

## Quad Cities 2

### Initiating Events

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**Significance:** Dec 28, 2002

Identified By: Self Disclosing

Item Type: FIN Finding

#### **INADEQUATE PROCEDURE AND SELF CHECKING RESULTS IN CONNECTING AIR POWERED VACUUM TO INSTRUMENT AIR SYSTEM AND TWO AIR TRANSIENTS**

The failure to identify the proper plant air supply prior to installing moisture separator decontamination equipment (air powered vacuum) resulted in two unexpected instrument air system transients on October 14 and 15, 2002. The work package did not contain equipment identification numbers to aid in identifying the proper air supply. In addition, the individual instructed to identify the air supply failed to perform self-checking activities that could have identified the inappropriate selection of instrument air for the equipment installation rather than service air. This finding was more than minor because it affected the loss of instrument air initiating event frequency. The finding was of very low safety significance because the exposure time was short and all mitigating systems needed to address a loss of instrument air were available. No violation of NRC requirements occurred due to the instrument air system being non-safety-related.

Inspection Report# : [2002008\(pdf\)](#)

G

**Significance:** Dec 20, 2002

Identified By: NRC

Item Type: FIN Finding

#### **Failure to Recognize and Address High Vibration Indications on Plant Equipment**

Green. The inspectors identified a Green finding due to the licensee's failure to recognize and address high vibration indications on plant equipment. On April 2, 2002, a Unit 2 main steam drain line broke due to high vibrations. The pipe break occurred down stream of the main steam isolation valves in a non-safety-related portion of the main steam piping. The issue was more than minor, in that if the vibrations were not corrected (on both units) they could become a more significant safety concern. However, due to the location of the actual break, the issue was determined to be of very low safety significance. This issue was not subject to NRC enforcement since the break occurred in a non-safety-related portion of the main steam line and did not impact the operation of safety-related equipment (Section 40A2.1.b1).

Inspection Report# : [2003002\(pdf\)](#)

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**Significance:** Sep 30, 2002

Identified By: Self Disclosing

Item Type: FIN Finding

#### **UNEXPECTED CHANGES IN UNIT 2 OPERATING PARAMETERS AND DRYER FAILURE DUE TO FLOW INDUCED VIBRATION.**

The failure to consider the impact of new flow induced vibration failure mechanisms on the Unit 2 steam dryer as part of the extended power uprate analysis resulted in unexpected and unpredictable changes in reactor power, reactor vessel level, reactor pressure, and main steam line flow between June 7 and July 11, 2002. The licensee subsequently determined that the changes in Unit 2 operating parameters were caused by the failure of a Unit 2 steam dryer cover plate. This finding was more than minor because the changes in Unit 2 operating parameters caused by the degraded dryer created conditions which increased the likelihood of a plant transient. However, this finding was of very low risk significance because the changes in plant parameters and the dryer failure did not contribute to the likelihood of a primary or secondary loss of coolant accident initiator, did not contribute to the likelihood of a reactor trip with mitigating equipment not available, and did not increase the likelihood of a fire or an internal or external flood. There were no violations of NRC requirements due to the steam dryer being non-safety related.

Inspection Report# : [2002007\(pdf\)](#)

G

**Significance:** Jun 30, 2002

Identified By: Self Disclosing

Item Type: FIN Finding

#### **INADEQUATE DIGITAL FEEDWATER SYSTEM DESIGN AND INADVERTENT GROUNDING OF PLANT EQUIPMENT RESULTS IN REACTOR SCRAM**

A digital feedwater control system design weakness, in conjunction with the inadvertent grounding of a pressure transmitter during an instrument maintenance surveillance, resulted in a manual reactor scram due to increasing reactor vessel water level. The inspectors determined that this issue was of very low safety significance because the feedwater system would have been recoverable following a Level 8 isolation

signal, and adequate mitigating systems equipment remained available to place and maintain the plant in a stable condition.

Inspection Report# : [2002005\(pdf\)](#)



**Significance:** Jun 30, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO PARTICIPATE IN TURNOVER CONTRIBUTES TO MANUAL REACTOR HEAD VENT ISOLATION VALVES BEING LEFT OPEN DURING UNIT STARTUP**

A lack of communications between operations personnel and an administrative senior reactor operator's failure to participate in a formal shift turnover resulted in operations personnel commencing a Unit 2 reactor startup with the manual reactor head vent isolation valves in the open position. The failure to participate in a turnover was considered a Non-Cited Violation of Technical Specification 5.4.1. The inspectors determined that this issue was of very low safety significance because the leak created by the open manual reactor head vent isolation valves was small, and adequate mitigating equipment was available to respond to a potential transient condition.

Inspection Report# : [2002005\(pdf\)](#)

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## Mitigating Systems



**Significance:** Dec 28, 2002

Identified By: Self Disclosing

Item Type: FIN Finding

**INADEQUATE DESIGN LEADS TO DELAY IN DISCOVERING SAFE SHUTDOWN MAKEUP PUMP WAS INOPERABLE DUE TO STRAINER CLOGGING**

A self-revealing failure occurred on October 16, 2002, when the safe shutdown makeup pump room cooler strainer became clogged with duck weed. The inspectors determined that twice per shift rounds to verify strainer operability and multiple strainer cleanings were not effective in ensuring continued operability of this equipment. In addition, control room personnel were not immediately notified of the clogged strainer via a control room alarm or a local alarm due to a system design deficiency. This finding was more than minor because the strainer clogging impacted the operability of the safe shutdown makeup pump which can be used when responding to initiating events. In addition, the system design issues created a situation where operations personnel were unaware of equipment operability issues. This finding was of very low safety significance because the total exposure time was short, all other mitigating systems were available, and the safe shutdown makeup pump could have been recovered if needed. No violation of NRC requirements occurred due to the safe shutdown makeup only being of augmented quality per the licensee's Quality Assurance Report.

Inspection Report# : [2002008\(pdf\)](#)



**Significance:** Dec 28, 2002

Identified By: Self Disclosing

Item Type: FIN Finding

**INADEQUATE PROCEDURE AND COMMUNICATION WEAKNESSES LEADS TO EMERGENCY DIESEL GENERATOR INOPERABILITY**

During the 1A stator water heat exchanger tube bundle replacement on November 11, 2002, approximately 200 gallons of water were released as the tube bundle was pulled from the heat exchanger. The water migrated to the Unit 1 emergency diesel generator room below and tripped the circulating oil pump and turbocharger lubricating oil pump rendering the diesel inoperable. The work package used to perform the work did not contain information regarding the large amounts of water that may be present in the heat exchanger. In addition, information regarding the amount of water present in the heat exchanger was not communicated to the contractors performing the work even though this information was well known by operations and maintenance personnel. This finding was more than minor because the inadequate work instructions and poor communications resulted in a situation which impacted the operability, availability, and reliability of the emergency diesel generator. The finding was of very low safety significance since the loss of the emergency diesel generator did not result in an actual loss of safety function of a system and did not result in an actual loss of safety function of a single train for greater than the Technical Specification Allowed Outage Time. No violations of NRC requirements were identified due to the stator water heat exchanger being non-safety-related.

Inspection Report# : [2002008\(pdf\)](#)



**Significance:** Dec 28, 2002

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

**HUMAN PERFORMANCE AND PROBLEM IDENTIFICATION AND RESOLUTION RESULTS IN FAILURE TO DISCOVER IMPACT OF LOOSE LEAD ON RESIDUAL HEAT REMOVAL INOPERABILITY**

A loose wire caused a condition that would have resulted in the failure of the 2B residual heat removal system to automatically start when required and would have resulted in the diversion of water from the 2A residual heat removal system if an emergency core cooling system actuation signal was received while the 2B residual heat removal system was operating in torus cooling. One Non-Cited Violation of Technical Specification 3.5.1 was identified. The licensee determined that the wire was loosened during the February 2002 refueling outage. The impact of the loose wire was not addressed until October 2002 even though unexpected equipment performance was experienced on three previous occasions. This finding was more than minor since the loose wire impacted the operability, availability, reliability, and capability of the residual heat removal system. The finding was determined to be of very low risk significance since the both trains of the residual heat removal system were recoverable using simple operator actions and all remaining mitigating systems equipment were available.

Inspection Report# : [2002008\(pdf\)](#)



**Significance:** Dec 20, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," Related to the Quality of Design Basis Engineering Calculations**

Green. The inspectors identified a Green Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," related to the quality of design basis engineering calculations. Specifically, the inspectors identified that instrument and test uncertainty was not considered in a number of design calculations, such that the calculation acceptance limits could not be validated. The diesel generator cooling water (DGCW), high pressure coolant injection (HPCI), and reactor core isolation cooling (RCIC) system design bases were not being adequately controlled by existing calculations. This finding was considered greater than minor because a loss of design control could affect the reliability of the DGCW, HPCI and RCIC systems to perform their safety functions. Because no operability concerns were identified, the issue was determined to be of very low safety significance (Section ).

Inspection Report# : [2003002\(pdf\)](#)



**Significance:** Sep 30, 2002

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

**FAILURE TO HAVE APPROPRIATE BEARING FIT-UP AND MOTOR LUBRICATION INSTRUCTIONS**

Inadequate bearing fit-up measurement and motor lubrication instructions resulted in a self-revealing failure of the 1A core spray and reactor core isolation cooling room cooler fan inboard motor bearings and a Non-Cited Violation of Technical Specification 5.4.1. The inspectors determined that this finding was more than minor because the improper bearing fit-up and lubrication instructions impacted the availability, reliability, and capability of equipment used to support risk significant mitigating equipment. The failure of the 1A core spray and reactor core isolation cooling room cooler was of low risk significance because the failure was not caused by a design or qualification deficiency, did not result in an actual loss of safety function for the core spray or reactor core isolation cooling systems, and did not screen as potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event.

Inspection Report# : [2002007\(pdf\)](#)



**Significance:** Sep 30, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO ADEQUATELY CORRECT MULTIPLE FAILURES OF THE 2A RHR NORMAL/ALTERNATE SWITCH**

Ineffective corrective actions resulted in repetitive failures of the 2A residual heat removal normal/alternate switch between June 1999 and September 2002 and a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XVI. The failure to correct the multiple normal/alternate switch failures was more than minor because the switch failures impacted the availability, reliability, and capability of equipment used to respond to initiating events and prevent undesirable consequences from a plant fire. This finding was of very low risk significance because the switch failures did not result in an actual loss of function for the residual heat removal system. The switch failures also failed to screen as a risk significant fire issue because the room cooler was not needed until 52 hours after a fire which provided the licensee adequate time to correct the failure.

Inspection Report# : [2002007\(pdf\)](#)



**Significance:** Sep 30, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO DOCUMENT AN OVERGREASING ISSUE IN THE CORRECTIVE ACTION PROGRAM AND TAKE ACTION TO ADDRESS THE EXTENT OF CONDITION**

The licensee failed to follow procedural requirements regarding the initiation of condition reports and determining the extent of condition following the discovery of a large amount of grease in the 1A core spray room cooler motor. As a result, the licensee did not provide a basis for continued operability of potentially impacted plant motors for approximately 40 days. This finding was more than minor because the licensee's

lack of action resulted in the inability to ensure the availability and reliability of mitigating systems equipment used to respond to initiating events and prevent undesirable consequences. The inspectors determined that this finding was of very low risk significance because subsequent reviews determined that even if the motors susceptible to overgreasing failed, the motors are not credited in the licensee's probabilistic risk assessment.

Inspection Report# : [2002007\(pdf\)](#)

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**Significance:** Jun 30, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO PERFORM REQUIRED PARTS EVALUATION FOR CONTROL ROD DRIVE ACCUMULATOR CLAMPS**

The inspectors identified a design deficiency and a Non-Cited Violation in that licensee personnel failed to perform a parts evaluation when installing hose clamps on the control rod drive system hydraulic accumulators instead of the seismically-qualified steel band clamps. This issue was of very low safety significance because the design deficiency did not result in a loss of function as described in Generic Letter 91-18, "Resolution of Degraded and Non-Conforming Conditions and on Operability."

Inspection Report# : [2002005\(pdf\)](#)

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**Significance:** Jun 30, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO MEET 10 CFR 50.62 DUE TO RELIEF VALVES LIFTING**

The inspectors documented a Non-Cited Violation of 10 CFR 50.62, "Anticipated Transient Without Scram Rule," due to the potential to lift the standby liquid control system relief valves during an anticipated transient without scram. The inspectors determined that this finding was of very low safety significance because the standby liquid control system could be recovered during an anticipated transient without scram event, the cycling of the relief valves would allow a portion of the sodium pentaborate solution to be injected into the reactor vessel, and the plant remained within the acceptance criteria of the original anticipated transient without scram analyses during the relief valve lifts.

Inspection Report# : [2002005\(pdf\)](#)

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**Significance:** Mar 31, 2002

Identified By: Self Disclosing

Item Type: FIN Finding

**CATASTROPHIC FAILURE OF 2B CONTROL ROD DRIVE PUMP**

On January 24, 2002, a catastrophic failure of the 2B control rod drive pump occurred approximately 4 days after conducting maintenance. The pump failure was caused by the inadequate lubrication of the inboard pump bearing due to the inappropriate setting of a constant level oiler. The root cause was that the constant level oiler was set approximately 15/64 of an inch lower than the specified setting due to maintenance personnel using a previously painted oil level reference line on the pump casing rather than a more exact installation method. No violations of NRC requirements were identified as a result of this event due to the control rod drive system being non-safety related. The finding was of very low safety significance. Although the finding represented an actual loss of safety function of one train of non-Technical Specification equipment designated as risk significant by the maintenance rule for greater than 24 hours, all remaining mitigating equipment remained available to respond to potential transients.

Inspection Report# : [2002004\(pdf\)](#)

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**Significance:** Mar 31, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO ADEQUATELY DETERMINE CAUSE OF SBLP PUMP TRIP AND TAKE CORRECTIVE ACTION**

The inspectors identified a Non-Cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to determine the cause of a 1995 2A standby liquid control pump trip and take corrective actions to preclude repetition. On February 15, 2002, during surveillance test actuations of the standby liquid control system explosive valves, the continuity of the firing circuit remained intact. Fragments contacted the standby liquid control system piping creating a circuit path to ground. The existence of a previously unidentified independent ground at a different point in the control circuitry created a condition where the voltage was not adequate to support continued system operation and the 2A standby liquid control pump tripped. The 2A standby liquid control pump tripped during the performance of the same surveillance procedure in 1995. Following the February 2002 pump failure, the licensee determined that troubleshooting performed in 1995 was inadequate in that it failed to identify the actual cause of the pump trip. The finding was of very low safety significance because the 2B train of the standby liquid control system was unaffected by this issue and all remaining mitigating equipment was available to respond to an anticipated transient without scram event.

Inspection Report# : [2002004\(pdf\)](#)

G**Significance:** Mar 31, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO ESTABLISH MEASURES TO ASSURE THAT ITEMS WERE CORRECTLY TRANSLATED INTO SPECIFICATIONS**

The inspectors identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III for failure to establish measures to assure that items such as thermal effects and the compatibility of materials were correctly translated into specifications for the Unit 2 emergency diesel generator fuel oil transfer system. On May 1, 2001, and May 3, 2001, a solenoid valve in the Unit 2 emergency diesel generator fuel oil transfer system failed to open approximately 12 hours after the start of the emergency diesel generator 24-hour endurance test. The solenoid valve failure was due to thermal pressurization of an isolated section of fuel oil transfer system discharge piping. The finding was of very low safety significance because the Unit 2 station blackout diesel generator was not impacted by this design issue, actions to manually fill the fuel oil day tank were proceduralized such that recovery of the emergency diesel generator should be successful, and alternative mitigating equipment was available to respond to a potential loss of offsite power.

Inspection Report# : [2002004\(pdf\)](#)G**Significance:** Feb 01, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to adequately address the erosion of the RHRSW room coolers' supply piping**

Green. The inspectors identified a failure to promptly identify and correct conditions adverse to quality involving the erosion of safety-related residual heat removal service water piping. The licensee's corrective actions for the piping leak included replacing the affected piping and performing ultrasonic testing on similar piping for the other trains. During this inspection, NRC inspectors identified that the corrective actions were inadequate in that the ultrasonic testing was not able to examine the area of the piping affected by the erosion as evidenced by the subsequent failure. This finding was determined to be of very low safety significance because the equipment was still capable of performing its intended safety function. A Non-Cited Violation of 10CFR 50 Appendix B, Criterion XVI was identified.

Inspection Report# : [2001015\(pdf\)](#)

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## Barrier Integrity

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## Emergency Preparedness

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## Occupational Radiation Safety

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## Public Radiation Safety

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## Physical Protection

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## Miscellaneous

**Significance:** N/A Dec 20, 2002

Identified By: NRC

Item Type: FIN Finding

**Corrective Action Program Generally Effective in Ensuring that Conditions Adverse to Quality were Being Adequately Addressed**

Although issues were generally entered into the corrective action process at an appropriate level, there were times when opportunities to identify issues were missed due to a narrow focus. This led to issues either being self-revealing or being identified by outside organizations. Several of these issues resulted in plant shutdowns. Minor issues were generally properly categorized and evaluated. However, there were a number of examples where it appeared that the initial evaluation was limited and narrowly focused. These examples tended to be non-routine and involved multiple organizations and layers of management. In general, the licensee effectively corrected plant problems. On the positive side, the inspectors noted that Nuclear Oversight appeared to be an effective source for identifying performance issues and that plant employees, in general, indicated a strong willingness to report problems "to the highest levels." The inspectors concluded that corrective action program was generally effective in ensuring that conditions adverse to quality were being adequately addressed

Inspection Report# : [2003002\(pdf\)](#)

Last modified : March 25, 2003