revision 2.01a. However, the pre-solved worksheet did not include the simultaneous failure of two auxiliary feedwater pumps. Therefore, the analyst performed a bounding Phase 3 significance determination. The analyst used the Fort Calhoun Standardized Plant Analysis Risk model, Revision 8.15, dated August 27, 2010, to calculate the conditional core damage probability, for a bounding event that included the failure to start for both the motor and turbine-driven auxiliary feedwater pumps. The change in core damage frequency was approximately 8.6×10^{-9} /year. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance. Inspection Report# : [2011002](#) (pdf)

Significance:  Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Determine the Cause of the Out Of Tolerance Condition Regarding Reactor Protection System Channel A Trip Unit 6

The inspectors identified a Green noncited violation of 10 CFR 50 Appendix B Criterion XVI, "Corrective Actions," which states in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. Contrary to the this, between July 28, 2003, and November 29, 2010, the licensee failed to determine the cause of the out of tolerance condition impacting reactor protection system channel A trip unit 6, which was a significant condition adverse to quality. This was entered into the licensee's corrective action program as Condition Report 2010-6190.

- The licensee's repeated failure to preclude the out-of-tolerance condition regarding reactor protection system channel A trip unit 6 is a performance deficiency. This finding is more than minor because if left uncorrected, the finding could have become more significant, in that, the licensee could fall below the technical specification "Minimum Operable Channels" if two additional trip unit six channels (B, C, or D) became inoperable. Because this finding occurred while the unit was operating at full power, the inspectors used Inspection Manual Chapter 0609 to determine its significance. Using Attachment 4 of that chapter, the inspectors determined that this finding has a very low safety significance (Green) because it was not a design or qualification deficiency, does not represent an actual loss of safety function, nor did it screen as potentially risk significant for external events. The finding was indicative of present performance and had a crosscutting aspect in the area of human performance associated with decision-making in that the licensee failed to use conservative assumptions in decision-making. The failure of the licensee to preclude repetition of the out-of-tolerance condition of reactor protection system channel A trip unit 6 is a significant condition adverse to quality.

Inspection Report# : [2011002](#) (pdf)

Significance:  Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Verify Design Adequacy of Refueling Water Tank Vortex Eliminator

The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control, which states, in part, that "design control measures shall provide for verifying or checking the adequacy of design, such as, by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Specifically, since 1998, the licensee failed to verify the adequacy of the design of the safety injection refueling water tank vortex eliminator to prevent potential air entrainment due to

vortexing in safety-related pump suction piping. This finding was entered into the licensee's corrective action program as Condition Reports 2007-2452 and 2011-0311.

The inspectors determined that the failure to verify the adequacy of the safety injection refueling water tank vortex eliminator was a performance deficiency. The finding was more than minor because it was associated with the design control 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 to prevent undesirable consequences. Inspectors performed a Phase 1 screening, in accordance with Inspection Manual Chapter 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and determined that the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee performed subsequent analysis which demonstrated that vortexing in the safety injection refueling water tank would not impact safety-related pump operation during a design basis event. This finding did not have a crosscutting aspect because the most significant contributor did not reflect current licensee performance.

Inspection Report# : [2011002](#) (pdf)

Significance: Y Jun 21, 2010

Identified By: NRC

Item Type: VIO Violation

Failure to Maintain External Flood Procedures

Yellow. The inspectors identified an apparent violation of Technical Specification 5.8.1.a, "Procedures," for failure to establish and maintain procedures that protect the intake structure and auxiliary building during external flooding events. The inspectors determined that the procedural guidance of GM-RR-AE-1002, "Flood Control Preparedness for Sandbagging," was inadequate because stacking and draping sandbags at a height of four feet over the top of floodgates would be insufficient to protect the vital facilities to 1014 feet mean sea level, as described in Updated Safety Analysis Report and station procedures. The licensee has entered this condition into their corrective action program as Condition Report 2010-2387. As result of this violation, the licensee has implemented a corrective action plan to correct identified deficiencies and ensure site readiness.

This performance deficiency is more than minor because it adversely affected the Mitigating Systems Cornerstone attribute of external events and affected the cornerstone objective of ensuring the availability and reliability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined the finding resulted in the degradation of equipment and functions specifically designed to mitigate a flooding initiating event. In addition, an external flood event would degrade two or more trains of a multi-train safety system. Therefore, the finding was potentially risk significant to flood initiators and a Phase 3 analysis was required. The preliminary change in core damage frequency was calculated to be $3.1E-5$ /year indicating that the finding was of substantial safety significance (Yellow). The finding was determined to have a crosscutting aspect in the area of problem identification and resolution, corrective action program, for failure to take appropriate corrective actions to address safety issues and adverse trends in a timely manner, commensurate with their safety significance and complexity. Specifically, from 2003 to 2008, the licensee failed to initiate appropriate corrective actions to ensure regulatory compliance of the external flooding design basis was maintained. [P.1(d)] (Section 4OA5.1)

ERRATA - 10/19/10 issued IR 05000285/2010008-01 to document final significance determination process letter.

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

Inspection Report# : [2010008](#) (pdf)

Barrier Integrity

Significance: G Sep 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Identify and Correct the Lack of Calibration for the HE-2 Crane Load Weighing System

The inspectors identified a noncited violation of 10 CFR 50 Appendix B Criterion XVI for the failure to identify and correct a condition adverse to quality. Specifically, with regard to the calibration of the load weighing system for the HE-2 crane prior to its use in lifting the spent fuel transfer cask, loaded with spent fuel, out of the spent fuel pool. This issue was entered into the licensee's corrective action program as Condition Report 2009-3186.

The failure by the licensee to promptly identify and correct the condition whereby the HE-2 crane load weighing system had not been calibrated or tested for an extended period of time leading up to its use during the lift of the spent fuel transfer cask on July 7, 2009, is a performance deficiency. The performance deficiency was determined to be more than minor because it adversely impacted the spent fuel pool fuel handling attribute of the Barrier Integrity Cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding) protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee failed on more than one occasion to identify and correct a condition whereby the load cell for the HE-2 crane was neither calibrated nor tested prior to lifting the spent fuel transfer cask, loaded with spent fuel, out of the spent fuel pool. Using Attachment 4 of Inspection Manual Chapter 0609, the inspectors determined that this finding has a very low safety significance (Green) because it did not result in a fuel handling error that caused damage to fuel clad integrity or a dropped assembly. The finding was not found to be indicative of current plant performance and thus no crosscutting aspect was identified.

Inspection Report# : [2011004](#) (pdf)

Significance:  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Follow Radiation Work Permit Procedure

Inspectors identified a noncited violation of Technical Specification 5.8.1a for the failure to follow procedural requirements to plan and carry out decontamination work in the spent fuel pool transfer canal. On January 24, 2011, decontamination work was performed in the spent fuel pool transfer canal, using Radiation Work Permit 11-3317. While planning and controlling the work, the licensee failed to follow multiple procedure steps. Specifically, the licensee did not prepare an ALARA planning worksheet as the initial step of generating the radiation work permit, did not document justification for changing the electronic dosimeter set points which were eventually determined to be inappropriate, and did not perform an ALARA briefing before the entries were made into the spent fuel pool transfer canal, which was posted as a restricted locked high radiation area. The inspectors also determined that there were aspects of the procedure that contained vague expectations, which contributed to decisions being made without using the procedure.

The failure to follow a procedure was a performance deficiency. The finding was more than minor because it negatively impacted the Occupational Radiation Safety Cornerstone's attribute of program and process, in that, by not following the procedure; radiological safety attributes built into the radiation work permit program were circumvented. Using Inspection Manual Chapter 0609, Appendix C, "Occupational Radiation Safety Significance Determination Process," the inspectors determined that the violation was of very low safety significance because: (1) it was not associated with ALARA planning or work controls, (2) there was no overexposure, (3) there was no substantial potential for an overexposure, and (4) the ability to assess dose was not compromised. This deficiency had a crosscutting aspect in the area of human performance related to work practices. Specifically, the licensee did not communicate human error prevention techniques, such as, holding pre-job briefs, self- and peer- checking, and proper documentation of activities.

Inspection Report# : [2011003](#) (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 Mar 31, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Submit a Timely Licensee Event Report

The inspectors identified a Severity Level IV noncited violation of 10 CFR 50.73 (a)(2)(i)(B) for the licensees' failure to submit a licensee event report within 60 days of discovery. On November 29, 2010, the licensee had the available information to determine reactor protection system channel A trip unit 6 had been inoperable from November 8 until November 29, 2010. Per the licensee's technical specifications, reactor protection system channel A trip unit 6 should have been in the tripped condition within 48 hours from time of discovering loss of operability. This is a reportable condition required by 10 CFR 50.73 (a)(2)(i)(B) as a condition prohibited by technical specifications. This was entered into the licensee's corrective action program as Condition Report 2011-2006.

The inspectors determined that the licensees' failure to submit a licensee event report within the required time was a performance deficiency. The licensee had the appropriate licensing basis information as well as the inspector's specific concerns regarding inadequate troubleshooting, potential preconditioning, inadequate maintenance, and operability concern; therefore the performance deficiency was within their ability to foresee and correct. The inspectors reviewed this issue in accordance with Inspection Manual Chapter 0612 and the NRC Enforcement Manual. Through this review, the inspectors determined that traditional enforcement was applicable to this issue because the NRC's regulatory ability was potentially affected. Specifically, the NRC relies on the licensee to identify and report conditions or events meeting the criteria specified in regulations in order to perform its regulatory function, and when this is not done the regulatory function is impacted, and is therefore a finding. The inspectors determined that this finding was not suitable for evaluation using the significance determination process, and as such, was evaluated for traditional enforcement only, in accordance with the NRC Enforcement Policy. This is a Severity Level IV noncited violation consistent with Sections 2.3.2 and 6.9.d of the NRC Enforcement Policy

Inspection Report# : [2011002](#) (*pdf*)

Last modified : March 02, 2012