

## Byron 2

# 4Q/2005 Plant Inspection Findings

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### Initiating Events

**G****Significance:** Dec 31, 2005

Identified By: Self-Revealing

Item Type: FIN Finding

**FAILURE OF THE NEWLY INSTALLED DIGITAL ELECTROHYDRAULIC SYSTEM TO RESPOND TO OPERATOR'S INPUT TO INITIATE A TURBINE RUNBACK**

A finding having very low safety significance (Green) was self-revealed when the newly installed Digital Electrohydraulic System (DEH) failed to respond to operator input to initiate a turbine runback that subsequently resulted in a reactor trip. The inspectors determined that the algorithm required for turbine runback was deleted from the software database due to a compiler fault. Modification review and testing performed by the licensee failed to discover the software error. To correct the problem the licensee reinstalled the deleted software algorithm into the DEH system.

The finding was more than minor because it affected the design control attribute of the Initiating Events cornerstone objective. The attribute objective limits the likelihood of those events that upset plant stability and challenge critical safety functions during at-power operations. Specifically, the lack of turbine runback capability contributed to a reactor trip from a feedwater system transient. The finding was determined to be of very low safety significance (Green), since it only contributed to the likelihood of a reactor trip. No violation of NRC requirements occurred.

Inspection Report# : [2005011\(pdf\)](#)**G****Significance:** Jun 30, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**Failure to Follow Severe Weather Procedure Results in Less than Required Essential Service Water Basin Level**

A finding of very low safety significance and associated Non-Cited Violation (NCV) of Technical Specification (TS) 5.4.1 regarding procedure adherence was self revealed, when during a tornado watch, operators failed to maintain both essential service water basin levels greater than 90 percent as specified in the associated abnormal operating procedure. Upon recognizing the low level condition, operators restored basin level to greater than 90 percent. The primary cause of this violation was related to the cross-cutting area of Human Performance (personnel) because the operators failed to maintain the required basin level even though adequate guidance for maintaining basin level was provided in the associated procedure.

This finding was more than minor because the operators allowed the level to drop below the operating limit; which is similar to the more than minor examples of Section 2 of Appendix E to Inspection Manual Chapter (IMC) 0612. The finding was determined to be of very low safety significance because the condition did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available.

Inspection Report# : [2005004\(pdf\)](#)**G****Significance:** Jun 30, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**Insufficient Fire Seal Material in Penetration Between Emergency Diesel Generator Rooms and Associated Switchgear Rooms**

The inspectors identified a finding of very low safety significance and associated NCV of the license number NPF-66 Section 2.E, requiring that the licensee shall implement and maintain in effect all provisions of the fire protection program as described in the licensee's Fire Protection Report. Specifically, during an inspection of the Division 21 electrical switchgear room the inspectors identified that a penetration that connected the Division 21 electrical switchgear room with the Unit 2 train A diesel generator had not been properly sealed as part of the 3-hour fire barrier. The licensee's extent of condition review identified two more penetrations in the Division 22 electrical switchgear room which also had not been properly sealed. Upon identification of the degraded penetrations, the licensee established the required compensatory fire watches until the penetrations were properly sealed.

This finding was considered more than minor, because it could be reasonably viewed as a precursor to a significant event, specifically a loss of Division 21 or 22 switchgear rooms with a fire in the Unit 2 train A or B diesel-generator rooms or loss of the Unit 2 train A or B diesel generator with a fire in the Division 21 or 22 switchgear rooms. The finding was determined to be of very low safety significance because the condition reflected a fire protection program element whose performance and reliability will be minimally impacted by the inspection finding. That is, if the fire occurred in the Division 21 switchgear room or Unit 2 train A diesel generator room, the fire would be confined in the two areas and the reliance on the Division 22 switchgear power is not effected.

Inspection Report# : [2005004\(pdf\)](#)

## Mitigating Systems

**G****Significance:** Dec 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILED TO PERFORM VT-2 EXAMINATION AT NOMINAL OPERATING PRESSURE FOR SIX NEW RHR SYSTEM WELDS**

The inspectors identified a finding involving a Non-Cited Violation (NCV) of 10 CFR Part 50.55a(g)(4)ii having very low safety significance for failure to perform a VT-2 examination at nominal operating pressure for six new residual heat removal system welds that were returned to service. This finding was entered into the licensee's corrective action program.

This finding was more than minor significance because the licensee returned these six welds to service without completing the required pressure test and VT-2 examination, which placed this system at increased risk for undetected leakage and component failure. Operation of this system with improperly tested piping affected the mitigating systems cornerstone objective of equipment reliability. This finding was of very low safety significance because the required test and VT-2 examination were subsequently completed and all welds passed. The finding was not suitable for a significance determination process evaluation. This finding has been reviewed by NRC Management and has been determined to be a Green finding of very low safety significance.

Inspection Report# : [2005011\(pdf\)](#)**G****Significance:** Sep 30, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**INADEQUATE CLEANING OF ESSENTIAL SERVICE WATER DIESEL FUEL OIL STORAGE TANKS.**

A self-revealing NCV of Technical Specification 5.4.1a, "Procedures", was identified for Byron's inadequate cleaning procedure for the Essential Service Water (SX) make-up pump diesel fuel oil storage tanks. This resulted in each of the SX make-up pumps being inoperable for a period of approximately 60 days. Byron's inadequate SX fuel tank cleaning procedure is identified as a performance deficiency that is greater than minor because it is associated with the equipment performance attribute of the mitigating systems cornerstone to ensure the availability, reliability, and capability of systems to respond to an initiating event to prevent undesirable consequences. A contributing cause to the inadequate SX fuel tank cleaning is related to the Human Performance cross-cutting area. Procedures for diesel fuel oil tank cleaning and post maintenance testing lacked technical details to ensure that the SX make-up pumps were restored to an operable condition.

Inspection Report# : [2005009\(pdf\)](#)**G****Significance:** Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO PROPERLY REVIEW AND MAKE PROCEDURE CHANGES**

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." After increasing the minimum required river screen house (RSH) temperature for securing a service water makeup pump from 50 degrees Fahrenheit to 70 degrees Fahrenheit in 1998, the licensee failed to revise two operating procedures. Once identified, the licensee reviewed other procedures and initiated procedure changes.

This issue was more than minor because the licensee failed to ensure that the procedures contained the necessary precautions and steps to ensure continued operability of the SX pumps. The issue was of very low safety significance because it did not represent the actual loss of safety function.

Inspection Report# : [2005002\(pdf\)](#)**G****Significance:** Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**INADEQUATE RIVER SCREEN HOUSE (RSH) VENTILATION CALCULATION**

A finding of very low safety significance was identified by the inspectors for a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." A river screen house (RSH) ventilation calculation assumed that only one Essential Service Water (SX) makeup pump would be running and calculated the maximum ambient temperature of the RSH to be 115 degrees Fahrenheit. Licensee personnel failed to consider that two SX makeup pumps could be in operation for up to five hours into an event. Since two pumps could be running, the calculation underestimated the heat input into the RSH from the operating pumps. Once identified, the licensee immediately performed an operability determination and concluded that based on current ambient temperatures, the pumps were operable. Additional assessments will be completed prior to summer temperatures.

This issue was more than minor because exceeding the temperature ratings for components could impact the ability of the diesel-driven pump to perform its safety function. The issue was of very low safety significance because it did not represent an actual loss of a safety function.  
Inspection Report# : [2005002\(pdf\)](#)

**G****Significance:** Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**LACK OF HEAT EXCHANGER OVER PRESSURE PROTECTION**

A finding of very low safety significance was identified by the inspectors for a Non-Cited Violation of 10 CFR 50.55a. The licensee did not ensure that the essential service water (SX) system contained pressure relief devices or had administrative controls to relieve excessive system pressure as required by Article ND-7110 of the American Society of Mechanical Engineers (ASME) Code, Section III. Once identified, the licensee immediately initiated actions to strengthen the administrative controls to prevent overpressure. This issue also impacted the cross-cutting aspect of problem identification and resolution because the licensee had opportunities to identify the condition in October 2003.

This issue was more than minor because failing to provide overpressure protection to the Unit 0 Component Cooling Heat Exchanger served by SX could result in inoperability of the component or diverted SX flow. The issue was of very low safety significance because it was not a design issue or an actual loss of the system's safety function.

Inspection Report# : [2005002\(pdf\)](#)**G****Significance:** Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**NON-SAFETY RELATED THERMOSTATS USED FOR AUXILIARY FEEDWATER PUMP ROOM COOLERS**

A finding of very low safety significance was identified by the inspectors for a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." The thermostats that control the essential service water (SX) system 1/2SX168 valves were non-safety related and their failure could affect the SX cooler flow to the diesel driven auxiliary feedwater (AFW) pump rooms. The original design review of the component classification failed to address all failure modes. Once identified, the licensee immediately performed an operability determination and based on engineering judgment, concluded that the valves were operable.

This issue was more than minor because failing to ensure proper room cooling could impact the function of temperature sensitive equipment and could result in inoperability of a diesel driven AFW pump. The issue was of very low safety significance because it was a design issue which did not result in loss of function per Generic Letter GL 91-18.

Inspection Report# : [2005002\(pdf\)](#)


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## Barrier Integrity

**G****Significance:** Sep 30, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**FUEL HANDLING ERROR POTENTIALLY DAMAGES FUEL ASSEMBLY.**

A Non-Cited Violation (NCV) of TS 5.4.1a, having very low safety significance was self-revealed. Specifically, a fuel handler moving new fuel in the spent fuel pool failed to unlatch the fuel assembly after being lowered into the designated storage position, potentially damaging the fuel assembly as the bridge crane was trolleyed with the fuel assembly partially inserted in its storage location. The inspectors determined that the failure to detach the fuel assembly from the fuel handling tool prior to raising the assembly approximately three feet and moving the spent fuel pool bridge crane hoist trolley was a performance deficiency. This performance deficiency warranted a significance evaluation in accordance with Inspection Manual Chapter (IMC) 0612 "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening." The inspectors determined that the finding was more than minor because it is related to the human performance attribute of the barrier integrity cornerstone to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. A contributing cause to the fuel handling procedure violation is related to the Human Performance cross-cutting area. The operators failed to follow the procedure specified in OU-BY-204, "Fuel Handling Procedures in the Spent Fuel Pool for Byron", Revision 2.

Inspection Report# : [2005009\(pdf\)](#)**Significance: SL-III** Jun 30, 2005

Identified By: NRC

Item Type: VIO Violation

**Review of Missed Ventilation And Filtration System Technical Specification Surveillance Requirements**

On January 13, 2005, during a Nuclear Oversight Audit, the licensee identified that 15 Technical Specifications required ventilation surveillance tests were not performed. The licensee's subsequent root cause evaluation and investigation determined that the missed

surveillance tests were due to willful falsification of documents by a non-licensed employee. The licensee's associated extent of condition review identified 12 additional TS required ventilation surveillance tests that were also falsified. Upon performing the 27 falsified surveillance requirements, six failed. The NRC determined that this issue was a violation of Byron Station Technical Specifications. By providing false information regarding the surveillances, the non-licensed employee also caused the licensee to be in violation of 10 CFR 50.9, "Completeness and Accuracy of Information. In addition, the activities of the employee also placed himself in violation of 10 CFR 50.5, "Deliberate Misconduct." The enforcement aspects of this issue were described in the Notice of Violation EA-05-159, "Byron Station - Notice of Violation [NRC Office of Investigations Report No. 3-2005-008," from James L. Caldwell to Christopher M. Crane, dated October 27, 2005. This URI is closed.

Inspection Report# : [2005011\(pdf\)](#)

Inspection Report# : [2005004\(pdf\)](#)

**G**

**Significance:** Mar 31, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**FAILURE TO CONTROL CONTAINMENT PENETRATIONS IN ACCORDANCE WITH TECHNICAL SPECIFICATION 3.9.4C DURING CORE ALTERATIONS.**

A finding of very low safety significance and an associated NCV of TS 3.9.4c was identified by the NRC. Specifically, the inspectors determined that during the performance of local leak rate tests the licensee failed to maintain containment penetrations closed while core alterations were in progress as was required by the TS.

The finding was more than minor because it affected the configuration control, specifically containment boundary preservation, attribute associated with the Reactor Safety Barrier Integrity Cornerstone objective to provide reasonable assurance that physical barriers, specifically containment, protect the public from radionuclide releases caused by accidents or events. This finding was of very low safety significance because (1) the issue did not increase the likelihood of a loss of primary coolant system inventory; (2) the issue did not degrade the licensee's ability to terminate a leak path or add RCS inventory when needed; and (3) the issue did not degrade the licensee's ability to recover decay heat removal once lost. Furthermore, the issue only impacted the containment function without affecting core damage frequency, and was associated with a shutdown condition during periods when the reactor vessel water level was greater than or equal to the level required for fuel moves.

Inspection Report# : [2005003\(pdf\)](#)

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**Significance:** Mar 31, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**EXCEEDING 100% LICENSED POWER FOLLOWING THE IMPLEMENTATION OF THE ULTRASONIC FEEDWATER FLOW MEASURING INSTRUMENTS.**

A finding of very low safety significance and an associated NCV for operating in excess of the licensed thermal power limits was self-revealed. Specifically, it was determined that for periods between May 2000 and August 2003, the installed feedwater ultrasonic flow measurement instruments provided non-conservative data to the reactor power calculation which resulted in power operation greater than the licensed maximum thermal power output of 3586.6 megawatts thermal (100 percent power). Unit 1 operated with a maximum power level of 102.62 percent. Unit 2 operated with a maximum power level of 101.88 percent. This finding was related to the cross-cutting area of Problem Identification and Resolution (evaluation) because the licensee missed several opportunities to determine that an over power condition existed.

This finding was more than minor because it affected the Barrier Integrity Cornerstone objective of providing reasonable assurance that the physical design barrier of fuel cladding protect the public from radionuclide releases caused by accidents or events, and was associated with the attribute of design control (core design analysis). The finding was of very low safety significance because of the fuel cladding barrier was no degraded.

Inspection Report# : [2005003\(pdf\)](#)

**G**

**Significance:** Feb 11, 2005

Identified By: NRC

Item Type: NCV NonCited Violation

**INADEQUATE ACCEPTANCE CRITERIA FOR FLOW TEST**

A finding of very low safety significance was identified by the inspectors for a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." The acceptance criteria for the minimum service water flow through a reactor containment fan cooler (RCFC) as specified in 1/2BOSR 5.5.2-1, "Reactor Containment Fan Cooler Monthly Surveillance," was based on a higher system pressure than expected during the limiting design basis accident. Therefore, the licensee did not ensure that the TS required flow would be achieved at the lower pressure conditions. Once identified, the licensee performed an operability determination and concluded the fan coolers were operable. Additional actions including revising the procedures were being considered.

This issue was more than minor because reduced service water flow through the RCFC could impact the heat removal capability of the RCFCs. The issue was of very low safety significance because it did not represent a reduction in defense in depth with respect to the physical integrity of the reactor containment.

Inspection Report# : [2005002\(pdf\)](#)

## Emergency Preparedness

**Significance:** SL-IV Dec 31, 2005

Identified By: NRC

Item Type: VIO Violation

### **FAILURE TO OBTAIN PRIOR NRC APPROVAL FOR CHANGE TO AN EAL THAT DECREASED THE EFFECTIVENESS OF THE EMERGENCY PLAN**

The inspectors identified that the licensee had changed its standard emergency action level (EAL) scheme by revising one EAL's criteria for an Unusual Event declaration that addressed an unplanned radiological release in excess of effluent radiation monitor readings unless the release could be determined to be below Offsite Dose Calculation Manual limits within 15 minutes for releases that could not be terminated in 60 minutes or less. The inspectors determined that this EAL change decreased the effectiveness of the emergency plan, and that the licensee did not obtain prior NRC approval for this change, contrary to the requirements of 10 CFR 50.54(q). The licensee is evaluating the options to correct the EAL.

Because the issue affected the NRC's ability to perform its regulatory function, it was evaluated with the traditional enforcement process as specified in Section IV.A.3 of the Enforcement Policy. According to Supplement VIII of the Enforcement Policy, this finding was determined to be a Severity Level IV because it involved a failure to meet a requirement not directly related to assessment and notification. Further, this problem was isolated to one EAL and was not indicative of a functional problem with the EAL scheme. Additionally, because the violation was a Severity Level IV and the licensee entered this issue into its corrective action program this finding is being treated as a Severity Level IV Non-Cited Violation of 10 CFR 50.54(q).

Inspection Report# : [2005011\(pdf\)](#)

## Occupational Radiation Safety

**Significance:**  Mar 31, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **FAILURE TO EVALUATE RADIOLOGICAL CONDITIONS PRIOR TO A SIGNIFICANT EQUIPMENT CONFIGURATION CHANGE.**

One self-revealed finding of very low safety significance and an associated Non-Cited Violation was identified when, on March 12, 2005, the licensee failed to conduct an adequate evaluation of the radiological conditions prior to removing the charcoal adsorber portion of HEPA units associated with work on the Unit 1 steam generators. Subsequently, Unit 1 Containment radiological conditions changed such that several air monitors went into high alarm on the iodine channel and 28 personnel were found to have unintended, low-level, internal contamination.

The issue was more than minor because it was associated with the Human Performance attribute (a cross-cutting area) of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radioactive materials in that multiple workers received unintended dose from small intakes. In that the finding was no specifically related to ALARA or planning issues, there was no radiological overexposures, nor the substantial potential for an overexposure, and the licensee's ability to assess worker dose was not compromised, the finding was determined to be of very low safety significance. The licensee's corrective actions for this issue included reinstalling the charcoal adsorbers and initiating additional containment atmosphere treatment, revising procedures to include specific criteria for charcoal adsorber removal, and modifying the outage schedule such that charcoal adsorber removal is logically tied to steam generator manway installation. One Non-Cited Violation for the failure to adequately evaluate radiological conditions in accordance with 10 CFR 20.1501 was also identified.

Inspection Report# : [2005003\(pdf\)](#)

**Significance:**  Mar 31, 2005

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **FAILURE TO OBTAIN A RADIATION PROTECTION BRIEFING PRIOR TO AN ENTRY INTO A HIGH RADIATION AREA.**

One self-revealed finding of very low safety significance and an associated NCV was identified when, on March 9, 2005, a contract radiation worker, while supporting polar crane movement of equipment used for the upper internals split pin modification, entered a High Radiation Area (HRA) without receiving a high radiation area brief from the radiation protection staff as required by the Radiation Work Permit.

The primary cause of this finding was related to the cross-cutting area of Human Performance (personnel). This issue was more than minor because it was associated with the Human Performance attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radioactive materials in that two barriers (i.e., the HRA briefing and compliance with the HRA posting) in place to prevent unplanned, unintended worker dose failed. In that the finding was no specifically related to ALARA or planning issues, there were no radiological overexposures, nor the substantial potential for an overexposure,

and the licensee's ability to assess worker dose was not compromised, the finding was determined to be of very low safety significance. The licensee's corrective actions for this issue included enhancing the physical and administrative RP controls over HRAs within containment. One Non-Cited Violation for the failure to obtain a HRA briefing prior to entry into the area in accordance with licensee procedures and Technical Specification 5.4.1 was also identified.

Inspection Report# : [2005003\(pdf\)](#)

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## Public Radiation Safety

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## Physical Protection

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

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## Miscellaneous

**Significance:** N/A Jul 01, 2005

Identified By: NRC

Item Type: FIN Finding

### PI&R INSPECTION SUMMARY

Overall, the team concluded that problems were being adequately identified, evaluated, and corrected. Issues captured in the corrective action program were appropriately screened and evaluated for root or apparent causes and workers generally expressed positive views about the program. However, the team identified two concerns that cut across all the functional areas (problem identification, evaluation and resolution) of the corrective actions program. Specifically, the team identified that plant staff were sometimes too focused on the specific process being implemented than on the overall program. There were several instances where issues were identified during cause or operability evaluations, but were not fed back into the corrective action program, because it was not a specific requirement of the evaluation process. The team also noted that industry experience, especially Braidwood station experience, was underutilized in identifying or evaluating issues. The Nuclear Oversight organization was considered intrusive and challenged corrective action program performance based on the numerous examples of assessment findings reviewed during the inspection. The team also observed that the station had reasonably addressed previously identified NRC issues, but noted that Nuclear Oversight had identified some concerns with the corrective actions for those issues identified during the 2003 NRC Problem Identification and Resolution inspection.

Inspection Report# : [2005008\(pdf\)](#)

Last modified : March 03, 2006