UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
801 WARRENVILLE ROAD
LISLE, ILLINOIS 60532-4351

February 07, 2000

EA 2000-012

Mr. Oliver D. Kingsley
President, Nuclear Generation Group
Commonwealth Edison Company
ATTN: Regulatory Services
Executive Towers West III
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: BYRON INSPECTION REPORT 50-454/99020(DRP); 50-455/99020(DRP)

Dear Mr. Kingsley:

On January 18, 2000, the NRC completed an inspection at the Byron 1 and 2 reactor facilities. The enclosed report presents the results of that inspection.

During this inspection period, your conduct of activities were generally characterized by safe and controlled operations, sound maintenance and engineering practices, and appropriate radiological controls.

Based on the results of this inspection, the NRC has determined that one violation of NRC requirements occurred. This violation is being treated as a Non-Cited Violations (NCV), consistent with Section VII.B.1.a of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or severity level of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region III; and the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Temptate NMSS/RGN-005

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be placed in the NRC Public Document Room.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

Michael J. Jordan, Chief
Reactor Projects Branch 3

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

Enclosure: Inspection Report 50-454/99020(DRP);
50-455/99020(DRP)

cc w/encl: D. Helwig, Senior Vice President, Nuclear Services
C. Crane, Senior Vice President, Nuclear Operations
H. Stanley, Vice President, Nuclear Operations
R. Krich, Vice President, Regulatory Services
DCD - Licensing
W. Levis, Site Vice President
R. Lopriore, Station Manager
K. Moser, Acting Regulatory Assurance Manager
M. Aguilar, Assistant Attorney General
State Liaison Officer
State Liaison Officer, State of Wisconsin
Chairman, Illinois Commerce Commission

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/s/ M. Jordan

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-454; 50-455
License Nos:	NPF-37; NPF-66
Report No:	50-454/99020(DRP); 50-455/99020(DRP)
Licensee:	Commonwealth Edison Company
Facility:	Byron Generating Station, Units 1 and 2
Location:	4450 N. German Church Road Byron, IL 61010
Dates:	December 7, 1999 - January 18, 2000
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 Division of Reactor Projects

EXECUTIVE SUMMARY

Byron Generating Station Units 1 and 2
NRC Inspection Report 50-454/99020(DRP); 50-455/99020(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

- Operations of the facility were conducted in a safe and controlled manner. Operators closely monitored plant parameters, followed procedures while conducting plant operations, and generally communicated effectively. (Section O1.1)

- Unit 2 experienced an automatic reactor trip from full power due to a fault on offsite line 0622 and a failure of an auxiliary relay contact associated with air circuit breaker 10-11. Following the reactor trip, all of the safety related systems operated as designed; however, various nonsafety-related equipment failures occurred, including the recurring failure of numerous feedwater heater relief valves. While the nonsafety-related equipment problems were a distraction for the plant operators, the operators effectively controlled and stabilized plant parameters following the reactor trip. (Section O1.2)

- The Unit 2 reactor startup from forced outage B2F20 was conducted in a safe and controlled manner. Specifically, operators followed plant startup procedures, generally responded to main control room annunciators appropriately, and usually used proper three-way communications. In addition, the senior reactor operators demonstrated effective command and control and reactivity management during the startup. (Section O1.3)

- Byron Station's preparations for the Year 2000 (Y2K) rollover were effective. Consequently, Byron Station did not experience any equipment problems due to the Y2K rollover. (Section O1.4)

- Three fuel handlers incorrectly identified/verified the position of the spent fuel pool (SFP) bridge crane over a designated fuel assembly storage location, which resulted in the mis-positioning of a fuel assembly within the SFP during fuel movement. (Section O2.1)

- The inspectors concluded that implementation of the Byron Station Workforce Contingency Manning Plan would not adversely impact the safe operation of the facility. (Section O8.1)

Maintenance/Surveillance

- Observed surveillance tests were performed well. Each of the tested components met their respective acceptance criteria and each of the surveillance tests were found to satisfy the requirements of the Technical Specifications. (Section M1.1)

- Observed maintenance activities were generally conducted well. Maintenance personnel were knowledgeable of the tasks and professionally completed the work. (Section M1.2)

- The inspectors concluded that the licensee failed to appropriately assess performance criteria for the essential service water (SX) system ultimate heat sink temperature control function when the 0B SX cooling tower to basin bypass valve, 0SX162B, exceeded its availability criteria during maintenance work in September 1998. The inspectors also concluded that the operations department's delay in returning 0SX162B to service resulted in unnecessary unavailability of the valve. (Section M2.1)

Engineering

- The licensee failed to incorporate appropriate post modification testing requirements from applicable design documents into work request instructions and to document completion of the post modification testing requirements when performing a temporary modification to the safety related non-accessible area exhaust filter plenum ventilation system. A Non-Cited Violation was issued. (Section E1.1)

Report Details

Summary of Plant Status

The licensee operated Unit 1 at or near full power for the duration of the inspection period.

The licensee operated Unit 2 at or near full power until January 13, 2000, when the unit experienced an automatic reactor trip due to a fault on offsite line 0622 and a failure of an auxiliary relay contact associated with air circuit breaker 10-11. Following the reactor trip, the licensee maintained Unit 2 in Mode 3, Hot Standby. On January 14, 2000, the licensee conducted a reactor startup and synchronized the unit to the grid. The licensee operated the unit at or near full power for the remainder of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Observations (71707)

The inspectors routinely observed the conduct of plant operations from the main control room, including shift turnover briefings, operator narrative logs, main control room annunciator response, and main control room board walkdowns. The inspectors observed consistent safety-conscious performance by control room operators. Operators closely monitored plant parameters, followed procedures while conducting plant operations, and generally communicated effectively. In addition, the inspectors routinely toured safety related areas of the plant to observe the physical condition of plant equipment and structures and to verify the alignment and operability of selected, risk significant safety related systems. No findings were identified with the status of safety related plant equipment. The inspectors concluded that operations of the facility were conducted in a safe and controlled manner.

O1.2 Operator Response to Unit 2 Reactor Trip

a. Inspection Scope (71707)

The inspectors responded to the control room and observed the licensee's plant recovery activities following an automatic reactor trip from full power. The inspectors reviewed the circumstances surrounding the event and interviewed engineering, maintenance and operations department personnel.

b. Observations and Findings

At 12:59 a.m. on January 13, 2000, Unit 2 experienced an automatic reactor trip from full power when the unit's main generator tripped due to a load rejection signal. In response to a fault on offsite line 0622, oil filled circuit breakers (OCBs) 11-12 and 12-13 tripped open to isolate the fault as designed. This action should have isolated the

fault and ended the voltage transient induced by the fault and not resulted in a unit trip. However, the main generator tripped on a load rejection signal which resulted in an unexpected turbine trip and reactor trip. As a result of the voltage transient that accompanied the main generator trip, two engineered safety feature actuations occurred (a Unit 1 and Unit 2 containment ventilation purge system isolation and an 0A fuel handling building ventilation system actuation) when their associated radiation monitors momentarily de-energized. All of the Unit 2 safety related systems operated as designed following the reactor trip. The licensee initiated a prompt investigation and made a 4-hour non-emergency report of the reactor trip to the NRC in accordance with 10 CFR Part 50.72(b)(2)(ii).

The inspectors noted that numerous non-safety related equipment failures occurred during the event, including the failure of 16 feedwater heater relief valves. The feedwater heater relief valves failed as a result of the hydraulic transient caused by the feedwater header isolation valves closing in response to the reactor trip. The hydraulic transient and subsequent failures of the feedwater relief valves has been a recurring problem at Byron Station. For example, 11 feedwater heater relief valves failed following the Unit 1 reactor trip in May 1999 and 9 valves failed following the Unit 1 reactor trip in September 1996. While the nonsafety-related equipment problems were a distraction for the plant operators, the operators effectively controlled and stabilized plant parameters following the reactor trip. At the end of this inspection period, the licensee was developing a corrective action plan for the recurring feedwater heater relief valve failures following a reactor trip.

The inspectors closely followed the licensee's investigation into the cause of the event and reviewed the licensee's root cause report. The licensee determined that a static wire on line 0622 had fallen and grounded the "B" phase of the 3-phase 345 kilovolt line. The licensee also determined that the load rejection logic was made up due to a latent failure of the "A" phase relay auxiliary contact for the load rejection circuit associated with Air Circuit Breaker (ACB) 10-11. As a result, the load rejection logic circuitry was satisfied when OCB 11-12 opened which resulted in the main generator trip. The licensee subsequently replaced the auxiliary contacts associated with the load rejection logic circuitry of ACB 10-11. At the end of this inspection period, the licensee was further evaluating the failure mechanism of the auxiliary contact and developing a corrective action plan.

c. Conclusions

Unit 2 experienced an automatic reactor trip from full power due to a fault on offsite line 0622 and a failure of an auxiliary relay contact associated with air circuit breaker 10-11. Following the reactor trip, all of the safety related systems operated as designed; however, various non-safety related equipment failures occurred, including the recurring failure of numerous feedwater heater relief valves. While the nonsafety-related equipment problems were a distraction for the plant operators, the operators effectively controlled and stabilized plant parameters following the reactor trip.

O1.3 Unit 2 Startup Following Forced Outage B2F20

a. Inspection Scope (71707)

The inspectors observed the licensee's restart activities following forced outage B2F20 from the control room and reviewed the procedures listed below.

- Unit 2 Byron General Operating Procedure (2BGP) 100-2, "Plant Startup," Revision 17
- 2BGP 100-2A1, "Reactor Startup," Revision 12
- 2BGP 100-3, "Power Ascension," Revision 20
- Byron System Operating Procedure (BOP) HD-6T1, "Turbine Operations Limitation Table Concerning the Isolation of Various Strings of Feedwater Heaters," Revision 1

b. Observations and Findings

The inspectors observed operators performing startup activities in the control room, and noted that operators followed plant startup procedures, generally responded to main control room annunciators appropriately, and usually used proper three-way communications. The inspectors also observed effective command and control and reactivity management during the Unit 2 reactor startup.

As a result of the significant number of feedwater heater relief valve failures, the licensee planned to restart Unit 2 in parallel with the repair of the relief valves. The inspectors noted that delays in the repair and return to service of the feedwater heater strings led to operation of the unit at low power for an extended period of time.

The inspectors identified that the operating shift planned to utilize guidance contained in a system engineering memorandum to operate the feedwater system in an abnormal configuration during the Unit 2 restart which was different than the guidance contained in BOP HD-6T1. While BOP HD-6T1 allowed the use of additional or less restrictive limits provided that a documented engineering evaluation approved by station management existed, the system engineering memorandum was not approved by station management and did not provide any evaluation of the guidance. Consequently, the inspectors were concerned that the operating shift planned to utilize guidance to operate the feedwater system in an abnormal configuration that had circumvented the station's procedural review and approval process. No violation of regulatory requirements occurred since this issue involved non-safety related equipment.

c. Conclusions

The Unit 2 reactor startup from forced outage B2F20 was conducted in a safe and controlled manner. Specifically, operators followed plant startup procedures, generally responded to main control room annunciators appropriately, and usually used proper three-way communications. In addition, the senior reactor operators demonstrated effective command and control and reactivity management during the startup.

O1.4 Byron Station's Readiness for the Year 2000 (Y2K) Rollover

a. Inspection Scope (71707)

The inspectors reviewed the licensee's preparations for the Y2K rollover, interviewed operations and engineering department personnel, and observed the licensee's activities during the Y2K rollover from the main control room.

b. Observations and Findings

In preparation for the Y2K rollover, the licensee upgraded or replaced all equipment and computer systems susceptible to date-related problems associated with the Y2K transition. The licensee also developed contingency plans for all equipment prioritized as being high or critical to the safe operation of the facility even though the equipment was not expected to experience any Y2K related problems. On December 31, 1999, the licensee augmented the plant staffing to ensure that sufficient personnel were immediately available to respond in the event that Byron Station experienced Y2K related equipment problems. In addition, the licensee performed a comprehensive list of pre and post Y2K rollover checks of plant equipment to identify any Y2K related problems. The inspectors noted that Byron Station did not experience any Y2K related problems during the Y2K rollover.

c. Conclusions

Byron Station's preparations for the Year 2000 (Y2K) rollover were effective. Consequently, Byron Station did not experience any equipment problems due to the Y2K rollover.

O2 Operational Status of Facilities and Equipment

O2.1 Inadvertent Mis-Positioning of a Fuel Assembly in the Spent Fuel Pool (SFP)

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the inadvertent mis-positioning of a fuel assembly in the SFP during fuel moves to support upcoming maintenance. The inspectors interviewed fuel handling and engineering department personnel and reviewed the licensee's prompt investigation, applicable portions of the Updated Final Safety Analysis Report (UFSAR) and Technical Specifications (TS), and the procedures listed below.

- Byron Administrative Procedure (BAP) 370-3, "Administrative Control During Refueling," Revision 25
- BAP 2000-3, "Safeguarding and Controlling Movements of Nuclear Fuel Within a Station," Revision 15
- Byron Fuel Handling Procedure (BFP) FH-4, "Fuel Movement in Spent Fuel Pool," Revision 9

b. Observations and Findings

On December 14, 1999, fuel handling personnel were transferring fuel assemblies within the SFP, which involved emptying seven storage racks and moving 405 fuel assemblies to other storage locations within the SFP. A Nuclear Component Transfer List (NCTL) was approved in accordance with BAP 2200-3 to transfer the fuel assemblies. The NCTL specified the fuel assemblies to be transferred and their new locations in the SFP to ensure compliance with the TS and design basis. During the performance of NCTL, Step 243, fuel handling personnel incorrectly picked up fuel assembly K28E from SFP storage location R-J12 and placed it into SFP storage location F-E12. According to NCTL, Step 243, fuel handling personnel were supposed to have transferred fuel assembly F42E from SFP storage location Q-J12 into SFP storage location F-E12. A fuel handler who operated the SFP bridge crane incorrectly positioned the crane over SFP storage location R-J12 instead of Q-J12, which were adjacent storage. A second fuel handler and the fuel handling supervisor then incorrectly verified the crane's position to be over SFP storage location Q-J12.

On December 16, 1999, a different fuel handling supervisor discovered that a single fuel assembly remained in SFP storage location Q-J12 after all of the fuel transfers were completed. The fuel handling supervisor recognized that the "Q" storage rack was supposed to be empty and notified the shift manager and nuclear materials custodian of the apparently misplaced fuel assembly. The shift manager suspended further fuel moves and initiated a prompt investigation.

The inspectors discussed the potential safety significance of this event with engineering department personnel and concurred with the licensee's conclusion that there were no adverse safety consequences. The fuel storage requirements defined by the SFP criticality analysis were met at all times and the design basis for fuel assembly storage in the SFP was bounded for the mis-positioning of a single fuel assembly. The inspectors reviewed the TS requirements for fuel assembly storage in the SFP and concurred with the licensee's conclusion that the requirements were met at all times with the mis-positioned fuel assembly.

The inspectors reviewed the licensee's prompt investigation which concluded that the apparent cause for this event was the improper identification of the SFP storage location by the crane operator followed by the improper verification of the SFP storage location by the second fuel handler and the fuel handling supervisor. The inspectors concurred with the licensee's conclusion and were concerned that an apparent breakdown in the station's verification practices had occurred, in that, three qualified fuel handlers all incorrectly identified/verified the SFP storage location. The inspectors noted that BFP FH-4, Step E.1, required, in part, that fuel handling personnel perform fuel movements per BAP 2000-3T3, "PWR [Pressurized Water Reactor] Station Nuclear Component Transfer List (NCTL)," or equivalent and dual verify and initial each step as performed. Byron Fuel Handling Procedure FH-4, Step F.2.c, required, in part, that fuel handling personnel perform a dual verification of the cell location and BAP 370-3, Step C.1.c, required, in part, that the steps of the NCTL be verified using "apart-in-action" or "concurrent dual verification" as documented on the field copies of the NCTL.

10 CFR Part 50, Appendix B, Criteria V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. The licensee's failure to correctly transfer fuel assembly F42E from SFP storage location Q-J12 into SFP storage location F-E12 in accordance with the NCTL, Step 243, as required by BFP FH-4 is a violation of 10 CFR Part 50, Appendix B, Criteria V. This violation constitutes a violation of minor significance and is not subject to formal enforcement action. This violation is in the licensee's corrective action program as problem identification form (PIF) B1999-04599. At the end of this inspection period, the licensee was conducting a root cause evaluation of this event to further evaluate the causes and identify corrective actions.

c. Conclusions

Three fuel handlers incorrectly identified/verified the position of the spent fuel pool (SFP) bridge crane over a designated fuel assembly storage location, which resulted in the mis-positioning of a fuel assembly within the SFP during fuel movement.

O8 Miscellaneous Operations Issues

O8.1 Review of Byron Station's Workforce Contingency Manning Plan

a. Inspection Scope (92709)

The inspectors reviewed the Byron Station Workforce Contingency Manning Plan and interviewed operations, emergency preparedness, and security department management personnel.

b. Observations and Findings

In response to the ongoing labor relations issues within the operations department, the licensee updated the operations department section of the Byron Station Workforce Contingency Manning Plan in order to be prepared for any unexpected labor action. While licensee management did not expect any labor actions to occur, licensee management determined that updating the operations department section of the workforce contingency manning plan was a conservative and prudent action.

The contingency manning plan for the operations department provided guidance for manning the operating shift positions with management personnel and consisted of three phases. The first phase would be implemented when bargaining unit operators unexpectedly failed to report for work. Shortly thereafter, the licensee would implement the second phase which involves refresher training for those management personnel that have not recently performed the duties of a non-licensed operator and license activation for those management personnel with inactive licenses. Following completion of the training and license activation, the licensee would transition to the third phase of the contingency manning plan which constitutes the long-term management staffing of the operating shift.

The inspectors determined that during each of these phases the licensee would maintain the minimum number of qualified and proficient licensed and non-licensed operators on shift, while maintaining a sufficient number of fire brigade qualified individuals onsite. In addition, the inspectors determined that the licensee would have adequate staffing to be able to implement the Generating Station Emergency Plan. However, the inspectors noted that during an event which required activation of the station's emergency response facilities, the operating crew shift rotation would have to be modified to a two crew rotation in order to fill all of the emergency responder positions.

c. Conclusions

The inspectors concluded that implementation of the Byron Station Workforce Contingency Manning Plan would not adversely impact the safe operation of the facility.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Surveillance Test Observations

a. Inspection Scope (61726)

The inspectors interviewed operations, engineering, and maintenance department personnel; reviewed the completed test documentation and applicable portions of the Updated Final Safety Analysis Report (UFSAR) and TS; and observed the performance of selected portions of the surveillance test procedures listed below.

- 0BVSR 5.5.8.SX.1-2 Unit 0 Test of the 0B Essential Service Water Makeup Pump
- 1BOSR 3.2.7-608A Unit One ESFAS [Engineered Safety Feature Actuation System] Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K608)
- 1BOSR 3.2.7-611A Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K611)
- 1BOSR 3.2.7-643A Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Containment Spray - K643)
- 1BOSR 8.1.2-1 Unit One 1A Diesel Generator Operability Monthly (Staggered) and Semi-Annual (Staggered) Surveillance
- 2BOSR 0.5-3.SX.1-2 Unit 2 Test of the 2B Essential Service Water Miscellaneous System Valves
- 2BOSR 3.2.7-610B Unit Two ESFAS Instrumentation Slave Relay Surveillance (Train B Automatic Safety Injection - K610)
- 2BOSR 3.2.7-630B Unit Two ESFAS Instrumentation Slave Relay Surveillance (Train B Automatic Safety Injection - K630)

- 2BVSR 5.2.4-6 Unit 2 Train B ASME [American Society of Mechanical Engineers] Surveillance Requirements for Centrifugal Charging Pump 2B and Chemical and Volume Control Valve Stroke Test

c. Conclusions

Observed surveillance tests were performed well. Each of the tested components met their respective acceptance criteria and each of the surveillance tests were found to satisfy the requirements of the TSs.

M1.2 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 portions of the TS and the UFSAR. Maintenance associated with the auxiliary feedwater water (AF) system and the diesel generators were selected for observation because these systems were identified as risk significant in the Byron Station Individual Plant Examination.

- WR 980019943-03 0D Auxiliary Building HVAC [Heating, Ventilation and Air Conditioning] Exhaust Fan - Install Rigging Points on Fan Housing
- WR 980064678-01 Inspect Unit 1 Containment Spray System Check Valve 1CS003A
- WR 980068101-01 Perform Instrument Maintenance Scheduled Calibration on 2A DG [Diesel Generator] Starting Circuit Failure Alarm Pressure Switch 2PSH-DG100A
- WR 980068393-01 Perform IM [Instrument Maintenance] Scheduled Calibration on 2A DG Starting Air Pressure left Switch 2PSL-DG088A
- WR 980120765-01 DG 1A Fuel Filter Differential Pressure High Switch Calibration
- WR 990087632-01 Vendor to Repair Screw Fractured Top Nozzles for Miscellaneous Mechanisms Reactor Fuel Handling and Transfer
- WR 990127393-01 2A Diesel Generator Did Not Start Within 10 Seconds
- WR 990127882-01 M-152-15 AB2 - Check Setpoint of This Valve
- WR 990127882-03 Install Pressure Test Gauge During Diesel Start Test
- WR 990127883-02 Support Testing of 2A Diesel Generator by Measuring Pressure to Trip Header
- WR 990131817-01 Iodine Channel Failed Check Source Test (0PR01J)
- WR 990132673-01 Lost Power Supply to "A" Train AF Flow Control Valve Controllers

c. Conclusions

Observed maintenance activities were generally conducted well. Maintenance personnel were knowledgeable of the tasks and professionally completed the work.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Maintenance Rule Review of the Essential Service Water (SX) System Ultimate Heat Sink Temperature Control Function

a. Inspection Scope (62707)

The inspectors reviewed the performance criteria of the SX system ultimate heat sink temperature control function (SX2) for compliance with the Maintenance Rule requirements of 10 CFR Part 50.65 and reviewed Nuclear Station Procedure (NSP) ER-3010, "Maintenance Rule", Revision 0. The inspectors verified that performance criteria were established commensurate with safety and evaluated the licensee's monitoring and trending of performance data.

b. Observations and Findings

The SX2 ultimate heat sink temperature control availability criteria was established at less than or equal to 54 days unavailability per cell per 2 years with 6 fans always operable, less than or equal to 14 days unavailability per bypass valve per 2 years, and no unavailability of the blowdown valve isolation function. The reliability criteria was established at less than or equal to 2 cell functional failures per site per 2 years, less than or equal to 2 bypass valve functional failures per site per 2 years, and no blowdown valve functional failures per site per 2 years.

The inspectors noted that function SX2 met all of the reliability performance criteria. However, in September 1998, the 0B SX cooling tower to basin bypass valve, 0SX162B, exceeded its availability criteria during maintenance work. Actual unavailability for the valve was 17.81 days during the rolling 2-year period though September 1999. The entire 17.81 days of unavailability was associated with one corrective maintenance activity, Work Request 960112838-01, to repair valve seat leak-by. On October 12, 1999, the inspectors discussed the unavailability of the valve with the Station Maintenance Rule Coordinator (SMRC) and requested to review the Maintenance Rule Expert Panel's justification for the SX2 function remaining in (a)(2) status. In response to the inspectors questions, the SMRC stated that the actual maintenance work on the valve was completed after approximately 3.5 days, that the operations department did not clear the out-of-service on the valve until two weeks later, and that the issue was under review by the station's Maintenance Rule Expert Panel.

The inspectors were concerned that the licensee had not addressed the unavailability of the valve sooner. A year had gone by since 0SX162B had exceeded the availability criteria. The inspectors were also concerned that the operations department's delay in returning the valve to service resulted in unnecessary unavailability of the valve. The SMRC subsequently located Maintenance Rule Expert Panel meeting notes from

November 5, 1998, when the Expert Panel first discussed the unavailability of all four bypass valves. At that time, the Expert Panel suspected the availability data to be inaccurate and requested the system engineer to review the out-of-service data for the valves. The inspectors noted that the Expert Panel met again on December 15, 1998, and concluded that availability criteria was not exceeded for any of the four bypass valves. The inspectors did not concur with the Expert Panel's conclusion because the availability criteria for 0SX162B had been exceeded. The Expert Panel had previously decided not to assess SX cooling tower modification work against the Maintenance Rule SX2 function performance criteria; however, the maintenance work on the bypass valve was corrective maintenance and not part of the cooling tower modification work.

The inspectors reviewed the licensee's Maintenance Rule Periodic Assessment completed on May 13, 1999, for the period of July 1, 1997 through December 31, 1998, pursuant to the requirements of 10CFR Part 50.65(a)(3). The inspectors noted that the licensee's assessment stated, in part, that all performance criteria were reviewed to evaluate performance of systems, structures, or components against the criteria and that several current (a)(2) systems, structures, or components had data exceeding their performance criteria, but appropriate justification for not classifying them as (a)(1) was documented in the Expert Panel meeting minutes and the monitoring forms. The inspectors determined, however, that the licensee failed to provide appropriate justification for not classifying the SX2 function as (a)(1) in the Expert Panel meeting minutes.

On October 21, 1999, the Expert Panel met to review the unavailability of 0SX162B. Although the availability criteria was exceeded, the system engineer and the SMRC recommended that the SX2 function remain classified as (a)(2) because most of the unavailability time was due to an administrative delay in the return to service of the valve; that the valve would have been readily available to perform its function in a relatively short period of time if needed; and that there was no equipment performance issue that required corrective action. The Expert Panel concurred with the system engineer and SMRC's evaluation and concluded that the excessive unavailability was the result of an isolated process breakdown, clearance of the out-of-service, and no definitive benefit would be gained by classifying the SX2 function in (a)(1) status.

10 CFR Part 50.65(a)(1) states, in part, that each holder of a license to operate a nuclear power plant shall monitor the performance or condition of structures, systems, or components, as defined by 10 CFR Part 50.65(b), against licensee established goals, in a manner sufficient to provide reasonable assurance that such structures, systems, or components are capable of fulfilling their intended functions. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken.

10 CFR Part 50.65(a)(2) states that, monitoring as specified in 10 CFR Part 50.65(a)(1) is not required where it has been demonstrated that the performance or condition of a structure, system, or component is being effectively controlled through the performance of appropriate preventive maintenance, such that, the structure, system, or component remains capable of performing its intended function.

10 CFR Part 50.65(a)(3) states, in part, that performance and condition monitoring activities and associated goals and preventive maintenance activities shall be evaluated at least every refueling cycle provided the interval between evaluations does exceed 24 months. Adjustments shall be made where necessary to ensure that the objective of preventing failures of structures, systems, and components through maintenance is appropriately balanced against the objective of minimizing unavailability of structures, systems, and components due to monitoring or preventive maintenance.
10 CFR Part 50.65(c) states that, the requirements of this section shall be implemented by each licensee no later than July 10, 1996.

The inspectors determined that on May 13, 1999, the licensee elected to not monitor the performance or condition of the SX system pursuant to the requirements of 10 CFR Part 50.65(a)(1) and did not demonstrate that the condition or performance of the SX system had been effectively maintained by performing appropriate preventive maintenance under the requirements of 10 CFR 50.65(a)(2). Specifically, the licensee failed to properly monitor unavailability of the SX2 ultimate heat sink temperature control function, which included 0SX162B, during the 2-year period prior to the periodic assessment performed in accordance with 10 CFR Part 50.65(a)(3). Therefore, the licensee's basis for placing the SX2 function under the requirements of section (a)(2) was inadequate and the SX2 function should have been monitored in accordance with Section (a)(1). The licensee's failure to properly monitor unavailability of the SX2 ultimate heat sink temperature control function constitutes a violation of minor significance and is not subject to formal enforcement action. This violation is in the licensee's corrective action program as PIF B1999-4233.

c. Conclusions

The inspectors concluded that the licensee failed to appropriately assess performance criteria for the essential service water (SX) system ultimate heat sink temperature control function when the 0B SX cooling tower to basin bypass valve, 0SX162B, exceeded its availability criteria during maintenance work in September 1998. The inspectors also concluded that the operations department's delay in returning 0SX162B to service resulted in unnecessary unavailability of the valve.

M8 Miscellaneous Maintenance Issues (61726 and 62707)

M8.1 (Closed) Licensee Event Report (LER) 50-455/99001: "Six of 20 Main Steam Safety Valve Relief Tests Exceeded Required Tolerance Due to Disk to Nozzle Metallic Bonding." During surveillance testing of the Unit 2 main steam safety valves (MSSVs) on October 19 and 20, 1999, the licensee identified that 6 of 20 MSSVs failed to meet the TS acceptance criteria for the lift setpoint. As a result of each of the MSSV test failures, the licensee entered the appropriate TS limiting condition for operation and restored each of the valves to an operable condition within the TS allowed outage time. The licensee also initiated a root cause investigation into the cause of the MSSV failures.

The licensee performed an evaluation of the impact of the MSSV surveillance testing results on the transient and accident analysis described in the UFSAR. The licensee

determined that the loss of load/turbine trip and inadvertent emergency core cooling system actuation transients and the small break loss-of-coolant accident were the limiting analyses. The licensee's evaluation concluded that the MSSV surveillance testing results did not invalidate the existing UFSAR analyses. The inspectors reviewed the licensee's evaluation and concurred with the results.

The licensee's root cause investigation determined that the cause of 5 of the 6 MSSV failures was relative radial motion between the valve disk and the valve nozzle during heatup due to differences in thermal expansion coefficients of the valve components. This relative motion caused galling on the component surfaces which resulted in the MSSV lifting above the TS acceptance criteria. The failure of the other MSSV was attributed to setpoint drift.

The inspectors reviewed the licensee's corrective actions documented in LER 50-455/99001 and Root Cause Report 18098. The inspectors noted that the licensee's corrective actions included upgrading the valve disk material to a material less susceptible to bonding (Inconel X-750) in all subsequent MSSV refurbishments. However, the inspectors identified that the licensee's procurement and work control processes would not ensure that the upgraded material would be used in all future refurbishments of the MSSVs. In response to the inspectors questions, the licensee updated the procurement system to ensure that the valve disk material for future purchases of MSSV valve disks would be Inconel X-750. In addition, the licensee planned to revise Byron Mechanical Maintenance Procedure 3114-14, "Main Steam Safety Valve Inspection and Repair," to require that future refurbishments of the MSSVs replace the valve disk with an Inconel X-750 valve disk. The inspectors reviewed the licensee's corrective actions and determined that they were acceptable. This LER is closed.

III. Engineering

E1 Conduct of Engineering

E1.1 Installation of a Temporary Pipe Tunnel Hatch Cover During Refueling Outage B2R08

a. Inspection Scope (37551)

The inspectors interviewed operations and engineering department personnel, reviewed the applicable portions of the Updated Final Safety Analysis Report and TSs, and reviewed the documents listed below.

- Byron Maintenance Procedure (BMP) 3300-25, "Refueling Water Storage Tank (RWST) Pipe Tunnel Hatch Cover (BILCO)," Revision 0
- Work Request (WR) 980105549-01, "Install/Remove BILCO Hatch to Support SG Work - B2R08"

b. Observations and Findings

On October 14, 1999, the licensee installed a temporary hatch cover in place of the permanent RWST pipe tunnel hatch cover to provide steam generator inspection support equipment (i.e., water, air, electrical and eddy current cables) access to the auxiliary building through the 2B safety injection pump room during the refueling outage. In accordance with WR 98015549-01 and BMP 3300-25, the RWST tunnel was sealed off, the permanent hatch was removed, the temporary hatch was installed, and the RWST tunnel was reopened. In doing so, the licensee modified the safety related non-accessible area exhaust filter plenum ventilation system envelope.

During the emergency mode of operation, the non-accessible area exhaust filter plenum ventilation system is designed to maintain a slight negative pressure in the emergency core cooling systems (ECCS) pump rooms, with respect to adjacent areas, to prevent unfiltered leakage. The operability of the non-accessible area exhaust filter plenum ventilation system ensures that radioactive materials leaking from ECCS equipment within the pump rooms following a loss-of-coolant accident are filtered prior to reaching the environment. The operation of this system and the resultant effect on offsite dosage calculations was assumed in the safety analyses. Technical Specification Surveillance Requirement 3.7.12.4 requires the licensee to verify that two non-accessible area exhaust filter plenum ventilation system trains can maintain a pressure less than or equal to -0.25 inches water gauge relative to atmospheric pressure during the emergency mode of operation at a flow rate of less than or equal to 68,200 cubic feet per minute per train. The Bases of the TS states that this surveillance requirement should be performed with the postulated number of auxiliary building supply and exhaust fans running considering the design basis scenario of a safety injection signal, which automatically routes the effluents from the non-accessible rooms through charcoal adsorbers and high-efficiency particulate air filters via charcoal booster fans. Performance of the surveillance requirement in this manner produces the least negative pressure in the ECCS pump room areas (i.e., the least margin to -0.25 inches water gauge).

The inspectors reviewed WR 98015549-01 and BMP 3300-25 and noted that provisions were neither provided in the work instructions nor in the maintenance procedure to assure that the non-accessible area exhaust filter plenum ventilation system would be adequately tested to demonstrate that it would perform satisfactorily in service (i.e., still maintain the design basis pressure differential) during modification and after the temporary hatch was installed. In several steps throughout BMP 3300-25, the system engineer was contacted to verify proper pressures were obtainable. However, the inspectors noted that an acceptance criteria was not specified in the procedure and no data was recorded in the procedure for pressure measurements. The inspectors also identified that the work instructions did not contain appropriate provisions to assure that adequate test instrumentation was used and that the test was performed under suitable environmental conditions such as those described in the TS Bases for Surveillance Requirement 3.7.12.4. Although the testing had been performed informally and the system engineer signed for verification that the proper pressures were obtainable, the testing was not appropriately documented and the requirements could not be verified to have been performed acceptably.

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 results shall be documented and evaluated to assure that test requirements have been satisfied. The failure to incorporate post modification testing requirements from applicable design documents into WR 98015549-01 and BMP 3300-25 and to document completion of the post modification testing requirements during modification and after installing the temporary RWST pipe tunnel hatch cover is a violation of 10 CFR Part 50, Appendix B, Criteria XI. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy (50-454/99020-01DRP)). This violation is in the licensee's corrective action program as PIF B2000-00189.

c. Conclusions

The licensee failed to incorporate appropriate post modification testing requirements from applicable design documents into work request instructions and to document completion of the post modification testing requirements when performing a temporary modification to the safety related non-accessible area exhaust filter plenum ventilation system. A Non-Cited Violation was issued.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls (71750)

During routine resident inspection activities, observations were conducted in the area of radiation protection and chemistry. No discrepancies were noted.

P1 Conduct of Emergency Preparedness Activities (71750)

During routine resident inspection activities, observations were conducted in the area of emergency preparedness. No discrepancies were noted.

S1 Conduct of Security and Safeguards Activities (71750)

During routine resident inspection activities, observations were conducted in the area of security and safeguards. No discrepancies were noted.

F1 Control of Fire Protection Activities

F1.1 Discrepancies Identified During Assessment of the Monthly Auxiliary Building Portable Fire Extinguisher Inspection

a. Inspection Scope (71750)

During routine inspection activities, the inspectors assessed the availability and operability of fire extinguishers in the auxiliary building. The inspectors interviewed the station's Fire Marshall and reviewed Unit 0 Byron Mechanical Maintenance Surveillance Requirement (BMSR) FP-3B, "Portable Fire Extinguisher Monthly Inspection," Revision 1.

b. Observations and Findings

On December 9, 1999, the inspectors identified that inspection tags for 6 of 24 portable fire extinguishers checked had not been initialed and dated to certify completion of the November 1999 monthly inspection. The inspectors addressed this issue with the station's Fire Marshall for resolution.

The surveillance test procedure, 0BMSR FP-3, had been conducted from November 22 through November 24, 1999, with satisfactory results documented. The inspectors reviewed the completed surveillance test procedure and noted that Step F.4 required the individual who performed the fire extinguisher inspection to initial and date the inspection tag attached to each of the fire extinguishers. The surveillance test procedure also contained a data sheet listing each of the 108 fire extinguishers in a table format. The inspectors noted that each entry of the data sheet had been initialed and dated, indicating that each of the fire extinguishers had been tested satisfactorily. At the end of the inspection period, the licensee's investigation of this issue was in progress. This issue is considered an Unresolved Item (50-454/455-99020-02(DRP)) pending NRC review of the licensee's investigation and resolution of this issue.

c. Conclusions

The inspectors identified several discrepancies with the performance of a portable fire extinguisher inspection surveillance test procedure completed in November 1999.

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 18, 2000. 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

R. Colglazier, NRC Coordinator
A. Cremean, Radiation Protection Operations Supervisor
M. Jurmain, Maintenance Manager
K. Jury, Support Services Manager
K. Kovar, Reactor Engineering Supervisor
J. Kramer, Work Control Manager
W. Levis, Site Vice President
R. Lopriore, Station Manager
K. Moser, Acting Regulatory Assurance Manager
K. Passmore, Assistant Systems Engineering Manager
R. Roton, Nuclear Oversight Assessment Manager
M. Snow, Operations Manager
D. Starke, Shift Chemistry Supervisor

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92709:	Licensee Plans for Coping With Strikes

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-455/99020-01	NCV	Inadequate test controls for a modification to the Unit 2 non-accessible area exhaust filter plenum ventilation system envelope
50-454/455/99020-02	URI	Review of the licensee's investigation and resolution of inspector identified discrepancies with a fire protection system surveillance test procedure

Closed

50-455/99001	LER	Six of 20 main steam safety valve relief tests exceeded required tolerance due to disk to nozzle metallic bonding
50-455/99020-01	NCV	Inadequate test controls for a modification to the Unit 2 non-accessible area exhaust filter plenum ventilation system envelope

Discussed

None

LIST OF ACRONYMS USED

ACB	Air Circuit Breaker
AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
BAP	Byron Administrative Procedure
BFP	Byron Fuel Handling Procedure
BGP	Byron General Operating Procedure
BMP	Byron Maintenance Procedure
BMSR	Byron Mechanical Maintenance Surveillance Requirement
BOP	Byron System Operating Procedure
BOSR	Byron Operating Surveillance Requirement
BVSR	Byron Technical Surveillance Requirement
CFR	Code of Federal Regulations
DG	Diesel Generator
DRP	Division of Reactor Projects
ECCS	Emergency Core Cooling System
ESFAS	Engineered Safety Feature Actuation System
HVAC	Heating, Ventilation and Air Conditioning
IM	Instrument Maintenance
LER	Licensee Event Report
MSSV	Main Steam Safety Valve
NCTL	Nuclear Component Transfer List
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSP	Nuclear Station Procedure
OCB	Oil Filled Circuit Breaker
PIF	Problem Identification Form
PWR	Pressurized Water Reactor
RWST	Refueling Water Storage Tank
SFP	Spent Fuel Pool
SMRC	Station Maintenance Rule Coordinator
SX	Essential Service Water
SX2	Essential Service Water System Ultimate Heat Sink Temperature Control Function
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WR	Work Request
Y2K	Year 2000