



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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LISLE, IL 60532-4352

September 6, 2012

Mr. Michael J. Pacilio
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
TRIENNIAL FIRE PROTECTION INSPECTION REPORT
05000254/2012011; 05000265/2012011(DRS)

Dear Mr. Pacilio:

On August 2, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed a triennial fire protection inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on August 2, 2012, with Mr. S. Darin and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Two NRC-identified findings of very low safety significance (Green) were identified during this inspection. These findings were determined to involve violations of NRC requirements. However, because of their very low safety significance and because the issues were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the subject or severity of any Non-Cited Violation you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector office at the Resident Inspector at Quad Cities Nuclear Power Station.

M. Pacilio

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any), will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-254 and 50-265
License Nos. DPR-29 and DPR-30

Enclosure: Inspection Report 05000254/2012011; 05000265/2012011(DRS)
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-254; 50-265
License Nos: DPR-29, DPR-30

Report No: 05000254/2012011; 05000265/2012011

Licensee: Exelon Generation Company, LLC

Facility: Quad Cities Nuclear Power Station, Units 1 and 2

Location: Cordova, IL

Dates: July 11 through August 2, 2012

Inspectors: A. Dahbur, Team Lead, Senior Reactor Inspector
N. Valos, Senior Risk Analyst
R. Winter, Reactor Inspector

Approved by: Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Enclosure

SUMMARY

IR 05000254/2012011, 05000265/2012011; 07/11/12 – 08/02/12; Quad Cities Nuclear Power Station, Units 1 and 2; Routine Triennial Fire Protection Baseline Inspection.

This report covers an announced Triennial Fire Protection Baseline Inspection. The inspection was conducted by Region III inspectors. Two (Green) findings were identified by the inspectors. The findings were considered Non-Cited Violations (NCVs) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be (Green) or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix R, Section III.L.3 for the licensee's failure to have an adequate procedure used to implement an alternative shutdown capability in the event of a fire in fire area TB-III. Specifically, the licensee failed to provide adequate steps to ensure the successful energization of Bus 23-1 from the Unit 2 Station Blackout (SBO) Diesel Generator (DG) in the event of a fire in fire area TB-III (Turbine Building Southern Zone Group). The licensee entered the issue into their corrective action program and added a step to close the Bus 23-1 and Bus 71 Tie Breaker.

The inspectors determined that the finding was more than minor because the procedure deficiency did not ensure the successful energization of Bus 23-1 from the Unit 2 SBO DG in the event of a fire in fire area TB-III, which was required to provide Torus cooling for Unit 1. The finding was screened as having very low safety significance in Task 1.3.1 of IMC 0609, Appendix F. This finding did not have a cross-cutting aspect because the finding was not representative of current performance. (Section 1R05.5.b)

- Green. The inspectors identified a finding of very low safety significance (Green) and associated NCV of 10 CFR Part 50, Appendix R, Section III.L.5 for the licensee's failure to have a procedure in effect that would provide adequate cold shutdown repairs for the 1A Recirculation Pump Discharge Valve MO 1-202-5A. Specifically, a procedure deficiency in Quad Cities Annunciator Response Procedure (ARP) 0030-01, Attachment D, provided an incorrect terminal point and cubicle location on MCC 18/19-5 for the cable wire to be lifted for cold shutdown repair in the event of a fire in fire area TB-III. The licensee entered the issue into their corrective action program revised the procedure and corrected the deficiency.

The inspectors determined that the finding was more than minor because the procedure deficiency could have resulted in operational complications and could have delayed reaching cold shutdown in the event of a fire in fire area TB-III. The finding was screened as having very low safety significance in Task 1.3.1 of IMC 0609, Appendix F. This finding did not have a cross-cutting aspect because the finding was not representative of current performance. (Section 1R05.9.b)

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R05 Fire Protection (71111.05T)

The purpose of the fire protection triennial baseline inspection was to conduct a design based, plant specific, risk-informed, onsite inspection of the licensee's fire protection program's defense-in-depth elements used to mitigate the consequences of a fire. The fire protection program shall extend the concept of defense-in-depth to fire protection in plant areas important to safety by:

- preventing fires from starting;
- rapidly detecting, controlling and extinguishing fires that do occur;
- providing protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe shutdown of the reactor plant; and
- taking reasonable actions to mitigate postulated events that could potentially cause loss of large areas of power reactor facilities due to explosions or fires.

The inspectors' evaluation focused on the design, operational status, and material condition of the reactor plant's fire protection program, post-fire safe shutdown systems, and B.5.b mitigating strategies. The objectives of the inspection were to assess whether the licensee had implemented a fire protection program that: (1) provided adequate controls for combustibles and ignition sources inside the plant; (2) provided adequate fire detection and suppression capability; (3) maintained passive fire protection features in good material condition; (4) established adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems or features; (5) ensured that procedures, equipment, fire barriers, and systems exist so that the post-fire capability to safely shut down the plant was ensured; (6) included feasible and reliable operator manual actions when appropriate to achieve safe shutdown; and (7) identified fire protection issues at an appropriate threshold and ensured these issues were entered into the licensee's problem identification and resolution program.

In addition, the inspectors' review and assessment focused on the licensee's post-fire safe shutdown systems for selected risk-significant fire areas. Inspector emphasis was placed on determining that the post-fire safe shutdown capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire safe shutdown success path was available. The inspectors' review and assessment also focused on the licensee's B.5.b related license conditions and the requirements of Title 10, Code of Federal Regulations (10 CFR) Part 50.54 (hh)(2). Inspector emphasis was to ensure that the licensee could maintain or restore core cooling, containment, and spent fuel pool cooling capabilities utilizing the B.5.b mitigating strategies following a loss of large areas of power reactor facilities due to explosions or fires. Documents reviewed are listed in the Attachment to this report.

The fire zones/areas and B.5.b mitigating strategies selected for review during this inspection are listed below and in Section 1R05.13. The fire zones/areas selected constituted four inspection samples and the B.5.b mitigating strategies selected constituted four inspection samples, respectively, as defined in Inspection Procedure 71111.05T.

Fire Area	Fire Zone	Description
CT-1	8.2.4	Unit 1 Cable Tunnel
TB-I	8.2.6.E	Unit 2 TB Ground Floor
TB-III	6.1.B	Unit 1 DC Panel Room
TB-I	8.2.7.E	Unit 2 TB Mezzanine Floor

.1 Protection of Safe Shutdown Capabilities

a. Inspection Scope

For each of the selected fire areas, the inspectors reviewed the fire hazards analysis, safe shutdown analysis, and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected.

The inspectors also reviewed the licensee’s design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings of significance were identified.

.2 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire area barriers, penetration seals, fire doors, electrical raceway fire barriers, and fire rated electrical cables. The inspectors observed the material condition and configuration of the installed barriers, seals, doors, and cables. The inspectors reviewed approved construction details and supporting fire tests. In addition, the inspectors reviewed license documentation, such as NRC safety evaluation reports, and deviations from NRC regulations and the National Fire Protection Association (NFPA) standards to verify that fire protection features met license commitments.

The inspectors walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers) to ensure they were appropriate for the fire hazards in the area.

The inspectors reviewed the installation, repair, and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating and that the installation met the engineering design.

b. Findings

No findings of significance were identified.

.3 Active Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire suppression and detection systems. The inspectors observed the material condition and configuration of the installed fire detection and suppression systems. The inspectors reviewed design documents and supporting calculations. In addition, the inspectors reviewed license basis documentation, such as, NRC safety evaluation reports, deviations from NRC regulations, and NFPA standards to verify that fire suppression and detection systems met license commitments.

b. Findings

No findings of significance were identified.

.4 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

For the selected fire areas, the inspectors verified that redundant trains of systems required for hot shutdown would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems including the effects of flooding. The inspectors conducted walkdowns of each of the selected fire areas to assess conditions such as the adequacy and condition of floor drains, equipment elevations, and spray protection.

b. Findings

No findings of significance were identified.

.5 Alternative Shutdown Capability

a. Inspection Scope

The inspectors reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions. The inspectors also focused on the adequacy of the systems to perform reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

The inspectors conducted selected area walkdowns to determine if operators could reasonably be expected to perform the alternate safe shutdown procedure actions and that equipment labeling was consistent with the alternate safe shutdown procedure. The review also looked at operator training, as well as consistency between the operations shutdown procedures and any associated administrative controls.

b. Findings

Inadequate Procedure to Energize Bus 23-1 to Provide Torus Cooling for Unit 1

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation of 10 CFR Part 50, Appendix R, Section III.L.3 for the licensee's failure to have an adequate procedure used to implement an alternative shutdown capability in the event of a fire. Specifically, the licensee failed to implement a procedure which would ensure the successful energization of Bus 23-1 from the Unit 2 Station Blackout (SBO) Diesel Generator (DG) in the event of a fire in fire area TB-III (Turbine Building Southern Zone Group). Bus 23-1 was required to be energized to provide Torus cooling for Unit 1 in the event of a fire in fire area TB-III.

Description: The licensee used the Quad Cities ARP 0030-01, "TB-III Injection with a safety system performance monitor (SSMP) and Bringing the Unit to Cold Shutdown," to safely shutdown the plant in the event of a fire in fire area TB-III. If power was lost to Bus 23, then Attachment K, "ANSO2 SBO DG 2 Local Emergency Operation," was used to energize Bus 23-1 from the Unit 2 SBO DG to allow restart of the 2A and 2B Residual Heat Removal Service Water (RHRSW) Pumps to support Unit 1 Torus cooling. The actions listed in Attachment K were to be performed by an operator from outside the control room.

The use of the Unit 2 SBO DG to provide power for Torus cooling was a contingency action in case of loss of offsite power. Safe shutdown circuit analysis has determined that offsite power would not be damaged for a fire in fire area TB-III. However, the overall reliability and availability of electrical power (i.e., onsite and offsite power) to Bus 23-1 would be decreased in the event of a fire in area TB-III. Also, since fire area TB-III is an alternative shutdown area, in accordance with the technical requirements of Sections III.L.3 of 10 CFR Part 50, Appendix R, the shutdown capability is required to accommodate post-fire conditions where offsite power is available and where offsite power is not available for 72 hours.

Figure 8.3-1 "Emergency Power System" of the updated final safety analysis report (UFSAR) showed three breakers required to be closed to provide a power source to Bus 23-1 from the Unit 2 SBO DG. These breakers were the SBO DG 2 feed to Bus 71 (Breaker 7101), Bus 23-1 Tie Breaker to Bus 71 located at Bus 71 (Breaker 7103) and Bus 23-1 Tie Breaker to Bus 71 located at Bus 23-1 (Breaker 2328).

During review of Attachment K by the inspectors, it was determined that the procedure lacked a step to close the Bus 23-1 Tie Breaker to Bus 71 (Breaker 2328) to provide the final electrical flow path to energize Bus 23-1 after Bus 71 was energized by the Unit 2 SBO DG. Bus 23-1 was required to be energized to provide Torus cooling for Unit 1 in the event of a fire in fire area TB-III.

In response to the inspectors' concern, the licensee initiated IR 01387237, "FPI – QCARP Procedure Deficiency, No Step to Energize Bus," and revised Attachment K of

the Quad Cities ARP 0030-01 on July 11, 2012, to provide a step to close the Bus 23-1 Tie Breaker to Bus 71 to provide an electrical flow path to energize Bus 23-1.

Analysis: The inspectors determined that the failure to implement a procedure which would provide alternative shutdown capability in the event of a fire in fire area TB-III was contrary to the requirements of 10 CFR Part 50, Appendix R, Section III.L.3, and was a performance deficiency. Specifically, the licensee failed to implement a procedure to ensure the successful energization of Bus 23-1 from the Unit 2 SBO DG in the event of a fire in fire area TB-III. Bus 23-1 was required to be energized to provide Torus cooling for Unit 1 in the event of a fire in fire area TB-III.

The finding was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Protection Against External Events (Fire) and affected the cornerstone 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 procedure deficiency did not ensure the successful energization of Bus 23-1 from the Unit 2 SBO DG in the event of a fire in fire area TB-III in case of loss of offsite power. In the event of a fire in fire area TB-III, Bus 23-1 was required to be energized to provide Torus cooling for Unit 1. Although the safe shutdown analysis determined that the fire would not damage cables associated with the offsite power sources, the overall reliability and availability of electrical power (i.e., onsite and offsite power) to Bus 23-1 would be decreased in the event of a fire in area TB-III.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Characterization of Findings," Table 3, the inspectors determined that the finding affected the ability to reach or maintain safe shutdown conditions in case of a fire. Therefore, screening under IMC 0609, Appendix F, "Fire Protection Significance Determination Process," was required.

The inspectors determined that the finding affected the post-fire safe shutdown finding category. The inspectors determined that the finding represented a low degradation because of two factors that limited the overall impact on the performance of the Quad Cities ARP 0030-01. First, the use of the Unit 2 SBO DG to provide power for Torus cooling was a contingency action in case of loss of offsite power in order to meet the requirement of Appendix R, Section III.L. Second, the affected action was to establish Torus cooling within three hours of a reactor scram. The failure to energize Bus 23-1 should be readily apparent to the operators. With a time period of three hours to establish Torus cooling, it would be expected that the operators would have diagnosed and corrected the issue associated with the failure of Bus 23-1 to be energized. Therefore, the inspectors determined that the finding screened as having very low safety-significance (Green) in Task 1.3.1 of IMC 0609, Appendix F.

The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Enforcement: Title 10 CFR 50.48(b)(2) requires, in part, that all nuclear power plants licensed to operate prior to January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, Section III.J, and Section III.O. Compliance with 10 CFR Part 50, Appendix R, Section III.L is considered necessary in order to satisfy the requirements of 10 CFR Part 50, Appendix R, Section III.G, Section III.L of 10 CFR Part 50, Appendix R, specifies implementation of alternative to dedicated shutdown capability required by Section III.G.3 of 10 CFR Part 50, Appendix R. Section III.L.3 of 10 CFR Part 50,

Appendix R, states, in part, that alternative shutdown capability shall be independent of the specific fire area and that procedures shall be in effect to implement this capability and shall accommodate post-fire conditions where offsite power is available and where offsite power is not available for 72 hours. Section 4.10.1 "Unit 1 Shutdown Analysis," of the Fire Protection Report stated, in part, that an alternative shutdown capability was utilized in the event of a fire in TB-III.

Contrary to the above, from March 4, 2009 until July 11, 2012, for an area where alternative shutdown capability was established, the licensee's procedure failed to implement this alternative shutdown capability where offsite power was not available. Specifically, Attachment K of procedure Quad Cities ARP 0030-01 did not ensure the successful energization of Bus 23-1 from the Unit 2 SBO DG in the event of a fire in fire area TB-III. Bus 23-1 was required to be energized to provide Torus cooling for Unit 1. Following the identification of the procedure deficiency, the licensee revised the procedure and added a step to ensure the energization of Bus 23-1 in the event of a fire in TB-III. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as IR 01387237, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000254/2012011-01; 05000265/2012011-01, Inadequate Procedure to Energize Bus 23-1 to Provide Torus Cooling for Unit 1).

.6 Circuit Analyses

a. Inspection Scope

The inspectors verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the inspectors verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts, shorts to ground, or other failures were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The inspectors' review considered fire and cable attributes, potential undesirable consequences, and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The inspectors also reviewed cable raceway drawings for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the cable routing matrices.

The inspectors reviewed circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination. Additionally, the inspectors reviewed a sample of circuit breaker maintenance records to verify that circuit breakers for components required for post-fire safe shutdown were properly maintained in accordance with procedural requirements.

The inspectors verified for cables that are important to safe shutdown (SSD) but not part of the success path, and that do not meet the separation/protection requirements of Section III.G.2 of 10 CFR Part 50, Appendix R, that the circuit analysis considered the cable failure modes. In addition, the inspectors have verified that the licensee has either: (1) determined that there is not a credible fire scenario (through fire

modeling); (2) implemented feasible and reliable manual actions to assure SSD capability; or (3) performed a circuit fault analysis demonstrating no potential impact on SSD capability exists.

b. Findings

No findings of significance were identified.

.7 Communications

a. Inspection Scope

The inspectors reviewed, on a sample basis, the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire brigade duties. The inspectors verified that plant telephones, page systems, sound powered phones, and radios were available for use and maintained in working order.

The inspectors reviewed the electrical power supplies and cable routing for these systems to verify that either the telephones or the radios would remain functional following a fire.

b. Findings

No findings of significance were identified.

.8 Emergency Lighting

a. Inspection Scope

The inspectors performed a plant walkdown of selected areas in which a sample of operator actions would be performed in the performance of alternative safe shutdown functions. As part of the walkdowns, the inspectors focused on the existence of sufficient emergency lighting for access and egress to areas and for performing necessary equipment operations. The locations and positioning of the emergency lights were observed during the walkdown and during review of manual actions implemented for the selected fire areas.

b. Findings

No findings of significance were identified.

.9 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the licensee's procedures to determine whether repairs were required to achieve cold shutdown and to verify that dedicated repair procedures, equipment, and material to accomplish those repairs were available onsite. The inspectors also evaluated whether cold shutdown could be achieved within the required time using the licensee's procedures and repair methods. The inspectors also verified that equipment necessary to perform cold shutdown repairs was available onsite and properly staged.

b. Findings

Inadequate Procedure for Cold Shutdown Repair of 1A Recirculation Pump Discharge Valve MO 1-202-5A

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation of 10 CFR Part 50, Appendix R, Section III.L.5 for the licensee's failure to have a procedure in effect that would provide adequate cold shutdown repair for the 1A Recirculation Pump Discharge Valve MO 1-202-5A. Specifically, Attachment D, "Repair of MO-1-202-5A Valve," of the Quad Cities ARP 0030-01, provided an incorrect Terminal Point (19) and cubicle location (Cubicle A4) on motor control center (MCC) 18/19-5 for the cable wire to be lifted for Cable 12654. These inadequate repair instructions could have resulted in operational complications and could have caused a delay in reaching cold shutdown in the event of a fire in fire area TB-III (Turbine Building Southern Zone Group).

Description: The licensee used the Quad Cities ARP 0030-01 to safely shutdown the plant in the event of a fire in fire area TB-III. To ensure that there is no backflow through the 1A Recirculation Pump and injection bypassing the reactor, motor operated valve MO 1-202-5A, "1A Recirculation Pump Discharge Valve," must be closed when reconfiguring the Unit 1 Division 1 RHR system for shutdown cooling. The MCC, 480V MCC 18/19-5, which supplied power to motor operated valve MO 1-202-5A was located inside primary containment and was not readily accessible. The safe shutdown analysis indicated that a fire in fire area TB-III may damage the control cables associated with the 480V MCC 18/19-5. Because of the location of the valve and the potential cable damage, a repair was required to remotely close valve MO 1-202-5A from Unit 1 480V MCC 18/19-5. Attachment D, "Repair of 1-202-5A Valve," was used to provide the repair to allow remote closure of the 1A Recirculation Pump Discharge Valve MO 1-202-5A.

Attachment D provided repair instructions to lift cable wires at certain terminal points to isolate the control circuit to allow the cold shutdown repair of valve MO 1-202-5A. During the inspectors' review of Attachment D and schematic/wiring drawings associated with the motor operated valve, it was determined that the procedure listed an incorrect Terminal Point (19) and cubicle location (Cubicle A4) on MCC 18/19-5 for the cable wire to be lifted for Cable 12654. The correct terminal point was for a GRN-BLK conductor for Cable 12654 to be lifted at MCC 18/19-5, Cubicle B2, Terminal Point 17.

During 2009, the licensee implemented a modification per Engineering Change (EC) 344616 (that electrically disconnected the Reactor Recirculation Loop Crosstie and Crosstie Bypass Valves MO 1-202-6A, 6B and MO 1-202-9A, 9B) that changed the wiring configuration associated with MO 1-202-5A. The EC 344616 did not identify the Quad Cities ARP 0030-01 as a procedure that was required to be changed as a result of the modification. The Quad Cities ARP 0030-01, Attachment D, was required to be revised to reflect the new correct terminal point and cubicle location for the cable wire to be lifted for Cable 12654.

In response to the inspectors concern, the licensee conducted a preliminary review of the electrical diagrams associated with the motor operated valve MO 1-202-5A and determined that the GRN-BLK conductor for Cable 12654 at MCC 18/19-5, Cubicle B2, Terminal Point 17, was not required to be lifted to allow remote closure of valve MO 1-202-5A. Because of the lifting of other wires as specified in the repair procedure, safe shutdown could be accomplished without lifting this wire, fire induced failures of cables associated with the valve would not result in spurious opening of the valve in the event

of a fire in TB-III. However, the inspectors determined that the procedure deficiency could have caused a delay in reaching cold shutdown in the event of a fire in fire area TB-III, while the cause of the procedure deficiency was investigated. Specifically, the inspectors were concerned that the procedure deficiency could have resulted in operational complications and could have delayed reaching cold shutdown in the event of a fire in fire area TB-III.

The licensee entered this issue into their corrective action program as IR 01393856, "FPI – QCARP 0030-01 and 0030-02 Identified Discrepancies," and revised the procedure and corrected the deficiency.

Analysis: The inspectors determined that the failure to provide an adequate procedure for the cold shutdown repair of 1A Recirculation Pump Discharge Valve MO 1-202-5A in the event of a fire in fire area TB-III was contrary to the requirements of 10 CFR Part 50, Appendix R, Section III.L.5 and was a performance deficiency. Specifically, procedure Quad Cities ARP 0030-01, Attachment D, provided an incorrect Terminal Point (19) and cubicle location (Cubicle A4) on MCC 18/19-5 for the cable wire to be lifted for Cable 12654 associated with MO 1-202-5A.

The finding was determined to be more than minor because it was associated with the Mitigating Systems cornerstone attribute of Protection Against External Events (Fire) and affected the cornerstone 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 procedure deficiency could have resulted in operational complications and could have delayed reaching cold shutdown in the event of a fire in fire area TB-III. The procedure deficiency delayed the capability of systems to achieve cold shutdown and would have added burden as well as uncertainty for operations personnel during an already challenging fire event.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Characterization of Findings," Table 3, the inspectors determined that the finding affected the ability to reach or maintain safe shutdown conditions in case of a fire. Therefore, screening under IMC0609, Appendix F, "Fire Protection Significance Determination Process," was required.

The inspectors determined that the finding affected the post-fire safe shutdown finding category and only affected the ability to reach and maintain cold shutdown conditions. Therefore, the inspectors determined that the finding screened as having very low safety significance (Green) in Task 1.3.1 of IMC 0609, Appendix F.

The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Enforcement: Title 10 CFR 50.48(b)(2) requires, in part, that all nuclear power plants licensed to operate prior to January 1, 1979, must satisfy the applicable requirements of Appendix R to this part, including specifically the requirements of Sections III.G, III.J, and III.O. Compliance with 10 CFR Part 50, Appendix R, Section III.L is considered necessary in order to satisfy the requirements of 10 CFR Part 50, Appendix R, Section III.G. Section III.L of 10 CFR Part 50, Appendix R, specifies implementation of alternative of dedicated shutdown capability required by Section III.G.3 of 10 CFR Part 50, Appendix R. Section III.L.5 of 10 CFR Part 50, Appendix R, states, in part, that the fire damage to equipment and systems shall be limited so that the systems can be made operable and cold shutdown achieved

within 72 hours and that procedures shall be in effect to implement such repairs. Section 4.10.1 "Unit 1 Shutdown Analysis," of the Fire Protection Report stated, in part, that an alternative shutdown capability was utilized in the event of a fire in TB-III.

Contrary to the above, from April 28, 2009, until July 31, 2012, the licensee did not have a procedure in effect that would provide adequate cold shutdown repairs for the 1A Recirculation Pump Discharge Valve MO 1-202-5A. Specifically, a procedure deficiency in the Quad Cities ARP 0030-01, Attachment D, provided an incorrect Terminal Point (19) and cubicle location (Cubicle A4) on MCC 18/19-5 for the cable wire to be lifted for Cable 12654, which could have resulted in operational complications and could have delayed reaching cold shutdown in the event of a fire in fire area TB-III. Following the identification of the procedure deficiency, the licensee revised the procedure and corrected the deficiency. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program as IR 01393856, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000254/2012011-02; 05000265/2012011-02, Inadequate Procedure for Cold Shutdown Repair of 1A Recirculation Pump Discharge Valve MO 1-202-5A).

.10 Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that compensatory measures were in place for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems, and equipment, passive fire barriers, pumps, valves or electrical devices providing safe shutdown functions or capabilities). The inspectors also conducted a review of the adequacy of short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings of significance were identified.

.11 Review and Documentation of Fire Protection Program Changes

a. Inspection Scope

The inspectors reviewed changes to the approved fire protection program to verify that the changes did not constitute an adverse effect on the ability to safely shutdown. The inspectors also reviewed the licensee's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings of significance were identified.

.12 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The inspectors reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the fire hazards analysis. A sample of hot work and transient combustible control permits were also reviewed. The inspectors performed plant walkdowns to verify that transient combustibles and ignition sources were being implemented in accordance with the administrative controls.

b. Findings

No findings of significance were identified.

.13 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's preparedness to handle large fires or explosions by reviewing selected mitigating strategies. This review ensured that the licensee continued to meet the requirements of their B.5.b related license conditions and 10 CFR 50.54(hh)(2) by determining that:

- Procedures were being maintained and adequate;
- Equipment was properly staged, maintained, and tested;
- Station personnel were knowledgeable and could implement the procedures; and
- Additionally, inspectors reviewed the storage, maintenance, and testing of B.5.b related equipment.

The inspectors reviewed the licensee's B.5.b related license conditions and evaluated selected mitigating strategies to ensure they remain feasible in light of operator training, maintenance/testing of necessary equipment and any plant modifications. In addition, the inspectors reviewed previous inspection reports for commitments made by the licensee to correct deficiencies identified during performance of Temporary Instruction (TI) 2515/171 or subsequent performances of these inspections.

The B.5.b mitigating strategies selected for review during this inspection are listed below. The offsite and onsite communications, notifications/emergency response organization activation, initial operational response actions and damage assessment activities identified in Table A.3 1 of Nuclear Energy Institute (NEI) 06-12, "B.5.b Phase II and III Submittal Guidance," Revision 2 are evaluated each time due to the mitigation strategies' scenario selected.

NEI 06-12, Revision 2, Section	Licensee Strategy (Table)
2.2	SFP Internal Makeup (Table A.2-1)
2.3.1	SFP External Makeup (Table A.2-2)
2.3.2	SFP External Spray (Table A.2-3)
3.4.6	Maximize Control Rod Drive Flow (Table A.5-6)

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program procedures and samples of corrective action documents to verify that the licensee was identifying issues related to the fire protection program at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed selected samples of condition reports, design packages, and fire protection system non-conformance documents.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On August 2, 2012, the inspectors presented the inspection results to Mr. Darin, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

S. Darin, Plant Manager
C. Alguire, System Engineering Manager
W. Beck, Regulatory Assurance Manager
K. Ohr, Engineering Director
J. Garrity, Maintenance Director
A. Misak, Nuclear Oversight Manager
K. O'Shea, Operations Director
B. Steadman, Design Engineering Director
M. Wagner, Regulatory Assurance
C. Pragman, Fire Protection Program Manager, Corporate Office
M. Dunlay, Design Engineering
M. Humphrey, Engineering Program
L. Geerts, Fire Marshal
V. Ezugha, Fire Protection System Manager
S. Fisher, CMO Manager/ SRO
M. Bridges, Operations/SRO
J. Rathman, Design Engineering (Electrical)
M. Taylor, Fire Protection Engineer, Corporate Office
T. Wojcik, Work Control
M. Rice, Program Engineering Manager
G. Harris, Human Performance Manager
T. Peterson, Regulatory Assurance Lead
T. Scott, Work Management Director

Nuclear Regulatory Commission

J. McGee, Senior Resident Inspector
B. Cushman, Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

05000254/2012011-01; 05000265/2012011-01	NCV	Inadequate Procedure to Energize Bus 23-1 to Provide Torus Cooling for Unit 1 (Section 1RO5.5.b)
05000254/2012011-02; 05000265/2012011-02	NCV	Inadequate Procedure for Cold Shutdown Repair of 1A Recirculation Pump Discharge Valve MO 1-202-5A (Section 1RO5.9.b)

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

CALCULATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
EC 368850	Documentation of Various Equipment Capabilities to Support a Security Event	3
QDC-4100-M-0691	Combustible Loading Calculation (TB-1)	4

ASSESSMENTS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
1309880-03	Pre NRC Triennial Inspection Self-Assessment (FASA)	April 30, 2012

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01386913	FPI - QCOS 4100-37 Needs Batt. Trickle Charger Info Added	July 10, 2012
01386917	FPI – QCARP Procedure Discrepancy – Procedure Vs Hard Card	July 10, 2012
01387040	FPI – QCARP Procedure Discrepancy – Wrong Cubicle Number	July 10, 2012
01387112	FPI – ELP 16M Aimed Incorrectly	July 10, 2012
01387131	FPI – QCOA 0010-20 Location of Non-PBX Phones (B.5.b)	July 10, 2012
01387237	FPI – QCARP Procedure Discrepancy, No Step to Energize Bus	July 10, 2012
01387464	FPI – Procedure Enhancement to Increase Flow to SFP	July 11, 2012
01388193	FPI – Fuel Oil XFER Valves not Removed from Documentation	July 12, 2012
01388444	FPI – Evaluate Outside Storage of B.5.b Equipment Trailer	July 13, 2012
01388474	FPI – B.5.b and EDMG Procedure Enhancements	July 13, 2012
01389344	FPI – Procedure Enhancement to QCOP 4100-16	July 16, 2012
01390280	FPI – Missing FME Covers on Hydrogen Cylinder Manifold	July 18, 2012

CALCULATIONS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01390530	FPI – Incorrect EPN in SSR Equipment List	July 19, 2012
01390853	FPI – Degraded Fire Department Connection Sign	July 19, 2012
01390857	FPI – ELP 42Q has a Misaligned Head Lamp	July 19, 2012
01390860	FPI – Unwanted Material in Cable Tray	July 19, 2012
01391023	FPI – Uncontrolled Plant Change	July 20, 2012
01391061	FPI – SSEL Flow Instrument	July 19, 2012
01393856	FPI – QCARP 0030-01 and 0030-02 Identified Discrepancies	July 27, 2012
01394613	FPI – NRC Identified QCARB Procedure Enhancements	July 30, 2012
01395960	FPI – Drip Pan Below U2 Main Gen not Seismically Anchored	August 1, 2012
01395983	FPI Minor Housekeeping Issue, Grease Board Near Cooling Line	August 1, 2012
01396185	FPI – NRC Identified QCARP Procedure Enhancements	August 2, 2012
01396372	SSMP MOV Breaker and Fuse Coordination	August 2, 2012
01396480	FPI – OP-MW-201-007 Attach. 1 Section II Enhancement	August 2, 2012

CORRECTIVE ACTION PROGRAM DOCUMENTS REVIEWED

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
00847883	Enhancement Items from B.5.B Inspection	November 20, 2008
00847885	Use of Internal Piping for External B.5.B Strategy	November 20, 2008
01018262	MSOPS 2Y – RCIC Test Line to CCST Flow Diversion	January 19, 2010
00879256	Fire Watch Expectations Were not Met	February 11, 2009
00915978	Outdated Fire Watch Inspection Log (Rev 6) Used	May 5, 2009
00948119	Confusion Over Firewatch Turnover	July 31, 2009
01098995	Adverse Trand: U2 EDG Cooling Water Total Flow Indication	August 6, 2010
01340283	OPEX Review for Flammable Gas Cylinder Issue	March 13, 2012
01389065	Fast Charge Light Will not Extinguish	July 16, 2012
01052407	MSOPS 2AA – Spurious Operation of	April 05, 2010

CORRECTIVE ACTION PROGRAM DOCUMENTS REVIEWED

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01018262	RCIC Minimum Flow Valve MSOPS 2Y – RCIC Test Line to CCST Flow Diversion	January 19, 2010

DRAWINGS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
M-29, Sheet 1	Diagram of Fire Pump Diesel Engine Fuel Piping	L
M-46, Sheet 1	Diagram of High Pressure Coolant Injection – HPCI Piping	CB
M-46, Sheet 2	Diagram of High Pressure Coolant Injection – HPCI Piping	R
M-70	Diagram of Safe Shutdown Make-Up Pump System	Z
M-87, Sheet 1	Diagram of High Pressure Coolant Injection – HPCI Piping	BL
M-89, Sheet 1	Diagram of Reactor Core Isolation Cooling RCIC Piping	BB
F-11-1	Detection and Suppression Cable Tunnel	G
F-13-1	Detection and Suppression Turbine Building Ground Floor	O
F-14-1	Detection and Suppression Turbine Building Mezzanine Floor	K
F-15-1	Detection and Suppression Turbine Building Mezzanine Floor	L
F-27	Turbine Building Corridor Ground Floor Suppression System	F
F-251	Underground Loops Fire Protection Piping	H
F-261	Fire Protection Piping Plan Cable Tunnel Area	G
F-276	Fire Suppression System Three Reactor Feed Pumps Speed Increaser Gears Area H	K
F-297	Fire Suppression System Hydrogen Seal Oil Unit Cir. Water Va. Hydraulic Op Unit	B
F-313	Fire Suppression System Trackway Area M	L
F-320	Trackway Unit 2 Turbine Building	0
F-330	Cable Tunnel – Unit 1 Turbine Building	1
F-370 sht. 12	Fire Protection Piping for Hydraulic Operations System	A

DRAWINGS

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
M-27	Diagram of Fire Protection Piping	QE
4E-1346A	Schematic Diagram – Safe Shutdown System; 4KV ACB 152-3101 and 152-1425	G
4E-6613A	Schematic Diagram – Motor Operated Valves 2901-6 and 2901-7	G

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
QCARP 0010-01	RB-IS Injection with SSMP and Bringing the Unit to Cold Shutdown	11
QCARP 0010-01	RB-2S Injection with SSMP and Bringing the Unit to Cold Shutdown	11
QCARP 0020-01	RB-IN Injection with SSMP and Bringing the Unit to Cold Shutdown	15
QCARP 0020-02	RB-2N Injection with SSMP and Bringing the Unit to Cold Shutdown	14
QCARP 0030-01	TB-III Injection with SSMP and Bringing the Unit to Cold Shutdown	20,22,24
QCARP 0030-02	TB-I Injection with SSMP and Bringing the Unit to Cold Shutdown	16
QCARP 0030-03	TB-II Unit 1 Injection with HPCI and Bringing the Unit to Cold Shutdown	16
QCARP 0030-04	TB-II Unit 2 Injection with RCIC and Bringing the Unit to Cold Shutdown	20
QCARP 0040-01	13-1 Injection with SSMP and Bringing the Unit to Cold Shutdown	16
QCARP 0040-02	24-1 Injection with SSMP and Bringing the Unit to Cold Shutdown	18
QCARP 0050-01	SB-1-1 Injection with SSMP and Bringing the Unit to Cold Shutdown	23
QCARP 0050-02	SB-1-2 Injection with RCIC and Bringing the Unit to Cold Shutdown	25
QCARP 0060-01	CT-I Injection with SSMP and Bringing the Unit to Cold Shutdown	14
QCARP 0060-02	CT-2 Injection with SSMP and Bringing the Unit to Cold Shutdown	19
QCOA 0010-12	Fire/Explosion	38
QCOA 0010-20	Security Event	29
QCOA 1900-01	Loss of Water Level in the Fuel Storage Pool or Reactor Cavity (G.7.c)	23
QCOP 1000-30	Post-Accident RHR Operation	28
QCOP 2900-02	Safe Shutdown Makeup Pump System Start Up	24

PROCEDURES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
QCOP 4100-16	Manually Filling the Diesel Fire Pump Day Tank	14
QCOP 4100-19	Emergency Portable Pump Operation (H.7.a.)	13
QCOP 6620-11	SBO DG 1(2) Local Emergency Operation	8
QCOS 0010-03	Safe Shutdown Equipment Inspection	27
QCOS 0010-15	Security Event Support Equipment Surveillance (J.7.a, J.7.b)	10,11
QCOS 4100-36	Emergency Portable Pump Surveillance (I.7.a.)	10
QCAP 1500-01	Administrative Requirements for Fire Protection	30

REFERENCES

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
FPR-R17-008	Transfer Pumps Eliminated as Normal Fill Supply to Diesel Driven Fire Pumps	July 15, 2005
LN-ARP	Lesson Plan - QCARPS	March 5, 2009
LN-B.5.b.1	Lesson Plan – Extreme Damage Mitigation B.5.b Strategies	May 4, 2012
LN-B.5.b.2	Lesson Plan – Extreme Damage Mitigation B.5.b Portable Diesel Driven Pump Operation	May 22, 2012
PM-11-010	Update to Existing Letter of Agreement with the Cordova Fire Department Dist	October 10, 2011

WORK ORDERS (WO)

<u>Number</u>	<u>Description or Title</u>	<u>Date or Revision</u>
01378921 01	Emergency Portable Pump Oil/Filter Change	October 13, 2011
01470925 01	Unit 2 Safe Shutdown Cabinet Inspection	March 13, 2012
01484244 01	Emergency Portable Pump Surveillance	April 25, 2012
01484245 01	Semi Annual Portable DG DC Supply Functional Test	April 25, 2012
01484597 01	Unit 1 Safe Shutdown Cabinet Inspection	April 27, 2012
01311627 01	EM Walkdown Group 2 Penet Fire Stops for SCAFF. Requirements	June 17, 2011
01311627 01	EM Group 2 Penetration Fire Stop Inspection Turb/Rx Bldg	September 2, 2011
01475164 01	Outage Only Accessible Fire Pen Seal Inspection	March 21, 2012
01512312 01	EM Perform Group 5 Eight Hour ELP Inspection	May 11, 2012

List of Acronyms Used

ADAMS	Agencywide Document Access Management System
ARP	Annunciator Response Procedure
CFR	Code of Federal Regulations
DG	Diesel Generator
DRS	Division of Reactor Safety
EC	Engineering Change
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
EPRI	Electric Power Research Institute
FSAR	Final Safety Analysis Report
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IPEEE	Individual Plant Examination of External Events
IR	Inspection Report
IR	Issue Report
LC	Load Center
LCB	Load Center Breaker
LCO	Limiting Condition for Operation
LOOP	Loss of Off-site Power
MCC	Motor Control Center
MOV	Motor-Operated Valve
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records
PI	Performance Indicator
PI&R	Problem Identification and Resolution
RCIC	Reactor Core Isolation Cooling
SBO	Station Blackout
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SSC	Systems, Structures, and Components
SSD	Safe Shutdown
SSMP	Safe Shutdown Makeup Pump
TB	Turbine Building
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order

M. Pacilio

-2-

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Sincerely,

Robert C. Daley, Chief
Engineering Branch 3
Division of Reactor Safety

Docket Nos. 50-254; 50-265
License Nos. DPR-29; DPR-30

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