

## Quad Cities 2

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### Initiating Events

**Significance:**  Jun 30, 2002

Identified By: NRC

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\(pdf\)](#)

**Significance:**  Dec 29, 2001

Identified By: NRC

Item Type: FIN Finding

#### **DEGRADED AND INADEQUATELY TESTED TRANSFORMER AND PROTECTIVE RELAYING RESULTS IN INCREASE IN TRANSIENT AND LOSS OF OFFSITE POWER INITIATING EVENT FREQUENCIES**

On August 2, 2001, Unit 2 experienced a transformer failure, reactor scram, and loss of offsite power. The inspectors determined that a lightning strike in conjunction with age related degradation and inadequate testing of the Unit 2 main power transformer and switchyard protective relaying contributed to the event and resulted in an increase in the initiating event frequency for plant transients and a loss of offsite power. The inspectors determined the risk significance of this issue to be very low since all remaining mitigating systems were available to mitigate the transformer rupture, reactor scram, and loss of offsite power.

Inspection Report# : [2001017\(pdf\)](#)

**Significance:**  Mar 31, 2001

Identified By: Licensee

Item Type: NCV NonCited Violation

**Operator-induced loss of feedwater heating transient**

On March 23 the inspectors reviewed an operator-induced loss of feedwater heating transient that occurred on Unit 2. The inspectors found that the operators failed to immediately recognize a reduction in feedwater heating and take prompt action to effectively control the increasing reactor power. The transient resulted in a 33 degree decrease in feedwater inlet temperature adding sufficient positive reactivity to increase reactor thermal power from 2511 to 2578 megawatts, approximately 102.7 percent of maximum licensed power. Exceeding Quad Cities License DPR-30 maximum thermal power of 2511 megawatts thermal was considered a Non-Cited Violation. The risk significance of this event was determined to be very low (Green) due to the relatively small increase a 2.7 percent power change will have on overall core thermal limits (Section 1R14).

Inspection Report# : [2001005\(pdf\)](#)

**Significance:**  Aug 15, 2000

Identified By: NRC

Item Type: FIN Finding

**Electrical ring bus caused electrical circuit breakers 1-3 and 3-4 to open.**

On July 18 a fault on one of the offsite power feeds to the Quad Cities electrical ring bus caused electrical circuit breakers 1-3 and 3-4 to open. This action isolated the fault and resulted in a Unit 2 turbine generator and reactor trip. The response by the switchyard resulted in a loss of power on the Unit 1 reserve auxiliary transformer. The response to the reactor scram on Unit 2 was as designed. Operator performance during this event was determined to have been acceptable. The inspectors reviewed the risk significance of this initiating event for both units using the Significance Determination Process. All mitigating equipment was available for Unit 2 following the uncomplicated trip, and this event was screened as having very low risk significance (GREEN.) One of two auxiliary transformers for Unit 1 was de-energized during the event, but the unit did not trip and all mitigating equipment was available. Therefore, this event was also screened as GREEN for Unit 1.

Inspection Report# : [2000011\(pdf\)](#)

**Significance:**  Jun 30, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**adjustments to the wrong instrument, causing a reactor trip on Unit 2**

On May 5 an instrument technician performing a calibration of the main steam line high steam flow detectors made adjustments to the wrong instrument, causing a reactor trip on Unit 2. Failure to implement the calibration procedure for the proper channel instrument was considered an NCV of Technical Specification 6.8.A.1. The safety significance of this event was minimal due to the availability of mitigating equipment (Section 4OA.3).

Inspection Report# : [2000007\(pdf\)](#)

**Significance:**  Jun 30, 2000

Identified By: NRC

Item Type: FIN Finding

**operators did not control reactor vessel inventory**

During operator response to a reactor trip on May 22, operators did not control reactor vessel inventory prior to the operating reactor feedwater pump tripping on high reactor vessel water level. Additionally, operators had not started a

reactor feedwater pump by the time a reactor low level condition existed. This resulted in a second engineered safety feature actuation. The inspectors reviewed this issue using the significance determination process for a transient with a loss of feedwater and determined this was of very low risk significance (Section 1R14).

Inspection Report# : [2000007\(pdf\)](#)

**Significance:**  Jun 30, 2000

Identified By: Self Disclosing

Item Type: NCV NonCited Violation

### **Maintenance work and emerging work - 2B reactor water cleanup pump seal line disconnect**

On June 10, maintenance workers disconnected a seal line to the 2B reactor water cleanup pump that was not properly isolated by the out-of-service tagout and discovered that the line was pressurized to about 1000 psig. The resulting spray caused a spread of contamination in the room and a potential hazard to the workers. No personnel injuries occurred as a result of this event. Failure to hang the proper out-of-service for the maintenance activity was considered a Non-Cited Violation (NCV) of Technical Specifications. The inspectors considered this event of very low safety significance due to the ability to isolate the leak and the availability of mitigating equipment (Section 1R13).

Inspection Report# : [2000007\(pdf\)](#)

**Significance:**  Feb 29, 2000

Identified By: NRC

Item Type: FIN Finding

### **Ice Melt Valve Failure**

Failure of the ice melt valve on January 22, 2000, resulted in some ice formation in the intake area. Operator detection and compensatory measures prevented the ice from affecting the water level in the intake. The valve gate had become detached from the stem. The failure of the ice melt valve was of very low risk significance because it did not result in an increased initiating event frequency for loss of both normal and ultimate heat sinks. The inspectors compared an estimated valve failure rate to the licensee's evaluation. The licensee's evaluation excluded this initiating event from the probabilistic risk assessment because no precursor event had occurred in the history of the station.

Inspection Report# : [2000001\(pdf\)](#)

**Significance:**  Sep 08, 1999

Identified By: NRC

Item Type: FIN Finding

### **Maintenance rule functional failures**

Problematic feedwater level control equipment on Unit 2 resulted in two reactor vessel water level transients in early 1999. The licensee initially evaluated these two events as not being maintenance rule functional failures, which was inappropriate. An NRC inspection and a subsequent licensee self-assessment identified the error. The licensee re-evaluated the two transients as being functional failures on July 28, 1999. This issue did not increase the frequency of initiating events and therefore was an issue of very low safety significance (Section 1R12).

Inspection Report# : [1999018\(pdf\)](#)

**Significance:**  Jul 20, 1999

Identified By: NRC

Item Type: FIN Finding

### **a 3-inch increase in reactor water level**

On Unit 2, a 3-inch increase in reactor water level occurred and required operators to take manual control of the

system. Various failures in the level control systems have resulted in about ten similar events since January 1, 1999, in which operators were required to intervene to prevent level transients that could have resulted in a reactor trip. Since the plant effect of the failures is limited to an uncomplicated reactor trip, the failures were considered to be of low risk significance using the significance determination process (Section 1R03).

Inspection Report# : [1999011\(pdf\)](#)

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## Mitigating Systems

**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\(pdf\)](#)

**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\(pdf\)](#)

**Significance:**  Mar 31, 2002

Identified By: NRC

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\(pdf\)](#)

**Significance:**  Mar 31, 2002

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO ADEQUATELY DETERMINE CAUSE OF SBLC 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\(pdf\)](#)

**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\(pdf\)](#)

**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\(pdf\)](#)

**Significance:** N/A Nov 15, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO FOLLOW OPERATOR REQUALIFICATION PROGRAM PROCEDURAL REQUIREMENTS**

No color. The inspectors identified a Non-Cited Violation wherein the facility licensee had failed to follow procedural requirements to evaluate a senior reactor operator (SRO) licensed individual in an SRO licensed position during the year 2001 annual licensed operator requalification examination (10 CFR 55.59). The finding was of very low safety significance because the SRO licensed individual held an "inactive" SRO license (i.e., would not be assigned to licensed duties unless his license was restored to an active status in accordance with 10 CFR 55.53).

Inspection Report# : [2001016\(pdf\)](#)

**Significance:**  Nov 15, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO MEET 10 CFR 50.65 REQUIREMENTS**

On October 24, 2001, the inspectors determined that the licensee failed to count Unit 1 and Unit 2 battery room ventilation system air handling unit drive belt failures as maintenance preventable functional failures and repeat maintenance preventable functional failures where appropriate. The licensee's incorrect assessment of these equipment failures resulted in a failure to develop and implement appropriate action plans for the battery room ventilation systems on Units 1 and 2, assess the Unit 2 battery room ventilation system for (a)(1)classification, and monitor the performance of the systems against licensee-established goals. The failure to properly implement maintenance rule requirements was considered a Non-Cited Violation of 10 CFR 50.65. The risk significance of the issue was determined to be of very low safety significance because the batteries supported by the battery room ventilation systems did not experience an actual loss of safety function.

Inspection Report# : [2001016\(pdf\)](#)

**Significance:**  Sep 30, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO VERIFY ADEQUATE FILL OF THE HIGH PRESSURE COOLANT INJECTION SYSTEM AS REQUIRED BY TECHNICAL SPECIFICATIONS**

On December 27, 2000, the licensee discovered that the high pressure coolant injection system was not filled with water from the pump discharge valve to the system isolation valve following maintenance activities. Technical Specification Surveillance Requirement 4.5.A.1.a.1 required the licensee to verify that the high pressure coolant injection system was filled with water every 31 days. The inspectors determined that greater than 31 days had elapsed since the licensee had verified that the high pressure coolant injection system was properly filled. The failure to perform the surveillance requirement within 31 days also resulted in the high pressure coolant injection system being inoperable for greater than the Technical Specification 3.5.A.3.a.3 allowed outage time of 14 days. The failure to meet the requirements of Technical Specification 3.5.A.3.a.3 and Surveillance Requirement 4.5.A.1.a.1 was considered a Non-Cited Violation. The risk significance of this event was determined to be very low since all remaining mitigation systems were available to provide water to the reactor during an event.

Inspection Report# : [2001014\(pdf\)](#)

**Significance:**  May 16, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to meet requirement of 10 CFR 50.59.**

On June 15, 2000, station personnel removed two of the three rainbow pumps from the site. Quad Cities Updated Final Safety Analysis Report, Section 9.2.5, specifies that portable pumps (called rainbow pumps) of sufficient capacity (5100 gallons per minute) are onsite to provide makeup water to the ultimate heat sink in the event of a Lock and Dam 14 failure on the Mississippi River. The inspectors determined that the licensee had made a change to the facility as described in the Quad Cities Updated Final Safety Analysis Report without first determining if the change required a license amendment, contrary to the requirements of 10 CFR 50.59. The failure to meet the requirements of 10 CFR 50.59 was considered a Non-Cited Violation. The risk significance of this event was determined to be very low due to the very small initiating event frequency of the lock and dam failure, the slow rate of event progression once the initiating event occurs, and the availability of other onsite sources of water not credited in the event analysis.

Inspection Report# : [2001008\(pdf\)](#)

**Significance:**  Mar 31, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**Surveillance testing involving timing of the Unit 1 and Unit 2 emergency diesel generators shortly after the engines had been shut down from previous runs**

Inspectors identified that on two occasions, March 9 and March 27, the licensee performed technical specification required surveillance testing involving timing of the Unit 1 and Unit 2 emergency diesel generators shortly after the engines had been shut down from previous runs. Station procedures were inadequate in prescribing the conditions for performance of the tests. Procedures did not prevent preconditioning of the air start systems, fuel systems, and other engine and electrical components. Inadequate procedures for testing was considered a Non-Cited Violation of 10 CFR Appendix B, Criterion V, "Instruction Procedures and Drawings." The risk significance was very low (Green) because inspectors determined that testing practices had not led to declining performance of the diesel generators (Section 1R22).

Inspection Report# : [2001005\(pdf\)](#)

**Significance:**  Dec 31, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Place the "A" Train of the Reactor Protection System in the Tripped Condition**

On November 6, 2000, the Number 2 turbine control valve fast closure trip failed to cause a half scram as expected during a Unit 2 surveillance test. The licensee then repeated the test three more times and the fast closure trip successfully caused the expected half scram each time. The licensee declared the trip function operable without taking the actions of Technical Specification 3.1.A, Action 1 for an inoperable channel. Generic Letter 91-18 states that repetitive testing to achieve acceptable results without first identifying and correcting the root cause of any problem is not an acceptable means for verifying operability. A subsequent autopsy of the pressure switch for the control valve fast closure trip found evidence of fretting which produced metallic particles believed to have caused the initial failure. The inspectors determined the Number 2 turbine control valve fast closure trip had been declared operable without adequate justification. The failure to implement the required actions of Technical Specification 3.1.A-1 for an inoperable channel of the turbine control valve fast closure trip was considered a Non-Cited Violation (50-265/00-20-01). The finding was determined to be of very low safety significance due to the level of redundancy and diversity of the reactor protection system. During the period of time that the Number 2 turbine control valve fast closure trip was inoperable, a sufficient number of turbine control valve fast closure channels remained operable to result in an

automatic scram, if required. Additionally, the turbine control valve fast closure trip is considered an anticipatory trip and, if inoperable, the reactor scram could still have been initiated by the reactor vessel high pressure or the average power range monitor high flux trips.

Inspection Report# : [2000020\(pdf\)](#)

G

**Significance:** Dec 15, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Seal Tops of Electrical Cabinets**

The team identified that electrical cabinets in the auxiliary electric equipment room were not sealed at the top to protect equipment from water damage. The failure to seal the top of the cabinets was considered a Non-Cited Violation (NCV 50-254/00-16-01; NCV 50-265/00-16-01) of Operating Licenses DPR-29 and DPR-30, Section h.3.F (Section 1R05.2.b.1). The failure to seal the cabinets, a fire protection feature, involved very low risk (Green) because a fire protection defense-in-depth element, as described by MC 0609, Appendix F, Fire Protection Significance Determination Process, was not affected.

Inspection Report# : [2000016\(pdf\)](#)

G

**Significance:** Dec 15, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Provide Fire Stops in Cable Trays**

The team identified that fire stops were not installed in divisional cable trays for which specified separation had not been maintained. The failure to install fire stops was considered a Non-Cited Violation (NCV 50-254/00-16-02; NCV 50-265/00-16-02) of Operating Licenses DPR-29 and DPR-30, Section H.3.F (Section 1R05.2.b.2). The failure to install fire stops, a fire protection feature, involved very low risk (Green) because a fire protection defense-in-depth element, as described by MC 0609, Appendix F, Fire Protection Significance Determination Process, was not affected.

Inspection Report# : [2000016\(pdf\)](#)

G

**Significance:** Nov 20, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Surveillance testing for torus temperature instrumentation components required by Technical Specification 4.2.F.1 had not been performed since installation in 1990 and 1991.**

On October 4, 2000, the licensee identified that surveillance testing for torus temperature instrumentation components required by Technical Specification 4.2.F.1 had not been performed since installation in 1990 and 1991. Condition Report Q2000-03512 was written to address the issue. Failure to perform testing of the instrumentation was considered a Non-Cited Violation of Technical Specification 4.2.F.1 (Section 4OA3). Failure to check instrument accuracy by this 18-month surveillance for Unit 1 and Unit 2 involved very low risk because when the surveillance was subsequently performed, instrument accuracy of the temperature indication loop was within acceptable tolerance.

Inspection Report# : [2000015\(pdf\)](#)

G

**Significance:** Sep 30, 2000

Identified By: NRC

Item Type: FIN Finding

#### **Inadequate operability documentation forms for Problem Identification Form Q2000-2372, regarding a design**



**deficiency for Units 1 and 2 high pressure coolant injection motor speed changers**

The inspectors found that the July 3 and August 23, 2000 supporting operability documentation forms for Problem Identification Form Q2000-2372, regarding a design deficiency for Units 1 and 2 high pressure coolant injection motor speed changers, did not adequately support the operability of the system. Inspectors reviewed the risk significance of the motor speed changer being inoperable and found the risk to be very low (GREEN) since the change to core damage frequency was less than E-6/year. In addition, operators were briefed on the potential problems with the system, and the licensee installed design changes to correct the problem on both units (Section 1R15).

Inspection Report# : [2000014\(pdf\)](#)



**Significance:** Sep 30, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**Degraded condition of fire door 128**

On September 15, the inspectors determined that the bottom latch in the inactive leaf of door 128, a 3-hour rated fire door, was not properly latched. The fire protection engineer determined that the degraded door also resulted in the inoperability of the emergency diesel generator room carbon dioxide fire suppression system. This finding constituted a violation of Quad Cities Operating Licensee DPR-29. This violation is being treated as a Non-Cited Violation (50-265/00-14-01), consistent with Section VI.A.1 of the May 1, 2000, Enforcement Policy (Section 1R05). The inspectors evaluated the degraded condition of fire door 128 using the fire protection Significance Determination Process, and evaluation techniques discussed with Senior Risk Analysts and Fire Protection Engineers in Region III and NRR. Since the degradation of the fire door was minimal, and the area of the turbine building directly in front of the door (within 15 to 20 feet) was relatively free of combustibles and cables, the inspectors determined that the possibility of a fire in the Unit 2 emergency diesel generator room spreading to damage the shared emergency diesel generator was not credible. Therefore the significance of this finding was considered very low (GREEN).

Inspection Report# : [2000014\(pdf\)](#)



**Significance:** Sep 30, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to implement modifications to correct a previously identified design deficiency which could have made the motor speed changer inoperable in accident situations**

Inspectors found that the licensee failed to implement modifications to correct a previously identified design deficiency which could have made the motor speed changer inoperable in accident situations. The failure to implement corrective actions for this condition was a violation of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." This violation is being treated as a Non-Cited Violation (50-254/00-14-02; 50-265/00-14-02), consistent with Section VI.A.1 of the May 1, 2000, Enforcement Policy. The inspectors found that the risk significance for internal and external events was very low (GREEN) since unavailability of the high pressure coolant injection system resulted in a change to core damage frequency of less than E-6/year. The licensee implemented modifications on both units to correct the design deficiency (Section 1R15).

Inspection Report# : [2000014\(pdf\)](#)

**Significance:** N/A Sep 15, 2000

Identified By: NRC

Item Type: FIN Finding

**WHITE Performance Indicators for Units 1 and 2 Safety System Functional Failures**

The licensee's August 14, 2000, root cause report for the high number of safety system functional failures on both units listed three root causes: inadequate knowledge of complex systems, a system vice functional focus, and inadequate integration of the new NRC inspection program into the station's processes. Corrective actions listed by the licensee

included: Maintenance department clarification of expectations for troubleshooting, Engineering department revision of a troubleshooting procedure to require formal troubleshooting plans, Regulatory Affairs requirement for root cause evaluation of any performance indicator which is "threatened" (less than 50 percent margin to the WHITE threshold), Regulatory Affairs requirement for root cause evaluations to include a section on cumulative effects of the system failure on a "threatened" performance indicator, Regulatory Assurance modification of corrective action program to implement root cause requirements for a "threatened" performance indicator, Plant Health Committee requirement for monthly review of performance indicators, development or revision of process to address a cumulative focus on NRC Mitigating Systems Cornerstone and functional health, Engineering action to expand use of formal troubleshooting techniques and enhance troubleshooting skills and troubleshooting procedure. The inspectors found no current concerns with the individual root cause reports for these issues. Inspectors validated the licensee assertion that poor troubleshooting and poor root causes were an issue at Quad Cities. Two of the ten events from the individual root cause evaluations were repeats of earlier events, and the root cause efforts were not effective initially. Inspectors found weaknesses in the overall root cause report for the multiple safety system functional failures as follows: • The overall root cause evaluation failed to incorporate one of two February 2000 events. Human performance events did not get full coverage in the overall root cause, some events for the safety system functional failures involving human performance were not included. • The evaluation was focused on problems which would cause an NRC performance indicator change, and to a lesser amount on why such a large number of failures were occurring at Quad Cities. The report listed actions to review another method for trending cumulative impact of failures, but another method was not ready for review at the end of the inspection. The inspectors determined that the licensee's search for similar failures focused on the recently instituted category of "performance indicator" and thereby eliminated a number of previous safety system functional failures that occurred in 1997 and 1998. • The corrective action for troubleshooting failed to incorporate the operations department, and only focused on maintenance and engineering. Although the licensee did not entirely agree with all of the weaknesses identified by the inspectors, nevertheless, the licensee revised several of the root cause evaluations to ensure appropriate actions were developed to address the inspector's concerns.

Inspection Report# : [2000013\(pdf\)](#)



**Significance:** Sep 15, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**One corrective action problem was found on August 16, 2000, and involved a previously identified design deficiency with the high pressure coolant injection system**

One corrective action problem was found on August 16, 2000, and involved a previously identified design deficiency with the high pressure coolant injection system. Problem Identification Form Q1997-04485 documented that the auto initiation signal for high pressure coolant injection did not electrically seal in as described in the updated final safety analysis. However, the tracking item for correcting this problem was closed without corrective action being completed. Condition Report Q2000-02954 was written to again track corrective actions to this problem. This was considered a Non-Cited Violation (NCV) of Criterion XVI, "Corrective Action," of 10 CFR 50, Appendix B. Inspectors considered this problem to be of very low risk significance (GREEN) since it would not have prevented the system from starting automatically or being initiated manually.

Inspection Report# : [2000013\(pdf\)](#)



**Significance:** Aug 15, 2000

Identified By: NRC

Item Type: FIN Finding

**Contribution of fire risk to core damage frequency associated with the safe shutdown makeup pump discharge valve being in a degraded condition.**

On July 19 during a regulatory conference, the licensee discussed the contribution of fire risk to core damage frequency associated with the safe shutdown makeup pump discharge valve being in a degraded condition. Based on the

information presented during the conference, the NRC concluded that this condition was of very low safety significance due to the short duration (2 days) the condition existed.

Inspection Report# : [2000011\(pdf\)](#)

**Significance:** N/A May 16, 2000

Identified By: NRC

Item Type: FIN Finding

### **Surveillance Testing**

During logic testing on March 21, 2000, the Unit 1 high pressure coolant injection auxiliary oil pump failed to properly operate. This condition rendered the system inoperable for automatic initiation for approximately one year. The risk from internal events for this condition was determined to be very low (GREEN) in Inspection Report 50-254/2000003; 50-265/2000003. The effect on risk due to external events, specifically fires, was determined to be potentially significant during a preliminary Significance Determination Process review. However, this issue was also the substantial contributor to a YELLOW high pressure coolant injection unavailability performance indicator, which represents performance that minimally reduces safety margin and requires NRC oversight. Therefore, the NRC considers the inspection findings and the performance indicator to be a single issue and agency action will be determined based on application of the Action Matrix for the YELLOW performance indicator.

Inspection Report# : [2000005\(pdf\)](#)

**Significance:**  Feb 29, 2000

Identified By: NRC

Item Type: FIN Finding

### **Safe Shutdown Makeup Pump Valve Failure**

On January 19, 2000, during planned maintenance activities, maintenance workers determined that the safe shutdown makeup pump system was inoperable due to a Unit 2 safe shutdown makeup pump injection valve failure to operate. The valve failure was evaluated using the Significance Determination Process and was found to be of very low risk significance because all other mitigating systems were available.

Inspection Report# : [2000001\(pdf\)](#)

**Significance:**  Feb 29, 2000

Identified By: NRC

Item Type: FIN Finding

### **Unit 2 Automatic Depressurization System Valves Taken Out-Of-Service in Mode 3**

On January 22, 2000, operators did not recognize entry into a Technical Specification action statement when relief valves were removed from service with the reactor in Mode 3. Upon discovery, about 4-1/2 hours later, the valves were returned to service. The Technical Specification action statement was not exceeded. The unavailability of the relief valves was evaluated by the NRC's Senior Reactor Analyst as part of the Significance Determination Process for shutdown issues. This issue was determined to be of very low risk significance because the reactor was in hot shutdown with vessel pressure at approximately 50 psig.

Inspection Report# : [2000001\(pdf\)](#)

**Significance:**  Feb 29, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

### **Emergency Diesel Generator Ventilation Power Supply Switch Out of Position**

On January 28, 2000, with Unit 1 operating at full power and with Unit 2 in Mode 5 (refuel), an operator identified that

the Unit 2 emergency diesel generator room ventilation fan power select switch was selected to the Unit 1 power supply. The Unit 2 emergency diesel generator was inoperable, but remained available for service. Since the shared emergency diesel generator was already inoperable to Unit 2, this condition left no operable emergency diesel generators for Unit 2. This issue is considered a non-cited violation consistent with the Interim Enforcement Policy for pilot plants. This issue was considered to be of very low safety significance because the Unit 1 diesel generator would not have been overloaded by the Unit 2 emergency diesel generator room ventilation fan. The Unit 2 emergency diesel generator was also available.

Inspection Report# : [2000001\(pdf\)](#)



**Significance:** Feb 29, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

### **Post Maintenance Testing**

On February 10, 2000, with Unit 2 in startup mode, the high pressure coolant injection pump failed to start during testing due to incomplete maintenance. A maintenance foreman erroneously signed off the work package as being completed when it was not. This issue is considered a non-cited violation consistent with the Interim Enforcement Policy for pilot plants. This issue was of very low risk significance since the system pressure was low, decay heat was low, and redundant methods of inventory injection were either operating or available.

Inspection Report# : [2000001\(pdf\)](#)



**Significance:** Feb 29, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

### **Too Few Intermediate Range Nuclear Instruments During Refueling**

From February 1 through 5, 2000, Unit 2 had less than the number of operable intermediate range nuclear instruments per channel (three) for the reactor protective system required by Technical Specification 3.1.A. Only two of four instruments were operable on the "B" channel and three of four were operable on the "A" channel. During this time, the reactor was in Mode 5 (refuel) and operators performed core alterations by moving irradiated fuel in the vessel. This issue is considered a non-cited violation consistent with the Interim Enforcement Policy for pilot plants Unit 2 was in cold shutdown with all control rods inserted. This issue was determined to be of very low risk significance because shutdown margin calculations and refueling interlocks provided assurance of adequate shutdown margin. Source range nuclear instruments provided a rod block function during refueling. Intermediate range nuclear instrument indication would not have been available until after the point where a reactivity excursion had occurred because the neutron level during refueling operations was too low for the intermediate range nuclear instruments.

Inspection Report# : [2000001\(pdf\)](#)



**Significance:** Jan 19, 2000

Identified By: NRC

Item Type: FIN Finding

### **Corrective Action Deficiencies Related to Heaters in the Contaminated Condensate Storage Tanks Allowed Degradation of the Heaters**

The inspectors found that corrective action deficiencies related to heaters in the contaminated condensate storage tanks allowed degradation of the heaters to the extent that high pressure injection systems could have been adversely affected. The risk significance for the loss of heaters in the contaminated condensate storage tanks was low, partially because both units were shut down during times when the high pressure injection sources could have been rendered inoperable due to lack of sufficient tank heating.

Inspection Report# : [1999025\(pdf\)](#)

**Significance:**  Jan 19, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**Contaminated Condensate Storage Tank Heaters Inoperable**

The inspectors found that design control deficiencies related to heaters in the contaminated condensate storage tanks allowed degradation of the heaters to the extent that high pressure injection systems could have been adversely affected. Modifications to the system did not evaluate the facility change as required by 10 CFR 50.59. This was considered to be a non-cited violation of 10 CFR 50.59. This issue was first documented by the licensee in August 1999 and addressed in Inspection Report 50-254/99020; 50-265/99020. The risk significance for the loss of heaters in the contaminated condensate storage tanks was low, partially because both units were shut down during times when the high pressure injection sources could have been rendered inoperable due to lack of sufficient tank heating.

Inspection Report# : [1999025\(pdf\)](#)

**Significance:**  Dec 03, 1999

Identified By: NRC

Item Type: FIN Finding

**Corrective Actions for a Design Control Problem with Software Backups were not Timely or Complete**

The inspectors found that two failures of a high pressure coolant injection valve to close in September and October 1999 were not properly classified in the maintenance rule program. Licensee engineers initially failed to consider the second failure of the 1-2301-5 valve to close on October 4, 1999, as a repetitive maintenance preventable functional failure, and failed to monitor the system under (a)(1) of the maintenance rule. This is considered an unresolved item. The valve failure was found to be of low risk significance because the inboard isolation valve was available.

Inspection Report# : [1999023\(pdf\)](#)

**Significance:**  Nov 19, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Ensure ADS Valves Qualified for Minimum Possible Voltage**

Four of the five Unit 1 automatic depressurization system relief valves were not initially qualified for the degraded voltage conditions that would be seen under accident conditions. The licensee had not originally accounted for the voltage drop that would occur between the station batteries and the valve solenoids when specifying the minimum voltage for which the valves needed to be qualified. The licensee subsequently identified a test report, done for another nuclear station, which qualified the valves to a lower voltage. The inspectors, in conjunction with the Office of Nuclear Reactor Regulations, reviewed the test and accepted it under condition that a ten volt penalty be applied to account for some test deficiencies. The licensee also performed calculations to show that the actual available voltage to the valves, under degraded conditions, was above the accepted minimum voltage. A non-cited violation was identified.

Inspection Report# : [1999021\(pdf\)](#)

**Significance:**  Oct 20, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to Promptly Correct Control Room Emergency Ventilation System Deficiency**

The inspectors identified two examples of inadequate corrective action regarding the Units 1 and 2 safety-related control room emergency ventilation system. In 1995 the licensee identified emergency diesel generator overloading concerns and degraded voltage concerns. This degraded and nonconforming condition was not corrected, and the

design basis for the emergency diesel generator system and control room emergency ventilation system were not changed to reflect the condition. Also, safety-related electrical drawing discrepancies with the control room emergency ventilation system were identified in 1997 and never corrected. A non-cited violation for 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" with two examples was identified. In utilizing the Significance Determination Process, this issue was determined to have low risk significance because control room habitability was assumed to be maintained for the 1 hour to start control room cooling and, therefore, there was no impact on the ability of control room operators to operate the required mitigating systems. Also, the design basis event was estimated to have a very low initiating event frequency (Section 1R16).

Inspection Report# : [1999020\(pdf\)](#)



**Significance:** Sep 08, 1999

Identified By: NRC

Item Type: FIN Finding

**A grounded resistor in the governor circuit that caused a failure of the Unit 2 reactor core isolation cooling pump**

On August 26, 1999, the licensee identified a grounded resistor in the governor circuit that caused a failure of the Unit 2 reactor core isolation cooling pump. The inspectors used the significance determination process to identify this event as having very low safety significance for the loss of offsite power initiating event due to the availability of other mitigating equipment (Section 1R22.2).

Inspection Report# : [1999018\(pdf\)](#)



**Significance:** Sep 08, 1999

Identified By: NRC

Item Type: FIN Finding

**Motor-operated valve dynamic testing**

During motor-operated valve dynamic testing on August 4, 1999, the Unit 1 residual heat removal cross-tie valve (19A) failed to fully close. However, approximately one month after the failure occurred, the licensee's corrective action program did not include a plan to determine the cause of the failure or to address any potential generic considerations for other valves (Section 1R22.1). No safety functions were affected and no risk increase resulted from this particular valve failure.

Inspection Report# : [1999018\(pdf\)](#)

**Significance:** N/A Sep 08, 1999

Identified By: NRC

Item Type: FIN Finding

**Removal of a high pressure injection pump in parallel with testing on an emergency diesel generator**

On two occasions, the licensee's work authorization process allowed removal of a high pressure injection pump in parallel with testing on an emergency diesel generator. The inspectors identified that on one occasion, planned conditional core damage probability was increased to greater than that allowed by licensee administrative procedures. The actual risk was lower because the licensee did not perform the work on both systems together. The significance of this finding was not assessed by the significance determination process due to the instantaneous risk involved and the fact that the work was not performed as planned following NRC discussions with plant management (Section 1R13).

Inspection Report# : [1999018\(pdf\)](#)



**Significance:** Sep 03, 1999

Identified By: NRC

Item Type: FIN Finding

**Copy of post-modification test not retained**

The inspectors identified that the Unit 1 post modification test for a design change package on the fuel transfer pump was not retained by the licensee. This item had very low risk significance. The licensee had retained the Unit 2 test and had signature evidence that the Unit 1 test was performed.

Inspection Report# : [1999017\(pdf\)](#)

G

**Significance:** Jul 20, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Corrective Action for Flooding Procedures.**

Corrective actions were not implemented for an inadequate flood protection procedure originally identified by the licensee in 1997. The procedures did not provide adequate instructions to protect the plant structurally under the forces of severe flood waters. This issue was inappropriately closed in the corrective action program without resolution. This was a non-cited violation for inadequate corrective action. A qualitative risk assessment of the impact of the procedure deficiencies concluded that the issues were of low risk significance since adequate time would be available to make procedure changes and take action during a flooding event. (Section 1R06).

Inspection Report# : [1999011\(pdf\)](#)

G

**Significance:** Jul 16, 1999

Identified By: NRC

Item Type: FIN Finding

**Corrective actions to address a Unit 1 emergency diesel generator failure**

Corrective actions to address a January 1998 Unit 1 emergency diesel generator (EDG) failure to start were postponed in some cases and in others only partially completed. (Reference Report Section 4OA1.3, page 5 ) This item was categorized by the significance determination process as being of low risk significance based on occasional EDG start failures, redundant EDGs and available off site power.

Inspection Report# : [1999012\(pdf\)](#)

G

**Significance:** Jul 16, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Excessive thrust conditions, found during testing of motor operated valves**

Excessive thrust conditions, found during testing of motor operated valves (MOV) from March 1997 through July 2, 1999, were not identified to management and did not receive appropriate corrective action to preclude recurrence. As a result, the cause of the problem was not identified and appropriate corrective action was not taken. This is a non-cited violation. This item was categorized by the significance determination process as being of low risk significance. (Reference Report Section 4OA1.4) Since nine of the ten valves found outside the acceptable thrust windows functioned as required during testing, the issue was determined to be of low risk significance and was categorized as "Green."

Inspection Report# : [1999012\(pdf\)](#)

G

**Significance:** Jul 15, 1999

Identified By: NRC

Item Type: FIN Finding

**The surveillance procedure for evaluating thermal performance of the residual heat removal heat exchangers**

The surveillance procedure for evaluating thermal performance of the residual heat removal heat exchangers contained errors which resulted in the licensee overestimating the heat removal capability of the 1A heat exchanger. This item had very low risk significance, since the heat exchanger was still capable of removing its design heat load.

Inspection Report# : [1999014\(pdf\)](#)

**Significance:**  Jul 15, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Three Examples of Design Control Relating to Original Plant Design**

A non-cited design control violation with multiple examples was identified during close out of two unresolved items from the architect-engineer inspection (50-254/265-98201). The issues dealt with ensuring adequate net positive suction head for the emergency core cooling system pumps, ensuring the residual heat removal service water piping was analyzed for its design condition, and determining the adequacy of a thermal relief valve. All the examples in the Non-Cited Violation resulted from original design deficiencies. The licensee's analyses showed that the pumps were operable. Therefore, this issue screened out of the significance determination process as having very low risk significance

Inspection Report# : [1999014\(pdf\)](#)

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## Barrier Integrity

**Significance:**  Nov 20, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**Three examples of failure to follow procedures.**

On November 3, 2000, the 1B channel of the reactor protective system flow biased neutron flux trip was found to be inoperable during reactor startup from the Unit 1 refueling outage 16. The licensee determined that poor wiring practices, poor second verification practices, and inadequate post maintenance testing of nuclear instrumentation wiring led to the malfunction. Maintenance workers failed to follow the wiring requirements in the work request, did not use lift and land sheets when removing and re-terminating the wires, and failed to label the wires which were lifted during the maintenance activity. Failure to follow the procedure (work request) for wiring was considered an example of a Non-Cited Violation. The risk significance of this event was very low because of the short amount of time that the unit was in Mode 1, because the "A" channel of flow biased trip setpoints was still operable, and because the wiring error actually caused the flow biased neutron flux trip to be more conservative (Example A). On October 14, 2000, during disassembly of the Unit 1 reactor for refueling outage 16, reactor service technicians opened a flanged connection of the reactor head vent piping with approximately 5 to 8 psig steam pressure still in the reactor vessel and initiated a steam release to the refueling floor area which lasted for several hours. Numerous procedural, process, and communication problems contributed to the event. Personnel safety, procedure adherence, procedure adequacy, and lack of control of reactor vessel disassembly activities were all concerns brought out by this event. The failure to follow procedures during vessel disassembly was considered an example of a Non-Cited Violation. The risk significance was evaluated as very low because the amount of reactor vessel inventory released to secondary containment was very low, and secondary containment integrity requirements were met (Example B). On October 22, 2000, workers attempting to replace a local power range monitor inadvertently lifted the local power range monitor tube off its seat in the reactor vessel bottom head. This caused highly contaminated radioactive water from the bottom of the reactor vessel to drain directly onto the workers. The draining stopped immediately after the local power range monitor tube was released and



resealed back into the vessel. One worker was contaminated such that a meter held to his body read 5 rem per hour on contact. Extraordinary actions by radiation protection workers resulted in the removal of the majority of the highly contaminated material quickly, such that the overall external shallow dose equivalent for the individual was estimated at 2.784 rem, and the internal dose received by the worker was estimated at 45 millirem. Problems involved in this event included workers not adhering to the instructions by radiation protection technicians, workers not having procedures with them and performing steps of two different procedures concurrently, and workers not informing operators or radiation protection technicians that they were taking actions that could allow water to be drained from the reactor vessel. In addition, the procedures were not adequate to control the work. The failure to follow procedures during local power range monitor replacement was considered an example of a Non-Cited Violation. The safety significance of this event was very low because sufficient makeup capacity to fill the vessel was available even if the local power range monitor failed to reseal, the local power range monitor tube was resealed quickly and the reactor vessel drainage stopped, and the contamination was mostly external and was removed quickly (Example C).  
Inspection Report# : [2000015\(pdf\)](#)

**Significance:**  Jun 30, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Corrective Action for Delinquent ASME Code Work Packages**

The inspectors identified a failure of the corrective action program where ASME Code Class 1, 2 and 3 Replacement and Repair program requirements for work package reviews were not met. On four occasions the licensee did not realize that the Code work packages were not meeting 10 CFR 50.55a ASME Code requirements. In each case, corrective actions were not taken to correct the situation. Failure to promptly identify and correct the failure to meet ASME code requirements for work packages was considered a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XVI. The safety significance of this issue was considered very low based on the absence of adverse consequences and the fact that no technical problems were identified.

Inspection Report# : [2000008\(pdf\)](#)

**Significance:**  Jan 19, 2000

Identified By: NRC

Item Type: FIN Finding

#### **Failure not classified as a functional failure under the Maintenance Rule**

A failure of a Unit 2 containment spray system valve was not properly classified as a maintenance rule functional failure under the maintenance rule program. This individual classification failure was corrected and did not impact the licensee's ability to demonstrate maintenance effectiveness for the system. The valve failure was considered to be of low risk significance using the Significance Determination Process because the other train of containment spray was fully functional.(Section 1R12)

Inspection Report# : [1999025\(pdf\)](#)

**Significance:**  Jan 19, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Overthrust of Motor-Operated Valve 2-1001-34A**

During surveillance testing on December 12, 1999, residual heat removal torus spray/test return valve 2-1001-34A closed with 116,831 pounds of thrust which was almost double the previous as-left thrust setting of the valve. This value also exceeded the seismic thrust limit for the valve. Corrective actions recommended to determine extent of condition after failure of a similar valve in 1998 were not taken. This was considered to be a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI. The excessive thrust problem was considered to have low risk significance

because the valve remained operable.

Inspection Report# : [1999025\(pdf\)](#)

G

**Significance:** Sep 08, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to promptly correct a design deficiency with the standby gas treatment system.**

The licensee discovered during surveillance testing on August 23, 1999, that both standby gas treatment trains may not have functioned as designed during a postulated loss of Bus 19. The item had been previously identified in 1992 but not adequately corrected. No design change or design evaluation justifying the degraded condition had been performed. Failure to take corrective action for this design problem was a Non-cited Violation of Criterion XVI of 10 CFR Part 50, Appendix B. This problem resolution violation could not be classified with a risk significance due to its programmatic nature. However, since 1992 the inspectors were not aware of any failures of the administrative controls that would have jeopardized standby gas treatment operability. Therefore, from an equipment standpoint, this finding has a very low risk significance (Section 40A1).

Inspection Report# : [1999018\(pdf\)](#)

G

**Significance:** Jul 20, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Secondary Containment Penetration.**

Secondary containment integrity did not exist from 1981 until May 1997 due to an unsealed 1 inch diameter penetration. This was a non-cited violation of Technical Specification 3.7 (Section 40A3). This issue had very low risk significance. Test results showed that the standby gas treatment system could still maintain negative pressure in secondary containment with leak pathways up to 4 inches in diameter.

Inspection Report# : [1999011\(pdf\)](#)

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## Emergency Preparedness

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## Occupational Radiation Safety

**Significance:** N/A Jul 13, 2001

Identified By: NRC

Item Type: FIN Finding

**A supplemental inspection was performed by the NRC to assess the licensee's evaluation associated with the failure to provide adequate radiological planning to maintain radiological doses as-low-as**

**is-reasonably-achievable (ALARA)**  
This supplemental inspection was performed by the NRC to assess the licensee's evaluation associated with the failure to provide adequate radiological planning to maintain radiological doses as-low-as-is-reasonably-achievable (ALARA) during the Fall 2000 Unit 1 outage. This performance issue was previously characterized as having low to moderate risk significance (White) in NRC Inspection Report No. 50-254/00-18(DRS) and 50-265/00-18(DRS). During this supplemental inspection, performed in accordance with Inspection Procedure 95001, the inspector concluded that the licensee performed a comprehensive evaluation of the radiological planning weaknesses. The licensee's evaluation attributed the planning weaknesses to ineffective job management by the radiation protection and construction staffs

(root cause). In determining the root cause, the licensee identified contributing factors which included ineffective management of work force changes and drywell temperature control, inadequate monitoring of job duration and identification of changes in duration, and inadequate consideration of work location dose rates and contamination levels when developing revised job dose estimates. The inspector reviewed the licensee's corrective actions, both completed and planned, and concluded that the corrective actions appeared to address the identified root cause and contributing causes. In particular, the licensee implemented an ALARA job standard to provide additional guidance to the staff for identifying and managing changes in radiological work. The purpose of the job standard was to fully identify the changes (both prior to the work and based on the as-found conditions) and to communicate the changes to the station ALARA committee so that the planning could be adequately evaluated to determine if replanning was necessary. Initial implementation of the standard during the Spring 2001 Unit 1 recirculation pump seal replacement was adequate; however, the inspector observed weaknesses in the understanding of staff concerning when the standard was to be applied. Due to the licensee's acceptable performance in assessing the radiological planning problems, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in NRC Manual Chapter 0305, "Operating Reactor Assessment Program." Implementation of the licensee's corrective actions will be reviewed during a future inspection.

Inspection Report# : [2001013\(pdf\)](#)



**Significance:** Nov 27, 2000

Identified By: NRC

Item Type: FIN Finding


**Radiological dose for the Safety Relief Valve (SRV) replacement work results in a determination of a White Finding.**

Planning problems caused the dose for the Safety Relief Valve (SRV) replacement work completed during refueling outage Q1R16 to exceed its projected dose by more than 50 percent. Elevated dose rates were encountered in the drywell as a result of cobalt 60 plate-out. The drywell cooling/ventilation system was out of service for maintenance and testing, significantly elevating temperatures in the drywell. Also, less experienced workers performed the SRV job NRC Supplemental Inspection (Report 50-254/01-13, 50-265/01-13): During this supplemental inspection, performed in accordance with Inspection Procedure 95001, the inspector concluded that the licensee performed a comprehensive evaluation of the radiological planning weaknesses. The licensee's evaluation attributed the planning weaknesses to ineffective job management by the radiation protection and construction staffs (root cause). In determining the root cause, the licensee identified contributing factors which included ineffective management of work force changes and drywell temperature control, inadequate monitoring of job duration and identification of changes in duration, and inadequate consideration of work location dose rates and contamination levels when developing revised job dose estimates. The inspector reviewed the licensee's corrective actions, both completed and planned, and concluded that the corrective actions appeared to address the identified root cause and contributing causes. In particular, the licensee implemented an ALARA job standard to provide additional guidance to the staff for identifying and managing changes in radiological work. The purpose of the job standard was to fully identify the changes (both prior to the work and based on the as-found conditions) and to communicate the changes to the station ALARA committee so that the planning could be adequately evaluated to determine if replanning was necessary. Initial implementation of the standard during the Spring 2001 Unit 1 recirculation pump seal replacement was adequate; however, the inspector observed weaknesses in the understanding of staff concerning when the standard was to be applied. Due to the licensee's acceptable performance in assessing the radiological planning problems, the White finding associated with this issue will only be considered in assessing plant performance for a total of four quarters in accordance with the guidance in NRC Manual Chapter 0305, "Operating Reactor Assessment Program." Implementation of the licensee's corrective actions will be reviewed during a future inspection.

Inspection Report# : [2000018\(pdf\)](#)

Inspection Report# : [2001013\(pdf\)](#)

## Public Radiation Safety

**Significance:**  Jul 02, 1999

Identified By: NRC

Item Type: FIN Finding

### **Lack of Documentation for Offsite Dose Calculation Manual Revisions**

The inspectors identified a lack of documentation for the licensee's review of changes to the Offsite Dose Calculation Manual. Although an independent technical review determined that the changes maintained a sufficient level of effluent control, the licensee did not maintain documentation to support this determination. (Section 2PS3.3) This item had very low risk significance based on the results of the independent technical review.

Inspection Report# : [1999013\(pdf\)](#)

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## Physical Protection

**Significance:** N/A Jun 14, 2001

Identified By: NRC

Item Type: FIN Finding

### **A supplemental inspection was performed to assess the licensee's root cause evaluation related to exercise failures during two of four force-on-force contingency exercises.**

This supplemental inspection was performed to assess the licensee's root cause evaluation related to exercise failures during two of four force-on-force contingency exercises. This performance issue was characterized as a White finding having a low to moderate risk significance in NRC Inspection Report No. 50-254; 265/00-201. This supplemental inspection determined that the licensee had performed a comprehensive evaluation which identified the root cause and contributing factors associated with the exercise failures noted above. The licensee's evaluation identified that the root cause of the exercise finding was a failure to effectively accomplish exercise control activities. Contributing factors were human performance errors by some security force response personnel and controllers, a lack of effective controller training, vulnerabilities in some defensive positions, and command and control activities. Licensee corrective actions were implemented to address the root cause and each contributing factor. Those actions appeared effective in correcting the identified deficiencies. Therefore, the White performance finding associated with the exercise failures was closed.

Inspection Report# : [2001011\(pdf\)](#)

**Significance:**  Nov 17, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

### **An unattended security storage container containing Safeguards Information was found unlocked and open for approximately two hours.**

An unattended security storage container containing Safeguards Information was found unlocked and open for approximately two hours (Section 40A3). The inspector reviewed the risk significance of this finding and determined the risk to be very low since no Safeguards Information was compromised and there have not been greater than two similar findings in four quarters.

Inspection Report# : [2000019\(pdf\)](#)



**Significance:** Jun 23, 2000

Identified By: NRC

Item Type: FIN Finding

**Contingency Response Performance Deficiencies**

Deficiencies were noted in the licensee's performance in the contingency response element of the Physical Protection Cornerstone. (The details of this finding are Safeguards Information and are required to be withheld from public disclosure.)

Inspection Report# : [2000201\(pdf\)](#)

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## Miscellaneous

**Significance:** SL-IV Aug 14, 2001

Identified By: NRC

Item Type: VIO Violation

**FAILURE TO ACCURATELY REPORT PERFORMANCE INDICATOR INFORMATION**

The inspectors identified that the licensee failed to report fault exposure hours for the failure of a fuel oil transfer solenoid valve to open during the Unit 2 emergency diesel generator (EDG) 18 month endurance test. The second quarter 2001 data reported to the NRC showed no fault exposure hours recorded for Unit 2 EDG. However, the inspectors found that fault exposure hours from a failed endurance run on May 1, 2001, should have been reported since only the time of the failure's discovery was known with certainty. Fault exposure hours going back to the last successful load test of the EDG on January 14, 2000, were not included in the licensee's July 2001 performance indicator data submittal for the Unit 2 Emergency Alternating Current (AC) - Safety System Unavailability performance indicator. Had the performance indicator data been properly reported, the performance indicator color would have been Red. Failure to properly report the performance indicator was considered a Severity Level IV violation of 10 CFR 50.9.

Inspection Report# : [2001012\(pdf\)](#)

**Significance:** N/A May 25, 2001

Identified By: NRC

Item Type: FIN Finding

**Adverse performance trend.**

The corrective actions to prevent recurrence for an event that resulted in an inadvertent steam release during a breach of the reactor pressure boundary proved to be ineffective to prevent a similar event that occurred six months later. Additionally, corrective actions for the second event were narrow in scope and did not address the aspects in common with the first event. Condition report Q2001-01976 was issued to address the potential common issues. The inspectors concluded that the issue was more than minor since the failure to fully identify and correct deficiencies could be reasonably viewed as a precursor to a significant event. The inspectors reviewed the applicability of the issue with respect to program cornerstones and determined that the issue did not impact a cornerstone. However, this issue contained extenuating circumstances in that the full extent of condition for the October event was not completely identified and corrected, allowing a similar event in April. The combination of these two events indicates an adverse performance trend.

Inspection Report# : [2001009\(pdf\)](#)

**Significance:** N/A May 25, 2001

Identified By: NRC

Item Type: FIN Finding

**Corrective action program problems.**

The inspectors concluded that in general the corrective action program was a complete program containing all the necessary attributes to successfully identify and correct issues at Quad Cities. However, over the past year there were several instances of difficulties with problem identification, evaluation and resolution. Most of these were documented in previous findings and violations in inspection reports. In general, these issues have been recognized, and actions have been taken to address them. For most of the issues it is too soon to fully evaluate the effectiveness of these actions so effectiveness is still to be determined. During this inspection, three areas of corrective action program problems were identified. These were the failure to properly implement the M&TE program, several instances when condition reports should have been written and they were not, and, failure to address common causes for similar steam release events on the reactor vessel during the October refueling outage, and in the April maintenance outage.

Inspection Report# : [2001009\(pdf\)](#)

**Significance:** N/A May 25, 2001

Identified By: NRC

Item Type: FIN Finding

**Test problems on condition reports not identified.**

In May of 2001, an inspector observing a surveillance noted that instrument maintenance technicians had difficulty conducting calibrations of differential transmitters on the Unit 2 station blackout diesel air intake filter differential pressure detectors. The results were not repeatable and indicated some out-of-tolerance readings on both instruments. No condition reports were generated for either the difficulty with the tests or the apparent out-of-tolerance results until inspectors intervened. Condition Report Q2001-1549 was issued 12 days later and subsequently, Condition Reports Q2001-1474 and Q2001-1475 were written for the out-of-tolerance readings. The inspectors reviewed the significance of not identifying test problems on condition reports and concluded that the issue was more than a minor issue because if left uncorrected, the issue could become a more significant safety concern. The actual effect on the station blackout diesel was minimal since it did not directly impact operation of the equipment and another diesel was available. However, this corrective action finding is a cross-cutting issue for corrective action process performance and is assigned No Color.

Inspection Report# : [2001009\(pdf\)](#)

**Significance:** N/A May 25, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to assure that measuring and test equipment was properly calibrated.**

In April of 2001, the station Nuclear Oversight staff identified that measurement and test equipment which was found to be out-of-calibration during post-use verifications was not evaluated as required by plant procedure. Also, condition reports on these out-of-tolerance conditions were not written when required by procedures. The licensee initiated a review which identified 159 items of out-of-tolerance equipment which had not been evaluated appropriately. The use of these items was evaluated and appropriate recovery actions taken. Failure to assure that measuring and test equipment used in 2000 and 2001 was properly calibrated was a Non-Cited Violation of 10 CFR 50, Appendix B. The inspectors reviewed the significance of not evaluating out-of-tolerance equipment and determined that the issue was more than a minor issue because if left uncorrected, the issue could become a more significant safety concern. However, since this is a corrective action concern, and no specific cornerstone was impacted, this item is assigned No Color.

Inspection Report# : [2001009\(pdf\)](#)

**Significance:** N/A May 16, 2001

Identified By: NRC

Item Type: NCV NonCited Violation

**Failure to report performance indicator data accurately.**

Inspectors found that the licensee reported safety system functional failure data improperly. The improperly reported safety system functional failure involved failure of the Unit 2 intermediate range nuclear monitors. Had this been reported properly, it would have caused the safety system functional failure performance indicator for Unit 2 to cross

the threshold from Green to White in the first quarter of 2000. The actual submittal showed performance indicator data in the licensee response or Green band. Because a performance indicator would have changed from Green to White, this was considered a Non-Cited Violation of 10 CFR 50.9.

Inspection Report# : [2001008\(pdf\)](#)

**Significance:** N/A Dec 15, 2000

Identified By: NRC

Item Type: NCV NonCited Violation

**Technical Errors in Appendix R Safe Shutdown Procedures**

The inspectors identified a number of technical errors in safe shutdown procedure QCARP 0050-02. The procedure errors were considered a Non-Cited Violation (NCV 50-254/00-16-03; NCV 50-265/00-16-03) of 10 CFR 50, Appendix R, Section III.L.5 (Section 40A4.1). The technical errors were determined to have no appreciable risk significance (No Color) because the errors would not have impacted safe shutdown. However, the errors were another example of a previously identified adverse trend in human performance.

Inspection Report# : [2000016\(pdf\)](#)

**Significance:** N/A Nov 20, 2000

Identified By: NRC

Item Type: FIN Finding

**The inspectors found that a number of human performance errors during the Q1R16 refueling outage period resulted in undesirable consequences and constituted an adverse trend.**

The inspectors found that a number of human performance errors during the Q1R16 refueling outage period, October 14 to November 3, resulted in undesirable consequences and constituted an adverse trend in human performance. These errors resulted from problems with procedure adherence, control of work activities, communications, and procedure quality. Resulting problems included venting the pressurized reactor to containment near maintenance workers who were not adequately prepared for the subsequent release of steam and contamination, inadvertently draining from the reactor vessel bottom head area resulting in significant personnel contamination, and a number of wiring and second verification errors during electrical modifications and maintenance. Although most of these wiring errors were caught and corrected during testing, one error was not caught and resulted in the inoperability of one of two channels of the reactor protective system flow biased trips. While none of these events resulted in equipment performance outside the licensee response band (GREEN), the overall trend indicated problems with adhering to procedures, proper performance of second verification techniques, and the communication and coordination of activities (Section 40A4).

Inspection Report# : [2000015\(pdf\)](#)

**Significance:** N/A Jun 30, 2000

Identified By: NRC

Item Type: FIN Finding

**Cross-Cutting Issues: Human Performance**

Inspectors found that several recent events which affected plant operations and/or had the potential to adversely affect personnel safety involved elements of human performance deficiencies. An apparent adverse trend in human performance during the period May 5, 2000 to June 30, 2000, was evidenced by the following incidents. A senior reactor operator failed to implement a Technical Specification surveillance requirement for removing an emergency diesel generator from service. Control room operators experienced problems controlling reactor vessel water level during post-scrum recovery efforts and failed to close a pair of drain valves during a pre-start of the Unit 1 high pressure coolant injection system. Maintenance personnel errors were involved in a reactor trip on May 5, and spread of contamination in the 2B reactor water cleanup room when a fitting was disconnected under 1000 psig pressure on June 10 (Section 40A.4).

Inspection Report# : [2000007\(pdf\)](#)

**Significance:** N/A Jun 30, 2000

Identified By: NRC

Item Type: FIN Finding

**Weakness in Corrective Action Program.**

The corrective action program was fully functional and typically identified and corrected conditions adverse to quality. In general, station personnel effectively identified and entered problems into the corrective action program using problem identification forms (PIFs). The significance threshold for entering issues into the program appeared appropriate. However, over the past year issues were identified at Quad Cities where the corrective action process was not vigorously implemented to address the issues. In addition, the licensee's corrective action process had lost over two items a month since January 2000. Although none of these lost items were considered safety significant, and thousands of other action items were opened and closed in that time frame, this represented a weakness in the licensee's program. Inspection Report# : [2000008\(pdf\)](#)



**Significance:** Apr 01, 2000

Identified By: Licensee

Item Type: NCV NonCited Violation

**On September 10, 1999, the control room emergency ventilation system was inoperable**

On September 10, 1999, the licensee identified that the control room emergency ventilation system was inoperable. Flow rates were out-of-specification due to repositioning of a ventilation damper 9 days previously. The action statement for Technical Specification 3.8.D allowed the system to be inoperable for 7 days. Failing to comply with the allowed outage time requirements was considered a non-cited violation of Technical Specification 3.8.D. This issue was screened as GREEN (very low risk significance) after a Phase 1 Significance Determination Process review (Section 40A3).

Inspection Report# : [2000003\(pdf\)](#)

**Significance:** N/A Feb 29, 2000

Identified By: NRC

Item Type: FIN Finding

**Human Performance Problems**

Inspectors found that errors in review, coordination, and implementation of maintenance activities during or near Unit 2 refueling outage number 16 (January and February 2000) led to inoperable safety systems. Operators were unaware that Technical Specification or administrative limiting condition for operation action statements were entered or exceeded. Required nuclear instruments and emergency diesel generators were not operable during some fuel moves (Sections 1R04 and 1R20.4), automatic depressurization system valves were taken out of service while required (Section 1R20.2), the high pressure coolant injection system was inoperable due to incomplete maintenance (Section 1R19.1), and safe shutdown requirements were not properly addressed (Section 1R20.5). Other events included technician errors in which electrical jumpers were installed in incorrect locations for logic used by the reactor protective system and by the emergency core cooling system. While the risk of the individual events was very low, an increase in maintenance activity problems was evident.

Inspection Report# : [2000001\(pdf\)](#)

**Significance:** N/A Dec 03, 1999

Identified By: NRC

Item Type: FIN Finding

**reactor coolant system leakage performance indicator**

The inspectors completed verification inspection of the reactor coolant system leakage performance indicator and found very minor discrepancies which did not affect the validity of the reported performance indicator (Section 40A2.2).

Inspection Report# : [1999023\(pdf\)](#)

**Significance:** N/A Dec 03, 1999

Identified By: NRC



Item Type: FIN Finding

**the public radiation safety performance indicator**

The inspectors verified that the licensee had properly evaluated and reported the public radiation safety performance indicator (Section 40A2.7).

Inspection Report# : [1999023\(pdf\)](#)

**Significance:** N/A Dec 03, 1999

Identified By: NRC

Item Type: FIN Finding

**verification inspection for the residual heat removal unavailability performance indicator.**

The inspectors completed the verification inspection for the residual heat removal unavailability performance indicator. The inspectors identified that the licensee had not included 12.5 hours of residual heat removal system unavailability during system logic testing in January 1999. The licensee explained that the rules for system availability, at that time, did not require documenting the safety system unavailability. The licensee elected to report these hours in a future submittal. The extra hours would not cause the residual heat removal system unavailability to cross a color threshold (Section 40A2.1).

Inspection Report# : [1999023\(pdf\)](#)

**Significance:** N/A Dec 03, 1999

Identified By: NRC

Item Type: FIN Finding

**verification inspection of the licensee's performance indicators**

The inspectors completed verification inspection of the licensee's performance indicators for scrams, scrams with loss of normal decay heat removal, reactor coolant specific activity, and primary containment leakage. No findings were identified (Section 40A2).

Inspection Report# : [1999023\(pdf\)](#)

**Significance:** N/A Oct 20, 1999

Identified By: NRC

Item Type: FIN Finding

**The licensee corrected discrepancies with the safety system functional failure indicator.**

The licensee corrected discrepancies with the safety system functional failure indicator previously identified by the NRC in the September report of performance indicator data. The NRC exercised enforcement discretion and did not issue a Notice of Violation (Section 40A3).

Inspection Report# : [1999020\(pdf\)](#)

**Significance:** N/A Oct 20, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Event Reporting Failure**

The inspectors identified two violations of NRC reporting requirements. The licensee failed to notify the NRC within 1 hour of identifying a condition in which the control room emergency ventilation system was found outside the design basis. The licensee also failed to notify the NRC within 4 hours of an event in which the reactor core isolation cooling system was unable to perform a required safety function. The licensee made late notifications, submitted a licensee event report for the control room emergency ventilation system, and planned to submit a licensee event report for the reactor core isolation cooling system failure. These were considered two non-cited violations (Plant Status).

Inspection Report# : [1999020\(pdf\)](#)

**Significance:** N/A Oct 20, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**Notification Failure Under 50.72**

The inspectors identified two violations of NRC reporting requirements. The licensee failed to notify the NRC within 1 hour of identifying a condition in which the control room emergency ventilation system was found outside the design basis. The licensee also failed to notify the NRC within 4 hours of an event in which the reactor core isolation cooling system was unable to perform a required safety function. The licensee made late notifications, submitted a licensee event report for the control room emergency ventilation system, and planned to submit a licensee event report for the reactor core isolation cooling system failure. These were considered two non-cited violations (Plant Status).

Inspection Report# : [1999020\(pdf\)](#)



**Significance:** Oct 08, 1999

Identified By: Licensee

Item Type: FIN Finding

**The licensee identified errors in the PI Occupational Radiation Safety Performance Indicator (PI)**

Occupational Radiation Safety Performance Indicator (PI). The licensee identified errors in the PI reported to the NRC. Originally, the licensee reported six technical specification high radiation area incidents, which resulted in a white PI. After identifying a missed occurrence and a misinterpretation of the PI criteria, the licensee determined that only two incidents were applicable to the PI, which resulted in the PI indicating that performance was in the licensee response band (green).

Inspection Report# : [1999022\(pdf\)](#)



**Significance:** Jul 16, 1999

Identified By: NRC

Item Type: NCV NonCited Violation

**the repetitive problem of excessive use of overtime.**

The root cause report and the corrective actions, approved by the Plant Operations Review Committee and the Corrective Action Review Board, did not fully address the repetitive problem of excessive use of overtime. There were 177 instances between February 1 and 28, 1999, where station procedures were not followed to control overtime of plant workers. Further corrective actions were being developed to ensure that overtime violations did not continue. There were no known incidents where the excessive use of overtime directly impacted or affected the safety of the plant; however, the repetitive failure to follow procedures to control overtime is a non-cited violation. (Reference Report Section 4OA1.4, page 8)

Inspection Report# : [1999012\(pdf\)](#)

Last modified : August 29, 2002