Fort Calhoun
2Q/2009 Plant Inspection Findings

Initiating Events

Significance: G Nov 18, 2008
Identified By: NRC
Item Type: FIN Finding
Inadequate Corrective Actions for Repetitive Failures of a Risk-Significant Valve
DRAFT - The inspectors identified a Green finding for inadequate corrective actions, which resulted in a plant transient. Specifically, prior corrective actions were ineffective at preventing repeated failures of condensate makeup control Valve, LCV 1190, a condition which had the potential to initiate a secondary plant event and/or adversely affect mitigating systems equipment (e.g., impacting the availability of the diesel-driven auxiliary feedwater Pump FW-54.)

The finding was greater than minor because the random failure of LCV-1190 could be reasonably viewed as precursor to a significant event. The finding, which is under the Initiating Events cornerstone, was of very low safety significance because it did not (1) result in exceeding the Technical Specification limit for reactor coolant system leakage, (2) contribute to both the likelihood and a reactor trip and that mitigation equipment would be unavailable, or (3) increase the likelihood of a fire or flood. This finding had a cross-cutting aspect in problem identification and resolution, specifically the evaluation aspect [P.1.(c)] because, as Inspection Manual Chapter 0305 states, licensees should “thoroughly evaluate problems such that the resolutions address the causes and extent of condition...” Based on the inspectors’ review of the previous events, the cause determinations lacked rigor and directly led to the recurrence of this condition.

Inspection Report# : 2008005 *(pdf)*

Significance: G Sep 30, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Reactor Coolant System Leak During Plant Heat-up Due to Inadequate Valve Packing
A Green self-revealing noncited violation of Technical Specification 5.8.1.a (Procedures) was identified for an inadequate maintenance procedure. Specifically, the licensee’s maintenance procedures did not provide adequate instructions for the craft to re-pack Pressurizer Spray Valve PCV-103-1 that resulted in a 2-3 gpm reactor coolant leak.

This finding was greater than minor because it was similar to non-minor example 4.b in Inspection Manual Chapter 0612, Appendix E, “Examples of Minor Issues,” in that a procedural error caused a reactor trip or other transient. The inspectors evaluated this finding using Manual Chapter 0609, Attachment 4. The inspectors determined that it was of very low safety significance (Green) because, assuming worst case degradation, the finding would not result in exceeding the technical specification limit for any reactor coolant system leakage, nor would it have likely affected other mitigation systems resulting in a total loss of their safety function. This finding had a crosscutting aspect in Human Performance, specifically the Decision Making aspect [H.1.(b)] because licensee personnel failed to use conservative assumptions in decision-making. Specifically, the relevant procedure left the detail of repacking the valves to skill of the craft and licensee personnel failed to challenge or question whether that was appropriate.

Inspection Report# : 2008004 *(pdf)*

Mitigating Systems

Significance: G Jun 30, 2009
Identified By: NRC
Item Type: VIO Violation
Failure to Properly Translate Raw Water System Design Basis Requirements
The inspectors identified a cited violation of 10 CFR Part 50, Appendix B, Criterion III, for the failure to correctly translate the Fort Calhoun Station raw water strainer component's design basis into specifications, procedures, and instructions. The raw water strainers were incorrectly translated as nonsafety related in design documents for their function of filtering small debris from the raw water system although the equipment is relied upon for design basis accident mitigation. This violation was identified by the NRC in 2007 and was a continuing violation that was not corrected in a reasonable time.

This finding was more than minor because it affected the Mitigating System Cornerstone objective of the design control attribute to ensure the reliability and availability of the raw water system to mitigate initiating events. Using the NRC Manual Chapter 0609, Phase 1 screening worksheet, the issue screened as having very low safety significance because it was a design or qualification deficiency confirmed not to result in a loss of operability per Part 9900, "Technical Guidance, Operability Determination Process for Operability and Functional Assessment." The finding had a problem identification and resolution crosscutting aspect (corrective action component) because the licensee failed to take appropriate corrective actions to address the safety issue in a timely manner [P.1(d)]

Inspection Report# : 2009003 *(pdf)*

Significance: G Mar 31, 2009
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Write an Adequate Shutdown Procedure
A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified for the licensee's failure to take prompt corrective measures after identifying that water could penetrate cracks in the turbine building concrete floor and adversely impact the operability of an emergency diesel generator and safety related switchgear. Cracks in the floor of turbine building mechanical equipment room were identified in February 2006, when water was observed leaking into the Diesel Generator 1 room (Room 63). The licensee took no immediate corrective actions to evaluate or repair the cracks. In February 2009, water was again observed leaking into Room 63, resulting in unexpected tripping of breakers associated with the Diesel Generator 1, secondary compressor motor starter. The licensee entered this issue into their corrective action program as Condition Report 2009-0687.

This finding was more than minor because the failure to perform adequate corrective actions on the turbine building floor, if left uncorrected, could become a more serious safety concern. Specifically, water could seep through the floor and render the emergency diesel generator and/or safety related switchgear inoperable. Using the Manual Chapter 0609, "Significance Determination Process," Attachment 4 "Phase 1 Initial Screening and Characterization of Findings," this finding was of very low safety significance because it: 1) was confirmed to result in a loss of functionality of the secondary compressor motor starter; 2) did not represent a loss of safety function; 3) did not result in a loss of a technical specification required train for more than its allowed outage time; 4) did not result in a loss of risk significant equipment for more than 24 hours; and 5) did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding did not have a crosscutting aspect because the performance deficiency was aged and not indicative of current licensee performance.

Inspection Report# : 2009002 *(pdf)*

Significance: G Aug 15, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Untimely Corrective Actions for Degraded Fire Protection Water Supply System

The team identified a noncited violation of License Condition 2.D and the Quality Assurance Plan for failure to implement timely corrective actions to address a degraded fire water supply system. Despite determining that the system was degraded and taking compensatory actions to assure the system remained functional in 2006, the licensee failed to correct the condition prior to completing the next outage. Using the guidance of Regulatory Issue Summary 2005 20, Revision 1, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety," the team determined the corrective actions were untimely and subject to enforcement. The fire water supply system piping continued to degrade because of corrosion. The licensee documented this deficiency in Condition Report 200805319.

The failure to correct the degraded fire water supply system in a timely manner was a performance deficiency. This deficiency was more than minor because if left uncorrected the finding would become a more significant safety concern, as a result of ongoing corrosion. The team evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." Because the fire water supply system met its design functions so long as both pumps and all pipe segments remained in service and the licensee established appropriate compensatory measures, the team assigned this finding a low degradation rating. As specified in Appendix F, Step 1.3, this finding had very low safety significance (Green). This finding has a crosscutting aspect in the area of human performance, specifically the resources attribute (H.2(a)), in that the licensee failed to promptly correct degraded fire water supply system and minimize the longstanding condition.

Inspection Report# : 2008009 *(pdf)*

Significance: G Aug 15, 2008
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Corrective Actions Related to Revising a Post-fire Safe Shutdown Procedure
The team identified a noncited violation of License Condition 2.D and the Quality Assurance Plan for failure to take adequate corrective action for a condition adverse to fire protection. Specifically, the licensee had included steps to open the breakers for the reactor coolant gas vent system valves in response to Noncited Violation 05000285/2005008 07; however, the licensee failed to identify, proceduralize and train operators to identify the instruments needed to implement this action. Spurious actuation of the valves because of fire damage could result in uncontrolled loss of reactor coolant inventory. The licensee documented this deficiency in Condition Report 200805325.

The failure to ensure that procedure steps instructed operators how to recognize the need to close spuriously opened reactor coolant gas system vent valves was a performance deficiency. This deficiency was more than minor in that it had the potential to affect the procedure quality attribute of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to external events (fire). The team evaluated this deficiency using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." Because of the design of the vent system valves (i.e., three spurious actuations needed to exceed charging pump capability), the availability of reliable reactor coolant system pressure and pressurizer level indications in the control room, and the ability of operator to compensate for the deficiency because of their experience and training, the team assigned this finding a low degradation rating. As specified in Appendix F, Step 1.3, this finding had very low safety significance (Green). This finding has a crosscutting aspect in the area of human performance, specifically the resources attribute (H.2(c)), in that the licensee failed to ensure that operators had complete, accurate and up to date procedures providing sufficient guidance to correct spurious reactor coolant gas vent system valve operation.

Inspection Report# : 2008009 *(pdf)*

Significance: N/A Aug 11, 2008
Identified By: NRC
Item Type: FIN Finding
95002 Inspection Results
The U.S. Nuclear Regulatory Commission conducted this supplemental inspection to assess the licensee’s individual and collective evaluation of a 2nd quarter 2007 mitigating systems cornerstone White finding, a 2nd quarter 2007 mitigating systems White NRC Performance Indicator, and a 3rd quarter 2007 mitigating systems White finding. These findings and performance indicator collectively placed the Fort Calhoun Station in the Degraded Cornerstone

Column (Column 3) of the NRC's Action Matrix from the 2nd quarter 2007 through the end of the 1st quarter 2008. The 2nd quarter 2007 White performance indicator associated with the safety system functional failure performance indicator was White because station reporting a cumulative six safety system functional failures during the previous four quarters. This performance indicator returned to Green in the 3rd quarter 2007. The 2nd quarter 2007 White finding, documented in NRC Inspection Report 05000285/2006018, was associated with improper valve maintenance activities on a containment spray header isolation valve rendering the valve inoperable for an entire operating cycle. The 3rd quarter 2007 White finding, documented in NRC Inspection Report 05000285/2007011, was associated with inadequate maintenance and corrective actions for a relay and contact failure in the field flash circuit of an emergency diesel generator rendering Emergency Diesel Generator 1 inoperable on two separate occasions.

The NRC inspection team concluded that the licensee adequately evaluated the White finding associated with the containment spray header isolation valve maintenance, identified the root and contributing causes, implemented effective interim corrective actions and long term corrective actions to prevent recurrence, defined the extent of condition appropriately, and planned effective long term actions to address the extent of causes. As a result, this White finding and associated Notice of Violation 05000285/2006018-01, "Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions Procedures, and Drawings"," is closed. Additionally, the team determined that the licensee adequately assessed the individual and collective aspects and contributors to the safety system functional failure performance indicator and identified appropriate actions as discussed in the inspection report. In addition, the team concluded that the licensee's evaluation of the inadequate corrective actions aspect of the Emergency Diesel Generator 1 relay maintenance White finding to be adequate and that acceptable interim and long term corrective actions were in place to assure that future significant conditions adverse to quality would be appropriately identified and evaluated in the licensee's corrective action program. As a result, Notice of Violation 05000285/2007011-02, "Inadequate Emergency Diesel Generator Corrective Measures," is closed.

However, the team determined that, although the licensee's evaluation of the Emergency Diesel Generator 1 relay failure identified the root and contributing causes, developed adequate corrective actions, and included plans to prevent recurrence of the failure of the emergency diesel generators, it failed to adequately assess the extent of condition. The licensee's assessment of extent of condition for the Emergency Diesel Generator 1 relay contact failure due to inappropriate lubrication was narrow and untimely. Specifically, the initial extent of condition scope was focused on the same relay type as the one that failed in the Emergency Diesel Generator 1 circuit, even though inappropriate lubrication was applied to other relay types. This narrow evaluation of the lubrication issues resulted in the licensee initially identifying only a population of five relays in components other than the emergency diesel generators. The licensee recognized that the extent of condition was narrow in February 2008, prior to this inspection, and expanded the scope to include other FID-1 relays that may have been inappropriately lubricated. However, the team concluded that the licensee's extent of condition was still too narrow in that the licensee failed to address the potential for sticking or binding of auxiliary contact actuators as a failure mechanism. Therefore, they failed to include safety-related FID-2 relays in the list of components to be evaluated and/or tested to assure their ability to perform their safety function. Additionally, the licensee's corrective actions to address the expanded extent of condition of lower risk significant relays were potentially untimely given that the licensee's actions depended on a preventative maintenance schedule over four operating cycles, approximately 6 years, to address the potential common cause failure mechanism of inappropriate application of lubricants. Assessing the operability status of all relays in a timely manner was important, given the common mode failure mechanism and the potential for multiple components, trains, or system functional failures during an event response.

During the inspection, Fort Calhoun Station entered a forced outage. Due to the team's questioning of the extent of condition, the licensee identified a population of 39 relays to be inspected during the forced outage. This inspection resulted in four relays not meeting acceptance criteria for contact resistance. The licensee determined that two of those relays needed further assessment and were tagged out of service in their safety position. This assessment is pending the shutdown of the facility to allow for as found testing of the components and is the subject of an unresolved item. The team also noted that, at the time of the inspection, the licensee was still making refinements to the overall preventative maintenance strategy to implement adequate maintenance on relays and contactors. Therefore, it was not clear that the licensee had a fully developed preventative maintenance plan that would assure that all of the correct maintenance would be implemented.

Consequently, the White finding associated with Notice of Violation 05000285/2007011-03 will remain open pending a future inspection

per NRC Inspection Procedure 95002 to verify that: (1) the extent of condition of inadequately maintained relays and contacts is appropriately assessed with regards to contactor binding; (2) adequate corrective actions are identified and implemented; and (3) the preventive maintenance and postmaintenance testing of risk-significant components and subcomponents, such as electrical relays and contactors, are properly evaluated and addressed.

The team determined that the licensee's common cause analysis of the individual issues was adequate and correctly identified underlying safety culture aspects which contributed to the events. As a result of the analysis, the licensee identified five focus areas, developed associated action plans, and implemented interim actions to help improve overall future plant performance. The licensee's focus areas consisted of Human Performance, Equipment Reliability, Latent Engineering Issues, Problem Identification and Resolution, and Safety Culture.

Inspection Report# : 2008006 *(pdf)*

Barrier Integrity

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

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