

Summer

4Q/2011 Plant Inspection Findings

Initiating Events

Significance:  Sep 30, 2011

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

Failure to Implement a Procedure for Manipulation of the 'C' Main Steam Isolation Valve

A self-revealing, non-cited violation was identified for the failure to comply with Technical Specification 6.8.1 to adequately implement a main steam operating procedure during manipulation of the 'C' main steam isolation valve (MSIV) resulting in excessive steam generator line differential pressure and subsequent safety injection. The issue was entered into the licensee's corrective action program as condition report CR-11-03001.

The failure to implement a procedure for manipulation of the 'C' MSIV was a performance deficiency (PD). The PD was more than minor and therefore a finding because it impacted the initiating events cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown and the related attribute of human performance because the licensee failed to properly implement a procedure controlling the manipulation of a MSIV. In accordance with Inspector Manual Chapter 0609, "Significant Determination Process," the inspectors performed a Phase 1 analysis and determined the finding was of very low safety significance or Green because the finding did not contribute to both the likelihood of both a reactor trip and the unavailability of mitigation equipment and associated functions. This finding involved the cross-cutting area of human performance, the component of the resources, and the aspect of procedure use and adherence, H.4(b), because the licensee failed to adequately follow procedures. (Section 4OA3.1)

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

Significance:  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Adequately Assess and Manage Risk of Switchyard Maintenance Activities During Lowered RCS Inventory Conditions (Section 1R13)

The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for the failure to perform an adequate risk assessment and implement approved high risk management contingency plans for work in the station's electrical switchyard. Specifically, on April 21, 2011, operations work control personnel failed to adequately assess the impact of work activities in the switchyard involving the use of vehicles, resulting in outage high risk management actions that prohibited the movement of vehicles during lowered reactor coolant system (RCS) inventory conditions from being implemented. Following the inspectors' identification of this issue, the licensee adequately assessed and managed the increase in risk for the activities. The issue was entered into the licensee's corrective action program as condition report CR-11-01908.

The failure to perform an adequate risk assessment and implement high risk evolution contingency plans for work in the station's switchyard was a performance deficiency within the licensee's ability to foresee and correct. This finding was associated with the Initiating Events Cornerstone and affected the cornerstone objective for limiting the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown, such as, loss of offsite power (LOOP) due to trucks damaging critical electrical components in the switchyard. The inspectors determined that the finding is more than minor because it was similar to both the more than minor examples 7.e and 7.g in NRC Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues," because the risk assessment for the switchyard work activity failed to consider the impact of vehicle movements resulting in outage high risk management actions that prohibited the movement of vehicles during lowered RCS inventory conditions from being implemented. A

Significance Determination Process (SDP), Phase 1 screening determined that the performance deficiency represented an increase in the likelihood of a LOOP during shutdown and therefore the risk was estimated using NRC IMC 0609, Appendix G, "Shutdown Operations Significance Determination Process." A Phase 2 SDP risk evaluation was done by a regional senior risk analyst using IMC 0609, Appendix G, Attachment 2. The major assumptions of the analysis were that the plant was in plant operating state (POS-2) in Mode 6, with the RCS vented and the residual heat removal (RHR) system in service for decay heat removal. Time to boil was estimated at 35 minutes with an estimated time to core damage of 8.8 hours. The exposure period was approximately 2.5 hours. The LOOP initiating event likelihood was increased by one order of magnitude due to the impact of the performance deficiency. Multiple (i.e., three) qualified sources of offsite power and both onsite emergency diesel generators were available when the vehicles were moved into the switchyard. Recovery credit for restoration of offsite power was included. The dominant sequence was a LOOP with failure of emergency power sources causing a loss of RHR and failure to recover offsite power or emergency power prior to core damage ensuing. The risk was mitigated by the short exposure period and the availability of mitigating system equipment. The result of the analysis was a core damage frequency risk increase of $<1E-6$ /year, a finding of very low safety significance (Green). The inspectors determined that this finding had a cross-cutting aspect in the area of Human Performance, because personnel did not appropriately plan and coordinate switchyard work activities consistent with nuclear safety by incorporating appropriate outage risk insights and risk management contingency plans [H.3(a)]. (Section 1R13)

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

Mitigating Systems

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Develop Procedures to Provide Starting Air to EDGs During a SBO Event

The team identified a non-cited violation (NCV) of 10 CFR 50.63, "Loss of all Alternating Current Power," for failure to ensure Regulatory Guide 1.155, "Station Blackout," (SBO) requirements were implemented. Specifically, the licensee failed to develop procedures to provide starting air to the emergency diesel generators (EDG) to restore emergency AC power during the recovery from a SBO. The licensee entered this issue into their corrective action program as CR-11-00746 and CR-11-00738, and initiated compensatory measures which included the development of procedure EMP-100.011, "Restoring Power to Emergency Diesel Generator Air Start Compressor," Rev. 0.

The licensee's failure to establish procedures to provide starting air to the EDGs to restore emergency ac power in the event of a SBO was a performance deficiency. The finding was more than minor because it was associated with the Design Control attribute of the Mitigating System Cornerstone and 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 develop procedures to provide starting air to the EDGs resulted in a lack of reasonable assurance that the licensee could provide adequate starting air to restore emergency ac power in the event of a SBO. The conditions necessary for the condition would be a loss of offsite power (LOOP), two failed start attempts of both EDGs, and failure to recover an EDG or offsite power within the four hour SBO coping period. Using Manual Chapter Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined the finding would represent a loss of the core heat removal safety function within the mitigating systems cornerstone conditional upon establishing these SBO circumstances. The pre-solved significance determination process (SDP) Phase 2 worksheet for VC Summer did not have an appropriate surrogate to evaluate these specific conditions, therefore an SDP phase 3 risk evaluation was performed by a regional SRA. The SDP phase 3 risk evaluation was performed using failure data from the NRC VC Summer SPAR model using a one year exposure period. The risk was mitigated by the number and likelihood of the conditions required to establish the circumstances necessary for the performance deficiency. The result of the SDP phase 3 risk analysis was a risk increase in core damage frequency of $<1E-6$ /year. The performance deficiency is characterized as GREEN, a finding of very low safety significance. A cross-cutting aspect was not identified because the finding does not represent current performance

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Correctly Translate the Design Basis into Procedures for Low EDG Air Pressure and Low Thermal Barrier Heat Exchanger Flow

The team identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, “Design Control” involving two examples. In one example, the licensee did not properly translate the instrument uncertainties associated with the EDG low pressure alarm and pressure indicator into operating procedures (OP) and alarm response procedures (ARP). In the second example, the licensee failed to translate the minimum thermal barrier flow requirements into applicable abnormal operating procedures (AOP) and ARPs. The licensee entered these issues into their corrective action program as CR 11-00744 and CR-11-00955.

The licensee’s failure to correctly translate the applicable design bases information for the EDG air start system and the thermal barrier heat exchangers setpoints into procedures was a performance deficiency. The finding was determined to be more than minor because it was associated with the Procedure Quality attribute of the Mitigating System Cornerstone and 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 translate the appropriate values into the procedures described above adversely affected the quality of procedures for abnormal and alarm conditions that are required by Regulatory Guide 1.33, Quality Assurance Program Requirements. The inadequate procedures adversely affected operator action to assess operability and to combat deficiencies associated with risk significant equipment. The team assessed the finding using the SDP and determined that the finding was of very low safety significance (Green) because it was a design deficiency confirmed not to result in the loss of operability or functionality, did not represent the loss of a system safety function and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. A cross-cutting aspect was not identified because the finding does not represent current performance. [Sections 1R21.2.2]

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Adequately Calculate Motor Actuator Output Torque and Control Circuit Voltages for MOVs

The team identified a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” for the licensee’s failure to use conservative motor control center (MCC) voltage inputs or methodologies when calculating motor actuator output torque and control circuit voltages for safety-related motor operated valves (MOV) that are be required to operate during design bases events. The licensee entered these issues into their corrective action program as CR-11-00782, CR-11-00956, and CR-11-00631 and performed an evaluation to confirm the operability of affected valves.

The team determined that that the licensee’s use of non-conservative MCC voltage/current inputs in safety-related calculations was a performance deficiency. The performance deficiency was more than minor because it adversely affected the mitigating systems cornerstone attribute of design control and adversely affected the cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. In accordance with NRC IMC 0609.04, “Initial Screening and Characterization of Findings”, the inspectors conducted a Phase 1 SDP screening and determined the finding to be of very low safety significance (Green) because it was a design deficiency confirmed not to result in the loss of operability or functionality, did not represent the loss of a system safety function and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. A cross-cutting aspect was not identified because the finding does not represent current performance

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Verify Adequacy of the Suction Lift for the Fuel Oil Transfer Pumps

The team identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, “Design Control,” for the licensee’s failure to establish design control measures to verify or check the adequacy of design inputs used to determine the required suction lift of the EDGs fuel oil transfer pumps. Specifically, the licensee used non-conservative pressure drops and atmospheric pressure values to determine the available suction lift required at the pump’s suction in order to transfer the fuel oil from the bottom of the underground fuel storage tanks to the day tanks. The licensee entered these issues into their corrective action program as CR-11-00565 and performed an evaluation to confirm the ability of the pumps to transfer the required volume of fuel.

The licensee’s failure to adequately account for pressure losses, flow rates and atmospheric conditions in a safety-related calculation was a performance deficiency. The performance deficiency was more than minor because it adversely affected the mitigating systems cornerstone attribute of design control 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 deficiencies in Calculation DC06630-004 resulted in a reasonable doubt that the fuel oil transfer pump could deliver the TS required volume of 48,500 gallons; because, if the maximum allowed differential pressure of 2.5 psig had been realized, and combined with the uncertainties associated with the measuring equipment, the pump would have been unable to transfer the required volume of fuel. In accordance with NRC IMC 0609.04, “Initial Screening and Characterization of Findings”, the inspectors conducted a Phase 1 SDP screening and determined the finding to be of very low safety significance (Green) because it was a design deficiency confirmed not to result in the loss of operability or functionality. A cross-cutting aspect was not identified because the finding does not represent current performance.

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Develop a Procedure to Ensure an Emergency Diesel Generator Alarm Device was Calibrated or Tested

The team identified a NCV of Technical Specification 6.8, “Procedures and Programs”, for the licensee’s failure to develop a procedure to ensure an EDG alarm device was properly calibrated or tested. Specifically, the component validating the “full” status of the EDG fuel header lines had never been calibrated, nor tested. The licensee entered these issues into their corrective action program as CR-11-00984

The team determined that the licensee’s failure to develop and implement a procedure that ensured the EDG ultrasonic alarm device was properly calibrated or tested was a performance deficiency. This performance deficiency is more than minor because it affected the mitigating systems cornerstone attribute of ensuring the availability, reliability, and capability of safety systems that respond to initiating events. Specifically, the lack of calibration and testing of a non safety-related device could adversely affect the capability of the EDG to start and load within 10 seconds as required by TS. In accordance with NRC IMC 0609.04, “Initial Screening and Characterization of Findings”, the inspectors conducted a Phase 1 SDP screening and determined the finding to be of very low safety significance (Green) because it was not a design issue resulting in loss of function, it did not represent an actual loss of a system safety function, it did not result in exceeding a TS allowed outage time, and it did not affect external event mitigation. A review of the most recent EDG tests demonstrated that the EDGs started within the required 10 seconds thereby indicating that the fuel line header was not empty at the time of the test. A cross-cutting aspect was not identified because the finding does not represent current performance.

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Properly Test Emergency Feedwater Pump Discharge Check Valves

The team identified a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion XI, “Test Control” for the licensee’s failure to establish a test program that demonstrated the operability of EFW pump discharge check valves. The test procedure was inadequate to provide reasonable assurance that the check valves would (1) not allow reverse

flow sufficient to rotate its pump backwards, (2) not allow reverse flow that would overpressurize its pump's suction piping and, (3) not allow reverse flow that would lower the forward flow to a value below the required flow to the steam generators. This issue was entered into the licensee's corrective action program as CR-11-00556.

The team determined that the licensee's development of an inadequate procedure to test safety-related check valves was a performance deficiency. This performance deficiency is more than minor because it affected the mitigating systems cornerstone attribute of ensuring the availability, reliability, and capability of safety systems that respond to initiating events. Specifically, the licensee failed to develop a test procedure that would reliably ascertain that the steam generators were not deprived of design bases flow via a leaking check valve. In accordance with NRC IMC 0609.04, "Initial Screening and Characterization of Findings", the inspectors conducted a Phase 1 SDP screening and determined the finding to be of very low safety significance (Green) because it was not a design issue resulting in loss of function, it did not represent an actual loss of a system safety function, it did not result in exceeding a Technical Specification allowed outage time, and it did not affect external event mitigation. A cross-cutting aspect was not identified because the finding does not represent current performance.

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Use the Most Limiting Design Inputs in an Electrical Calculation

The team identified a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" for the licensee's failure to use the most limiting design inputs in an electrical calculation associated with determining settings for the degraded voltage relays to ensure that adequate voltages would be available to safety-related emergency core cooling system equipment during a design basis loss of coolant accident with offsite power available. Specifically, the team identified nine deficiencies in Calculation DC08200-001, "ESF Undervoltage Logic and Settings." The licensee entered this issue into the corrective action program as condition report CR-11-01045.

The team determined that the use of non-conservative inputs and methodologies in electrical calculation DC08200-001 was a performance deficiency. Specifically, the nine examples of deficiencies in the calculation resulted in a reasonable doubt that a spurious separation from offsite power would occur and that adequate voltages would be available to safety-related emergency core cooling system equipment during a design basis loss of coolant accident with offsite power available. This 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. The finding affected the availability of the offsite power feed from Transformer XTF-4 and/or XTF-5, and with XTF-6 voltage regulator not in service under specific minimum grid voltage conditions. These transformers are the normal offsite power supply to Safety Bus 1DA and the alternate supply to Safety Bus 1DB. Using Manual Chapter Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the inspectors determined that the finding represented a potential loss of core decay heat removal safety function under the mitigating systems cornerstone conditional upon specific offsite power grid system voltage circumstances. The VC Summer SDP phase 2 pre-solved Worksheet did not have a suitable surrogate for this finding therefore a phase 3 SDP analysis was performed by a regional SRA. The phase 3 SDP analysis utilized the latest VC Summer NRC SPAR risk model and an exposure period of 3 hours per year. The dominant sequence was a loss of DC Bus B with a failure of emergency feedwater and a failure to implement feed and bleed leading to core damage. The risk was mitigated by equipment available from Safety Bus 1DB and the short exposure period. The SDP phase 3 risk analysis result was an increase in core damage frequency of <math><1E-6</math> per year. The finding was characterized as GREEN, a finding of very low safety significance. A cross-cutting aspect was not identified because the finding does not represent current performance.

Inspection Report# : [2011006](#) (pdf)

Significance:  Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Adequately Account for the In-rush Current of the 7.2 kV Breaker Spring Charging Motors in a Safety-related Battery Voltage Drop Calculation

The team identified a non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" for the licensee's failure to adequately account for the in-rush current of the 7.2 kV breaker spring charging motors in a safety-related calculation. Specifically, the licensee used the steady-state current instead of the more limiting in-rush current in battery voltage drop calculation. The licensee entered the issue into their corrective action program as CR 11-00989 and performed testing to confirm the ability of the breaker to close with reduced voltage.

The failure of the licensee to use the more limiting in-rush current in the safety-related calculation is a performance deficiency. The performance deficiency was more than minor because it adversely affected the mitigating systems cornerstone attribute of design control 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 deficiencies in Calculation DC08320-010 resulted in a reasonable doubt that the B service water pump breaker would not have reliably closed during a design bases event. The performance deficiency resulted in the breakers not being tested with the lower voltage (71.04vdc) that would be available during an event. In accordance with NRC IMC 0609.04, "Initial Screening and Characterization of Findings", the inspectors conducted a Phase 1 Significance Determination Process (SDP) screening and determined the finding to be of very low safety significance (Green) because it was a design deficiency confirmed not to result in the loss of operability or functionality, did not represent the loss of a system safety function and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. A cross-cutting aspect was not identified because the finding does not represent current performance

Inspection Report# : [2011006](#) (pdf)

Barrier Integrity

Significance:  Jun 30, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Perform ISI General Visual Examinations of Containment Moisture Barrier Associated with Containment Liner Leak Chase Test Connection Threaded Pipe Plugs

The inspectors identified a Green NCV of 10 CFR Part 50.55a, "Codes and Standards," involving the licensee's failure to properly apply Subsection IWE of ASME Section XI for conducting general visual examinations of the metal-to-metal pipe plugs installed in the containment liner channel weld leak chase test connections that provide a moisture barrier to the containment liner seam welds. Following the inspectors' identification of this issue, the licensee conducted the visual examinations and found missing pipe plugs and water in four of the leak chase test connection zones. The licensee adequately assessed and corrected the deficiencies prior to entering Mode 4 (Hot Shutdown) to ensure the integrity of containment was maintained. The issue was entered into the licensee's corrective action program as condition report CR-11-02834.

The failure to conduct a general visual examination of 100 percent of the moisture barriers intended to prevent intrusion of moisture against inaccessible areas of the containment liner at metal-to-metal interfaces which are not seal welded, was a performance deficiency that was within the licensee's ability to foresee and correct. This finding was of more than minor significance because the failure to conduct required visual examinations and identify the degraded moisture barriers which allowed the intrusion of water into the four liner leak chase channels, if left uncorrected, could have resulted in more significant corrosion degradation of the containment liner or associated liner welds. The finding was associated with the design control attribute of the Barrier Integrity Cornerstone and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, visual examinations of the containment metal liner provide assurance that the liner remains capable of performing its intended safety function. The inspectors used IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," and determined that the finding was of low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of the reactor containment. A cross-cutting aspect was not identified because the finding does not represent current licensee performance. (Section 1R20)

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

Significance: G Apr 15, 2011

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Implement Timely Corrective Actions to Address Design Bases Requirements for SGTR Event

The team identified a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action", for the licensee's failure to implement prompt corrective actions to ensure that SG primary to secondary break flow could be terminated within the accident analysis assumptions used for a design basis SGTR event. The licensee entered this concern into the corrective action program as CR-11-01031.

The licensee's failure to implement prompt and effective corrective actions to ensure that primary to secondary steam generator tube rupture (SGTR) break flow could be terminated within the timeframes established by the FSAR accident analysis of record was a performance deficiency. The performance deficiency was greater than minor because it adversely affected the SSC/barrier performance, procedure quality, and human performance attributes 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 complete timely corrective actions to ensure the adequacy of system design, emergency operating procedures, and/or licensing basis SGTR accident analyses challenged the assurance that those attributes would demonstrate sufficient protection for the consequences associated with a design basis SGTR event. The significance of the finding was screened using the barrier integrity column of IMC 0609, "Significance Determination Process", Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and determined to be of very low safety significance (Green) because the finding did not represent (1) the degradation of only the radiological barrier function provided for the control room/auxiliary building/spent fuel pool, (2) the degradation of the barrier function of the control room against toxic atmosphere or smoke, (3) an actual open pathway in the integrity of reactor containment or heat removal components, or (4) an actual reduction in function of hydrogen igniters in the reactor containment. The finding directly involved a cross-cutting aspect in the resources component of the human performance area [H.2(a)].

Inspection Report# : [2011006](#) (*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 02, 2012