

Quad Cities 1

2Q/2006 Plant Inspection Findings

Initiating Events

G**Significance:** Jun 30, 2006

Identified By: NRC

Item Type: FIN Finding

TURBINE/GENERATOR LOAD REJECT AND REACTOR SCRAM DUE TO MAIN POWER TRANSFORMER ISSUES

A self-revealing Green finding was identified on February 22 when the Unit 1 main turbine tripped causing a reactor scram. The licensee's post-scram efforts determined that the turbine trip was caused by degradation of the main power transformer protective relaying wiring which resulted in the actuation of a protective relay due to an electrical ground. The wiring insulation degradation was a result of electrical conduit bushings not being installed at various junction boxes as required by the main power transformer design specifications. The lack of bushings caused damage to the wire as it was pulled through the electrical conduit during transformer construction.

The failure to follow design specifications when constructing the main power transformer was more than minor because it was a precursor to a significant event (a transient). The inspectors determined that this finding was of very low safety significance because it did not contribute to both the likelihood of a reactor scram and the likelihood that mitigation equipment would not be available. This finding was not considered a violation of regulatory requirements since the main power transformer is a non-safety related component. Corrective actions for this issue included installing new protective relaying wiring external to the transformer. The licensee planned to replace the transformer in the Spring of 2007.

Inspection Report# : [2006005\(pdf\)](#)G**Significance:** Feb 07, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO IDENTIFY DEGRADED UNIT 2 SNUBBER AND BROKEN WELDS ON PILOT VALVE/ACTUATOR SUPPORT

The inspectors identified a finding of very low safety significance and a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XVI on January 17, 2006, for failure to conduct effective walkdowns during the Unit 2 and Unit 1 outages that occurred on December 30, 2005, and January 7, 2006, respectively. This resulted in the licensee's failure to identify components and systems degraded by increased steam line vibration at EPU power levels. Specifically, during the Unit 2 outage commencing on January 13, a severely degraded snubber (bent extension tube and nearly worn through spherical bearing and attachment pin) on the Unit 2 3D ERV discharge piping was found. In addition, broken tack welds were discovered on both ends of the 3D and 3E ERVs and on one end of the 3C ERV pilot valve/actuator support. Several additional deficiencies of lesser significance were identified during the January 15 Unit 1 outage. Based on the degradation mode and extent of the Unit 2 3D ERV snubber end connection damage and Unit 2 3D, 3C, and 3E ERV turnbuckle tack weld cracks, it was determined that the degraded conditions existed prior to the Unit 2 and Unit 1 outages on December 30, 2005, and January 7, 2006, respectively.

This finding was determined to be more than minor because, if left uncorrected, the finding would become a significant safety concern. Specifically, the degraded components would continue to degrade and, if not identified and corrected, could eventually result in component or system failure. This finding was of very low safety significance because the degraded items identified did not result in a loss of safety function of any system. The inspectors determined that this finding also affected the cross cutting area of problem identification and resolution because the licensee had performed multiple drywell walkdowns in an effort to assess the main steam line vibration impacts, but had failed to identify the degraded equipment discussed above. The licensee conducted additional focused walkdowns during the January 13, 2006, Unit 2 outage and the Unit 1 outage which began on January 15, 2006, and initiated Issue Report 451822 to document the issue and determine corrective actions to be taken.

Inspection Report# : [2006009\(pdf\)](#)G**Significance:** Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

4160 VOLT RELAYING AND METERING SINGLE FAILURE VULNERABILITY

A finding of very low safety significance was identified when the licensee discovered that a spurious open circuit on the relaying and metering transformers for the unit auxiliary or the reserve auxiliary transformer could result in a loss of power to the residual heat removal service water system. This finding was determined to be a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III.

This finding was more than minor because if left uncorrected, the open circuit vulnerability would leave the station susceptible to a loss of the residual heat removal service water system following a loss of offsite power event. This finding was determined to be of very low safety significance because the frequency of the circuit failure was less than 1.0E-6 and because the probability of experiencing a control room fire concurrent with the postulated circuit failure was also significantly low. Corrective actions for this issue included installing a temporary modification to eliminate the vulnerability, reviewing other electrical circuitry for similar vulnerabilities, and designing and installing a future permanent modification.

Inspection Report# : [2005005\(pdf\)](#)

Mitigating Systems

G**Significance:** Jun 30, 2006

Identified By: NRC

Item Type: FIN Finding

FAILURE TO EVALUATE AND ADDRESS LONG-STANDING DEGRADATION OF RHRSW SUMP PUMPS PRIOR TO IMPACTING INTERNAL FLOODING PROTECTION EQUIPMENT

The inspectors identified a Green finding in June 2006 due to the licensee's failure to recognize and address long-standing degradation of the residual heat removal service water (RHRSW) vault sump pumps.

This issue was determined to be more than minor because a degraded sump pump was left unrepaired for approximately 15 months and ultimately resulted in rendering both of the internal flooding protection check valves for the 1A RHRSW vault inoperable. This finding was determined to be of very low safety significance because an internal flood in the RHRSW area could not have rendered two or more trains of the RHRSW system inoperable concurrently. The inspectors also determined that this finding affected the cross-cutting area of problem identification and resolution because several departments had the opportunity to evaluate and address the degradation of the sump pumps prior to the loss of flood protection occurring. Corrective actions for this issue included performing a historical review of RHRSW vault sump pump maintenance and initiating work requests to inspect and replace all sump pumps not replaced in the last two years.

Inspection Report# : [2006005\(pdf\)](#)**G****Significance:** Jun 30, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE OF THE 1B CORE SPRAY PUMP TO START DUE TO BREAKER ALIGNMENT ISSUES

A self-revealing Green finding and a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," were identified on January 4, 2006, due to the Unit 1 "B" core spray system failing to start during testing. The pump failed to start because of misalignment between the pump breaker's secondary disconnect pins and the breaker cubicle's secondary disconnect slides. Procedural inadequacies contributed to this failure since neither the breaker installation procedure nor the breaker preventive maintenance procedure addressed the importance properly aligning the breaker and cubicle components.

The lack of procedural instructions was determined to be more than minor because if left uncorrected, the lack of instructions could lead of additional safety-related breakers being misaligned during installation. This finding was found to be of low safety significance because additional low pressure injection systems were available for use if needed. Corrective actions for this issue included properly installing a new breaker in the 1B core spray pump breaker cubicle and revising and implementing the appropriate preventive maintenance and breaker installation procedures.

Inspection Report# : [2006005\(pdf\)](#)**W****Significance:** Jun 29, 2006

Identified By: NRC

Item Type: VIO Violation

FAILURE TO ESTABLISH MEASURES TO ENSURE THAT THE UNIT 1 ERV ACTUATORS REMAINED SUITABLE FOR OPERATION WHILE OPERATING AT EPU POWER LEVELS

Title 10 CFR 50, Appendix B, Criterion III, Design Control, requires, in part, that measures be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems, and components.

Contrary to the above, the licensee failed to establish measures to ensure that the application of the electromatic relief valve (ERV) actuators (which are essential to perform the safety-related reactor vessel depressurization and reactor overpressure protection functions) was reviewed and remained suitable for operation prior to implementing an extended power uprate (EPU) for Unit 1 in November 2002. This resulted in multiple ERVs becoming inoperable and unavailable due to being subjected to significantly higher vibration levels during Unit 1 operation at EPU power levels.

The inspectors determined that this finding also affected the cross-cutting area of problem identification and resolution because the licensee failed to fully evaluate historical and predictive information regarding higher than expected main steam line vibrations. Corrective actions included replacing the Unit 1 ERV actuators in January 2006, installing new ERV actuators designed to withstand the increased vibrations experienced during EPU operations in May 2006, and installing an additional modification to reduce the overall main steam line vibration levels. Additional corrective actions were in progress to address the organizational aspects that contributed to this issue.

Inspection Report# : [2006014\(pdf\)](#)**G****Significance:** Jun 29, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

SSMP Credited as a Redundant System for an Appendix R III.G.2 Fire Area

The inspectors identified a Non-cited Violation of 10 CFR Part 50, Appendix R, Section III.G.2, having very low safety significance involving the licensee's failure to ensure, in the event of a severe fire, that one redundant train of systems necessary to achieve and maintain hot shutdown conditions was free of fire damage. Specifically, the licensee failed to ensure, in the event of a fire in any of the III.G.2 fire areas, that one redundant train of reactor coolant inventory makeup water remained free of fire damage. Instead the licensee credited the dedicated safe shutdown makeup pump for reactor coolant inventory makeup water in the III.G.2 fire areas. The licensee planned to review the options for resolving this issue and pursue appropriate actions.

The finding was more than minor because this failure could have affected the mitigating systems cornerstone objective and safe shutdown. Specifically, the licensee failed to ensure that one redundant train of reactor coolant inventory makeup water was available, and instead relied on an alternate shutdown system without an analysis and procedures that demonstrated full compliance with all of the requirements of 10 CFR Part 50, Appendix R, Section III.G.3 and III.L, or requesting prior NRC approval. The finding was not suitable for SDP evaluation, but has been reviewed by NRC management and was determined to be a finding of very low safety significance.

Inspection Report# : [2006002\(pdf\)](#)

G

Significance: Jun 29, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure To Ensure One Redundant Train of RHRSW Free of Fire Damage

The inspectors identified a NCV of 10 CFR Part 50, Appendix R, Section III.G.2, having very low safety significance (Green) involving the licensee failure to ensure, in the event of a severe fire, that one redundant train of systems necessary to achieve and maintain hot shutdown conditions was free of fire damage. Specifically, the licensee failed to ensure, in the event of a fire in Fire Areas TB-III, 13-1 or 24-1, that one redundant train of residual heat removal service water (RHRSW) remained free of fire damage. Instead the opposite unit's RHRSW train was cross-tied (i.e., an alternative SSD activity) and credited for torus cooling during hot shutdown for a III.G.2 fire area. In addition, the licensee failed to have analyses and procedures that demonstrated full compliance with all of the requirements of 10 CFR Part 50, Appendix R, Section III.G.3, and Section III.L. The licensee planned to review the options for resolving this issue and pursue the appropriate actions.

The finding was more than minor because the failure to ensure one redundant train of RHRSW was available for torus cooling for hot shutdown could have affected the mitigating systems cornerstone objective and SSD. The finding was not suitable for SDP evaluation, but has been reviewed by NRC management and was determined to be a finding of very low safety significance.

Inspection Report# : [2006002\(pdf\)](#)

G

Significance: Jun 29, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Procedure Included Unapproved Fuse Repair for Appendix R

The inspectors identified a NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instruction, Procedures, and Drawings," having very low safety significance (Green) involving inadequate procedure steps. Specifically, The licensee failed to provide adequate procedure steps in accordance with Appendix R requirements for hot shutdown and allowed the replacement (i.e., a repair) of breaker fuses prior to attaining hot shutdown. Specifically, QCNPS's Procedure QOP 6500-10 "Local Control of 4160 and 480 Volt Motor Operated Circuit Breaker," Revision 8, included a hot shutdown repair to replace any circuit breaker's control fuses that were believed to be blown due to a fire-induced failure. This fuse replacement constituted a hot shutdown repair which was not allowed by 10 CFR Part 50, Appendix R. Once identified, the licensee revised procedure QOP 6500-10 and added steps to manually close breakers using a local pushbutton.

The finding was more than minor because the failure to include adequate procedure steps could have affected the mitigating systems cornerstone objective and SSD. Performing the repair activities could have delayed and/or complicated shutdown of the plant. The finding was of very low safety significance because the licensee could have manually charged the breaker's spring and closed the breaker using the pushbutton located at the breaker.

Inspection Report# : [2006002\(pdf\)](#)

G

Significance: Jun 29, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Maintain Acceptable Pre-Fire Plans

The inspectors identified a NCV of QCNPS's license condition for fire protection, having very low safety significance (Green) involving the lack of complete and accurate information in the QCNPS's fire pre-plans for various plant fire areas. Specifically, the licensee failed to include important information in the fire pre-plans, such as hydrogen and electrical hazards, to assist the fire brigade to fight a fire within those plant fire areas.

The finding was more than minor because the failure to provide adequate warnings and guidance related to hydrogen and electrical hazards in the fire pre-plans could have adversely impacted the fire brigade's ability to fight a fire, thereby, increasing the likelihood of a fire which would challenge SSD and could have affected the mitigating systems cornerstone objective. The inspectors determined that this issue also affected the cross-cutting area of Problem Identification and Resolution because the licensee failed to identify the presence of hydrogen and oxygen hazards in

Fire Areas RB-7 and RB-19 during their review as part of the fire pre-plan improvement effort conducted as a result of previously identified corrective action (IR 00221528). The finding was of very low safety significance because of the extensive training provided to the fire brigade members to deal with unexpected contingencies.

Inspection Report# : [2006002\(pdf\)](#)

G

Significance: Jun 29, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Have a Calculation for Hose Stations That Did Not Meet Code Requirements to Ensure Adequate Water Pressure and Flow Rate

The inspectors identified a NCV of QCNPS's license condition for fire protection, having very low safety significance (Green) involving adequacy of water pressure and flow rate at standpipes with hose connections. Specifically, the licensee failed to provide calculations to ensure that an adequate water pressure and flow rate were available to meet the QCNPS's FPP requirements. The licensee planned to perform calculations to verify water flow at all affected standpipes with hose connections.

The finding was more than minor because the failure to provide an adequate water pressure and flow rate at standpipes with hose connections could hamper the fire brigades ability to fight a fire, thereby, increasing the likelihood of a fire which would challenge SSD and could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because other defense-in-depth fire protection elements remained unaffected in all fire areas.

Inspection Report# : [2006002\(pdf\)](#)

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Significance: Jun 29, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

Failure to Meet NFPA Code Requirements for Class A Fire Extinguishers

The inspectors identified a NCV of QCNPS's license condition for fire protection, having very low safety significance (Green) involving adequacy of number of Class A fire extinguishers. Specifically, the licensee failed to have an adequate number of Class A fire extinguishers available where significant fire hazards existed to meet the NFPA 10 Code requirements to suppress and/or extinguish Class A fire hazards. The licensee planned to evaluate putting more Class A fire extinguishers into the plant.

The finding was more than minor because failure to have an adequate number of Class A fire extinguishers available could potentially escalate a small fire into a larger fire since only standpipes with hose connections were available and their use required a trained fire brigade to extinguish the fire. As a result, non-fire brigade personnel would be prevented from moving quickly to suppress and/or extinguish a small fire and the potential for an escalated fire could have affected the mitigating systems cornerstone objective. The finding was of very low safety significance because most fire areas and zones have fire detectors that would alarm in the control room and the fire brigade would respond to a fire in these areas. In addition, other defense-in-depth fire protection elements remained unaffected and a fire in these areas would not result in a loss of dedicated SSD systems.

Inspection Report# : [2006002\(pdf\)](#)

G

Significance: Feb 07, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO APPLY DESIGN CONTROL MEASURES TO ENSURE ERV PILOT VALVE/ACTUATOR SUPPORT WAS ADEQUATE FOR EPU OPERATION

The inspectors identified a finding of very low safety significance and a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion III on January 15, 2006, for failure to adequately implement design control measures to ensure that the ERV assemblies were suitable for Extended Power Uprate (EPU) operations. This resulted in the licensee's failure to identify that the ERV pilot valve/actuator supports (turnbuckles) would degrade at EPU power levels. Following the January 13, 2006, Unit 2 shutdown, the licensee reported broken turnbuckle tack welds on both ends of the 3D and 3E ERVs and on one end of the 3C ERV. Inspection of the threaded portions of the 3D turnbuckle indicated significant degradation from thread fretting and thread fracture.

This finding was determined to be more than minor because if left uncorrected, the ERV turnbuckles would continue to degrade, potentially fail, and result in an inoperable ERV or inadvertent opening of the ERV due to a pilot line failure. This finding was of very low safety significance because although the Unit 2 3D ERV turnbuckle was degraded and considered to be a design deficiency, the degradation/deficiency did not result in an ERV loss of function. The inspectors concluded that this finding also affected the cross cutting area of problem identification and resolution because the licensee had performed several evaluations regarding the acceptability of equipment operation at EPU power levels and had failed to identify the ERV turnbuckle as a high stress, and potential failure, location. Corrective actions for this issue included inspecting the remaining turnbuckle tack welds, scheduling an inspection of the Unit 2 3E ERV turnbuckle during the March 2006 refueling outage, performing additional extent of condition reviews to identify other EPU vulnerable components, and addressing the organizational issues which contributed to the failure to identify the turnbuckle as a potential high stress location.

Inspection Report# : [2006009\(pdf\)](#)

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Significance: Feb 07, 2006

Identified By: NRC

Item Type: NCV NonCited Violation

INADEQUATE MAINTENANCE PROCEDURE TO INSPECT ERV ACTUATORS

The inspectors identified a finding of very low safety significance and a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion V on January 10, 2006, for failure to implement procedures appropriate to the circumstance for previous inspection and disassembly of the Unit 1 3D ERV actuator. The licensee had not identified that the ERV actuator disassembly and inspection procedures failed to include the inspection of all critical components subject to wear or loosening. This resulted in the licensee's failure to adequately inspect the ERV pivot bolts for tightness or wear. In addition to significant wear identified on the Unit 1 3D ERV pivot bolts, one of the Unit 1 3E ERV pivot bolts was found backed out and the Unit 2 3D ERV was missing one of the two pivot bolts.

This finding was determined to be more than minor because, if left uncorrected, the ERV pivot bolts would continue to degrade or loosen and could result in the failure of an ERV to actuate when required. This finding was of very low safety significance because although the results of a subsequent pivot bolt inspection indicated that some of the bolts were degraded, missing, or loose, the degradation in these instances did not result in an actual loss of system function. Corrective actions for this issue included revising the appropriate maintenance procedures, inspecting the Unit 2 pivot bolts, and installing new pivot bolts where needed.

Inspection Report# : [2006009\(pdf\)](#)



Significance: Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

FAILURE TO FOLLOW THE CODE CASE N-513 CONTROL MEASURES FOR INSPECTIONS AND TESTS

A finding of very low safety significance was identified for the failure to adequately implement code case instructions for determining the operability and extent of condition when a pipe flaw was found on the residual heat removal service water system. The failure was determined to be a Violation of 10 CFR Part 50, Appendix B, Criterion III.

The finding was more than minor because, if left uncorrected, the extent of the piping flaw geometry would not be fully understood due to a lack of inspection that could result in inappropriately concluding that equipment important to safety was operable. The finding was considered to be of very low safety significance because the licensee was able to verify that the minimum pipe wall thickness of suspect examined areas of the residual heat removal service water piping welds met the functionality requirements for system operability. Corrective actions for this issue include the extent of condition ultrasonic tests that have been completed and the weld repair of the 1D residual heat removal service water pump flaw.

Inspection Report# : [2005005\(pdf\)](#)



Significance: Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

LACK OF PROCEDURE INSTRUCTION IN PROCEDURE QCEMS 0250-11 TO EVALUATE AERO SHELL 7 GREASE FOR LUBRICANT AND THICKENER SEPARATION

A finding of very low safety significance was identified for the failure to provide adequate instruction for the application of grease as a lubricant to 480 Volt motor control center auxiliary contacts during maintenance. The failure was determined to be a Violation of 10 CFR Part 50, Appendix B, Criterion V.

The finding was more than minor because, if left uncorrected, degraded grease could be applied during maintenance activities to impact the operability, availability, reliability or safety function of a mitigating system. The finding was considered to be of very low safety significance because the finding did not result in an actual loss of a safety system function. Corrective actions for this issue included the removal of the old Aero Shell 7 grease can from the electrical maintenance shop to prevent its use and the generation of work orders to clean and re-lubricate the CR105X auxiliary contacts where white residue has been identified at various motor control center cubicles during the January through February 2005 inspection.

Inspection Report# : [2005005\(pdf\)](#)



Significance: Sep 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

MISAPPLICATION OF AERO SHELL 7 GREASE

A finding of very low safety significance was identified for failing to follow a maintenance procedure that resulted in the failure of residual heat removal valve 1-1001-26B to operate during testing. The failure was determined to be a violation of 10 CFR Part 50, Appendix B, Criterion V.

The finding was more than minor because if left uncorrected, this inappropriate maintenance practice would result in hardened grease in other auxiliary contact assemblies impacting the operability, availability, reliability, or safety function of mitigating systems. The finding was considered to be of very low safety significance because the finding did not result in an actual loss of a safety system function. Corrective actions for this issue include the auxiliary contact assemblies in the motor control center cubicle being replaced and properly lubricated with Dow Corning 44 grease.

Inspection Report# : [2005005\(pdf\)](#)

Barrier Integrity

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

[Physical Protection](#) information not publicly available.

Miscellaneous

Last modified : August 25, 2006