

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No: 50-454/455-99002(DRP)

Licensee: Commonwealth Edison Company

Facility: Byron Generating Station, Units 1 and 2

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

Dates: January 5 - February 16, 1999

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EXECUTIVE SUMMARY

Byron Generating Station Units 1 and 2 Byron Inspection Report 50-454/99002(DRP); 50-455/99002(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 inspectors concluded that routine operations of the facility were conducted in a professional, safe and controlled manner. Operators responded appropriately to alarms, closely monitored main control room panels, were knowledgeable of plant conditions, properly used procedures, and generally used three-way communications. (Section O1.1)
- The inspectors identified that informality and deficiencies in the conduct of Plant Operations Review Committee (PORC) Meeting 99-03 resulted in mis-communication between the PORC and the operating shift regarding the action plan for exiting the Technical Specification shutdown action requirement for an inoperable reactor trip breaker. Specifically, the operating shift did not implement the action plan as the PORC intended. The inspectors also concluded that the actions taken by the operating shift did not place the unit at increased risk. (Section O1.2)
- The inspectors concluded that the operators' response was appropriate to the blockage of the river screen house traveling screens and the resultant loss of water level in the intake bay. The inspectors also concluded that the licensee's failure to complete operator training for a recently installed modification to the traveling screen differential level instrumentation resulted in confusion over intake bay level during the transient. No violation of regulatory requirements were identified. (Section O1.3)
- The inspectors concurred with the licensee's conclusion that the operators failed to control the configuration of chemical feed system drain valve which resulted in the inadvertent transfer of approximately 4800 gallons of liquid (including approximately 400 gallons of sodium hypochlorite) to the treated runoff system. The inspectors also concluded that previous corrective actions for a similar configuration control event, which was documented in NRC Inspection Report 50-454/98025(DRP); 50-455/98025(DRP), were not totally effective in preventing a recurrence. No violation of regulatory requirements occurred since the deficiency involved the nonsafety-related chemical feed system. (Section O2.1)
- The inspectors concurred with the licensee's conclusion that operators failed to control the configuration of the 2A condensate/condensate booster pump casing vent valves, due to errors in the implementation of the out-of-service program. These errors resulted in the inadvertent degradation of condenser vacuum and the subsequent reduction in Unit 2 power level by approximately 30 megawatts electrical. No violation of regulatory requirements occurred since the deficiency involved the nonsafety-related condensate system. (Section O2.2)

Maintenance/Surveillance

- The inspectors concluded that the maintenance work instructions for the diesel generators lacked appropriate guidance for the assembly of some mechanical joints. A Non-Cited Violation was issued. The inspectors concurred with the licensee's conclusion that the 1B diesel generator failed to start during post-maintenance testing due to insufficient work instructions to prime the fuel oil system. (Section M3.1)
- The inspectors concurred with the licensee's conclusion that measuring and test equipment was installed at the wrong terminals during the performance of a Byron operating surveillance primarily due to an inadequate pre-job briefing and an improperly performed independent verification of the installation activity. This issue was considered of minor safety significance. However, the inspectors also concluded that the licensee's corrective actions for similar issues, which were documented in NRC Inspection Reports 50-454/98025(DRP); 50-455/98025(DRP) and 50-454/98020(DRP); 50-455/98020(DRP), have not been totally effective at preventing the recurrence of these types of errors. (Section M4.1)
- The inspectors concurred with the licensee's conclusion that the invalid high energy line break signal and resulting isolation of the Unit 1 steam generator blowdown system during the performance of a Byron instrument surveillance procedure occurred due to multiple human errors and inadequate communications practices. An escalated enforcement item was issued to allow the licensee time to develop their corrective actions. (Section M4.2)

Engineering

- The inspectors concurred with the operating shift's operability determination that the Unit 2 containment floor drain sump level indication was inoperable and that the operability assessment provided by the engineering department was inadequate to justify operability. (Section E2.1)

Plant Support

- The inspectors concluded that an individual failed to notify the radiation protection department upon receipt of an alarm on the gatehouse exit contamination portal monitor. The individual was subsequently surveyed by the radiation protection department personnel and determined to not be contaminated. This failure constituted a violation of minor significance and is not subject to formal enforcement action. The inspectors also concluded that the security guards in the gatehouse did not recognize the significance of the contamination alarm and did not ensure that the required actions were completed. (Section R4.1)

Report Details

Summary of Plant Status

The licensee operated Unit 1 at or near full power until January 8, 1999, when the licensee initiated a Technical Specification required plant shutdown due to the failure of the 'A' reactor trip breaker during surveillance testing. The licensee reduced power level to approximately 55 percent prior to restoring the operability of the breaker. The licensee returned Unit 1 to full power later the same day and operated at or near full power for the remainder of the inspection period.

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

I. Operations

O1 Conduct of Operations

O1.1 General Comments (71707)

During this inspection period, the inspectors routinely observed the conduct of plant operations. Operators responded appropriately to alarms, closely monitored main control room panels, were knowledgeable of plant conditions, properly used procedures, and generally used three-way communications. Overall, the inspectors concluded that routine operations of the facility were conducted in a professional, safe and controlled manner.

On February 5, 1999, the licensee implemented Amendment No. 106 to the station's Technical Specifications (TS). The amendment reflects the full conversion of the licensee's TS to a set of Improved Technical Specifications based on NUREG-1431, "Standard Technical Specifications -- Westinghouse Plants," Revision 1, dated April 1995. The inspectors reviewed the implementation and the Limiting Conditions for Operation Action Requirements in effect at the time of implementation and concluded that the requirements of the TS were satisfied.

O1.2 Ineffective Communication Between the Plant Operations Review Committee and the Operating Shift

a. Inspection Scope (71707)

The inspectors observed the licensee's response to the failure of the 'A' reactor trip breaker to remain closed during Byron Operating Surveillance (BOS) 3.1.1-20, "Unit One Train A Solid State Protection System Bi-Monthly Surveillance (Staggered)," Revision 18, Section F.13, "System Restoration." The inspectors also observed Plant Operations Review Committee (PORC) Meeting 99-03, which was convened to approve the action plan for exiting the TS shutdown action requirement for an inoperable reactor trip breaker. The inspectors interviewed operations and engineering department personnel and reviewed Nuclear Station Work Procedure A-21, "Temporary Modifications," Revision 0, and Temporary Modification 99-1-002, "Install Electrical Jumper to Bypass the 'A' Reactor Trip Breaker Shunt Trip Test Pushbutton."

b. Observations and Findings

On January 8, 1999, immediately following closure of the 'A' reactor trip breaker during the performance of BOS 3.1.1-20, Section F.13, "System Restoration," the breaker tripped open. As a result, the operators declared the reactor trip breaker inoperable and commenced a unit shutdown in accordance with TS 3.3.1, Table 3.3-1, "Reactor Trip System Instrumentation," Action 12b. In parallel with the unit shutdown, maintenance and engineering department personnel conducted troubleshooting activities on the breaker and determined that the breaker failed to remain closed due to a failed shunt trip test pushbutton.

As a result, the licensee conducted a PORC meeting to approve an action plan for exiting the TS shutdown action requirement for the inoperable reactor trip breaker. The approved action plan included the following sequential steps: (1) installation of a jumper around the shunt trip test pushbutton, which required a 10 CFR Part 50.59 screening/evaluation to be completed; (2) racking in the breaker and verifying that the breaker remained closed; (3) opening the bypass breaker; (4) returning the solid state protection system to a normal lineup; and (5) exiting the TS shutdown action requirement. However, the inspectors identified that the operating shift did not implement the action plan as specified by the PORC, in that, all actions were taken prior to the completion of the 50.59 evaluation. The inspectors also determined that the operating shift adequately controlled the installation of the jumper and did not place the unit at increased risk. In response to the inspectors questions, the licensee recognized the error and re-entered the TS action statement pending completion of the 50.59 evaluation.

The licensee's subsequent critique of the event revealed that informality and deficiencies in the conduct of the PORC meeting resulted in mis-communication between the PORC and the operating shift. The licensee's corrective actions for this event included improving the formality of the conduct of PORC meetings and establishing the practice of using the approved PORC meeting minutes to communicate the results of the meetings. The inspectors concluded that the licensee's corrective actions were acceptable.

c. Conclusions

The inspectors identified that informality and deficiencies in the conduct of Plant Operations Review Committee (PORC) Meeting 99-03 resulted in mis-communication between the PORC and the operating shift regarding the action plan for exiting the Technical Specification shutdown action requirement for an inoperable reactor trip breaker. Specifically, the operating shift did not implement the action plan as the PORC intended. The inspectors also concluded that the actions taken by the operating shift did not place the unit at increased risk.

O1.3 Blockage of the River Screen House Traveling Screens with Leaves and Ice

a. Inspection Scope (71707)

The inspectors observed the licensee's response to the blockage of the river screen house traveling screens with leaves and ice. The inspectors also interviewed operations

and engineering department personnel, and reviewed applicable portions of the TS and the Updated Final Safety Analysis Report (UFSAR).

b. Observations and Findings

On January 26, 1999, immediately following the circulating water system warm-up line being placed in service, the river screen house traveling screens were blocked with the resultant influx of leaves and ice. Consequently, the intake bay water level lowered approximately 92 inches prior to the operators stopping the circulating water system make-up pumps, reestablishing intake bay level and clearing the debris from the traveling screens. The operating shift subsequently restored the circulating water system configuration and initiated an investigation into the event. The licensee also evaluated the impact of the loss of level in the intake bay on the operability of the safety-related essential service water make-up pumps and concluded that adequate net positive suction head and flow existed for the pumps to have fulfilled their safety function. At the end of this inspection period, the licensee was evaluating future operation of the warm-up line and its effects on the intake area of the river screen house.

The inspectors noted that operators were not familiar with the operation of a recently installed modification to the traveling screen differential level instrumentation in the river screen house, which resulted in reporting incorrect intake bay water levels. This was due to one water level indicator pegged high and unfamiliarity with the a second newly installed water level indication. The licensee had installed the modification in July 1998, and had identified the operator training for this modification consistent with the requirements in Byron Administrative Procedure (BAP) 1600-12, "Design Change Packages - Type Exempt Change (EC)." However, the licensee did not require that the training be completed prior to placing the new instrumentation in service. The inspectors concurred with operations management's subsequent conclusion that the deferral of this training had not been appropriate.

c. Conclusions

The inspectors concluded that the operators' response was appropriate to the blockage of the river screen house traveling screens and the resultant loss of water level in the intake bay. The inspectors also concluded that the licensee's failure to complete operator training for a recently installed modification to the traveling screen differential level instrumentation resulted in confusion over intake bay level during the transient. No violation of regulatory requirements were identified.

O2 Operational Status of Facilities and Equipment

O2.1 Inadvertent Chemical Addition to Treated Runoff System Due to Valve Misalignment

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the licensee's failure to control the configuration of chemical feed (CF) system drain valve OCF072, which resulted in the inadvertent transfer of approximately 4800 gallons of liquid (including approximately 400 gallons of sodium hypochlorite) to the treated runoff system. The inspectors interviewed operations department personnel and reviewed the following procedures:

Nuclear Station Work Procedure A-21, "Temporary Modifications," Revision 0; Work Request (WR) 970004650-02, "Hook Up the Mobil Pumping Unit to Support Heat Exchanger Work;" Byron Operating Procedure (BOP) CF-31, "Operation of the Roger Mobile [Portable Pumping System] for Radiologically Non-Contaminated System Draining," Revision 0; and BOP CF-8, "Manual Chemical Addition to the Non-Essential Service Water System," Revision 7.

b. Observations and Findings

On January 19, 1999, while adding sodium hypochlorite to the non-essential service water system, a non-licensed operator identified a strong odor in the turbine building. Upon investigation, operators determined that CF system drain valve 0CF072 was open with a hose routed to the turbine building fire and oil sump and that approximately 4800 gallons of liquid (including approximately 400 gallons of sodium hypochlorite) had been inadvertently pumped to the sump. The discharge of the CF system had previously been aligned in accordance with BOP CF-31 to drain the 2A containment ventilation chiller for maintenance on January 14, 1999, and had not been restored to its normal configuration when work on the chiller was completed. Consequently, when the licensee subsequently performed the chemical addition in accordance with BOP CF-8, an unidentified flow path existed which resulted in the inadvertent transfer of approximately 4800 gallons of liquid to the treated runoff system.

The licensee's prompt investigation revealed that: (1) the operators failed to control the configuration of the CF system; (2) BOP CF-8 did not verify proper system alignment to support the chemical addition; and (3) the pre-job briefing conducted for the chemical addition did not address the existing system configuration. At the end of the inspection period, the licensee had not completed their root cause evaluation and had not identified corrective actions for this issue. No violation of regulatory requirements occurred since the deficiency involved the nonsafety-related CF system. However, the inspectors were concerned that the licensee's corrective actions for a similar issue, which was documented in NRC Inspection Report 50-454/98025(DRP); 50-455/98025(DRP), had not been effective at preventing this occurrence.

c. Conclusions

The inspectors concurred with the licensee's conclusion that the operators failed to control the configuration of chemical feed system drain valve which resulted in the inadvertent transfer of approximately 4800 gallons of liquid (including approximately 400 gallons of sodium hypochlorite) to the treated runoff system. The inspectors also concluded that previous corrective actions for a similar configuration control event, which was documented in NRC Inspection Report 50-454/98025(DRP); 50-455/98025(DRP), were not totally effective in preventing a recurrence. No violation of regulatory requirements occurred since the deficiency involved the nonsafety-related chemical feed system.

O2.2 Unit 2 Loss of Condenser Vacuum Due to Out-of-Service (OOS) Errors

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the licensee's failure to control the configuration of the 2A condensate/condensate booster (CD/CB) pump casing vent

valves, 2CD061A and 2CD061B, which resulted in the inadvertent degradation of condenser vacuum and the subsequent reduction in Unit 2 power level by approximately 30 megawatts electrical. The inspectors interviewed operations department personnel and reviewed BAP 330-1, "Station Equipment Out-Of-Service Procedure," Revision 28.

b. Observations and Findings

On January 19, 1999, while mechanical maintenance personnel were performing maintenance on the 2A CD/CB pump, Unit 2 condenser vacuum unexpectedly degraded due to air in-leakage to the condenser. Upon investigation, the licensee determined that a non-licensed operator had opened pump casing vent valves 2CD061A and 2CD061B, which vented the pump to the condenser, and pump casing drain valve 2CD161A to drain the pump at the request of mechanical maintenance. Consequently, when mechanical maintenance personnel disconnected a fitting on one of the vent lines, a pre-existing siphon was broken allowing air in-leakage to the condenser, which resulted in degradation of condenser vacuum and a small reduction in Unit 2 power level. In response to this transient, the operators closed the pump casing vent valves, restored condenser vacuum and power level.

The licensee's initial investigation revealed that: (1) the OCS for the 2A CD/CB pump incorrectly specified information cards for the pump casing vent valves, which allowed operation of the valves to vent the pump, rather than OOS cards as required by BAP 330-1; (2) the pump casing vent valves were not operated in accordance with the instructions on the information cards; (3) the operators failed to track the status of the abnormal configuration of the pump casing vent valves; and (4) the licensee's corrective actions, which had been implemented for similar deficiencies with the OOS on the 1D CD/CB pump in December 1998, were not incorporated into the OOS for the 2A CD/CB pump. At the end of the inspection period, the licensee had not completed their root cause evaluation and had not identified corrective actions for this issue. No violation of regulatory requirements occurred since the deficiency involved the nonsafety-related condensate system.

c. Conclusions

The inspectors concurred with the licensee's conclusion that operators failed to control the configuration of the 2A condensate/condensate booster pump casing vent valves, due to errors in the implementation of the out-of-service program. These errors resulted in the inadvertent degradation of condenser vacuum and the subsequent reduction in Unit 2 power level by approximately 30 megawatts electrical. No violation of regulatory requirements occurred since the deficiency involved the nonsafety-related condensate system.

O8 Miscellaneous Operations Issues (92700)

- O8.1 (Closed) LER 50-454/97020: "Excessive Operator Response Times Due to Inadequate Analysis Implementation." This event was originally discussed in detail in NRC Inspection Report 50-454/97016(DRS); 50-455/97016(DRS) and resulted in a violation, which was subsequently closed in NRC Inspection Report 50-454/98024(DRS); 50-455/98024(DRS). The licensee's evaluation of the event and corrective actions for the violation resulted in this licensee event report. The inspectors reviewed the

licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.

- O8.2 (Closed) LER 50-455/97003: "Reactor Trip Due to Age-Related Failures of Redundant Rod Drive Power Supplies." This event was originally discussed in detail in NRC Inspection Report 50-454/97020(DRP); 50-455/97020(DRP). On October 10, 1997, an automatic reactor trip occurred on Unit 2 due to the failure of two degrading redundant power supplies in the rod drive control system. The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.

II. Maintenance

M3 Maintenance Procedures and Documentation

M3.1 Insufficient Maintenance Instructions for the Diesel Generators

a. Inspection Scope (62707)

The inspectors observed the performance of selected portions of WR 980049199-01, "Mounting Bracket on Fuel Oil Return Header is Broken," and interviewed maintenance and engineering department personnel. The inspectors also reviewed Byron Mechanical Maintenance Procedure (BMP) 3100-8, "Mechanical Closure," Revision 8, and the vendor information for various fittings and mechanical joints associated with the diesel generators.

b. Observations and Findings

On January 19, 1999, following maintenance on the 1B diesel generator (DG) in accordance with WR 980049199-01, the DG failed to start during post-maintenance testing. The licensee subsequently determined that the cause of the failure to start was inadequate priming of the DG following maintenance on the fuel oil system. The work instructions contained in WR 980049199-01 did not contain any guidance on how to prime the fuel oil system. Consequently, the mechanics did not properly prime the 1B DG and the 1B DG failed to start during post-maintenance testing. In response to this event, the licensee planned to revise several maintenance procedures and model work requests to include specific work instructions for priming the DG fuel oil system following maintenance. The inspectors concluded that the licensee's corrective actions were acceptable.

In addition, while observing the subsequent fuel oil line repair, the inspectors identified that the work instructions for the reassembly of the high pressure noses from the jerk (fuel injection) pumps to the fuel oil return line were inadequate. Specifically, the work instructions stated that the connections be tightened equally wrench tight; however, this particular type of fitting was required by the manufacturer's assembly instructions to be torqued to 12 ± 1 ft-lbs. In response to the inspectors' questions, the licensee identified and initiated revisions to approximately 21 other previously approved work requests for the DGs, which had not been worked, and several BMPs to include specific guidance for the assembly of various mechanical fittings and joints. The inspectors concluded that the licensee's corrective actions were acceptable.

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 failure to provide proper torque requirements for the assembly of the high pressure hoses from the jerk pumps to the fuel oil return line header is a violation of 10 CFR Part 50, Appendix B, Criteria V. This non-repetitive, licensee identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-454/99002-01(DRP)).

c. Conclusions

The inspectors concluded that the maintenance work instructions for the diesel generators lacked appropriate guidance for the assembly of some mechanical joints. A Non-Cited Violation was issued. The inspectors concurred with the licensee's conclusion that the 1B diesel generator failed to start during post-maintenance testing due to insufficient work instructions to prime the fuel oil system.

M4 Maintenance Staff Knowledge and Performance

M4.1 Improper Installation of Measuring and Test Equipment During Testing of the 1B Diesel Generator

a. Inspection Scope (62707, 61726)

The inspectors reviewed the circumstances surrounding the improper installation of a strip chart recorder during the performance of BOS 8.1.1.2.a-2, "Unit One 1B Diesel Generator Operability Monthly (Staggered) and Semi-Annual (Staggered) Surveillance," Revision 16. The inspectors interviewed operations and maintenance department personnel and reviewed the apparent cause evaluation for Problem Identification Form B1999-00190, "Strip Chart Recorder Connected to Wrong Terminal."

b. Observations and Findings

On January 19, 1999, during the performance of BOS 8.1.1.2.a-2, Section F.3.e, electrical maintenance technicians improperly installed the strip chart recorder. Specifically, the chart recorder voltage module was required to be installed to terminals 7 and 10 at panel 1PL08J. However, the recorder voltage module was installed to terminals 7 and 8 at 1PL08J. Consequently, the required data was not recorded during the subsequent surveillance testing of the 1B DG. While investigating the failure to record the required data, the electrical maintenance technicians identified that the recorder voltage module had been installed on the wrong terminals. As a result, the operating shift initiated a prompt investigation into the cause of the error and satisfactorily re-performed the surveillance testing.

The licensee's investigation revealed that the error occurred due to an inadequate pre-job briefing and an improperly performed independent verification of the installation activity. In addition, the investigation revealed that the licensee failed to recognize that neither electrical maintenance technician had previously performed this activity. The licensee's corrective actions for this event included disciplinary action against the involved maintenance personnel; additional training for the maintenance department on

pre-job briefings, the selection of personnel for job assignments, and the independent verification process; and reviewing the event with system engineering department personnel emphasizing the importance of procedural adherence. The inspectors concluded that the licensee's corrective actions for this error were acceptable. This failure constitutes a violation of minor significance and is not subject to formal enforcement action. However, the inspectors were concerned that the licensee's corrective actions for similar issues, which were documented in NRC Inspection Reports 50-454/98025(DRP); 50-455/98025(DRP) and 50-454/98020(DRP); 50-455/98020(DRP), have not yet been effective at preventing the recurrence of these types of errors.

c. Conclusions

The inspectors concurred with the licensee's conclusion that measuring and test equipment was installed at the wrong terminals during the performance of a Byron operating surveillance primarily due to an inadequate pre-job briefing and an improperly performed independent verification of the installation activity. This issue was considered of minor safety significance. However, the inspectors also concluded that the licensee's corrective actions for similar issues, which were documented in NRC Inspection Reports 50-454/98025(DRP); 50-455/98025(DRP) and 50-454/98020(DRP); 50-455/98020(DRP), have not been totally effective at preventing the recurrence of these types of errors.

M4.2 Human Performance Errors Resulted in an Invalid High Energy Line Break (HELB) Signal and Actuation During Temperature Switch Calibration

a. Inspection Scope (62707, 61726)

The inspectors reviewed the circumstances surrounding the inadvertent HELB and equipment response of the Unit 1 steam generator blowdown system during the performance of Byron Instrument Surveillance (BIS) 3.3.12-201, "Surveillance Calibration of Steam Generator Blowdown Area Temperature Switches (SD) Environmentally Qualified," Revision 5. The inspectors interviewed operations and maintenance department personnel and reviewed the results of the licensee's prompt investigation into the event.

b. Observations and Findings

On January 20, 1999, during the performance of BIS 3.3.12-201, a nuclear station operator installed fuse FU31 at panel 1PA27J, Step F.24, prior to the completion of Step F.22 for the steam generator blowdown condenser room temperature high blowdown isolation alarm. Since the instrument maintenance technician requested the fuse to be installed, the unit supervisor incorrectly believed that the surveillance testing activity was completed since the installation of the fuse was expected to be the last action step of the procedure. Therefore, the unit supervisor directed that steam generator blowdown be re-established. Consequently, during the subsequent performance of Step F.22, an unexpected HELB isolation of the Unit 1 steam generator blowdown system occurred when the instrument maintenance technicians incorrectly installed a jumper across terminal points 1 and 2 at junction box 1JB1743A instead of across terminal points 11 and 12. In response to the invalid HELB actuation and

equipment response, the operating shift restored the system configuration and initiated a prompt investigation into the cause of the error.

The licensee's prompt investigation revealed that the invalid HELB signal and equipment actuation occurred due to multiple human errors and inadequate communications practices. The licensee's corrective actions for this event included removal of the instrument maintenance technicians from duties; and reviewing the event with the operations and maintenance departments emphasizing the importance of procedural adherence and effective communications. At the end of the inspection period, the licensee had not completed their root cause evaluation and had not identified corrective actions for this issue.

Technical Specification 6.8.1.a states that written procedures shall be established, implemented, and maintained for procedures recommended in Appendix A, of Regulatory Guide 1.33, Revision 2, February 1978. Appendix A of Regulatory Guide 1.33, Revision 2, February 1978, specifies that procedures are required for each surveillance test listed in TS. Byron Instrument Surveillance 3.3.12-201 is the implementing procedure for the HELB isolation instrumentation operability testing required by TS 4.3.3.12. The installation of fuse FU31 at the wrong step of the procedure and connection of the jumper across terminal points 1 and 2 at junction box 1JB1743A instead of terminal points 11 and 12 are both considered examples of an apparent violation of TS 6.8.1.a (Escalated Enforcement Item 50-454/99002-02(DRP)). This issue, which may represent a violation of NRC requirements, will remain open for a reasonable time to allow the licensee to develop its corrective actions.

c. Conclusions

The inspectors concurred with the licensee's conclusion that the invalid high energy line break signal and resulting isolation of the Unit 1 steam generator blowdown system during the performance of a Byron instrument surveillance procedure occurred due to multiple human errors and inadequate communications practices. An escalated enforcement item was issued to allow the licensee time to develop their corrective actions.

M8 Miscellaneous Maintenance Issues (92700)

- M8.1 (Closed) LER 50-454/97021: "Operation Outside Ventilation Design Basis Due to Inadequate Procedure." On October 28, 1997, the licensee identified that control room door SD171 (a seismically qualified ventilation barrier) was removed and a non-seismically qualified structure was in place to maintain the control room pressure boundary. The licensee failed to adequately evaluate the seismic qualification of the control room envelope before removing the door which placed the plant in a condition outside the design basis for a seismic event. The licensee's process for impairing ventilation barriers was found to be inadequate because appropriate procedural guidance to evaluate the impact on seismic qualifications of impaired structures, including compensatory measures, was not appropriate to the circumstances.

The inspectors documented an example of a violation of 10CFR Part 50, Appendix B, Criteria V in NRC Inspection Report 50-454/98017(DRP); 50-455/98017(DRP). Similarly, in that example, the licensee failed to adequately evaluate the affects of

control room ventilation barrier impairments on the operability of the control room ventilation system.

10CFR Part 50, Appendix B, Criteria V, "Instructions, Procedures, and Drawings," requires that activities affecting quality be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and be accomplished in accordance with these instructions, procedures, or drawings. The failure to provide appropriate instructions to evaluate the seismic qualification of the control room ventilation barrier when door SD171 was removed is considered a violation of 10CFR Part 50, Appendix B, Criteria V. This violation constitutes an additional example of violation 50-454/455-98017-02(DRP) and is not being cited individually. No additional response to violation 50-454/455-98017-02(DRP) is required. Further corrective actions for this additional example are expected to be taken in conjunction with corrective actions for the previously cited violation. This licensee event report is closed.

- M8.2 (Closed) LER 50-454/97017-00 and 01: "Completion of Shutdown Initiated Due to Degraded Condition of Safety Injection System Found During Monthly Venting Surveillance." This event was originally discussed in NRC Inspection Report 50-454/97020(DRP); 50-455/97020(DRP). While performing surveillance testing on the safety injection (SI) system, the licensee identified that the leak rate past the reactor coolant system cold leg back-up check valve for the 1C SI accumulator, 1SI8819C, exceeded the TS limit of 1 gallon per minute for reactor coolant system pressure boundary valves. The licensee was unable to reduce the valve leakage prior to the expiration of the 4-hour limiting condition for operation and performed a plant shutdown. The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.
- M8.3 (Closed) LER 50-454/97011: "Missing Support on Oil Cooler Caused SI Pump to be Inoperable Due to Work Process Deficiency." During a walkdown of the 1B SI pump room on May 27, 1997, the inspectors identified a missing seismic support bracket under the 1B SI pump lube oil cooler end bell. On May 29, 1997, the licensee completed an operability assessment which determined the 1B SI pump was inoperable because it did not meet the seismic design requirements with the support bracket missing. Subsequently, the licensee completed an engineering analysis which concluded that the 1B SI pump remained fully qualified even with the missing support bracket. The licensee provided the analysis and justification for cancellation of this licensee event report in a letter to the NRC dated November 17, 1998. The inspectors reviewed the licensee's analysis and justification for cancellation of this licensee event report and consider them to be acceptable. This licensee event report is closed.
- M8.4 (Closed) LER 50-455/97004: "Reverse Functioning Control Switch Due to Improper Actuator Installation and Failure to Recognize Reportability of the Issue." On September 6, 1997, the licensee replaced the actuator on the control switch for valve 2SI8964 (Isolation Valve for the test Line to the Refueling Water Storage Tank). The licensee failed to perform post maintenance testing for verification of the valve stroke time to assure operability. On September 12, 1997, while attempting to operate 2SI8964, the licensee identified that the valve would not operate correctly using the control switch and declared the valve inoperable. The licensee initially failed to recognize that this event was reportable and did not notify the NRC until November 19, 1997. The valve would not operate using the control switch due to improper installation.

There were no adverse effects on plant safety as a result of this event because the valve remained closed during the time it was inoperable.

Technical Specification 4.6.3.1 requires that the isolation valves specified in Table 3.6-1 shall be demonstrated operable prior to returning the valve to service after maintenance, repair, or replacement work is performed on the valve or its associated actuator, control or power circuit by performance of a cycling test, and verification of isolation time. Valve 2SI8964 is a valve specified in Table 3.6-1 of the TS. The licensee's failure to perform post maintenance verification stroke testing of the valve to assure its operability is considered to be a violation of TS 4.6.3.1. This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-455/99002-03(DRP)).

Code of Federal Regulations Title 10 Part 50.73(a) states, in part, that licensees shall report any operation or condition prohibited by the plant's TS by submitting a licensee event report within 30 days after the discovery of the event. The licensee's failure to submit the required report within 30 days is considered to be a violation of 10 CFR 50.73(a). This failure constitutes a violation of minor significance and is not subject to formal enforcement action.

The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Operability Assessments

a. Inspection Scope (37551)

The inspectors interviewed operations and engineering department personnel; reviewed applicable portions of the UFSAR and TS; and evaluated the following operability assessments.

- 96-013 Potential for Debris to Block Flow Through ECCS [Emergency Core Cooling System] Throttle Valves 1/2SI8810A-D and 1/2SI8822A-D
- 98-066 Unit 2 Containment Floor Drain Sump Level Indication (2LI-PC002) Does Not Respond as Expected to Changes in Containment Pressure

b. Observations and Findings

Operability Assessment 96-013

In April 1996, the licensee initiated Operability Assessment 96-013, following the identification of the potential for debris to pass through the containment sump screen openings and block flow through ECCS throttle valves in the charging and safety injection systems. The inspectors concluded that this operability assessment provided a reasonable justification for continued operation based on engineering judgement

arguments in accordance with NRC Generic Letter 91-18, "Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Non-conforming Conditions." The licensee originally planned to change the facility's design basis to match the existing condition via the 10 CFR Part 50.59 process. However, in July 1997, the licensee determined that the acceptance of the as found condition was not appropriate. As a result, the licensee began the process of modifying the facility to correct the non-conforming condition. The inspectors noted that the licensee did not plan on completing these modifications until September 2000 for Unit 1 and April 2001 for Unit 2.

10 CFR Part 50, Appendix B, Criteria XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. Generic Letter 91-18, Revision 1, provides additional clarifying guidance in the event that degraded or nonconforming conditions of structures, systems, or components subject to Appendix B are identified. Specifically, the timeliness of the corrective action should be commensurate with the safety significance of the issue; and, the NRC expects time frames longer than the next refueling outage to be explicitly justified by the licensee as part of the deficiency tracking documentation. However, the inspectors noted that at the end of the inspection period, the licensee had not justified the time frame for completion of the planned modifications.

This issue is considered an Unresolved Item (50-454/455-99002-04(DRP)) pending NRC review of the licensee's justification for not correcting the nonconforming condition at the first opportunity and the licensee's evaluation of the safety consequences of the nonconforming condition.

Operability Assessment 98-066

On December 19, 1998, the licensee identified that the Unit 2 containment floor drain sump level indication, 2LI-PC002, did not respond as expected due to changes in containment pressure. The operators considered the instrument to be operable since it satisfied its surveillance test acceptance criteria. However, on December 23, 1998, the licensee declared 2LI-PC002 inoperable when it exceeded its surveillance test acceptance criteria following a routine containment pressure release. The operating shift questioned the ability of the instrument to perform its intended function following an accident when a larger containment pressure transient could be expected and requested engineering to perform an operability assessment.

Engineering department personnel concluded that 2LI-PC002 was degraded but operable since the instrument was capable of providing adequate long term sump level indication. This conclusion assumed that containment pressure would remain stable and provide accurate level information for trending purposes. However, the operability assessment failed to address the operability of the instrument as a post-accident monitor under post-accident conditions when a containment pressure transient would be expected. Consequently, the operating shift rejected Operability Assessment 98-066 and concluded that 2LI-PC002 was inoperable. The resulting Technical Specification Limiting Condition for Operation allowed for continued operation with a notification to the NRC if not corrected.

c. Conclusions

The inspectors concurred with the operating shift's operability determination that the Unit 2 containment floor drain sump level indication was inoperable and that the operability assessment provided by the engineering department was inadequate to justify operability.

E8 Miscellaneous Engineering Issues (92700)

- E8.1 (Closed) LER 50-454/97016: "Projected Steam Generator Leak Rate Combined with Technical Specification (TS) Limit for Dose Equivalent Iodine Creates Potential for Operation Outside Design Basis." In a letter to the NRC dated July 30, 1997, the licensee identified a discrepancy in the methodology used to determine the predicted Byron Unit 1 end of cycle 8 steam generator accident leak rate. Additionally, the licensee provided an operability assessment which justified continued operation with a reduced allowable reactor coolant system dose equivalent iodine-131 (DE I-131) concentration and requested approval of a TS amendment for the reduced DE I-131 limit. Approval of the TS amendment was not received prior to the projected accident leak rate exceeding the design basis limit and on October 7, 1997 the licensee notified the NRC under the requirements of 10 CFR Part 50.72(b)(1)(ii)(B).

The licensee implemented a compensatory action to administratively control reactor coolant system DE I-131 concentration at a reduced value sufficient to ensure that offsite doses would be within TS limits and 10 percent of 10 CFR Part 100 limits for a postulated main steam line break accident consistent with the operability assessment. At the end of cycle 8, the licensee replaced all four Unit 1 steam generators with new steam generators which are not susceptible to outer diameter stress corrosion cracking and therefore the same issue is no longer a concern. The inspectors reviewed the licensee's corrective actions for this event and found them to be acceptable. This licensee event report is closed.

IV. Plant Support

R4 Staff Knowledge and Performance in Radiological Protection and Chemistry (RP&C) Controls

- R4.1 An Individual Exiting Protected Area Failed to Properly Pass Through a Contamination Portal Monitor.

a. Inspection Scope (71750)

The inspectors reviewed the circumstances surrounding an individual who failed to properly pass through a contamination portal monitor while exiting the protected area on December 23, 1998. The inspectors interviewed appropriate station management personnel and reviewed the following documents: Apparent Cause Evaluation Report 454-201-98-CAQ03711, "Person Exiting the Protected Area and Failed to Take Appropriate Actions;" Byron Radiological Protection Procedure (BRP) 5720-3, "Personal External Contamination Surveys," Revision 3; and, Radiation Worker Handbook, Revision 1.

b. Observations and Findings

While exiting the protected area on December 23, 1998, the inspectors observed that an individual caused an alarm of the exit contamination portal monitor, passed through the exit turnstile, and proceed to the parking lot. While the inspectors notified the radiological protection office, a licensee management individual who also witnessed this event escorted the individual back to the gatehouse. In addition, the inspectors noted that the security guards in the gatehouse did not recognize the significance of the contamination alarm and did not stop the individual from exiting the gatehouse or notify the radiation protection department of the alarm. A radiological protection technician subsequently responded to the gatehouse and verified that the individual was not contaminated.

The inspectors noted that the posted instructions at each of the portal monitors, which were also contained in the Radiation Worker Handbook, were not consistent with the procedural requirements contained in BRP 5720-3. Specifically, in the event that the portal monitor contamination alarm sounded, the posted instructions directed the individual to re-monitor and contact the radiation protection department if the monitor alarmed a second time. However, BRP 5720-3 required individuals to immediately notify the radiation protection department if the alarm on the contamination monitor indicated the presence of contamination.

The licensee's corrective actions for this issue included: (1) formal discipline, counseling, and refresher training for the individual who failed to implement the requirements of BRP 5720-3; (2) awareness training for security department personnel on radiological protection requirements; and (3) revising BRP 5720-3 and several other contamination control procedures to correct the inconsistencies. The inspectors considered the licensee's corrective action to be acceptable.

c. Conclusions

The inspectors concluded that an individual failed to notify the radiation protection department upon receipt of an alarm on the gatehouse exit contamination portal monitor. The individual was subsequently surveyed by the radiation protection department personnel and determined to not be contaminated. This failure constituted a violation of minor significance and is not subject to formal enforcement action. The inspectors also concluded that the security guards in the gatehouse did not recognize the significance of the contamination alarm and did not ensure that the required actions were completed.

F8 Miscellaneous Fire Protection Issues (92904)

- F8.1 (Closed) URI 50-454/455-96013-01(DRS): "Failure to Report RCP [Reactor Coolant Pump] Oil Collection Outside Design Basis." This issue was identified as an unresolved item because the inspectors did not consider this condition to be in full compliance with 10 CFR Part 50, Appendix R, Section III.O, and therefore outside the design basis for the plant. The licensee disagreed that the condition was outside the design basis and stated that the original drip pan configuration was previously approved by the NRC. Documentation was available to indicate that this drip pan configuration was not a concern during previous NRC inspections of the RCP oil collection system. The licensee installed a modification to enhance the RCP oil collection system and to ensure

that the adequacy of the system would not become a future concern. The modification added two additional drain pans and lengthened one drain pan for each RCP. The modification had been completed on both Byron units. This unresolved item is closed.

- F8.2 (Closed) Violation 50-454/455/96013-02(DRS): "Corrective Action to Prevent Recurring Freezing." The licensee failed to take corrective actions to prevent repetitive freezing of fire protection system components due to inadequate control of exterior doors and louvers. The inspectors reviewed the licensee's corrective actions to check for any notable weaknesses. No weaknesses were identified and the corrective actions were found to be acceptable. This violation is closed.
- F8.3 (Closed) Violation 50-454/455/97019-01(DRS): "Lack of Cable Separation in Certain Fire Zones." The licensee failed to provide separation of cables for redundant trains of safety-related structures, systems, and components in seven fire zones. The inspectors reviewed the licensee's corrective actions to check for any notable weaknesses. No weaknesses were identified and the corrective actions were found to be acceptable. This violation is closed.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on February 16, 1999. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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

INSPECTION PROCEDURES USED

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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-454/99002-01	NCV	Failure to Provide Appropriate Work Instructions for Maintenance on the 1B DG
50-454/99002-02	EEl	Failure to Implement BIS 3.3.12-201
50-455/99002-03	NCV	Failure to Implement TS Surveillance Requirement 4.6.3.1
50-454/455/99002-04	URI	Review of the Licensee's Justification for Not Correcting the Nonconforming Condition at the First Opportunity and the Licensee's Evaluation of the Safety Consequences of the Nonconforming Condition

Closed

50-454/97020	LER	Excessive Operator Response Times Due to Inadequate Analysis Implementation
50-455/97003	LER	Reactor Trip Due to Age-Related Failures of Redundant Rod Drive Power Supplies

ITEMS OPENED, CLOSED, AND DISCUSSED (cont'd)

Closed

50-454/99002-01	NCV	Failure to Provide Appropriate Work Instructions for Maintenance on the 1B DG
50-454/97021	LER	Operation Outside Ventilation Design Basis Due to Inadequate Procedure
50-454/97017-00 and 01	LER	Completion of Shutdown Initiated Due to Degraded Condition of Safety Injection System Found During Monthly Venting Surveillance
50-454/97011	LER	Missing Support on Oil Cooler Caused SI Pump to be Inoperable Due to Work Process Deficiency
50-455/97004	LER	Reverse Functioning Control Switch Due to Improper Actuator Installation and Failure to Recognize Reportability of the Issue
50-455/99002-03	NCV	Failure to Implement TS Surveillance Requirement 4.6.3.1
50-454/97016	LER	Projected Steam Generator Leak Rate Combined with Technical Specification (TS) Limit for Dose Equivalent Iodine Creates Potential for Operation Outside Design Basis
50-454/455/96013-01	URI	Failure to Report RCP [Reactor Coolant Pump] Oil Collection Outside Design Basis
50-454/455/96013-02	VIO	Corrective Action to Prevent Recurring Freezing
50-454/455/97019-01	VIO	Lack of Cable Separation. Certain Fire Zones

Discussed

50-454/455/98017-02	VIO	Failure to Meet TS 3.0.3 Action Requirements for Two Trains of VC Inoperable
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LIST OF ACRONYMS USED

BAP	Byron Administrative Procedure
BIS	Byron Instrument Surveillance
BMP	Byron Mechanical Maintenance Procedure
BOP	Byron Operating Procedure
BOS	Byron Operating Surveillance
BRP	Byron Radiological Protection Procedure
CD/CB	Condensate/Condensate Booster Pump
CF	Chemical Feed
DG	Diesel Generator
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
EEI	Escalated Enforcement Item
HELB	High Energy Line Break
LER	Licensee Event Report
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
OOS	Out-of-Service
PDR	Public Document Room
PORC	Plant Operations Review Committee
RCP	Reactor Coolant Pump
RP&C	Radiological Protection and Chemistry
SI	Safety Injection
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VIO	Violation
WR	Work Request