Robinson 2
4Q/2010 Plant Inspection Findings

Initiating Events

Significance: G Dec 31, 2010
Identified By: NRC
Item Type: FIN Finding
Failure to Perform 5-year Vendor Manual Specified Reactor Coolant Pump Motor Inspections
The inspectors identified a Green finding for failure to perform vendor recommended inspections of the reactor coolant pump (RCP) motors. Visual inspections of the RCP stator assemblies were not performed at five year intervals in accordance with the vendor technical manual preventive maintenance instructions. Adequate justification for exceeding the five year interval was not provided. Inspection of the stator assembly in accordance with the vendor recommendations at a five year interval is expected to have identified any significant degradation requiring repairs. The licensee failed to conduct these inspections and a motor failure occurred on October 7, 2010. The licensee replaced the failed “C” RCP motor and will evaluate the preventive maintenance inspection interval. The licensee has entered this issue into the CAP as Nuclear Condition Report (NCR) 438509.

The failure to partially disassemble the RCP motors and perform visual inspections of the rotor and stator assemblies was a performance deficiency that was within the licensee’s ability to foresee and correct, and therefore should have been prevented. The finding is more than minor because it adversely impacted the equipment performance attribute of the initiating event cornerstone and its objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the “C” RCP motor failed causing a reactor trip. The finding, screened per Appendix A of IMC 0609, Significance Determination Process, was determined to have very low safety significance (Green) because although the stator failure damaged the number two and number three RCP seals, no damage to number one RCP seal occurred. The number one RCP seal is the primary reactor coolant system pressure boundary. A cross-cutting aspect was not assigned to the finding because the performance deficiency does not represent current performance.

Inspection Report# : 2010005 *(pdf)*

Significance: G Sep 30, 2010
Identified By: Self-Revealing
Item Type: FIN Finding
Failure to have adequate work and post maintenance testing insturctions for the volume control tank comparator module
A self revealing Green finding was identified for a failure to have adequate work orders to properly configure and post maintenance test the volume control tank (VCT) level comparator module. The licensee’s procedure ADM-NGGC-0104, Work Implementation and Completion, required that work orders contain all work activities necessary to perform all related work activities including Post Maintenance Testing (PMT). The licensee’s work orders for installing a jumper on the VCT level comparator module and for post maintenance testing failed to contain adequate instructions to properly configure (place jumper in correct location) and post maintenance test the volume control tank level comparator module. This resulted in the failure of the charging pump suction to automatically transfer from the volume control tank to the refueling water storage tank (RWST) when the auto transfer VCT low level setpoint was reached. The licensee’s identified corrective actions included repairing the subject VCT level module, reviewing the adequacy of other replacement NUS modules that have non-safety control functions and revising the site specific PMT procedures to provide more specific guidance for ensuring that the control loop circuit is adequately tested.

The failure to have adequate work order instructions to properly configure and post maintenance test the volume control tank level comparator module is a performance deficiency. This finding is greater than minor because the failure to auto transfer from the VCT to the RWST could cause a failure of the charging pump, resulting in the loss of seal injection which is a precursor to a seal LOCA. Using IMC 0609, “Significance Determination Process,” (SDP)

Phase 1 Worksheet, the inspectors concluded that a Phase 2 evaluation was required since the finding could have likely affected other mitigation systems resulting in a total loss of their safety function. This issue was evaluated using IMC 0609, Appendix A (SDP Phase 2) as being potentially greater than green with loss of component cooling water (LOCCW) and loss of service water (LOSW) as the dominant sequences. A phase 3 SDP risk evaluation was performed by a regional senior reactor analyst in accordance with the guidance in IMC 0609 Appendix A utilizing the NRC's Robinson Standardized Plant Analysis Risk (SPAR) model. The VCT level comparator module performance deficiency resulted in a core damage frequency increase of less than 1E-6, Green. The risk was mitigated by the availability of the letdown and normal makeup charging pump suction sources, which would be available under certain conditions reducing the likelihood of an autoswap demand. Another factor which mitigated the risk is that the fire shutdown procedures for most fire areas specify use of a manual RWST supply valve. The performance deficiency is characterized as Green, a finding of very low safety significance. This issue has a cross-cutting aspect in the resources component of the human performance area because the licensee did not provide complete, accurate, and up-to-date work packages for the configuration and testing of the VCT comparator module. (H.2.(c)) (Section 1R19)

Inspection Report# : 2010004 *(pdf)*

Significance: G Sep 30, 2010
Identified By: Self-Revealing
Item Type: FIN Finding
Failure to design and implement a simulator model that demonstrated reference plant response
A self-revealing Green NCV of 10 CFR 55.46(c), "Simulation Facilities", was identified for a plant referenced simulator used for administration of operating tests not correctly modeling the reference plant. A loss of electrical power that resulted in a loss of component cooling water (CCW) to the reactor coolant pump seals was not properly modeled in the simulator. When power to safety-related 480 volt bus E-2 was transferred to the emergency diesel generator in the reference-plant, FCV-626, thermal barrier heat exchanger outlet isolation flow control valve, closed. The simulator modeled FCV-626 to respond to CCW flow through the valve and did not model the effect of a loss of power to the valve operator and associated control circuit. Consequently, with a loss of power to bus E-2, the simulator model allowed this valve to remain open. The licensee documented the issue in Significant Adverse Condition Investigation Report, 390095. As corrective action the licensee changed the simulator modeling to match the plant configuration.

The inspectors determined that the failure of the simulator to accurately demonstrate reference plant response was a performance deficiency. This finding was more than minor because it affected the human performance attribute of the initiating events cornerstone in that the unexpected closure of FCV-626 raises the likelihood of human error in response to a loss and subsequent re-energization of the E-2 Bus. This could challenge reactor coolant pump seal cooling and result in reactor coolant pump seal failure. The finding was evaluated using the Operator Requalification Human Performance SDP (MC 0609, Appendix I) because it was a requalification training issue related to simulator fidelity. The finding was of very low safety significance (Green) because the discrepancy did not have an impact on operator actions resulting in a total loss of RCP seal cooling and subsequent increase in reactor coolant system (RCS) leakage. There is not a cross-cutting aspect associated with the finding because the performance deficiency involving the simulator modeling occurred over 3 years ago and does not reflect current licensee performance. (Section 1R11.2)

Inspection Report# : 2010004 *(pdf)*

Significance: G Sep 30, 2010
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Deficiencies in non safety-related cable installation result in fire and rector trip
A self-revealing Green finding was identified for the licensee's failure to adequately follow guidance in a design change package for the installation of non safety-related 4kV cables. This resulted in cables with design features inappropriate for the application being installed and eventually led to a fire and a reactor trip. Specifically, the licensee failed to follow the cable vendor recommendations and a self-imposed administrative requirement/standard for cable installation contained in cable specification L2-E-035, "Specification for 5,000 Volt Power Cable". The licensee entered this into the CAP as NCR 390095. As corrective actions, the licensee replaced the cable, conduit and other damaged equipment, including evaluation on damage to cables in overhead, and the feeder cables to station service

transformer (SST) 2E and 4kV bus 5.

The failure to follow the guidance in the design change package to install non safety-related cables between Bus 4 and Bus 5 in accordance with their design change program and vendor and cable installation specifications was a performance deficiency. This finding was determined to be more than minor because it affected the Initiating Events Cornerstone objective of limiting events that upset plant stability, and was related to the attribute of Design Control (i.e., Plant Modifications). Specifically, the inadequate cable modification was determined to be the root cause of the reactor trip that occurred on March 28, 2010. This deficiency also paralleled Inspection Manual Chapter 0612, Appendix E, Example 2.e, as the licensee did not follow their own administrative requirements and vendor recommendations for cable installation. The performance deficiency was screened using Phase 1 of Inspection Manual Chapter 0609, Significance Determination Process, which determined that because the finding increases the likelihood of a fire, a Phase 3 SDP analysis was required. A phase 3 SDP risk evaluation was performed by a regional senior reactor analyst in accordance with the guidance in IMC 0609 Appendix F utilizing the NRC’s Robinson SPAR model. The Phase 3 analysis determined the finding to be of very low safety significance (Green) because the core damage frequency increase was less than 1E-6. There is not a cross-cutting aspect associated with the finding because the performance deficiency involving the cable installation occurred greater than 20 years ago and does not reflect current licensee performance. (Section 4OA5.11)

Inspection Report# : 2010004 *(pdf)*

Significance: G Sep 30, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to establish an adequate PATH-1 emergency operating procedure
The inspectors identified an apparent violation (AV) of Technical Specifications (TS) 5.4.1, “Procedures”, for the licensee’s failure to establish and maintain an adequate emergency procedure that ensured reactor coolant pump (RCP) seal cooling was maintained following a reactor trip. The licensee has entered this into the CAP as nuclear condition report (NCR) 423147. Corrective actions for this finding are still being evaluated.

The failure to establish and maintain an emergency procedure that would ensure adequate reactor coolant pump seal cooling, preventing seal degradation and a possible seal LOCA was a performance deficiency. The finding is more than minor because it is associated with the Initiating Events Cornerstone and affected the 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, specifically a loss of seal cooling to prevent the initiation of a RCP seal loss of coolant accident (LOCA). Using Manual Chapter Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," the inspectors determined the finding required a Phase 2 analysis because the finding could result in RCS leakage exceeding Technical Specification limits. The Phase 2 analysis determined that this finding was potentially greater than green; therefore, a Phase 3 analysis is required by a regional senior reactor analyst due to an increase in the likely hood of an RCP seal LOCA. The significance of this finding is designated as To Be Determined (TBD) until the safety characterization has been completed. The cause of this finding had a cross-cutting aspect of Documentation, Procedures, and Component Labeling, in the Resources component of the cross-cutting area of Human Performance, in that the licensee failed to ensure procedures for emergency operations were adequate to assure nuclear safety. (H.2 (c)) (Section 4OA3.2)

2010013 Report:
The inspectors identified a green NCV of Technical Specifications (TS) 5.4.1, “Procedures”, for the licensee’s failure to establish and maintain an adequate emergency procedure that ensured reactor coolant pump (RCP) seal cooling was maintained following a reactor trip. The licensee has entered this into the corrective action program (CAP) as nuclear condition report (NCR) 423147. As a corrective action the licensee revised the Path1 procedure for verifying adequate seal cooling to the RCPs.

The failure to establish and maintain an emergency procedure that would ensure adequate reactor coolant pump seal cooling, preventing seal degradation and a possible seal LOCA was a performance deficiency. The finding is more than minor because it is associated with the Initiating Events Cornerstone and affected the 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, specifically a loss of seal cooling to prevent the initiation of a RCP seal loss of coolant accident (LOCA). A Phase 3 analysis was performed utilizing the NRC's Robinson Standardized Plant Analysis Risk (SPAR) model and developed an event tree to specifically evaluate the performance deficiency's conditions. The result of the Phase 3 analysis was a core damage frequency increase of <1E-6/year a finding of very low safety significance. The cause of this finding had a cross-cutting aspect of Documentation, Procedures, and Component Labeling, in the Resources component of the cross-cutting area of Human Performance, in that the licensee failed to ensure procedures for emergency operations were adequate to assure nuclear safety. (H.2(c)) (Section 4OA5.02)

Inspection Report# : 2010004 *(pdf)*
Inspection Report# : 2010013 *(pdf)*

Significance: G Aug 26, 2010
Identified By: Self-Revealing
Item Type: FIN Finding
Failure to Correct a Control Power Fuse Defect in 4kV Breaker 52/24
A self-revealing finding of very low safety significance was identified for the licensee's failure to follow the site's CAP procedure, CAP-NGGC-0200, "Corrective Action Program," Revision 26; in that a degraded control power condition for the non-vital 4kV Bus 5 feeder breaker 52/24 was not identified and evaluated through an NCR which resulted in inadequate corrective actions leading to a plant trip and a complicated plant fire. The licensee implemented corrective actions to replace the affected breaker and inspect all breakers potentially affected by the same degraded control power condition.

This finding is more than minor because it is associated with Equipment Performance attribute of the Initiating Events Cornerstone and affects the cornerstone objective in that the failure to evaluate and correct the breaker position indicating light, which indicated the lack of breaker control power, resulted in the breaker failing to isolate an electrical fault, resulting in a reactor trip. The inspectors used NRC IMC 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," to evaluate the significance of this issue and determined that this finding contributed to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available. Therefore, further significance determination analysis was performed in accordance with IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations." The inspectors conducted a Phase 3 analysis and determined this finding was of very low safety significance because the performance deficiency did not affect the mitigating capabilities of the auxiliary feedwater system and the feed and bleed safety function. This finding has a cross-cutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee failed to implement the corrective action program with a low threshold for identifying the issue, and ensuring that the issue was identified completely, accurately, and in a timely manner commensurate with its safety significance. (P.1.a)

Inspection Report# : 2010006 *(pdf)*

Significance: G Jun 30, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to determine the cause of and take corrective actions to preclude repetition of an identified programmatic deficiency in foreign-material-exclusion controls.
Green. The inspectors identified a violation of 10 CFR 50, Appendix B, Criterion XVI, for the licensee's failure in 2004 to determine the cause of a programmatic deficiency in foreign-material-exclusion (FME) controls, which resulted in steam generator tube leakage. This licensee entered the issue into the corrective action program as AR 272388 following the issuance of URI 05000261/2008002-01. A revised extent of condition and all corrective actions to the FME program were implemented in 2008.

Failure to evaluate FME programmatic deficiencies in AR 115704 or in any other NCR since 2004 until the issuance of URI 05000261/2008002-01 is a performance deficiency. The inspectors initially screened this issue in accordance with Inspection Manual Chapter 0609 Appendix J for URI 05000261/2008002-1. This screening directed an additional operating cycle be reviewed to provide a basis to evaluate the effectiveness of the licensee's corrective actions. Based on the steam generator tube performance following the most recent refueling outage, with respect to no potential tube ruptures (all tubes sustained 3 times delta Pressure for normal operation) or tubes that should have been repaired as a result of previous inspections, the issue was screened in accordance with Manual Chapter 0609 Appendix A. This finding is more-than-minor because it affects the “Equipment Performance” attribute of the Initiating Events Cornerstone, in that deficiencies in foreign-material-exclusion controls could allow foreign material to enter the steam generators, and the foreign material could initiate a steam generator tube leak or rupture. The finding has very low safety significance because no significant tube damage occurred during the extended significance determination review. The finding is not indicative of current performance in that the timeframe of the performance deficiency was 2004-2007 and therefore a cross-cutting aspect will not be assigned to this issue.

Inspection Report# : 2010003 *(pdf)*

Mitigating Systems

Significance: G Dec 31, 2010
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Procedure violation for overriding feedwater isolation safety function in Mode 3
A self-revealing Green NCV of Technical Specification (TS) 5.4.1, Procedures, was identified when the licensee bypassed the feedwater isolation safety function, in Mode 3, a condition prohibited by TS and an action contrary to procedural requirements. On October 7, 2010, Unit 2 was in Mode 3 after a reactor trip that occurred earlier in the day. Steam generator feedwater was being supplied by the auxiliary feedwater (AFW) system and the main feedwater system was not running because of an automatic feedwater isolation, which occurred shortly after the reactor trip due to high ‘C’ S/G water level. Contrary to procedure OP-403, Feedwater System, control room operators overrode the feedwater isolation safety function by placing the feedwater logic switches in “Override/Reset,” and leaving them in that position for three hours and twenty minutes. Upon realization of the error, licensee operators isolated S/G feed flow, placed the feedwater isolation logic switches in the “Normal” position, and restarted S/G feed flow with the AFW system. This issue was entered into the licensee’s CAP as AR 425643.

The failure to operate the feedwater isolation logic switches in accordance with plant procedures is a performance deficiency. The finding is more than minor because it affects the human performance attribute of the Mitigating Systems cornerstone and the objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, the finding affected the ability for the feedwater isolation (FWIS) to isolate the S/Gs and prevent overfeeding/overcooling events. The inspectors evaluated this finding using IMC 0609, Significance Determination Process Phase 1 screening and determined that the finding represented a complete loss of the FWIS function which required further evaluation under SDP Phase 2. The Robinson Phase 2 Pre-Solved SDP Worksheet and Phase 2 SDP Notebook did not include the FWIS function therefore a phase 3 SDP analysis was performed by a regional Senior Regional Analyst (SRA) in accordance with NRC IMC 0609. The plant was already shutdown prior to the performance deficiency so Anticipated Transients Without Scram scenarios would not be valid. The impact of the loss of the FWIS function would be that the S/Gs would not be isolated on Hi-Hi S/G water level and plant overfeed scenarios could result in Safety Injection initiation on low Reactor Coolant System (RCS) pressure and potential overfill/moisture carryover scenarios could overspeed the turbine driven AFW pump. The phase 3 analysis considered a potential overcooling and safety injection scenario using the licensee’s full scope Robinson Probabilistic Risk Assessment (PRA) model data and a potential moisture carryover induced overfeed scenario causing a loss of the turbine driven AFW pump on overspeed using the NRC Robinson Standardized Plant Analysis Risk (SPAR) model and data. The core damage frequency increase for both scenarios was <1E-6 per year. The risk was mitigated by the short exposure period. The finding is characterized as Green, a finding of very low safety significance. The finding has a cross-cutting aspect in the Human Performance area, Decision Making component because the licensee failed to make a safety-significant or risk-significant decision using a systematic process to ensure safety was maintained when faced with uncertain or unexpected plant conditions. Specifically, the licensee intentionally bypassed the safety function of feedwater isolation instrumentation while it was required with the reactor plant in Mode 3. (H.1(a)) (Section 4OA5.02)

Inspection Report# : 2010012 *(pdf)*

Significance: G Dec 31, 2010
Identified By: NRC
Item Type: FIN Finding
Operator transient response adversely affected by uncorrected, known plant deficiency
The inspectors identified a Green finding for failure to correct a known equipment deficiency which adversely affected the operators' ability to respond to reactor trip transients. Contrary to the licensee's corrective action program, as described in procedure CAP-NGGC-0200, the licensee failed to address and correct an abnormal or unexpected equipment condition that affected and complicated plant events. The turbine building lubrication oil (lube oil) area fire protection detectors were known to actuate the turbine building lube oil deluge system after reactor trips when the 6A and 6B feedwater heater relief valves lifted. After the October 7, 2010, reactor trip, steam from the relief valves drifted to the area of the turbine building fire detectors, causing them to actuate the turbine building lube oil deluge system. This actuation caused distractions in the main control room because of several fire protection alarms sprayed fire protection water in the turbine building, and required the diversion of field operators to isolate the spuriously actuated deluge system. As an immediate corrective action after the October 7, 2010, reactor trip, the licensee directed the steam relief valve discharges from the 6A and 6B feedwater heaters and the 1A and 1B moisture separator drain tanks to an area outside the turbine building (NCR 425437).

The failure to correct a long-standing deficiency that adversely affected operator response to reactor trips is a performance deficiency. The finding is more than minor because it is associated with the mitigating systems cornerstone attribute of human performance in that the performance of operators was adversely affected by the fire protection actuation after the reactor trip. This adverse effect included diverting operator attention and resources away from initiating event response. Using the Inspection Manual 0609, Significance Determination Process Phase 1 Worksheet, the inspectors concluded that the finding is of very low safety significance (Green) because it is not a design or qualification deficiency, does not represent a loss of safety function, does not represent the loss of safety function of a single train of TS equipment, does not represent the loss of risk-significant equipment, and is not potentially risk significant due to an external events. The cause of this finding is directly related to the corrective action

program component of the problem identification and resolution cross cutting area because appropriate and timely corrective actions were not taken for a known adverse condition. (P.1(d)) (Section 4OA5.08)

Inspection Report# : 2010012 *(pdf)*

Significance: W Dec 31, 2010
Identified By: NRC
Item Type: VIO Violation
Failure to Comply with Conduct of Operations Procedure
The inspectors identified a problem associated with the failure to implement requirements and standards of the fleet conduct of operations procedure, which involves an AV and four related violations for failure to meet Technical Specification (TS) 5.4.1, "Procedures". Specifically, the licensee's failure to adequately implement operational oversight functions including: command and control, supervision, and independent assessment which contributed to an uncontrolled cooldown of the Reactor Coolant System (RCS) and subsequent safety injection, actions that increased the likelihood of Reactor Coolant Pump (RCP) seal failure, and the initiation of a preventable plant fire that resulted in an Alert emergency classification being declared. Furthermore, the four related violations of TS 5.4.1, "Procedures" mentioned above were identified for failure to follow procedures: APP-003-E3, "VCT Hi/Lo Level"; EPP-4, "Reactor Trip Response", APP-009-B6, "Aux Transfer Fault Trip"; and Emergency Operating Procedure, Path 1. As corrective actions, the licensee enhanced the licensed operator training material, re-trained and evaluated all control room operators, performed procedure enhancements, crew reconstitution to enhance performance, and personnel and management changes. This finding was entered into the licensee's CAP as NCRs 390095 and 423246.

Failure to adequately implement the requirements contained in OPS-NGGC-1000, Fleet Conduct of Operations, was a performance deficiency. The finding was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone in that it affected the cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to adequately implement requirements contained in OPS-NGGC-1000, Fleet Conduct of Operations, contributed to a

complete loss of charging system flow, an increase in the likelihood of RCP seal failure and initiation of a fire on March 28, 2010. A Phase 3 SDP analysis using the NRC's Robinson SPAR model and input from the licensee's full scope model resulted in this finding being characterized as preliminarily White, a finding of low to moderate safety significance. The cause of this finding had a cross-cutting aspect of supervisory and management oversight of work activities such that nuclear safety is supported, in the Work Practices component of the Human Performance cross-cutting area, because plant supervisors failed to enforce proper communications methods at the job site and failed to properly supervise workers executing procedure steps. (H.4(c)) (Section 4OA5.01)
Inspection Report# : 2010013 *(pdf)*
Inspection Report# : 2011008 *(pdf)*

Significance: G Nov 15, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Establish Proper In-service Testing Acceptance Criteria to Prevent Reverse Rotation of the SDAFW Pump
The team identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the licensee's failure to ensure the in-service testing (IST) of the discharge check valve of the Auxiliary Feedwater (AFW) steam driven pump applied an acceptance criterion that is in accordance with the limits established in design documents. The licensee revised the IST procedure during the inspection and is tracking further action in the corrective action program under NCR 419768.

The failure to establish proper acceptance criteria for the Steam Driven (SD) AFW discharge check valve was a performance deficiency. This finding was more than minor because it affected the mitigating systems cornerstone attribute of procedure quality to ensure the availability, reliability, and capability of safety systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to incorporate the proper acceptance criteria could result in a failure of the test to identify a check valve degraded to a condition where its back leakage will cause reverse rotation of the SD AFW pump. This finding was of very low safety significance because it was not a test issue resulting in loss of function, did not represent an actual loss of a system safety function, did not result in exceeding the TS allowed outage time, and did not affect external event mitigation. The team determined that no cross cutting aspect was applicable to this performance deficiency because the failure to establish a proper acceptance criteria for the discharge check valve of the SDAFW pump was determined to not be indicative of current licensee performance. (Section 1R21.2.1)

Inspection Report# : 2010011 *(pdf)*

Significance: G Nov 15, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure To Ensure that the Full Range of Emergency Diesel Generator Frequency is Accounted for in the Safety Analyses
The team identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to account for the high range of Emergency Diesel Generator (EDG) frequency allowed by technical specifications (TS) in the safety analysis. While no immediate operability issues were identified, the licensee entered this issue into the corrective action program as NCR 420058.

The failure to evaluate the effect of high EDG frequency was a performance deficiency. This finding was a more than minor because it affected the mitigating systems cornerstone attribute of design control to ensure the availability, reliability, and capability of safety systems that respond to initiating events to prevent undesirable consequences. This finding also closely parallels IMC 0612, Appendix E, Example 3.j, "Not Minor: If the engineering calculation error results in a condition where there is now a reasonable doubt on the operability of a system or component, or if significant programmatic deficiencies were identified with the issue that could lead to worse errors if uncorrected." Specifically, failure to account for an allowable diesel frequency of 61.2 Hz (60 +2%) for all safety related pumps may result in operating at a higher flow rate and a higher developed suction head. This finding was of very low safety significance because it was not a design issue resulting in loss of function, did not represent an actual loss of a system safety function, did not result in exceeding the TS allowed outage time, and did not affect external event mitigation.

The team also evaluated the finding for cross-cutting aspects and determined it to involve the area of Problem Identification and Resolution associated with Operating Experience for the licensee's failure thoroughly evaluate NRC Information Notice 2008-02, which specifically identified high diesel frequency as a potential problem for AC motor-operated pumps [P.2(a)]. (Section 1R21.2.1)

Inspection Report# : 2010011 *(pdf)*

Significance: G Nov 15, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Demonstrate the Capability of the Fuel Oil Storage Tank and the Service Water Pumps to Fulfill Their Safety Functions Under All Conditions
The team a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to have calculations supporting the design bases of safety related components, specifically for the EDG fuel oil storage tank with respect to tornado wind loadings, and the net positive suction head (NPSH) of the service water pumps. No immediate operability issues were identified and the licensee entered this issue into the corrective action program as NCR 422985 and NCR 423985.

The failure to demonstrate the adequacy of the design for safety related components, specifically regarding the capability of the fuel oil storage tank to withstand tornado wind loading and the failure to demonstrate that the NPSH available to the service water pumps was greater than the required NPSH, was a performance deficiency. This finding was more than minor because it affected the mitigating systems cornerstone attribute of design control to ensure the availability, reliability, and capability of safety systems that respond to initiating events to prevent undesirable consequences. This finding was of very low safety significance because the licensee performed a simplified evaluation indicating that this condition was not a design issue resulting in loss of function, it did not represent an actual loss of a system safety function, did not result in exceeding the TS allowed outage time, and did not affect external event mitigation. The team determined that no cross cutting aspect was applicable to this performance deficiency because the failure to demonstrate the adequacy of the design was determined to not be indicative of current licensee performance. (Section 1R21.2.4)

Inspection Report# : 2010011 *(pdf)*

Significance: G Nov 15, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Correctly Translate EDG Starting Air System Design Requirements into TS
The team identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to correctly translate the design basis of the EDG air start system into specifications. Specifically, the licensee did not properly translate the lowest air pressure for the EDG air start receiver that would provide a single EDG start into the TS (150 psig). The licensee reviewed the low pressure alarm history of the EDGs and did find any instance where they failed to declare the EDG inoperable based on the new operability setpoint. Further actions are being tracked in the corrective action program under NCR 423776.

The licensee's failure to correctly translate the design basis of the EDG air start system into the TS was determined to be a performance deficiency. The finding was more than minor because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. Specifically, the EDG starting air receiver pressure could fall below 150 psig, but the TS would not direct the licensee to declare the EDG inoperable. The finding is of very low safety significance as it was determined not to have resulted in the loss of operability or functionality. The team determined that no cross cutting aspect was applicable to this performance deficiency because the failure was determined to not be indicative of current licensee performance. (Section 1R21.2.5)

Inspection Report# : 2010011 *(pdf)*

Significance: G Nov 15, 2010

Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Criteria to Prevent Spurious Actuation of Amptector Trip Devices
The team identified a Green NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," in that the licensee failed to verify the adequacy of the design for Amptector trip devices installed on safety related 480V circuit breakers. The licensee reviewed the latest calibration records and contacted the vendor for further guidance and additional information. Further actions are being tracked in the corrective action program under NCR 423795.

The team determined that the failure to establish an adequate minimum setting for Amptector trip devices 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 affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Also, this finding closely parallels NRC IMC 0612, Appendix E, Example 3.j in that the condition resulted in reasonable doubt of the operability of the safety related 480V system pending re-analysis. Specifically, the licensee failed to evaluate margins needed to prevent spurious tripping during accident loading conditions. The team determined the finding was of very low safety significance because it was a design deficiency that did not result in a loss of operability or functionality. The team also evaluated the finding for cross-cutting aspects and determined it to involve the area of Human Performance, because this condition is related to the component of resources which requires complete, accurate and up-to-date design documentation, specifically calculations, to assure nuclear safety [H.2(c)]. (Section 1R21.2.11)

Inspection Report# : 2010011 *(pdf)*

Significance: G Nov 15, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Translate Vendor Recommendations Into Procedures for 480V Circuit Breakers
The team identified a Green NCV of 10 CFR 50, Appendix B, Criterion V, "Procedures, Instructions and Drawings," for failure to follow procedure EGR-NGGC-006, Vendor Manuals, which requires performance of reviews to determine technical accuracy and potential changes to procedures, processes or equipment; specifically for safety related 480V Breakers and reactor trip breakers. The licensee performed a gap analysis, reviewed the discrepancies, and concluded that they did not impede the ability of the breakers from performing their associated function. Further actions are being tracked in the corrective action program under NCRs 422184 and 422976.

The team concluded that the failure to perform reviews to determine technical accuracy and potential changes to procedures for circuit breaker vendor manual changes was a performance deficiency. This finding is more than minor because it affects the mitigating systems cornerstone objective to ensure the reliability, availability, and capability of systems that respond to initiating events and is associated with the attribute of procedure quality, in that procedure inconsistencies were identified in procedures MST-012-1, Maintenance and Testing of "A" Reactor Trip Breaker, and PM-466, Westinghouse Type 50DH350E 1200 Amp 4160V Air Circuit Breaker Maintenance. This finding also closely parallels IMC 0612, Appendix E, Example 4.a., in that the procedure discrepancies indicate that the licensee routinely failed to perform reviews EGR-NGGC-006, Vendor Manuals, which requires performance of reviews to determine technical accuracy and potential changes to procedures, processes or equipment. The team determined the finding was of very low safety significance because it was a design deficiency that did not result in a loss of operability or functionality. The team also evaluated the finding for cross-cutting aspects and determined it to involve the area of Problem Identification and Resolution associated with Operating Experience for the licensee's failure to thoroughly evaluate vendor recommendations, as well as NRC Information Notice 2008-02 which identified an issue relating to improper maintenance of circuit breakers involving failure to follow vendor maintenance recommendations [P.2(b)]. (Section 1R21.2.11)

Inspection Report# : 2010011 *(pdf)*

Significance: W Sep 30, 2010
Identified By: NRC
Item Type: VIO Violation

Failure to correctly implement a systems approach to training for the licensed oeprator requalification program

The inspectors identified an Apparent Violation (AV) of 10 CFR 55.59(c), “Requalification program requirements”, for the licensee’s failure to properly implement elements of a Commission approved program developed using a systems approach to training (SAT), that was implemented in lieu of meeting the requirements defined in 10 CFR 55.59 (c). The finding was entered into the licensee’s corrective action program as NCR-423232, NCR-423238, and NCR-423239. Corrective actions for this finding are still being evaluated.

The licensee’s failure to properly implement elements of a Commission approved requalification program was a performance deficiency. The finding was determined to be more than minor because it was associated with the Initiating Events Cornerstone and affected the cornerstone’s objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the failure to implement training requirements for Path-1 and perform adequate retraining of operators that demonstrated areas of weakness during operating tests contributed to operators’ failure to identify and implement actions to mitigate a loss of seal cooling to the reactor coolant pumps (RCPs) during the events of March 28, 2010. Contrary to Augmented Inspection Team Report 05000261/2010009, further inspection revealed that RCP seal injection was not adequate coincident with a loss of cooling to the thermal barrier heat exchanger to the “B” RCP. Using Manual Chapter Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," the inspectors determined the finding required a Phase 2 analysis because the finding could result in reactor coolant system (RCS) leakage exceeding Technical Specification limits. The Phase 2 analysis determined that this finding was potentially greater than green; therefore, a Phase 3 analysis is required by a regional senior reactor analyst due to an increase in the likelihood of an RCP seal LOCA. The significance of this finding is designated as To Be Determined (TBD) until the safety characterization has been completed. The cause of this finding was directly related to the cross cutting aspect of Personnel Training and Qualifications in the Resources component of the Human Performance area, in that the licensee failed to ensure the adequacy of the training provided to operators to assure nuclear safety. (H.2(b)) (Section 1R11.3)

2010013 Report:
The inspectors identified a problem associated with the implementation of the Commission approved requalification program developed using a system approach to training, which involves an apparent violation and an associated finding. Specifically, the AV of 10 CFR 55.59(c)4 involves the failure to adequately design and implement training based on learning objectives in that lesson material failed to identify the basis of a procedural action involving reactor coolant pump seal cooling in procedure Path-1, as required by the definition of systems approach to training, Element 3 in 10 CFR 55.4. The associated finding involves the failure to meet Training Program Procedure TTP-200, “Licensed Operator/Shift Technical Advisor Continuing Training Program,” which is part of the systems approach to training, by not identifying, documenting, and evaluating operator weaknesses exhibited during evaluated scenarios. As corrective actions, the licensee trained all licensed operators on PATH-1-005 objective requirements and increased the rigor of their remediation program. The finding was entered into the licensee’s CAP as NCR-423232, NCR-423238, and NCR-423239.

The licensee’s failure to properly implement elements of a Commission approved requalification program was a performance deficiency. The finding was determined to be more than minor because it was associated with the Mitigating Systems Cornerstone in that it affected the cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to implement training requirements for Path-1 contributed to operators’ failure to identify and implement actions to mitigate a loss of seal cooling to the reactor coolant pumps during the events of March 28, 2010. A Phase 3 SDP analysis using the NRC’s Robinson SPAR model and input from the licensee’s full scope model resulted in this finding being characterized as preliminarily White, a finding of low to moderate safety significance. The cause of this finding was directly related to the cross cutting aspect of Personnel Training and Qualifications in the Resources component of the Human Performance area, in that the licensee failed to ensure the adequacy of the training provided to operators to assure nuclear safety. (H.2(b)) (Section 4OA5.03)

Inspection Report# : 2010004 *(pdf)*
Inspection Report# : 2010013 *(pdf)*
Inspection Report# : 2011008 *(pdf)*

Significance: W Aug 26, 2010
Identified By: NRC
Item Type: VIO Violation
Failure to Correct a Condition Adverse to Quality in "B" Emergency Diesel Generator Output Breaker 52/27B
The NRC identified an apparent violation (AV) of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" for the licensee's failure to promptly correct a condition adverse to quality involving the failure of the "B" Emergency Diesel Generator (EDG) output breaker 52/27B to close in October 2008 due to a stuck control relay linkage. As a result, the failure recurred in April 2009 and caused the EDG to become inoperable. The licensee implemented actions to correct the cause of the breaker failure and to inspect all similar breakers susceptible to the same condition.

This finding is more than minor because it is associated with the Equipment Performance attribute of the Mitigating Systems Cornerstone and adversely affects the cornerstone objective in that the failure to correct the "B" EDG output breaker 52/27B resulted in the inoperability of the "B" EDG for a period greater than the allowed outage time in plant Technical Specifications (TS). An SDP analysis using the NRC's Robinson Standardized Plant Analysis Risk (SPAR) model and input from the licensee's full scope model resulted in this finding being characterized as preliminarily White, a finding of low to moderate safety significance. This finding has a cross-cutting aspect in the area of problem identification and resolution associated with the corrective action program component because the licensee failed to implement the corrective action program with a low threshold for identifying the issue, and ensuring that the issue was identified completely, accurately, and in a timely manner commensurate with its safety significance (P.1.a).

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, and non-conformances are promptly identified and corrected. Technical Specifications (TS) 3.8.1, Condition B, requires that an inoperable Emergency Diesel Generator (EDG) shall be restored to operable status within 7 days.

Contrary to the above, on October 15, 2008, Carolina Power and Light Company (Licensee) failed to assure that a condition adverse to quality, involving an EDG output breaker 52/27B failure-to-close malfunction, was promptly corrected. Specifically, indications of control relay malfunction during post-modification testing existed but were not identified and corrected. As a result, a similar malfunction during a surveillance test caused the "B" EDG to become inoperable, from March 28 to April 23, 2009, which exceeded the TS allowed outage time.

Inspection Report# : 2010006 *(pdf)*
Inspection Report# : 2010014 *(pdf)*

Significance: SL-III Aug 26, 2010
Identified By: NRC
Item Type: VIO Violation
Materially Inaccurate Information Provided to NRC in LER 2009-001 which impacted the Regulatory Process
The NRC identified an AV of 10 CFR 50.9(a) for failure to provide accurate and complete information in Licensee Event Report (LER) 05000261/2009-001-000. This information was material to NRC because it was used, in part, as the basis for exercising enforcement discretion for a violation of TS Action Statement 3.8.1.B.4 and Condition C. This AV has been entered into the licensee's corrective action program as NCRs 413010 and 419191 to correct the inaccurate and incomplete information.

This violation is being treated as traditional enforcement because the failure to provide complete and accurate information impacted the regulatory process. The inspectors determined the severity level of this apparent violation is potentially greater than Severity Level IV. Cross-cutting aspects are not assigned to violations being dispositioned through the traditional enforcement process.

10 CFR 50.9(a) requires, in part, that information provided to the Commission by a licensee shall be complete and accurate in all material respects.

Contrary to the above, on June 18, 2009, the Licensee submitted information that was not complete and accurate in all material respects. Specifically, the Licensee submitted Licensee Event Report (LER) 05000261/2009-001-00 which described the corrective actions taken on October 15, 2008, for a similar "B" EDG output breaker failure. The LER stated that the breaker was tested in accordance with Preventive Maintenance (PM) Procedure, PM-163, "Inspection

and Testing of Circuit Breakers for 480 Volt Bus
E2” and that the procedure was successfully completed. The NRC determined that the Licensee did not conduct full testing as stated, and had only completed the instructions for returning the breaker to service. The information provided in the LER was material because the NRC relied on this information to exercise enforcement discretion for the 2009 failure which would likely have resulted in an additional inspection effort.

This is a Severity Level III violation (Enforcement Policy, Supplement VII.C.1).
Inspection Report# : 2010006 *(pdf)*
Inspection Report# : 2010014 *(pdf)*

Significance: G Mar 31, 2010
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Inaccurate Drawings Result In Loss of RWST Level Indication Due to Freezing
A self-revealing non-cited violation of Technical Specification 5.4.1, Procedures, was identified in that the licensee used inaccurate drawings to hang clearances on freeze protection circuits which resulted in the Refueling Water Storage Tank (RWST) level instrument lines freezing. The licensee failed to properly translate the design of the freeze protection circuits to the drawings used in the clearances, causing the RWST level sensing line freeze protection to be unavailable. The licensee removed the clearance, re-energized the freeze protection and level indications were restored. The licensee entered the drawing discrepancy issue into the corrective action program as AR 374561

The disabling of the RWST level instrument freeze protection during the RHR pump work is a performance deficiency. The finding is more than minor because it affected the mitigating systems cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events. Specifically, the RWST level instrument line freezing caused the required post accident instrumentation of the RWST to be inoperable. Using Appendix A of the Significance Process (SDP) described in IMC 0609, Mitigating System Cornerstone, this finding was determined to have very low safety significance (Green) because no loss of operability or functionality of the RWST resulted from the level sensing line freezing. There is no cross-cutting aspect of this NCV since the incorrect drawing that resulted in the inaccurate clearance was last revised in 1986 and is not indicative of current licensee performance.
Inspection Report# : 2010002 *(pdf)*

Significance: G Mar 31, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
“A” Emergency Diesel Generator Fuel Oil Transfer Pump Power Supply Cable Subjected to Continuous Submersion in Water Design Deficiency
The inspectors identified a NCV of 10 CFR Part 50, Appendix B, Criterion III, Design Control, in that the licensee failed to maintain a safety-related cable in an environment for which it was designed. Specifically, the “A” Emergency Diesel (EDG) Fuel Oil Transfer Pump power supply cable was exposed to continuous submersion in water. The licensee removed the accumulated water from the hand hole, resealed, and reinstalled the hand hole cover. The licensee entered the issue into the corrective action program as AR 370343.

Failure to maintain a safety related cable in an environment for which it was designed is a performance deficiency. The finding is more than minor in accordance with IMC 0612, Appendix B (Block 9, Figure 2), “Issue Screening,” because if left uncorrected, the performance deficiency has the potential to lead to a more significant safety concern. Specifically, subjecting the “A” EDG fuel oil transfer pump cable to continuous submersion could, over time degrade the cable and result in failure. In accordance with IMC 0609 (Table 4a), “Phase 1 – Initial Screening and Characterization of Findings”, the finding was determined to be of very low safety significance (Green) because the finding was not a design or qualification deficiency which resulted in a loss of operability or functionality. The cause of the finding was directly related to the problem evaluation cross-cutting aspect in the corrective action program component of the Problem Identification and Resolution area because the licensee did not thoroughly evaluate the condition described in NRC Generic Letter 2007-01 Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients (P.1 (c))

Inspection Report# : 2010002 *(pdf)*

Barrier Integrity

Significance: Nov 15, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Implement Adequate Post Maintenance Test of Residual Heat Removal Valve Interlock Function
The team identified a finding having very low safety significance (Green) involving the failure to perform a post maintenance test to verify functionality of valve position permissive interlocks associated with the reactor coolant system (RCS) hot leg loop isolation valves. The licensee performed a visual inspection to verify that the associated contacts for the valve position permissive interlock function were in their expected open position, and is tracking further actions in the corrective action program under NCR 422032.

The failure to perform a post maintenance test to verify functionality of the permissive interlock associated with the RCS hot leg loop isolation valves following replacement of relays which affected that function was a performance deficiency. The finding was more than minor because it adversely affected the RCS and barrier performance attribute of the barrier integrity cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to verify functionality of the permissive interlocks for the RCS hot leg loop isolation valves following intrusive maintenance, challenged the assurance that the interlock's design function would be available to prevent opening of the RCS hot leg isolation valves with a flow path established to the RWST and; therefore, prevent a loss of RCS water inventory to the RWST. The finding was determined to be of very low safety significance because the finding would not have likely affected other mitigation systems resulting in a total loss of their safety function. Further, this finding did not constitute a violation of NRC requirements since the interlock function and associated components the licensee failed to test were not safety-related. The finding is assigned a cross-cutting aspect in the resources component of the human performance area in that complete, accurate, and up-to-date work packages were not provided [H.2(c)]. (Section 1R21.3)

Inspection Report# : 2010011 *(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

Last modified : March 03, 2011