

April 28, 2000

EA 00-105

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 50-454/2000002(DRP); 50-455/2000002(DRP)

Dear Mr. Kingsley:

On April 1, 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, the conduct of activities at the Byron Station was conservative, with a continuing focus on safety. Control room operations were consistently performed in a safe, professional and controlled manner. Routine maintenance and surveillance testing activities were properly coordinated and performed per approved procedures.

We noted that two of the issues discussed in the enclosed inspection report involved failure of your staff to properly implement the corrective action process. In the first example, your staff failed to correct an identified problem with a fire protection system valve that rendered the carbon dioxide fire suppression system in the auxiliary building inoperable for 24 days and subsequently resulted in an inadvertent discharge of carbon dioxide into the Unit 1 lower cable spreading room during surveillance testing. In the second example, your staff failed to identify maintenance rule performance criteria being exceeded on two maintenance rule system functions.

Based on the results of this inspection, the NRC has determined that three violations of NRC requirements occurred. These violations are being treated as Non-Cited Violations (NCVs), consistent with Section VII.B.1.a of the Enforcement Policy. These NCVs are described in the subject inspection report. If you contest the violation or severity level of these NCVs, 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.

O. Kingsley

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

Sincerely,

/RA/

Michael J. Jordan, Chief
Reactor Projects Branch 3

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

Enclosure: Inspection Report 50-454/2000002(DRP);
50-455/2000002(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
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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: 50-454/2000002(DRP); 50-455/2000002(DRP)

Licensee: Commonwealth Edison Company

Facility: Byron Generating Station, Units 1 and 2

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

Dates: February 23 - April 1, 2000

Inspectors: E. Cobey, Senior Resident Inspector
B. Kemker, Resident Inspector
D. Chyu, Reactor Engineer
D. Funk, Emergency Preparedness Analyst
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 50-454/2000002(DRP); 50-455/2000002(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 and region based inspectors.

Operations

- The licensee consistently operated plant systems and equipment in a safe, conservative, and professional manner. Operating shift turnover briefings were effective. Control room operators closely monitored plant parameters, responded appropriately to main control room annunciators, and followed procedures while conducting plant operations. (Section O1.1)
- Recently completed licensee self-assessments of operating department performance were self-critical; appropriately identified strengths and areas for improvement; and were consistent with the inspectors' observations and findings during the same periods of time. (Section O7.1)
- The licensee failed to correct a fire protection system valve problem that rendered the auxiliary building portion of the carbon dioxide (CO₂) fire suppression system inoperable for 24 days and resulted in an inadvertent discharge of CO₂ into the Unit 1 lower cable spreading room (LCSR). The inspectors concurred with the licensee's conclusion that safe shutdown conditions could have been achieved and maintained in the event of a fire in Unit 2 LCSR zone 2S-43 by crediting actions outside the safe shutdown analysis. This issue was treated as a Non-Cited Violation. (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 satisfied the requirements of the Technical Specifications. (Section M1.1)
- Observed maintenance activities were generally conducted well and were completed in accordance with approved procedures. Maintenance personnel were knowledgeable of the tasks and professionally completed the work. (Section M1.2)
- The licensee failed to correctly classify a functional failure of maintenance rule function VA5, maintain auxiliary building and fuel handling building negative differential pressure. The licensee also failed to properly monitor the performance criteria for maintenance rule function CB1, provide normal and emergency condensate for the feedwater system, and EF1, processing of the solid state protection system and output from the engineered safety feature actuation and reactor protection systems. In addition, the licensee missed opportunities to self-identify each of these deficiencies. This issue was treated as a Non-Cited Violation. (Section M2.1)

Engineering

- The temporary plant system modifications reviewed were appropriately controlled, installed and tested. (Section E2.1)

Plant Support

- The inspectors identified numerous errors in the Byron Station Safe Shutdown Analysis, none of which impacted the licensee's ability to achieve and maintain cold shutdown conditions following a fire. The inspectors also identified that the licensee's annual inspection of the materials needed to conduct cold shutdown repairs was not proceduralized, which resulted in the last two annual inspections not verifying all required material onsite. In addition, the inspectors identified that the licensee did not have approved procedures in effect to conduct each of the cold shutdown repairs that were credited in the Byron Fire Protection Report. This issue was treated as a Non-Cited Violation. (Section F3.1)

Report Details

Summary of Plant Status

The licensee operated Units 1 and 2 at or near full power for the duration of this inspection period.

I. Operations

O1 Conduct of Operations

O1.1 General Observations (71707)

During this inspection period, the inspectors routinely conducted observations of main control room activities including shift turnover briefings, routine reactivity manipulations, periodic surveillance testing, main control room annunciator response, and main control room board walkdowns. The inspectors consistently observed safe, conservative, and professional operation of plant systems and equipment. Shift turnover briefings included discussions of plant status, major equipment out-of-service, maintenance and testing in progress, existing limiting conditions for operation, and work scheduled for the shift. Control room operators closely monitored plant parameters, followed procedures while conducting plant operations, and responded appropriately to main control room annunciators. The inspectors also assessed the status of safety-related structures, systems and components during routine inspections of the facility. No deficiencies 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.

O7 Quality Assurance in Operations

O7.1 Review of Recent Nuclear Oversight and Operations Department Self-Assessments

a. Inspection Scope (71707)

The inspectors reviewed applicable portions of the "Commonwealth Edison Nuclear Generation Group (NGG) Self-Assessment Handbook," Revision 1; Nuclear Station Procedure AD-AA-103, "NGG Self-Assessment Procedure," Revision 1; and the Nuclear Oversight and Operations Department self-assessment reports listed below.

- Byron Operations Department Focus Area Self-Assessment of the Non-Licensed Operator Migration Training Program, conducted February 7 through 14, 2000
- Byron Station Assessment Report, Nuclear Oversight Assessment NOA-06-00-OP01, "Operations Work Practices," dated March 6, 2000
- Byron Station Operational Areas 4th Quarter 1999 Self-Assessment Report
- Byron Station Operational Areas January 2000 Monthly Self-Assessment Report
- Byron Station Operational Areas February 2000 Monthly Self-Assessment Report
- Operations Scorecard Report 4th Quarter Assessment, dated January 20, 2000
- Operations Scorecard Report January 2000 Assessment, dated February 7, 2000

b. Observations and Findings

The inspectors noted that the self-assessments were self-critical and emphasized recurring issues at the station, including configuration control occurrences and human performance errors. The licensee appropriately identified strengths and areas for improvement in each performance area assessed. Information for the operating department self-assessments was obtained from direct observations by operating department supervisors (i.e., scorecards), conduct of focus area self-assessments, review of corrective action program data, and review of data from external sources. Information for the nuclear oversight department assessment was obtained primarily from direct nuclear oversight field observations and review of station records. The inspectors noted that the results of the licensee's self-assessments were consistent with the inspectors' observations and findings during the same periods of time.

c. Conclusions

Recently completed licensee self-assessments of operating department performance were self-critical; appropriately identified strengths and areas for improvement; and were consistent with the inspectors' observations and findings during the same periods of time.

O8 Miscellaneous Operations Issues (92901 and 92700)

- O8.1 (Closed) Unresolved Item (URI) 50-454/455-2000001-01 (DRP): "Review of the Licensee's Capability to Achieve and Maintain Safe Shutdown by Crediting Actions Outside the Safe Shutdown Analysis." As documented in NRC Inspection Report 50-454/455-2000001(DRP), the licensee failed to correct a fire protection system valve problem that rendered the auxiliary building portion of the carbon dioxide (CO₂) fire suppression system inoperable for 24 days and resulted in an inadvertent discharge of CO₂ into the Unit 1 lower cable spreading room (LCSR).

In the event of a fire in LCSR zone 2S-43, the licensee relied upon division 21 equipment to achieve and maintain safe shutdown conditions. However, the power supply cables for the redundant division 21 and division 22 safety-related 125 volt battery chargers were routed through the affected area and were not protected by a 1-hour fire barrier. The cables associated with the division 21 and division 22, 125 volt direct current (DC) annunciator and indication circuitry were also routed through the affected area.

The inspectors determined that in the event of a loss of the division 21 battery charger power supply cable in a fire, the battery would have the capacity to supply its electrical loads for over 3 hours. Upon loss of the battery charger, DC bus voltage would drop from 129 to 123 volts, which was below the normal "green" band of 128 to 131 volts on the control room indicator. If the control room DC bus voltage indicating circuit experienced a fire-induced fault, the indicator would have been off-scale. In either case, operators would have been prompted to investigate the condition. Considering the amount of time available to identify the fault and take operator actions, the inspectors determined that the licensee's capability to achieve and maintain safe shutdown conditions was maintained.

As a result of this issue, the licensee revised the safe shutdown analysis description in the Byron Station Fire Protection Report to include operator actions to cross-tie power from the division 11 DC bus to the division 21 DC bus. In addition, the licensee revised the applicable fire alarm response procedure to alert operators to the potential loss of the battery chargers. The inspectors reviewed the licensee's corrective actions and determined that they were acceptable.

The Byron Station Operating License for Unit 1, NPF-37, requires, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the licensee's Fire Protection Report. The Byron Station Fire Protection Report, Section 3.4, "Quality Assurance Program," states, in part, that activities involving fire protection systems are covered by the Commonwealth Edison Company Quality Assurance Program. The Commonwealth Edison Quality Assurance Manual, Section 16.3.1, states, in part, that the licensee uses a corrective action system to promptly identify and correct items or occurrences that are adverse to quality or might adversely affect the safe operation of a nuclear generating station. These items or occurrences include failures, malfunctions, deficiencies, deviations, defective material and equipment, nonconformances and programmatic deficiencies. The licensee's failure to correct the identified deficiency on individual zone 1S-43 manual actuation discharge valve, 0CO05JC, which rendered the auxiliary building portion of the CO₂ fire suppression system inoperable for 24 days and resulted in an inadvertent discharge of CO₂ into the Unit 1 LCSR is a violation of the Byron Station Operating License. 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 (50-454/455/2000002-01(DRP)). This violation is in the licensee's corrective action program as problem identification form B1999-04628.

- O8.2 (Closed) Licensee Event Report (LER) 50-455/2000-001-00: "Automatic Reactor Trip System Actuation Due to Off-Site Power Line Fault and Failed Air Circuit Breaker Load Rejection Contact." 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. This event was originally discussed in detail in NRC Inspection Report 50-454/455-99020(DRP). An engineering review of the air circuit breaker load rejection contact failure was also discussed in NRC Inspection Report 50-454/455-2000003(DRS). The licensee conducted a root cause investigation of this event but was unable to conclusively determine the cause of the contact failure. The licensee reported this event as a condition that resulted in an automatic actuation of the reactor protection system in accordance with 10 CFR 50.73(a)(2)(iv). The inspectors concurred with the licensee's conclusion that there were no adverse plant or public safety consequences as a result of this event. The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This LER is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Surveillance Test Observations

a. Inspection Scope (61726)

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

- 1BOSR 3.2.7-604A Unit 1 ESFAS [Engineered Safety Feature Actuation System] Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K604)
- 1BOSR 3.2.7-608A Unit 1 ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K608)
- 1BOSR 3.2.7-638A Unit 1 ESFAS Instrumentation Slave Relay Surveillance (Train A Feedwater Isolation, Hi-Hi S/G [Steam Generator] Level - K638)
- 1BOSR 3.2.7-643A Unit 1 ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Containment Spray - K643)
- 1BOSR 3.2.7-644A Unit 1 ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Containment Spray - K644)
- 1BOSR FW-SA1 Unit 1 Anticipated Transient Without Scram Mitigation System (AMS) at Power Semiannual Surveillance
- 1BVSR 5.5.8.AF.1-2 Unit 1 ASME [American Society of Mechanical Engineers] Surveillance Requirements for the Diesel Driven Auxiliary Feedwater Pump
- 2BOSR 0.5-3SX.1-2 Unit 2 Test of the 2B Essential Service Water Miscellaneous System Valves
- 2BOSR 3.2.7-614B Unit 2 ESFAS Instrumentation Slave Relay Surveillance (Train B Containment Isolation Phase A - K614)
- 2BOSR 3.2.7-630B Unit 2 ESFAS Instrumentation Slave Relay Surveillance (Train B Feedwater Isolation, Safety Injection - K630)
- 2BOSR 3.2.7-644B Unit 2 ESFAS Instrumentation Slave Relay Surveillance (Train B Automatic Containment Spray - K644)
- 2BOSR 7.5.3-1 Unit 2 Motor Driven Auxiliary Feedwater Pump Monthly Surveillance
- 2BVSR 5.2.4-1 Unit 2 ASME Surveillance Requirements for Safety Injection Pump 2SI01PA
- 2BVSR 5.5.8.AF.1-1 Unit 2 ASME Surveillance Requirements for the Motor Driven Auxiliary Feedwater Pump
- 2BVSR 6.6.7-1 Unit 2 Reactor Containment Fan Cooler Automatic Actuation 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 satisfied the requirements of the TSs.

M1.2 Maintenance Observations

a. Inspection Scope (62707)

The inspectors interviewed operations, maintenance, and engineering 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 essential service water (SX) and auxiliary feedwater (AF) systems were selected for observation because the systems were identified as risk significant in the Byron Station Individual Plant Examination.

- WR 970101696-01 Install Loose Parts Monitor Design Change Package 9700434
- WR 980074697-01 1A AF Pump Discharge Valve - Rebuild Actuator/Replace Elastomers
- WR 980080609-01 1A Motor Driven AF Pump - Clean and Inspect Lube Oil Cooler
- WR 980101101-01 0A SX Makeup Pump - Complete SX Makeup Pump Prime Mover Inspection
- WR 990008483-01 1B DG [Diesel Generator] - Calibrate Pressure Switch 1PS-DG108B
- WR 990008484-01 1B DG - Calibrate Pressure Switch 1PSH-DG103B
- WR 990008485-01 1B DG - Calibrate Pressure Switch 1PS-DG102B
- WR 990079197-01 0A SX Makeup Pump - Clean Base Tank, Inspect Float Valve
- WR 990139745-01 0B SX Makeup Pump - Remove/Reinstall Gear Box Drive Coupling and Pedestal
- WR 990142402-01 Perform Functional Test of Loose Parts Monitor 2VY-LM001,002

c. Conclusions

Observed maintenance activities were generally conducted well and were completed in accordance with approved procedures. 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 Periodic Assessment

a. Inspection Scope (62707)

The inspectors reviewed the licensee's most recent 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 10 CFR Part 50.65 (a)(3). The

inspectors also reviewed Nuclear Station Procedure ER-3010, "Maintenance Rule," Revision 0, and interviewed engineering department personnel.

b. Observations and Findings

While reviewing the licensee's maintenance rule database, the inspectors noted that the database reflected that maintenance rule function VA5, maintain auxiliary building and fuel handling building negative differential pressure, had not experienced any functional failures during the period of July 1, 1997 through December 31, 1998. However, the inspectors identified that the issue described in Licensee Event Report 50-455/98-005, "Inadequate Administrative Controls Lead to Operation Outside the Ventilation System Design Basis," satisfied the VA5 functional failure guidance delineated in the licensee's maintenance rule program. In response to the inspectors' questions, the licensee's expert panel reviewed the issue on March 8, 2000, and concluded that this issue had not been appropriately classified as a maintenance rule functional failure. Consequently, the licensee revised the maintenance rule database to reflect this functional failure. This single functional failure did not cause maintenance rule function VA5 to exceed its reliability performance criteria of less than or equal to 3 functional failures per 2 years. The inspections determined that no violation of regulatory requirements occurred because the licensee demonstrated that the function was effectively controlled.

In addition, while responding to the inspectors' questions regarding the Maintenance Rule Periodic Assessment, the licensee determined that they failed to recognize that two maintenance rule functions exceeded their performance criteria during the assessment period. Specifically:

- Maintenance rule function CB1, provide normal and emergency condensate for the feedwater system, for the 1B condensate train exceeded its availability performance criteria in February 1998. The CB1 availability performance criteria was less than or equal to 45 days per train per 2 years. The actual unavailability data of the 1B condensate train for the 2 year period ending in February 1998 was 52.82 days. The licensee's monthly performance criteria monitoring did not identify that the availability criteria had been exceeded. Therefore, the licensee did not transition the function to an (a)(1) status or demonstrate that the performance of the function had been effectively maintained by performing appropriate preventive maintenance. As a result, the licensee's expert panel reviewed this issue on February 16, 2000, and determined that the unavailability exceeding the performance criteria in February 1998, when compared to the overall availability and reliability of the 1B condensate train, did not currently warrant (a)(1) classification of maintenance rule function CB1. The inspectors concurred with the licensee's conclusion.
- Maintenance rule function EF1, processing of the solid state protection system and output from the engineered safety feature actuation and reactor protection systems, exceeded its reliability performance criteria during the period of July 1996 through June 1998. The EF1 reliability performance criteria was less than or equal to 1 functional failure per 2 years. On June 5, 1996, the licensee experienced a functional failure of the train A steamline rate high safety injection signal. On July 11, 1996, the licensee experienced a failure of the K602 slave relay to latch during surveillance testing which was incorrectly classified as a

functional failure of maintenance rule function EF2, provide input to the solid state protection system, engineered safety feature actuation and reactor protection systems, and control functions to various plant systems.

In January 1998, the licensee recognized that K602 slave relay failure had been assigned to maintenance rule function EF2 in error and re-assigned the failure to maintenance rule function EF1. However, the licensee did not recognize that this resulted in maintenance rule function EF1 reliability performance criteria being exceeded. Therefore, the licensee did not transition the function to an (a)(1) status or demonstrate that the performance of the function had been effectively maintained by performing appropriate preventive maintenance. As a result, the licensee's expert panel reviewed this issue on March 8, 2000, and determined that the failure of the K602 slave relay to latch was not a maintenance rule functional failure because the maintenance rule function of the K602 slave relay was not affected by the failure of the relay to latch. The inspectors concurred with the licensee's conclusion.

10 CFR paragraph 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 paragraph 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 Paragraph 50.65(a)(2) states that, monitoring as specified in 10 CFR Paragraph 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 Paragraph 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 not 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.

The inspectors determined that on May 13, 1999, the licensee elected to not monitor the performance or condition of maintenance rule functions CB1 and EF1 pursuant to the requirements of 10 CFR Paragraph 50.65(a)(1) and did not demonstrate that the condition or performance of these functions had been effectively maintained by performing appropriate preventive maintenance under the requirements of 10 CFR Paragraph 50.65(a)(2). Specifically, the licensee failed to properly monitor unavailability of maintenance rule function CB1 and reliability of maintenance rule function EF1, during the 2-year period prior to the periodic assessment performed in accordance with 10 CFR Paragraph 50.65(a)(3). Therefore, the licensee's basis for placing both the CB1 and EF1 functions under the requirements of Paragraph (a)(2) was inadequate and both functions should have been monitored in accordance with Paragraph (a)(1). The

licensee's failure to properly monitor the unavailability of maintenance rule function CB1 and the reliability of maintenance rule function EF1 is a violation of 10 CFR section 50.65. 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 (50-454/455/2000002-02(DRP)). This violation is in the licensee's corrective action program as problem identification form (PIF) B2000-00579.

The inspectors had previously identified a similar issue which was documented in NRC Inspection Report 50-454/455-99020(DRP). This issue involved the licensee's failure to appropriately assess the availability performance criteria for the essential service water system ultimate heat sink temperature control function. The inspectors were concerned that the licensee's corrective actions for this issue were narrowly focused and did not ensure that other similar deficiencies were identified and dispositioned appropriately. In response to the inspectors concerns, the licensee initiated PIF B2000-00643 to address the corrective action process being inadequate for determining the extent of condition of identified deficiencies.

c. Conclusions

The licensee failed to correctly classify a functional failure of maintenance rule function VA5, maintain auxiliary building and fuel handling building negative differential pressure. The licensee also failed to properly monitor the performance criteria for maintenance rule function CB1, provide normal and emergency condensate for the feedwater system, and EF1, processing of the solid state protection system and output from the engineered safety feature actuation and reactor protection systems. In addition, the licensee missed opportunities to self-identify each of these deficiencies. A Non-Cited Violation was issued.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Temporary Modifications

a. Inspection Scope (37551)

The inspectors interviewed engineering department personnel and evaluated the temporary modifications listed below. In addition, the inspectors reviewed Nuclear Station Procedure CC-AA-112, "Temporary Modifications," Revision 0 and applicable portions of the Updated Final Safety Analysis Report.

- Design Change Package (DCP) 9900391, "Connect Interlock Circuitry from Non-Functioning 2SX173 Valve to 2SX178 Valve"
- DCP 9900437, "Need to Monitor the Operating Characteristics of Digital Electro-Hydraulic Control System PROM [Programable Read Only Memory] Logic Card C1-K46 Via a Chart Recorder"

b. Observations and Findings

The inspectors reviewed the temporary modifications listed above and noted that the design change packages contained clear installation instructions and that the installation of the design changes were in accordance with the installation instructions. Post modification testing was completed with acceptable results after installation of the design changes and the test acceptance criteria was appropriate for the modifications. The inspectors also reviewed the licensee's safety evaluations completed in accordance with 10 CFR Part 50.59 for each design change package and found that the modifications were appropriately evaluated prior to their installation.

c. Conclusions

The temporary plant system modifications reviewed were appropriately controlled, installed and tested.

E8 Miscellaneous Engineering Issues (92700 and 92903)

E8.1 (Closed) Licensee Event Report (LER) 50-454/2000-001-00: "Inservice Testing Not Performed on Several Valves due to Inadequate Program Scope Development." In 1999, the licensee conducted a design basis review of the components in the Inservice Test (IST) program at each of the Commonwealth Edison nuclear facilities. During this review, the licensee identified 32 valves that were not included within the scope of the IST program as required by ASME/ANSI OM Part 10, "Inservice Testing of Valves in Light-Water Reactor Power Plants." The licensee determined that the existing surveillance testing program for 24 of the 32 valves did not satisfy the IST program requirements of ASME/ANSI OM Part 10. The licensee subsequently performed the testing required by the IST program on each of the valves with acceptable results.

Prior to implementation of Improved TSs on February 5, 2000, implementation of the IST program was governed by TS Surveillance Requirement 4.0.5.a which required, 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, IWB-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, Section 1 which requires, in part, that active or passive valves which are required to perform a specific function in shutting down the reactor to 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.

Following implementation of Improved TSs on February 5, 2000, implementation of the IST program was governed by TS 5.5.8, which requires that the IST Program be established, implemented, and maintained. 10 CFR Part 50.55a(f)(4)(ii) requires, in part, that inservice tests to verify operational readiness of pumps and valves must comply with the latest edition and addenda of the code incorporated in 10 CFR Part 50.55a(b), which includes ASME Boiler and Pressure Vessel Code, Section XI, IWB-1100, "Valve Testing."

The inspectors had previously identified deficiencies with the scoping of valves into the IST program, which were documented in NRC Inspection Reports

50-454/455/98025(DRP) and 50-454/455/99003(DRP). As a result, the NRC issued Non Cited Violation (NCV) 50-454/455/99003-05(DRP). The failure to include 32 valves within the IST program as required by ASME/ANSI OM Part 10 constitutes additional examples of NCV 50-454/455/99003-05(DRP) and is not being treated individually. Further corrective actions for these additional examples are expected to be taken in conjunction with the corrective actions from the previous NCV.

The licensee's investigation revealed that insufficient controls had been in place to ensure that the personnel making IST scoping decisions had the proper knowledge to make the full spectrum of scoping decisions during previous IST scoping efforts. The inspectors reviewed the licensee's corrective actions and determined that they were acceptable. This LER is closed.

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.

P8 Miscellaneous Emergency Preparedness Issues (92904)

- P.8.1 (Closed) Inspection Follow-Up Item (IFI) 50-454/455-99015-01: "Difficulty in Dispatching 'Urgent' In-Plant Team." During the 1999 Byron Station Emergency Exercise, the dispatch of urgent priority emergency response teams was not always timely. Corrective actions included development of an Emergency Preparedness Department Training and Reference Material OSC [Operations Support Center] Team Dispatch Priority Scheme, dated January 3, 2000. This document establishes Nuclear Generation Group policy for the dispatch of emergency teams from the OSC. As part of this policy, the definitions of urgent, high and medium were redefined to better specify the actions associated with emergency response teams. Training on the new dispatch priority definitions were conducted during a series of table top drills during the first quarter of calendar year 2000 and will be fully evaluated during a utility only drill conducted in April 2000. This item is closed.

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.

F3 Fire Protection Procedures and Documentation

F3.1 Post-Fire Safe Shutdown Analysis Credit for Cold Shutdown Repairs

a. Inspection Scope (37551 and 71750)

The inspectors evaluated the Byron Station Safe Shutdown Analysis with regard to achieving and maintaining cold shutdown following a fire. The inspectors interviewed engineering department personnel and reviewed the following documents.

- Byron Fire Protection Report
- Byron Station Units 1 and 2 Cold Shutdown Repair Cable Routing Report
- Byron Electrical Maintenance Procedure (BHP) 4200-33, "Installation of Appendix R Emergency Cable," Revision 8
- BHP 4200-46, "Control Switch Replacement Appendix R and General Plant," Revision 4
- Byron Instrument Maintenance Procedure (BIP) 2500-109, "Calibration of a Balance of Plant (BOP) 7300 Loop," Revision 6
- Byron Instrument Maintenance Surveillance Requirement Procedure 3.3.2-205, "Surveillance Calibration of Wide Range Reactor Coolant Pressure A and C Hot Leg," Revision 2
- Calibration of Residual Heat Removal Pump 1A Return Temperature Control Loop (RH) Test Report Package
- Calibration of Residual Heat Removal Pump 1B Return Temperature Control Loop (RH) Test Report Package
- Calibration of Wide Range Reactor Coolant Pressure Loop 1A Hot Leg (RC) Test Report Package
- Calibration of Wide Range Reactor Coolant Pressure Loop 1C Hot Leg (RC) Test Report Package
- Nuclear Station Procedure (NSP) MA-AA-AD-6-03005, "Maintenance Planning," Revision 0
- NSP-MA-AA-AD-6-03009, "Work Execution and Close Out," Revision 1
- NSP-WC-3010, "Troubleshooting," Revision 0
- NSP-WC-AA-101, "Work Screening and Classification," Revision 1
- NSP-WC-AA-104, "Review and Screening for High Production Risk Activities and Work Authorization," Revision 1
- NSP-WC-AA-105, "Post-Maintenance Testing Program," Revision 0
- Nuclear Station Work Procedure WM-10, "Preparation of Maintenance Work Packages," Revision 2

b. Observations and Findings

While reviewing the Byron Station Safe Shutdown Analysis, the inspectors identified three notable issues. Those issues are discussed in the following paragraphs.

The inspectors identified numerous inconsistencies between the text of the analysis and the attached tables. In response to the inspectors' observations, the licensee reviewed the inconsistencies and determined that the text and tables contained numerous errors. As a result of the number and nature of these errors, the licensee initiated problem identification form (PIF) B2000-00403 and initiated a comprehensive review of the safe shutdown analysis to identify and resolve any inconsistencies. At the end of the inspection period, the licensee's review was in progress and the licensee had not identified any errors in the analysis that would have impacted its ability to achieve and maintain cold shutdown conditions following a fire.

The inspectors also noted that Byron Fire Protection Report, Section 3.5.c(5), requires, in part, that all materials and equipment needed to make repairs to achieve cold shutdown conditions be maintained onsite. In order to ensure that all materials needed to conduct these repairs were maintained onsite, the licensee performed an annual inspection. However, the inspectors noted that this inspection was not proceduralized, and as a result, the inventories conducted in 1998 and 1999 did not verify that all of the

materials needed for cold shutdown repairs were onsite. In response to the inspectors' questions, the licensee performed a complete inventory on February 24, 2000 and determined that all required materials were onsite. At the end of the inspection period, the licensee was developing a surveillance procedure to provide proceduralized guidance for the performance of this annual inspection. The licensee included this corrective action in PIF B2000-00403.

In addition, the inspectors identified that the licensee did not have approved procedures in effect to conduct each of the cold shutdown repairs that were credited in the Byron Station Safe Shutdown Analysis. Specifically, the licensee did not have approved procedures to repair or replace the residual heat removal heat exchanger outlet temperature instruments, 1/2TE-604 and 1/2TE-605, or the reactor coolant wide range pressure instruments, 1/2PT-403 and 1/2PT-405. Repairs to these instruments were credited to achieve and maintain cold shutdown conditions for fires in the main control room, the Unit 1 and Unit 2 auxiliary electric equipment rooms, and the Unit 1 and Unit 2 auxiliary building 364 foot elevation. The inspectors noted that the licensee had approved repair procedures in effect to conduct the remaining cold shutdown repairs credited in the Byron Station Safe Shutdown Analysis. Specifically, post-fire cable repairs were governed by BHP 4200-33 and post-fire repairs to control switches were governed by BHP 4200-46.

Byron Station Operating Licenses for Unit 1 and Unit 2, NPF-37 and NPF-66 respectively, require, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the licensee's Fire Protection Report. Byron Fire Protection Report, Section 3.5.c(5), requires, in part, that procedures shall be in effect to implement repairs to achieve cold shutdown conditions within 72 hours. Byron Fire Protection Report, Section 2.4.1.6, also requires, in part, that for each of the fire zones listed in Table 2.4-6, "Unit 1 Fire Zone Repair Description," and Table 2.4-3, "Unit 2 Fire Zone Repair Description," where credit is taken for making cold shutdown repairs, a procedure will be written and be available to cover the repair needed. The failure to have approved procedures to repair or replace the residual heat removal heat exchanger outlet temperature instruments and the reactor coolant wide range pressure instruments, which were repairs credited to achieve and maintain cold shutdown conditions in Table 2.4-6 and Table 2.4-3 of the Byron Fire Protection Report, is a violation of the Byron Station Operating License. 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 (50-454/455/2000002-03(DRP)). This violation is in the licensee's corrective action program as PIF B2000-01005.

Also, in response to the inspectors' questions regarding cold shutdown repair procedures, the licensee determined that the Pre-Fire Plans do not reference the applicable cold shutdown repair procedures as required by Byron Fire Protection Report, Section 2.4.1.6. As a result, the licensee initiated PIF B2000-00699 to document the issue and develop appropriate corrective actions.

c. Conclusions

The inspectors identified numerous errors in the Byron Station Safe Shutdown Analysis, none of which impacted the licensee's ability to achieve and maintain cold shutdown conditions following a fire. The inspectors also identified that the licensee's annual inspection of the materials needed to conduct cold shutdown repairs was not

proceduralized, which resulted in the last two annual inspections not verifying all required material onsite. In addition, the inspectors identified that the licensee did not have approved procedures in effect to conduct each of the cold shutdown repairs that were credited in the Byron Fire Protection Report. This issue was treated as a Non-Cited Violation.

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 March 31, 2000. The licensee acknowledged the findings presented with the one exception described below. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

As documented in Section F3.1 of this report, the inspectors concluded that the licensee did not have approved procedures in effect to conduct each of the cold shutdown repairs that were credited in the Byron Fire Protection Report. The licensee disagreed. The licensee's position was that the procedures which govern the work control process satisfied the requirements specified in the Byron Fire Protection Report. The inspectors subsequently reviewed the licensee's position and determined that the licensee's work control procedures did not satisfy the requirement specified in the Byron Fire Protection Report, Sections 2.4.1.6 and 3.5.c(5).

PARTIAL LIST OF PERSONS CONTACTED

Licensee

B. Adams, Regulatory Assurance Manager
J. Harkness, System Engineering Maintenance Rule Program Engineer
J. Kramer, Work Control Manager
S. Kuczynski, Maintenance Manager
R. Lopriore, Station Manager
W. McNeill, Radiation Protection Manager
D. Prisby, System Engineering Performance Monitoring Supervisor
R. Roton, Acting Nuclear Oversight Manager
T. Schuster, Chemistry Manager
M. Snow, Operations Manager
G. Stauffer, NRC Coordinator
D. Wozniak , Engineering Manager

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 92700: Onsite Followup of Written Reports of Nonroutine Events at Power Reactor
Facilities
IP 92901: Follow-up Plant Operations
IP 92903: Follow-up Engineering
IP 92904 Follow-up Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-454/2000002-01	NCV	Failure to correct a fire protection system valve problem that rendered the carbon dioxide fire suppression system inoperable
50-454/455-2000002-02	NCV	Failure to properly monitor maintenance rule performance criteria for two functions
50-454/455-2000002-03	NCV	Failure to have approved procedures to implement repairs to achieve cold shutdown conditions

Closed

50-454/455-2000001-01	URI	Review of the licensee's capability to achieve and maintain safe shutdown by crediting actions outside the safe shutdown analysis
50-454/2000002-01	NCV	Failure to correct a fire protection system valve problem that rendered the carbon dioxide fire suppression system inoperable
50-455/2000-001-00	LER	Automatic reactor trip system actuation due to off-site power line fault and failed air circuit breaker load rejection contact
50-454/455-2000002-02	NCV	Failure to properly monitor maintenance rule performance criteria for two functions
50-454/2000-001-00	LER	Inservice testing not performed on several valves due to inadequate program scope development
50-454/455-99015-01	IFI	Difficulty in dispatching "urgent" in-plant team
50-454/455-2000002-03	NCV	Failure to have approved procedures to implement repairs to achieve cold shutdown conditions

Discussed

50-455/98-005	LER	Inadequate administrative controls lead to operation outside the ventilation system design basis
50-454/455-99003-05	NCV	Failure to include valves in the inservice test (IST) program

LIST OF ACRONYMS USED

AF	Auxiliary Feedwater
AMS	Anticipated Transient Without Scram Mitigation System
ASME	American Society of Mechanical Engineers
BHP	Byron Electrical Maintenance Procedure
BIP	Byron Instrument Maintenance Procedure
BOSR	Byron Operating Surveillance Requirement Procedure
BVSR	Byron Technical Surveillance Requirement Procedure
CFR	Code of Federal Regulations
CO ₂	Carbon Dioxide
DC	Direct Current
DCP	Design Change Package
DG	Diesel Generator
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ESFAS	Engineered Safety Feature Actuation System
IFI	Inspection Follow-Up Item
IST	Inservice Test
LCSR	Lower Cable Spreading Room
LER	Licensee Event Report
NCV	Non-Cited Violation
NGG	Nuclear Generation Group
NRC	Nuclear Regulatory Commission
OSC	Operations Support Center
PIF	Problem Identification Report
PROM	Programmable Read Only Memory
S/G	Steam Generator
SX	Essential Service Water
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WR	Work Request