

Columbia Generating Station 2Q/2016 Plant Inspection Findings

Initiating Events

Significance: G Jun 30, 2016

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

Loss of RCC Cooling Requiring a Reactor Scram

The inspectors reviewed a self-revealed, non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to follow procedure OI-41, "Operations Work Control Expectations," Revision 59. Specifically, the licensee incorrectly marked steps of procedure OSP-FPC/IST-Q701, "Fuel Pool Cooling System Operability Surveillance," Revision 34, as not applicable and therefore did not provide mechanical isolation between the non-safety reactor closed loop cooling system and the safety-related standby service water system. As a result, on March 28, 2016, the reactor closed loop cooling system was momentarily depressurized into the service water system and required a manual reactor scram due to a loss of reactor closed loop cooling for non-safety systems. The licensee entered this issue into their corrective action program as Action Request 346945.

The failure to follow procedure OI-41, "Operations Work Control Expectations," Revision 59, was a performance deficiency. This performance deficiency was more than minor, and therefore a finding, because it adversely affected the configuration control attribute of the Initiating Events Cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Using Inspection Manual Chapter 0609, Attachment 04, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 1, "Initiating Events Screening Questions," dated June 19, 2012, the inspectors determined the finding was of very low safety significance (Green) because the finding did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The finding had a cross-cutting aspect in the area of human performance associated with avoiding complacency because the licensee failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes including implementing appropriate error reduction tools. Specifically, licensed operators failed to recognize the possible latent issues and inherent risk of marking large portions of a procedure as "not applicable." [H.12]

Inspection Report# : [2016002](#) (*pdf*)

Mitigating Systems

Significance: G Dec 31, 2015

Identified By: Self-Revealing

Item Type: NCV Non-Cited Violation

Incorrect Electrical Component Operated During Maintenance

The inspectors reviewed a self-revealing non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to implement Work Order 02048855 during maintenance on a safety-related power panel. Specifically, the licensee operated an incorrect electrical disconnect, E-DISC-7AA-6A. Further, upon realization of the error, maintenance personnel re-energized the E-DISC-7AA-6A circuit without understanding the effects of that

action. As a result of this incorrect component operation, the division 1 emergency diesel generator was rendered inoperable. As an immediate corrective action, the licensee stopped all associated maintenance and restored the division 1 emergency diesel generator to operable status by performing the standby alignment procedure. The licensee entered this issue into their corrective action program as Action Request 337018.

The failure to implement Work Order 02048855 during maintenance on a safety-related power panel was a performance deficiency. This performance deficiency was more than minor, and therefore a finding, because it adversely affected the configuration control attribute of the Mitigating Systems Cornerstone objective of ensuring the capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609, Attachment 04, "Initial Characterization of Findings," and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," Exhibit 2, "Mitigating Systems Screening Questions," dated June 19, 2012, the inspectors determined the finding was of very low safety significance (Green) because the finding did not represent a loss of safety function, did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time, and did not represent an actual loss of function of one or more non-technical specification equipment for greater than 24 hours. The inspectors determined the finding had a cross-cutting aspect in the area of human performance associated with the avoid complacency component because the licensee failed to recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes including implementing appropriate error reduction tools. Specifically, the maintenance staff failed to follow the site's error prevention tool process and operated the incorrect component [H.12].

Inspection Report# : [2015004](#) (*pdf*)

Significance:  Oct 01, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Ensure Adequate Acceptance Criteria in Fire Main Surveillance Testing

The team identified a non-cited violation of License Condition 2.C.14, "Fire Protection Program (Generic Letter 86-10)," for the failure to establish procedural guidance for validating the underground fire main condition to ensure the required fire suppression system demands were met. Specifically, the licensee failed to provide acceptance criteria in Plant Procedure Manual 15.4.2, "Fire Main Hydraulic Data Acquisition," to validate that the fire water supply at the base of the largest demanding fire suppression system was adequate given the current condition of the fire main. From review of design information, the team verified the licensee met their fire protection system design flow and pressure requirements, determined that other pumps would be available, and determined this finding did not affect the ability to achieve safe shutdown. The licensee entered this deficiency in their corrective action program as Action Request AR-00335821.

The failure to provide adequate acceptance criteria to validate the condition of the water supply was a performance deficiency. Specifically, the licensee failed to provide adequate acceptance in the Plant Procedure Manual 15.4.2 for Surveillance Requirement 1.10.1.14 to ensure that the current fire water supply can meet the largest demanding fire suppression system. The performance deficiency was more than minor because it was associated with the protection of external events attribute (fire) of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team evaluated the finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," because it affected the firewater supply category. Using Appendix F, Attachment 1, "Fire Protection Significance Determination Process Phase 1 Worksheet," Task 1.4.7, "Fire Water Supply," the team assigned a very low safety significance (Green) to the finding because of the availability of at least 50 percent of the required firewater capacity. The team confirmed this after verifying the water supply exceeded the minimum in the water supply calculations, the availability of additional fire pumps beyond that required for the minimum water supply and the condition did not affect the ability to achieve safe shutdown. The finding did not have a cross-cutting aspect since the performance deficiency was more than three years old and not indicative of current performance.

Inspection Report# : [2015008](#) (pdf)

Significance:  Oct 01, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Inadequate Alternative Shutdown Procedure

The team identified a non-cited violation of Technical Specification 5.4, "Procedures," for the failure to provide adequate procedures to implement the fire protection program. Specifically, the alternative shutdown procedure failed to assure operator actions for post-fire safe shutdown would be performed within the required times following a control room evacuation due to fire. The licensee entered this issue into their corrective action program as Action Request AR-00335854 and issued Night Order Number 1668 providing direction to the operators as a compensatory measure until they completed additional corrective actions.

The failure to provide an adequate procedure to assure operators performed post-fire safe shutdown actions within the required time following a control room evacuation due to fire was a performance deficiency. The performance deficiency was more than minor because it was associated with the protection against external events (fire) attribute of the Mitigating Systems cornerstone and it adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team evaluated this finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," dated September 20, 2013. Since operators would take more than the 10 minutes specified in their procedure to initiate reactor depressurization, the team could not determine that the operators had maintained the ability to reach and maintain safe shutdown conditions. The dominant core damage sequences involved (1) a fire in the control room that required a control room evacuation and (2) the failure of operators to initiate emergency depressurization. Therefore, a Region IV senior reactor analyst performed a bounding detailed risk evaluation. The analyst noted that additional time was available in a probabilistic risk assessment calculation. The additional time available in a probabilistic risk assessment calculation helped to minimize the risk. Based on this information, the finding screened to Green because the licensee could achieve safe shutdown. The finding did not have a crosscutting aspect since the performance deficiency was more than three years old and not indicative of current performance.

Inspection Report# : [2015008](#) (pdf)

Significance:  Sep 30, 2015

Identified By: NRC

Item Type: FIN Finding

Failure to Maintain Seismic Instrumentation Functional to Alert Plant Operators of Ground Motions Exceeding the Operating Basis Earthquake

The inspectors identified a finding associated with the licensee's failure to maintain seismic instrumentation functional as required by Licensee Controlled Specification 1.3.7.2, "Seismic Monitoring Instrumentation." Specifically, because of inadequate calibration procedures, several as-left setpoints for the seismic response spectrum recorders indicating lights were non-conservative relative to their function to alert operators of ground motion exceeding the operating basis earthquake (OBE). Following discovery of this issue, the licensee recalibrated the seismic response spectrum recorders using OBE ground motions as the upper tolerance. The licensee entered this issue into their corrective action program as Action Request 333996.

The performance deficiency was more than minor because it affected the configuration control attribute of the Mitigating Systems Cornerstone objective and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in seismic instruments calibrations that were non-conservative relative to their function to alert plant operators that a shutdown is required. NRC regulations require a plant shutdown

since systems necessary for continued operation without undue risk to the health and safety of the public are not designed to remain functional, in all cases, following an OBE. The inspector performed the initial significance determination using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance because (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours. Additionally, the finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather initiating event. The finding does not have a cross-cutting aspect since the configuration control error is associated with an instrument setpoint change request from 1990 and therefore not reflective of current licensee performance.

Inspection Report# : [2015003](#) (pdf)

Significance:  Sep 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Non-Conservative Shutdown Criteria in Earthquake Abnormal Procedure

The inspectors identified a non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the failure to maintain an adequate abnormal procedure for earthquakes. Specifically, the licensee failed to establish appropriate shutdown criteria for earthquakes that exhibit ground motion exceeding the operating basis earthquake (OBE). The licensee's shutdown criteria would allow for continued operations if ground motion at a single frequency exceeded the design response spectrum. In response to this issue, the licensee initiated corrective actions to change the station's earthquake abnormal procedure to provide shutdown criteria consistent with the original licensing basis of the facility. The licensee entered this issue into their corrective action program as Action Request 336875.

The performance deficiency was more than minor because it affected the procedural adequacy attribute of the Mitigating Systems Cornerstone objective and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in shutdown criteria that would allow for continued operations following events where ground motion at a single frequency exceeded the design response spectra. NRC regulations require a plant shutdown since systems necessary for continued operation without undue risk to the health and safety of the public are not designed to remain functional, in all cases, following an OBE. The inspector performed the initial significance determination using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors determined that the finding was of very low safety significance because (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours. Additionally, the finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather initiating event. The finding does not have a cross-cutting aspect since the procedure error is associated with a 1996 change to the licensing basis and therefore not reflective of current licensee performance.

Inspection Report# : [2015003](#) (pdf)

Significance:  Sep 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Provide Design Control Measures for Control Room Emergency Chillers

The inspectors identified a non-cited violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to verify the adequacy of the design of the control room HVAC system. Specifically, the licensee failed to demonstrate the ability of control room HVAC design to maintain the temperatures in the main control room below habitability and environmental qualification limits, for the duration of all accident scenarios. The licensee initiated Action Request 332565 to document the concern, issued night order 1662 to communicate the issue, aligned both control room air handling units to their respective chillers, created a quick card procedure to perform the chiller reset actions, and validated the quick card actions could be accomplished within 10 minutes. Additionally, the licensee determined that operators could restore the chillers during accident conditions within 90 minutes to prevent temperatures from exceeding equipment operability limits.

The performance deficiency was more than minor because it adversely affected the design control attribute of the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," the inspectors determined the finding was of very low safety significance because (1) the finding was not a deficiency affecting the design or qualification of a mitigating system; (2) the finding did not represent a loss of system and/or function; (3) the finding did not represent an actual loss of function of a single train for greater than its technical specification allowed outage time; and (4) the finding does not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant in accordance with the licensee's maintenance rule program for greater than 24 hours. This finding had a cross-cutting aspect in the area of problem identification and resolution, evaluation, in that the licensee did not thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee did not thoroughly evaluate the extent of condition from NRC-identified NCV 05000397/2013002-04, "Failure to Obtain NRC Approval for Changes to Control Room HVAC Requirements," for the effect of this change on other station calculations [P.2].

Inspection Report# : [2015003](#) (*pdf*)

Significance:  Sep 30, 2015

Identified By: NRC

Item Type: NCV Non-Cited Violation

Failure to Implement Procedures to Ensure Availability of Safe Shutdown Personnel

The inspectors identified a non-cited violation of Technical Specification 5.4.1.a, "Procedures," for the licensee's failure to ensure operators could perform time-critical steps for fire events. Specifically, on July 4, 2015, the licensee failed to implement written procedures to ensure that an equipment operator can complete certain post-fire safe-shutdown actions within 10 minutes. In response to this conclusion, the licensee initiated Action Request 332747 to document the inability to meet the post-fire safe-shutdown actions in accordance with procedure PPM 1.3.1, "Operating Policy, Programs, and Practices," Revision 119. Additionally, the licensee issued Night Order 1655, reminding all operating crews of the requirements of procedure PPM 1.3.1 for leaving the protected area.

This performance deficiency was more than minor because it was associated with the protection against external factors attribute of the Mitigating System Cornerstone and affected the cornerstone's objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. A senior reactor analyst performed a detailed significance determination process review using NRC Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination," dated September 20, 2013 and NRC Inspection Manual 0308, Attachment 3, Appendix F, "Technical Basis Fire Protection Significance Determination Process (Supplemental Guidance for Implementing IMC 0609, Appendix F) At Power Operations," dated February 28, 2005. The senior reactor analyst determined that the failure of the equipment operator to perform the certain post-fire safe-shutdown actions within 10 minutes would not adversely affect a quantitative risk assessment, and therefore this finding was of very low safety significance (Green). This finding has a cross-cutting aspect in the area of Human Performance, Teamwork, because the licensee failed to communicate and to coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. Specifically, the

equipment operator spoke with the shift technical advisor about the need to exit the protected area at the morning turnover meeting but neither individual spoke with the control room supervisor. Communication was ineffective in that the Equipment Operator believed permission was granted and proceeded to exit the protected area [H.4].
Inspection Report# : [2015003](#) (*pdf*)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Security

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

Miscellaneous

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