

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-454; 50-455
License Nos: NPF-37; NPF-66

Report No: 50-454/455-98025(DRP)

Licensee: Commonwealth Edison Company

Facility: Byron Generating Station, Units 1 and 2

Location: 4450 N. German Church Road
Byron, IL 61010

Dates: November 24, 1998 - January 4, 1999

Inspectors: E. Cobey, Senior Resident Inspector
B. Kemker, Resident Inspector
C. Thompson, Illinois Department of Nuclear Safety

Approved by: Michael J. Jordan, Chief
Reactor Projects Branch 3

EXECUTIVE SUMMARY

Byron Generating Station Units 1 and 2 Byron Inspection Report 50-454/98025(DRP); 50-455/98025(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of inspection activities by the resident staff.

Operations

- The inspectors concurred with the licensee's conclusions regarding the unexpected reactor coolant system temperature transient during the performance of Byron Operating Surveillance (BOS) 3.4.2 b-1, "Unit Two Turbine Throttle and Governor Valve Quarterly Surveillance," Revision 4, and the inadvertent trip of the 2B chemical and volume control pump due to several personnel errors, insufficient training, and deficiencies in the corrective action program. The inspectors also concluded that the licensee's establishment of an event response team to investigate the causes of the event was appropriate. A Non-Cited Violation was issued for an operator's failure to implement Byron Operating Procedure CV-5, "Operation of the Reactor Makeup System in the Dilute and Alternate Dilute Mode," Revision 9. (Section O1.1)
- The inspectors concluded that the return to service of the 1C turbine driven feedwater pump was conducted in a safe and controlled manner. Specifically, the heightened level of awareness briefing was thorough; management oversight of the evolution was appropriate; and reactivity management during power level changes was effective. The inspectors also concluded that the licensee had not maintained control of the configuration of the pump's speed setter control potentiometer, which resulted in an operator not being able to adjust the speed of the pump. No violation of regulatory requirements occurred since the deficiency involved non-safety related equipment. (Section O1.2)
- The inspectors concluded that the licensee failed to maintain adequate configuration control of two installed temporary systems. The inspectors also concluded that the licensee's corrective actions for a similar issue, which was documented in NRC Inspection Report 50-454/98014(DRP); 50-455/98014(DRP), were not effective in preventing a recurrence. Both temporary systems were non-safety related; therefore, no violations of regulatory requirements occurred. (Section O2.1)
- The inspectors concluded that a system engineer re-positioned the common spent fuel pool heat exchanger return throttle valve, 0FC8754, without authorization from the operations department. The inspectors also concluded that previous corrective actions for a similar configuration control event, involving a system engineer's unauthorized operation of the Unit 1 loose parts monitoring system, had not been effective in preventing recurrence of a similar event. No violations of regulatory requirements were identified. (Section O2.2)

- The inspectors concurred with the licensee's conclusion that the position verification of containment penetration test, vent, and drain valves had not been performed at the frequency required by Technical Specification Surveillance Requirement 4.6.1.1.a. A Non-Cited Violation was issued. (Section O8.1)

Maintenance/Surveillance

- The inspectors concluded that observed maintenance activities were conducted well. Specifically, heightened level of awareness briefings for the maintenance activities were thorough including establishing contingency and compensatory actions where appropriate. Supervisory oversight of maintenance activities was evident. The inspectors identified an improperly performed independent verification of the termination of wiring connections. No violation of regulatory requirements occurred since the deficiency involved non-safety related equipment. (Section M1.1)
- The inspectors concluded that the observed surveillance tests were performed well. Specifically, the surveillance tests satisfied the requirements of the Technical Specifications; and each of the tested components met their respective acceptance criteria and remained operable. (Section M1.2)
- The inspectors concluded that cold weather preparations were not effectively implemented, in that, several components specified in Byron Operating Surveillance Requirement XFT-A1, "Freezing Temperature Equipment Protection," were not tested; identified deficiencies were not tracked to ensure that corrective actions were completed; and heat tracing and ventilation systems were not tested to ensure that these systems would operate in the configuration required for cold weather operations. No violation of regulatory requirements occurred since the deficiencies involved non-safety related equipment. (Section M1.3)
- The inspectors concluded that Byron Engineering Surveillances 1BVS 7.1.2.1.b.1-1, "Unit 1 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," and 2BVS 7.1.2.1.b.1-1, "Unit 2 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," unacceptably preconditioned the stroke time testing of the auxiliary feedwater discharge valves, 1/2AF004A/B, by not measuring the stroke time until the sixth time the valves were opened during the test. A violation was cited. (Section M1.4)

Engineering

- The inspectors concluded that the licensee failed to include the auxiliary feedwater pump discharge valves, 1/2AF004A/B, in the inservice testing program. An escalated enforcement item was issued to allow the licensee time to develop their corrective actions. (Section E1.1)

Report Details

Summary of Plant Status

The licensee operated Unit 1 at or near full power until December 23, 1998, when the licensee reduced power level to approximately 28 percent in response to a condenser tube leak which caused secondary plant chemistry parameters to exceed action level concentrations. On December 25, 1998, the licensee returned Unit 1 to full power and operated at or near full power for the remainder of the inspection period.

The licensee operated Unit 2 at or near full power for the duration of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Unexpected Reactor Coolant System Temperature Transient During Turbine and Governor Valve Testing

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the unexpected reactor coolant system temperature transient during the performance of Byron Operating Surveillance (BOS) 3.4.2.b-1, "Unit Two Turbine Throttle and Governor Valve Quarterly Surveillance," Revision 4. The inspectors interviewed operations department personnel, reviewed the surveillance test procedure, and evaluated the results of the licensee's investigation.

b. Observations and Findings

On December 13, 1998, the licensee performed BOS 3.4.2.b-1 at a higher power level than previously performed, 1020 megawatts electrical (MWe) instead of less than 900 MWe. Consequently, the valve position limit (VPL) was activated during the closure of the No.1 governor valve. When the VPL is not activated, the three governor valves that are not being tested automatically open or close to compensate for the change in steam flow due to the movement of the valve being tested. However, when the VPL is activated, movement of the governor valves that are not being tested is stopped and the digital electro-hydraulic control (DEHC) system feedback loops are deactivated. In order to clear the VPL condition, the unit power level has to be reduced. However, the operators failed to recognize that the VPL was activated. As a result, when the No.1 governor valve was subsequently re-opened, the reactor coolant system temperature dropped due to an increase in steam flow.

In response to the temperature transient, the operators stopped further opening of the No.1 governor valve and initiated a 200 gallon dilution to raise reactor coolant system temperature. During the dilution the operator attempted to reduce the amount of the dilution from 200 to 100 gallons by manipulation of the primary water totalizer. However,

manipulation of the primary water totalizer to reduce the amount of the dilution was not allowed by Byron Operating Procedure (BOP) CV-5, "Operation of the Reactor Makeup System in the Dilute and Alternate Dilute Mode," which required that the dilution be secured and reinitiated at the desired amount.

Prior to completion of the dilution, the operators recognized that the cause of the temperature transient was the activation of the VPL. As a result, the operators attempted to secure the dilution. However, due to a perceived time pressure and being distracted by an operator work around associated with the primary water deviation automatic isolation and alarm, the operator inadvertently tripped the 2B chemical and volume control (CV) pump instead of placing the makeup control switch in the "OFF" position to secure the dilution as specified by BOP CV-5.

Technical Specifications (TS) 6.8.1.a states that written procedures shall be established, implemented, and maintained for procedures recommended in Appendix A, of Regulatory Guide 1.33, Revision 2, February 1978. Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, specifies operation of the chemical and volume control system as an example of a pressurized water reactor system operating procedure. Byron Operating Procedure CV-5, "Operation of the Reactor Makeup System in the Dilute and Alternate Dilute Mode," Revision 9, is one of the chemical and volume control system operating procedures. The operator's manipulation of the primary water totalizer to reduce the amount of the dilution from 200 to 100 gallons, and, the operator's inadvertent tripping of the 2B CV pump instead of placing the makeup control switch in the "OFF" position to secure the dilution was a violation of TS 6.8.1.a for failure to implement BOP CV-5. This non-repetitive, licensee identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-455/98025-01(DRP)).

In response to these events, the operators restarted the 2B CV pump and notified the shift manager of the temperature transient and the inadvertent CV pump trip. The operators subsequently reduced the unit power level to clear the VPL and restarted BOS 3.4.2.b-1. During testing of the No. 2 governor valve, the VPL was again activated, which required the operators to further reduce the unit power level. Following the decrease in unit power level, the operators were able to successfully complete BOS 3.4.2.b-1. The licensee initiated a prompt investigation and established an event response team to determine the causes of the event.

The licensee's investigation revealed that: (1) operators had insufficient knowledge and procedural guidance on the operation of the DEHC system; (2) operator adherence to operating standards (e.g., self-checking and peer checking techniques, three-way communications, reactivity management, procedural adherence, and supervisory oversight) and their understanding of these standards were weak; (3) change management for conducting BOS 3.4.2.b-1 under different plant conditions was ineffective; and (4) corrective actions for previous events were not effectively implemented. The licensee's corrective actions for this event included: (1) training the operators on the operation of the DEHC system; (2) evaluating an upgrade to the training simulator for improvements in the modeling of the DEHC system; (3) revising BOS 3.4.2.b-1 and BOP CV-5; (4) implementing measures to reinforce adherence to operating standards; (5) improving the planning and scheduling processes to provide a

review for first time evolutions; (6) improving the procedure revision process to provide a method to identify internal commitments so that they are not inadvertently removed; and (7) implementing a human-factors corrective action on the CV pump control switches to prevent inadvertent operation. The inspectors concluded that the licensee's corrective actions were acceptable.

c. Conclusions

The inspectors concurred with the licensee's conclusions regarding the unexpected reactor coolant system temperature transient during the performance of Byron Operating Surveillance (BOS) 3.4.2.b-1, "Unit Two Turbine Throttle and Governor Valve Quarterly Surveillance," Revision 4, and the inadvertent trip of the 2B chemical and volume control pump due to several personnel errors, insufficient training, and deficiencies in the corrective action program. The inspectors also concluded that the licensee's establishment of an event response team to investigate the causes of the event was appropriate. A Non-Cited Violation was issued for an operator's failure to implement Byron Operating Procedure CV-5, "Operation of the Reactor Makeup System in the Dilute and Alternate Dilute Mode," Revision 9.

O1.2 Unit 1 Turbine Driven Main Feedwater (FW) Pump Return to Service Following Maintenance:

a. Inspection Scope (71707)

The inspectors observed the licensee's heightened level of awareness (HLA) briefing and return to service of the 1C turbine driven FW pump following maintenance, interviewed operations department personnel, and reviewed the following procedures:

- 1BGP 100-3 Power Ascension
- 1BGP 100-4 Power Dissension
- BOP FW-1a Unit 1 Startup of a Turbine Driven Main Feedwater Pump
- BOP FW-8 Shutdown of a Motor Driven Feedwater Pump

b. Observations and Findings

On December 13, 1998, the licensee reduced Unit 1 power level to 1050 MWe to return the 1C FW pump to service following planned maintenance. The inspectors observed the HLA briefing for the evolution and noted that the briefing was thorough. Specifically, the briefing included a discussion of the expected plant response and contingency actions, the chain of command, and the roles and responsibilities of the involved personnel. The inspectors also noted that a temporary change to BOP FW-8, which isolated recirculation flow for the motor driven FW pump to reduce the flow transient on the secondary plant during the pump shutdown, was briefed and subsequently performed well.

The inspectors identified that the operators did not use procedures as required by Byron Administrative Procedure (BAP) 340-1, "Use of Procedures for Operating Department," Revision 9, for the frequent boration and dilution evolutions conducted during the Unit 1 power dissension and ascension, respectively. Byron Administrative Procedure 340-1

requires, in part, that procedures be used "in-hand" to ensure procedural compliance for all main control room and in-plant activities. The inspectors observed that procedures were used "in-hand" for the initial performance of each evolution; however for each subsequent performance, the operators did not use or reference these procedures in any way. The inspectors concluded that while the operators did not use procedures as required by BAP 340-1, the evolutions were conducted correctly. The operators' failure to perform "in-hand" use of procedures during boration and dilution evolutions was a violation of TS 6.8.1.a for failure to implement BAP 340-1. This failure constitutes a violation of minor significance and is not subject to formal enforcement action.

In addition, the licensee experienced a delay in the startup of the 1C FW pump because the pump's speed setter control potentiometer was locked (the potentiometer locking device was engaged) which prevented the control room operator from raising pump speed when the pump was latched. The potentiometer was required to be unlocked to allow proper pump speed control. The licensee restored the speed setter control potentiometer to its correct configuration and completed the pump startup. At the end of the inspection period, the licensee's investigation into the failure to maintain the configuration of the potentiometer was in progress. Consequently, the licensee had not yet determined the cause for the failure to maintain the configuration of the potentiometer.

c. Conclusions

The inspectors concluded that the return to service of the 1C turbine driven feedwater pump was conducted in a safe and controlled manner. Specifically, the heightened level of awareness briefing was thorough; management oversight of the evolution was appropriate; and reactivity management during power level changes was effective. The inspectors also concluded that the licensee had not maintained control of the configuration of the pump's speed setter control potentiometer, which resulted in an operator not being able to adjust the speed of the pump. No violation of regulatory requirements occurred since the deficiency involved non-safety related equipment.

O2 Operational Status of Facilities and Equipment

O2.1 Failure to Control the Configuration of Temporary Systems

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the licensee's failure to control the configuration of two temporary systems. The inspectors interviewed engineering, maintenance, and operations department personnel and reviewed the following procedures: Nuclear Station Work Procedure (NSWP) A-21, "Temporary Modifications," Revision 0; BOP CF-31, "Operation of the Roger Mobile [Portable Pumping System] for Radiologically Noncontaminated System Draining," Revision 0; and Work Request (WR) 970004650-02, "Essential Service Water (SX) Drain Temporary Portable Pump Connection."

b. Observations and Findings

Failure to Control the Configuration of a Portable Pumping System

On November 24, 1998, the inspectors noted the temporary installation of a portable pumping system which had been used to drain the 0A main control room ventilation (VC) chiller to the SX system via the chemical feed (CF) system for maintenance. The inspectors recognized that the maintenance on the 0A VC chiller had been completed approximately one week earlier. The inspectors identified "equipment in use" tags attached to each end of the hose, which connected the portable pumping system to the CF system, that contained conflicting and outdated information. The inspectors also identified that the isolation valves between the portable pumping system and the SX system were open and that no personnel were attending the temporary equipment. Although the system valve lineup was not correct, the inspectors determined that the SX system was still operable.

The licensee concurred with the inspectors conclusion that positive control of the configuration of the system had not been maintained. Specifically, the isolation valves should have been closed and the portable pumping system disconnected when maintenance on the chiller was completed in accordance with BOP CF-31 and WR 970004650-02; the status of the installed equipment should have been tracked by the operations department and routinely checked on operator rounds for proper labeling and operation; and, the installation and projected removal dates of the equipment should have been noted on the system "status tracking" board in the shift manager's office. The portable pumping system was installed in the non-safety related CF system; therefore, no violation of regulatory requirements occurred. However, the inspectors were concerned since a similar issue with the licensee's failure to control the configuration of this portable pumping system was previously identified by the inspectors and was discussed in NRC Inspection Report 50-454/98014(DRP); 50-455/98014(DRP). The inspectors concluded that the licensee's corrective actions for that issue were not effective in preventing a recurrence.

Failure to Control the Configuration of a Cold Weather Protection Temporary Modification

On December 17, 1998, the inspectors identified that the portable heater installed by Temporary Modification 98-0-066, "Installation of Space Heater and Curtain to Provide Localized Heating at Fire Protection Panel 0PL52J in the Circulating Water Pump House," was energized with the fan secured contrary to the operating instructions for the heater unit. In response to the inspectors questions, the licensee secured the heater unit and initiated problem identification form (PIF) B1998-05235. The licensee subsequently identified that the operating instructions for the heater unit, which were contained in Temporary Modification 98-0-066, had not been incorporated into an operating aid or procedure upon installation of the temporary modification as required by NSWP-A-21. Consequently, the operators were unaware of the instructions and that the heater unit was improperly secured on December 16, 1998. Since the temporary modification was non-safety related, no violation of regulatory requirements occurred.

c. Conclusions

The inspectors concluded that the licensee failed to maintain adequate configuration control of two installed temporary systems. The inspectors also concluded that the licensee's corrective actions for a similar issue, which was documented in NRC Inspection Report 50-454/98014(DRP); 50-455/98014(DRP), were not effective in preventing a recurrence. Both temporary systems were non-safety related; therefore, no violations of regulatory requirements occurred.

O2.2 Failure to Control the Configuration of a Spent Fuel Pool (SFP) Cooling System Valve

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the licensee's failure to control the configuration of the common SFP heat exchanger return throttle valve, 0FC8754. The inspectors interviewed operations and engineering department personnel and reviewed Apparent Cause Evaluation Report 454-201-98-CAQ03564, "Spent Fuel Pool Pump Flow Discrepancy."

b. Observations and Findings

On December 9, 1998, a non-licensed operator identified that the Unit 1 SFP pump suction pressure had decreased below its minimum acceptable value and that pump discharge pressure had also decreased below its previously recorded value. The operating shift's investigation revealed that earlier in the day a system engineer had changed the position of 0FC8754 while performing surveillance testing to verify the operation of a malfunctioning ultrasonic flowmeter. The system engineer manipulated the valve without authorization from the operating shift contrary to Byron Station management's expectations and policy. The non-licensed operator restored the system's operating parameters to within acceptable values. There were no adverse effects on the pump or the SFP cooling system and no violations of regulatory requirements were identified.

A similar configuration control event was documented in NRC Inspection Report 50-454/98017(DRP); 50-455/98017(DRP) where a system engineer rendered the Unit 1 loose parts monitoring system inoperable by inappropriately manipulating system equipment without authorization from the operations department. In this instance, the engineer did not understand the impact of his actions on the operability of the system and performed activities outside the scope of what had been authorized by the operating shift. The licensee's corrective actions for the event included appropriate measures to address the specific event; however, the inspectors were concerned because these corrective actions failed to prevent recurrence of a similar event.

The licensee's corrective actions for the unauthorized operation of 0FC8754 included: (1) discussing this event and similar events that had recently occurred with the system engineering department to re-enforce management's expectation that system engineers are not to manipulate plant equipment; and (2) formal discipline and counseling for the system engineer involved in this event. The inspectors considered the licensee's corrective actions acceptable.

c. Conclusions

The inspectors concluded that a system engineer re-positioned the common spent fuel pool heat exchanger return throttle valve, 0FC8754, without authorization from the operations department. The inspectors also concluded that previous corrective actions for a similar configuration control event, involving a system engineer's unauthorized operation of the Unit 1 loose parts monitoring system, had not been effective in preventing recurrence of a similar event. No violations of regulatory requirements were identified.

O8 Miscellaneous Operations Issues (92700)

- O8.1 (Closed) LER 50-454/97015: "Containment Penetration Test, Vent and Drain Valves Not Surveilled Within 31 Days Due to Difference in Interpretation." In October 1995, the licensee revised their surveillance test procedures governing the verification of primary containment isolation valves under the provisions of 10 CFR Part 50.59 to change the position verification frequency for test, vent, and drain valves from 31 days to once per entry into cold shutdown if not done with the previous 92 days. The change was made based on the licensee's technical review which determined that no testing requirements were established for the test, vent, and drain valves. Also, administrative controls were put into place to ensure proper positioning of these valves. On June 16, 1997, the NRC issued "Safety Evaluation by the Office of Nuclear Reactor Regulation Catawba Containment Integrity Positions (Region II Task Interface Agreement 96-015)" which stated that containment penetration test, vent, and drain valves were required for containment isolation; therefore, the position of the test, vent, and drain valves must be verified every 31 days in accordance with Technical Specification Requirement 4.6.1.1.a. The licensee reviewed this safety evaluation in August 1997 and concluded that the change in test frequency for their test, vent, and drain valves placed both units in a condition prohibited by TS.

Technical Specification Surveillance Requirement 4.6.1.1.a requires, in part, that primary containment integrity shall be demonstrated at least once per 31 days by verifying that all penetrations not capable of being closed by operable containment automatic isolation valves and required to be closed during accident conditions are closed by valves, blind flanges, or deactivated automatic valves secured in their positions. As a result of changes to their procedures governing the verification of primary containment isolation valves, the licensee failed to verify containment penetration test, vent, and drain valves closed once per 31 days. This was a violation of TS Surveillance Requirement 4.6.1.1.a. This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-454/455-98025-02(DRP)).

Although the valves had not been verified closed within the required frequency, they remained closed by administrative controls. The licensee confirmed this by performing the surveillance test for all test, vent, and drain valves upon determination that the 31 day verification requirement had not been met. The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance Observations

a. Inspection Scope (62707)

The inspectors interviewed operations, engineering and maintenance department personnel and observed the performance of all or portions of the work requests (WR) listed below. When applicable, the inspectors also reviewed TS and the Updated Final Safety Analysis Report (UFSAR). Maintenance associated with the component cooling water pump and the emergency diesel generator were selected for observation since they were identified as risk significant components in the Byron Station Individual Plant Examination. In addition, the inspectors observed the inverter and connector replacement in the annunciator system logic cabinet, 2PA19J, due to the potential to lose all alarms in the Unit 2 control room.

- WR 950103657-01 1B Emergency Diesel Generator Room Ventilation Bypass Damper Troubleshoot and Repair
- WR 960011878-01 1B Emergency Diesel Generator Room Ventilation Bypass Damper Alignment
- WR 980116195-01 2B Component Cooling Water Pump Elevated Axial Outboard Motor Bearing Vibration Troubleshoot and Repair
- WR 980133087-01 2PA19J Replace Inverter/Connector

b. Observations and Findings

Inverter and Connector Replacement in the Annunciator System Logic Cabinet 2PA19J

On December 22, 1998, the inspectors observed the heightened level of awareness briefing and the maintenance activities associated with WR 980133087-01, "2PA19J Replace Inverter/Connector." The inspectors noted that the heightened level of awareness briefing for the maintenance activities was thorough, the operating shift had developed contingency and compensatory actions for the possible loss of all annunciators in the Unit 2 control room; and supervisory oversight of the maintenance activities was heightened appropriately. The inspectors concluded that the licensee's preparations for the maintenance activity were thorough and effective.

While observing the maintenance activity, the inspectors identified that the Maintenance Alteration Log indicated that the six wires associated with the inverter were determined; however, each of the wires had previously been terminated to the replacement inverter in the maintenance shop. Byron Administrative Procedure 100-25, "Independent Verification," Revision 1, Section C.5.e, describes the process for conducting an independent verification during the termination and determination of electrical cables, conductors, and wires. Specifically, the first person identifies the correct unit, equipment, panel, device, terminal point and the conductors to be

terminated or determinated. The second person, apart in action, verifies the correct unit, equipment, panel, device, terminal point and the conductors to be terminated or determinated and concurs with the first person. The first person then terminates or determinates one lead at a time and initials the Maintenance Alteration Log. The process is then repeated for each lead. Based on discussions with the involved maintenance technicians, the inspectors concluded that the independent verification process had not been rigorously adhered to during the termination of the six wires on the replacement inverter; however, the wiring terminations had been performed correctly and no adverse consequences resulted from the improperly performed independent verification.

c. Conclusions

The inspectors concluded that observed maintenance activities were conducted well. Specifically, heightened level of awareness briefings for the maintenance activities were thorough including establishing contingency and compensatory actions where appropriate. Supervisory oversight of maintenance activities was evident. The inspectors identified an improperly performed independent verification of the termination of wiring connections. No violation of regulatory requirements occurred since the deficiency involved non-safety related equipment.

M1.2 Surveillance Test Observations

a. Inspection Scope (61726)

The inspectors interviewed operations and engineering personnel, reviewed the completed test documentation and applicable portions of the UFSAR and TS, and observed the performance of selected portions of the following surveillance test procedures.

- 1BOS 3.2.1-804 Unit One ESFAS [Engineered Safety Feature Actuation Signal] Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K609)
- 1BOS 3.2.1-805 Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K610)
- 1BOS 3.2.1-807 Unit One ESFAS instrumentation Slave Relay Surveillance (Train A Feedwater Isolation, Safety Injection - K630)
- 1BOS 3.2.1-811 Unit One ESFAS Instrumentation Slave Relay Surveillance (Train B Automatic Safety Injection - K603)
- 1BOS 3.2.1-817 Unit One ESFAS Instrumentation Slave Relay Surveillance (Train B Feedwater Isolation, Safety Injection - K630)
- 1BOS 3.2.1-860 Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Containment Isolation Phase B - K618, K626)
- 1BOS 3.2.1-931 Unit One ESFAS Instrumentation Slave Relay Surveillance (Train B Turbine Trip - K640)
- 1BOS 3.2.1-991 Unit One ESFAS Instrumentation Slave Relay Surveillance (Train B Feedwater Pump Trip, Steam Generator Level Hi-Hi - K621)

- 2BOS 2.1.1.b-1 Unit Two Axial Flux Difference (AFD) Monitor Alarm Inoperable Surveillance
- 2BOS 6.2.3.a-1 Unit Two Reactor Containment Fan Cooler Monthly Surveillance
- 1BVS XPT-21 Unit One Control Rod System Checkout Following Refueling
- 1BVS 5.2.F.2-2 Unit One ASME [American Society of Mechanical Engineers] Surveillance Requirements for Safety Injection Pump 1SI01PB

c. Conclusions

The inspectors concluded that the observed surveillance tests were performed well. Specifically, the surveillance tests satisfied the requirements of the TSs; and each of the tested components met their respective acceptance criteria and remained operable.

M1.3 Cold Weather Preparations

a. Inspection Scope (71714)

The inspectors evaluated the licensee's cold weather preparations, interviewed operating and engineering department personnel, and reviewed Byron Operating Surveillance Requirement (BOSR) XFT-A1, "Freezing Temperature Equipment Protection."

b. Observations and Findings

During review of 0BOSR XFT-A1, which had been completed on October 30, 1998, the inspectors noted that the licensee had identified approximately 40 equipment deficiencies during the performance of this surveillance test. The inspectors identified that 6 components listed in 0BOSR XFT-A1 had not been tested and no tracking mechanism existed to ensure that these components would be tested. The inspectors also identified that an action request to repair a component had been inappropriately canceled without correcting the deficiency. In response to the inspectors questions, the licensee initiated PIF B1998-05248 and re-performed selected portions of 0BOSR XFT-A1 on December 18, 1998.

In addition, following completion of 0BOSR XFT-A1 on October 30, 1998, the inspectors noted that the licensee had secured or repositioned equipment due to unusually warm weather experienced in November 1998. However, the licensee had not effectively maintained the status of this equipment. Consequently, the licensee re-performed selected portions of 0BOSR XFT-A1 on three separate occasions between December 20, 1998, and January 4, 1999. During the performance of these partial surveillance tests, the licensee identified an additional 24 equipment deficiencies, 11 of which were recurring.

The inspectors also identified that the licensee did not test or perform periodic maintenance on the heat tracing systems that were energized during the performance of 0BOSR XFT-A1. As a result, the licensee did not have any indication of whether or not

these systems were operable. In response to the inspectors questions, the licensee successfully tested each of the heat tracing systems to verify that they were operable. The inspectors also noted that the licensee did not test ventilation system dampers, which were required to change position during cold weather operations. Consequently, the licensee did not identify that several dampers in the diesel generator and switchgear ventilation systems were not operable until cold weather conditions occurred. At the end of the inspection period, the licensee was evaluating changes to 0BOSR XFT-A1 to improve the effectiveness of their cold weather preparations. However, these failures did not effect operability of TS required equipment.

Conclusions

The inspectors concluded that cold weather preparations were not effectively implemented, in that, several components specified in Byron Operating Surveillance Requirement XFT-A1, "Freezing Temperature Equipment Protection," were not tested; identified deficiencies were not tracked to ensure that corrective actions were completed; and heat tracing and ventilation systems were not tested to ensure that these systems would operate in the configuration required for cold weather operations. No violation of regulatory requirements occurred since the deficiencies involved non-safety related equipment.

M1.4 Preconditioning of Auxiliary Feedwater (AF) Valves During Surveillance Testing

a. Inspection Scope (61726)

The inspectors interviewed operations and engineering department personnel and reviewed Byron Engineering Surveillances (BVSs) 1BVS 7.1.2.1.b.1-1, "Unit 1 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," 2BVS 7.1.2.1.b.1-1, "Unit 2 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," 1BVS 7.1.2.1.b.2-1, "Unit 1 Auxiliary Feedwater Pump Emergency Actuation Signal Verification Test," and 2BVS 7.1.2.1.b.2-1, "Unit 2 Auxiliary Feedwater Pump Emergency Actuation Signal Verification Test." The inspectors also reviewed Byron Site Policy Memo 600.12, "Preconditioning," and the applicable portions of the UFSAR and TS.

b. Observations and Findings

As documented in NRC Inspection Report 50-454/98020(DRP); 50-455/98020(DRP), the inspectors identified that the stroke time testing of the AF pump discharge valves, 1/2AF004A/B, was preconditioned, in that, the stroke time measurement was performed on the sixth open stroke instead of the first open stroke of the valves. The licensee's subsequent investigation revealed that the preconditioning of the testing occurred due to insufficient sensitivity to preconditioning issues during procedure development and review. The licensee's corrective actions for this issue included: (1) revising 1/2BVS 7.1.2.1.b.1-1 and 1/2BVS 7.1.2.1.b.2-1 to remove the test preconditioning; (2) revising BAP 1310-A2, "Procedure Review Checklist," or other appropriate document to require that all surveillances are reviewed for preconditioning; (3) reviewing all operating and engineering surveillance test procedures for preconditioning situations; and (4) reviewing the work scheduling process to ensure consistency with Byron Site

Policy Memo 600.12. The inspectors concluded that the licensee's corrective actions were acceptable.

10 CFR Part 50, Appendix B, Criteria XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions. Byron Site Policy Memo 600.12, "Preconditioning," Revision 0, defines preconditioning as the unacceptable practice of "grooming" a component prior to a surveillance in such a way that the results of the surveillance test are invalidated. In addition, Byron Site Policy Memo 600.12 specifies, in part, that preconditioning is unacceptable.

Technical Specification Surveillance Requirement 4.7.1.2.1.c.(1) requires that each auxiliary feedwater pump be demonstrated operable at least once per 18 months during shutdown by verifying that each automatic valve in the flowpath actuates to its correct position upon receipt of an auxiliary feedwater actuation test signal. Updated Final Safety Analysis Report, Section 10.4.9.3.1, specifies, in part, that an auxiliary feedwater pump can deliver at least 160 gpm to each of three unfaulted steam generators within 1 minute without operator action. Byron Engineering Surveillances 1BVS 7.1.2.1.b.1-1, "Unit 1 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," and 2BVS 7.1.2.1.b.1-1, "Unit 2 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," satisfy TS Surveillance Requirement 4.7.1.2.1.c.(1) and demonstrate that the open stroke time of the auxiliary feedwater pump discharge valves, 1/2AF004A/B, support the auxiliary feedwater flow requirement specified in UFSAR, Section 10.4.9.3.1. The failure of the licensee's test controls to ensure that the stroke time testing of 1/2AF004A/B was not preconditioned and to demonstrate that 1/2AF004A/B would perform satisfactorily in service, is considered a violation of 10 CFR Part 50, Appendix B, Criteria XI, (50-454/455-98025-03(DRP)).

c. Conclusions

The inspectors concluded that Byron Engineering Surveillances 1BVS 7.1.2.1.b.1-1, "Unit 1 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," and 2BVS 7.1.2.1.b.1-1, "Unit 2 Auxiliary Feedwater Valve Emergency Actuation Signal Verification Test," unacceptably preconditioned the stroke time testing of the auxiliary feedwater discharge valves, 1/2AF004A/B, by not measuring the stroke time until the sixth time the valves were opened during the test. A violation was cited.

M8 Miscellaneous Maintenance Issues (92700, 92902)

M8.1 (Closed) EEI 50-454/455-98020-02(DRP): "Unacceptable Preconditioning of the Auxiliary Feedwater Pump Discharge Valves, 1/2AF004A/B." This issue is discussed in Section M1.4 of this report. This escalated enforcement item is closed.

- M8.2 (Closed) Violation 50-454/455-97022-01(DRP): "Inadequate Procedure for 2B Chemical and Volume Control (CV) Pump Fill and Vent." An appropriate procedure was not available to provide instructions for venting the 2B CV pump and connecting system piping after maintenance was performed which partially drained the pump and system. The maintenance evolution was not routine, and as such, a specific procedure should have been prepared to vent the pump. An existing procedure for venting the pump was not appropriate for the task since it utilized flow paths outside the out-of-service isolation boundary. The lack of an appropriate venting procedure resulted in the pump being vented using craft capability and the pump recirculation line being vented using a temporary procedure change to a system surveillance test procedure.

The inspectors reviewed the licensee's corrective actions to check for any notable weaknesses. No weaknesses were identified and the corrective actions were found to be acceptable. This violation is closed.

- M8.3 (Closed) Violation 50-454/455-97008-02(DRP): "Failure to Test 2B Auxiliary Feed (AF) Pump Under Suitable Conditions." During performance of ASME surveillance testing, the 2B diesel driven AF pump failed to start on the initial series of engine cranks. The licensee then started the engine locally for the surveillance test. After completion of the ASME surveillance, the licensee selected the engine's alternate battery bank and performed the quarterly TS surveillance test which required that the engine start on a slave relay signal. The inspectors concluded that performance of the ASME surveillance (using the local manual start) preconditioned the engine prior to the slave relay start surveillance test.

The inspectors reviewed the licensee's initial corrective actions and found them to be acceptable. The licensee has also initiated a corrective action plan to correct other problems with preconditioning at Byron Station. The effectiveness of these actions will take time to determine. The inspectors considered this violation closed with the long term corrective actions to be reviewed with Violation 50-454/455-98025-03(DRP).

- M8.4 (Closed) LER 50-454/97012: "Plant Shutdown Required Within 48 Hours Per TS." This event was originally discussed in NRC Inspection Report 50-454/97008(DRP); 50-455/97008(DRP). The active train of the hydraulic system for the 1A main steam isolation valve failed during a partial stroke surveillance. The licensee was unable to repair the system prior to the expiration of the 48-hour limiting condition for operation and performed a plant shutdown. The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 Failure to Include Valves in the Inservice Test (IST) Program

a. Inspection Scope (37551)

The inspectors reviewed "Byron's Second Interval Inservice Testing Plan Pumps and Valves," Revision 1a, and applicable portions of Section XI of the ASME Boiler and Pressure Vessel Code. The inspectors also interviewed engineering department personnel and reviewed the following surveillance test procedures.

- 1BOS 7.1.2.1.a-1 1A Train Auxiliary Feedwater Monthly Surveillance
- 1BOS 7.1.2.1.a-2 1B Train Auxiliary Feedwater Monthly Surveillance
- 1BOS 7.1.2.2-1 Unit One Train A Auxiliary Feedwater Flowpath Operability Surveillance Following Cold Shutdown
- 1BOS 7.1.2.2-2 Unit One Train B Auxiliary Feedwater Flowpath Operability Surveillance Following Cold Shutdown
- 2BOS 7.1.2.1.a-1 2A Train Auxiliary Feedwater Monthly Surveillance
- 2BOS 7.1.2.1.a-2 2B Train Auxiliary Feedwater Monthly Surveillance
- 2BOS 7.1.2.2-1 Unit Two Train A Auxiliary Feedwater Flowpath Operability Surveillance Following Cold Shutdown
- 2BOS 7.1.2.2-2 Unit Two Train B Auxiliary Feedwater Flowpath Operability Surveillance Following Cold Shutdown

b. Observations and Findings

During the review of the preconditioning of the auxiliary feedwater pump discharge valves, 1/2AF004A/B, which is discussed in Section M1.4 of this report, the inspectors noted that the valves were not included within the scope of the IST program. The inspectors questioned the basis for the exclusion of the valves from the IST program. In response to the inspectors questions, the licensee concluded that the valves should have been included within the scope of the IST program and initiated PIF B1998-05172 to address the issue. The inspectors also determined that the IST requirement for 1/2AF004A/B was satisfied by performance of the more restrictive TS Surveillance Requirements accomplished during the completion of the 8 surveillance test procedures listed above. The licensee subsequently identified that the safety injection pump suction valves, 1/2SI8923A/B, also were not included within the scope of the IST program, but should have been, and initiated PIF B1998-05242 to address the issue. Consequently, the inspectors were concerned that a potential programmatic issue existed with the scoping of the IST program.

Technical Specification Surveillance Requirement 4.0.5.a states, in part, that inservice testing of ASME Code Class 1,2, and 3 pumps and valves shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code. Section XI of the ASME Boiler and Pressure Vessel Code, IWV-1100, "Valve Testing," states that valve testing shall be performed in accordance with the requirements stated in

ASME/ANSI OM Part 10. ASME/ANSI OM Part 10, "Inservice Testing of Valves in Light-Water Reactor Power Plants," Section 1, requires, in part, that active or passive valves which are required to perform a specific function in shutting down the reactor to the cold shutdown condition, in maintaining the cold shutdown condition, or in mitigating the consequences of an accident are required to be included in the IST program.

The auxiliary feedwater pump discharge valves, 1/2AF004A/B, are ASME Code Class 3 valves which have a passive open safety function in mitigating the consequences of accidents. The failure to include the auxiliary feedwater pump discharge valves, 1/2AF004A/B, in the IST program is considered an apparent violation of TS 4.0.5.a (Escalated Enforcement Item 50-454/455-98025-04(DRP)). This issue may represent a violation of NRC requirements, will remain open for a reasonable time to allow the licensee to develop its corrective actions.

c. Conclusions

The inspectors concluded that the licensee failed to include the auxiliary feedwater pump discharge valves, 1/2AF004A/B, in the inservice testing program. An escalated enforcement item was issued to allow the licensee time to develop their corrective actions.

IV. Plant Support

F8 Miscellaneous Fire Protection Issues (71750, 92904)

- F8.1 (Closed) Violation 50-454/455-97024-01(DRP): "Oil Soaked Rags Found in a 55-Gallon Barrel Without a Self Closing Lid." The inspectors identified a 55-gallon barrel outside the 1A chemical and volume control pump room that contained oil soaked rags. Byron Administrative Procedure 1100-9, "Control, Use, and Storage of Flammable and Combustible Liquids and Aerosols," required that oil soaked rags be disposed of in an approved waste can with a self closing lid. The inspectors reviewed the licensee's corrective actions to check for any notable weaknesses. No weaknesses were identified and the corrective actions were found to be acceptable. This violation is closed.
- F8.2 (Closed) Violation 50-454/455-97024-02(DRP): "Failure to Obtain a Transient Fire Load Permit." The inspectors identified 13 containers of Carboline staged near the Unit 2 fuel transfer canal control panel without an approved Transient Fire Load Permit. Byron Administrative Procedure 1100-9, "Control, Use, and Storage of Flammable and Combustible Liquids and Aerosols," required that all flammable and combustible liquid containers transported into plant areas, which will be left unattended, shall have prior authorization by the Station Fire Marshall/designee. Authorization shall be accomplished by approval of a Transient Fire Load Permit by the Station Fire Marshall/designee. The inspectors reviewed the licensee's corrective actions to check for any notable weaknesses. No weaknesses were identified and the corrective actions were found to be acceptable. This violation is closed.

F8.3 (Closed) Violation 50-454/455-98005-05a, b, and c(DRP): "Failure to Control Transient Combustible Materials." The inspectors identified multiple examples of the licensee's failure to implement the transient combustible material control program. This violation was also discussed in NRC Inspection Report 50-454/98017(DRP); 50-455/98017(DRP). The inspectors reviewed the licensee's corrective actions to check for any notable weaknesses. No weaknesses were identified and the corrective actions were found to be acceptable. This violation is closed.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on January 4, 1999. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

K. Graesser, Site Vice President
W. Levis, Station Manager
B. Adams, Regulatory Assurance Manager
T. Gierich, Operations Manager
B. Kouba, Engineering Manager
T. Schuster, Work Control Manager
M. Snow, Maintenance Manager
J. Stone, Nuclear Oversight Manager

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71714:	Cold Weather Preparations
IP 71750:	Plant Support Activities
IP 92700:	Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92902:	Follow-up Maintenance
IP 92904:	Follow-up Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-455/98025-01	NCV	Failure to Implement BOP CV-5
50-454/455-98025-02	NCV	Failure to Verify the Position of Containment Penetration Test, Vent and Drain Valves in Accordance with TS Surveillance Requirement 4.6.1.1.a
50-454/455-98025-03	VIO	Unacceptable Preconditioning of the Auxiliary Feedwater Pump Discharge Valves, 1/2AF004A/B
50-454/455-98025-04	EEl	Failure to Include Valves in the IST Program

Closed

50-455/98025-01	NCV	Failure to Implement BOP CV-5
50-454/455-98025-02	NCV	Failure to Verify the Position of Containment Penetration Test, Vent and Drain Valves in Accordance with TS Surveillance Requirement 4.6.1.1.a
50-454/97015	LER	Containment Penetration Test, Vent and Drain Valves Not Surveilled Within 31 Days Due to Difference in Interpretation
50-454/455-98020-02	EEl	Unacceptable Preconditioning of the Auxiliary Feedwater Pump Discharge Valves, 1/2AF004A/B
50-454/455-97022-01	VIO	Inadequate Procedure for 2B CV Pump Fill and Vent
50-454/455-97008-02	VIO	Failure to Test 2B AF Pump Under Suitable Conditions
50-454/97012	LER	Plant Shutdown Required Within 48 Hours Per TSs
50-454/455-97024-01	VIO	Oil Soaked Rags Found in a 55-Gallon Barrel Without a Self Closing Lid
50-454/455-97024-02	VIO	Failure to Obtain a Transient Fire Load Permit
50-454/455-98005-05a, b, c	VIO	Failure to Control Transient Combustible Materials

LIST OF ACRONYMS USED

AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
BAP	Byron Administrative Procedure
BOP	Byron Operating Procedure
BOS	Byron Operating Surveillance
BOSR	Byron Operating Surveillance Requirement
BVS	Byron Engineering Surveillance
CF	Chemical Feed
CV	Chemical and Volume Control
DEHC	Digital Electro-Hydraulic Control
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
EEI	Escalated Enforcement Item
ESFAS	Engineered Safety Feature Actuation Signal
FW	Feedwater
HLA	Heightened Level of Awareness
IST	Inservice Testing
LER	Licensee Event Report
MWe	Megawatt Electrical
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
NSWP	Nuclear Station Work Procedure
PDR	Public Document Room
PIF	Problem Identification Form
SFP	Spent Fuel Pool
SX	Essential Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VC	Control Room Ventilation
VIO	Violation
VPL	Valve Position Limit
WR	Work Request