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Byron Generating Station  
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June 10, 1996

LTR: BYRON 96-0172  
FILE: 1.10.0101

U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Attention: Document Control Desk

Subject: Byron Nuclear Power Station Units 1 and 2  
Response to Notice of Violation  
Inspection Report No. 50-454/96003; 50-455/96003  
NRC Docket Numbers 50-454, 50-455

Reference: Lewis F. Miller, Jr. letter to Mr. Graesser dated  
May 10, 1996, transmitting NRC Inspection  
Report 50-454/96003; 50-455/96003

Enclosed is Commonwealth Edison Company's response to the Notice of Violation (NOV) which was transmitted with the referenced letter and Inspection Report. The NOV cited two (2) Severity Level IV violations requiring a written response. ComEd's response is provided in the attachment.

This letter contains the following commitments:

- 1) A Training Revision Request (TRR #01776) was written to present the inadvertent boration event, Operator Workaround (OWA)#172, procedure changes (BOP SI-13, FC-14, and BAR 1-9-A6, 1-9-B6) and other corrective actions/lessons learned to licensed operators.
- 2) Temporary procedure changes have been made for BAR 1-9-A6 and 1-9-B6 pending resolution of OWA #172, involving the "PW Deviation" and "BA Deviation" alarms.
- 3) Additional signs will be posted (AR #960027318, 960027320) at the Essential Service Water (SX) pump rooms identifying the doors as watertight and the requirement for their closure.
- 4) BOP 199-EO IN is being revised to eliminate the need for the operator to manipulate the voltmeter selector switch associated with the Control Rod Drive Motor Generator (MG) set.

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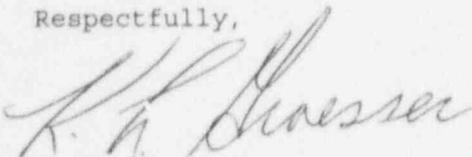
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- 5) A protective cover is being evaluated for use on the control panel during performance of Diesel Generator (DG) surveillance to preclude inadvertent switch actuation.
- 6) A discussion of the Reactor Coolant System (RCS) leakage event, focusing on the need to initiate the performance of a surveillance any time the flow characteristics of the Seal Injection System are changed, will be included in the training program for all Licensed Operators.
- 7) A discussion of the RCS leakage event, focusing on the deficient initial evaluation for the Filter Setpoint Change which resulted in the event, will be included in the training program for System Engineers.

If your staff has any questions or comments concerning this letter, please refer them to Don Brindle, Regulatory Assurance Supervisor, at (815)234-5441 ext.2280.

Respectfully,



K. L. Graesser  
Site Vice President  
Byron Nuclear Power Station

KLG/DB/rp

Attachment(s)

cc: H. J. Miller, NRC Regional Administrator - RIII  
G. F. Dick Jr., Byron Project Manager - NRR  
H. Peterson, Senior Resident Inspector, Byron  
L. F. Miller Jr., Reactor Projects Chief - RIII  
D. L. Farrar, Nuclear Regulatory Services Manager, Downers Grove  
Safety Review Dept, c/o Document Control Desk, 3rd Floor, Downers Grove  
DCD-Licensing, Suite 400, Downers Grove.

ATTACHMENT I

VIOLATION (454/455-96003-01)

10 CFR Part 50, Appendix B, Criterion V, requires, in part, that activities affecting quality shall be prescribed by documented procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures.

Technical Specification 6.8.1 requires, in part, that written procedures shall be established, implemented, and maintained covering activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978.

- a. Byron Annunciator Response procedure (BAR) 1-9-B6, Revision 2, "Primary Water Flow Deviation," states in part, that a flow deviation condition initiates an automatic signal to shut 1CV110B, "Boric Acid Blender to Charging Pump Valve," and 1CV111B, "Boric Acid Blender to Volume Control Tank Valve." The procedure also requires the operator to immediately place the makeup control switch to OFF and verify or start the primary water makeup pump. The subsequent actions include determining the reason for the deviation, ensuring proper valve lineup, and then restarting the system.

Contrary to the above, on March 13, 1996, the Unit 1 Primary Water Flow Deviation annunciator alarmed and the nuclear station operator (NSO) failed to determine the reason for the deviation and failed to ensure the proper valve lineup prior to initiating boric acid flow to the reactor coolant system. (50-454/455-96003-01a(DRP))

- b. Byron Administrative Procedure (BAP) 1100-3, Revision 10, "Fire Protection Systems, Fire Rated Assemblies, Ventilation Seals, and Flood Seal Impairments," requires water tight doors to be closed except during personnel passage or when the room was occupied.

Contrary to the above, on February 22, 1996, the inspectors identified an open water tight door located between the Essential Service Water (SX) A train pump room and the adjacent auxiliary building floor drain sump room with the room not occupied. (50-454/455-96003-01b(DRP))

- c. Byron Operating Procedure (BOP) FC-7, Revision 3, "Startup of the Purification System to Purify the Refueling Water Storage Tank (RWST), requires valve 2FC8765, "Spent Fuel Pool Filter Demin Loop Return to Spent Fuel Pool," to be closed.

Contrary to the above, on February 19, 1996, during a valve lineup for purification of the RWST, operators failed to close one valve, 2FC8765, "Spent Fuel Pool Filter Demin Loop Return to Spent Fuel Pool." The failure to reposition 2FC8765 allowed approximately 1000 gallons of water to flow from the RWST to the spent fuel pool. (50-455-96003-01c(DRP))

- d. BAP 300-1, Revision 13, "Conduct of Operations," paragraph 3.f requires, in part, an operator to read the switch label prior actuating a switch to ensure he or she was about to operate the correct equipment.

Contrary to the above, on March 5, 1996, an operator inadvertently tripped the 1B control rod drive motor generator (MG) set. The operator operated the MG set motor output breaker control switch instead of the voltmeter selector switch, inadvertently opening the MG output breaker. (50-454-96003-01d(DRP))

- e. BAP 300-1, Revision 13, "Conduct of Operations," paragraph 3.f requires, in part, an operator to read the switch label prior actuating the switch to ensure he or she was about to operate the correct equipment.

Contrary to the above, on March 13, 1996, an operator inadvertently tripped the 2A Diesel Generator (DG). The operator looked at the wattmeter and then without looking at the switch label, placed his hand on the DG output breaker switch and opened the output breaker tripping off the DG. (50-455-96003-01e(DRP))

This is a Severity Level IV Violation (Supplement I).  
(50-454/455-96003-01(DRS))

#### REASON FOR THE VIOLATION

- a. Inadvertent Boration of Unit 1 Reactor Coolant System

While filling the Spent Fuel Pool (SFP) Transfer Canal from the Unit 1 Boric Acid Blender (IAW BOP FC-14), the Main Control Board annunciator "PW Flow Deviation" alarmed. This annunciator is not uncommon while the RMCS is in use, as the Air Operated Valve (AOV) throttles to position. This alarm also indicates that 1CV110B is being auto closed. 1CV110B was not open, since flow was going to the SFP via a hose. The conditioned reaction by the nuclear station operator (NSO) is to place 1CV110B to open when the alarm sounds so as to maintain the normally desired flow to CVCS. In this instance, the conditioned response was inappropriate. The causes of this event were habit intrusion and concurrent work activities ongoing.

b. Watertight Door for Essential Service Water (SX) Pump Room Found Open

The apparent or proximate cause for the door being left open is indeterminate. Numerous work groups, including Station and contractor personnel, were present in the SX Pump Room throughout the day. Supervisors and craft personnel questioned were cognizant of the requirement to close the door upon exiting as long as no additional personnel were still within the room. Due to the size of the room and the numerous work groups involved, personnel may have assumed that the room was still occupied when the door was left open. Self-checking was not performed by personnel to determine whether or not the room was still occupied.

c. Inadvertent Transfer of Water from Unit 2 RWST to SFP

While performing BOP FC-7, "Startup of the Purification System to Purify the Unit 2 RWST", two EA's divided the valves listed in the procedure to perform the valve line-ups. During the performance of the valve line-up, valve 2FC8765 was missed by each EA. This allowed this valve to remain open and subsequently transfer RWST water to the SFP.

The causes of this error were due to procedural inadequacy and failure by the EA's to perform a self-check prior to the performance of the valve line-ups.

d. Inadvertent Trip of Unit 1B Control Drive Motor Generator (MG)

While performing operator rounds, an Equipment Operator (EO) was checking the MG sets for target voltages and amps. The EO had just previously checked, correctly, the 1A MG set. In performing the check on the 1B MG set, the operator was observing the voltmeter while reaching for the voltmeter selector switch. He incorrectly grabbed the MG set motor breaker control switch and actuated the switch, which in turn tripped the breaker.

This was a skill based error, in that the operator failed to perform a self-check prior to actuating the switch. He did not visually acknowledge that he had the correct switch in hand prior to actuating the equipment.

e. Inadvertent Trip of the 2A Emergency Diesel Generator (DG)

During performance of 2BOS 8.1.1.2.A4, the Nuclear Station Operator (NSO) desired to lower load on the 2A DG. He identified the governor adjust switch and placed his hand in the vicinity of the switch. The NSO then looked back to the 2A DG wattmeter and grasped a switch, the DG output breaker switch, without checking the switch he had grasped. Upon actuating the switch, the breaker opened and tripped the 2A DG.

This was a skill based error. The individual did not perform a self-check to ensure he was operating the proper equipment prior to actually engaging the equipment.

## CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

A number of improvements have been initiated in the human performance areas of procedure adherence and configuration control. Shift operators are very active with error reduction efforts through the use of:

- Self-assessments (S/A)
  - Shift Engineers had generated shiftly S/A reports to periodically focus management attention to procedure adherence and skill based error reduction.
  - Shift Engineers are monitoring individual crew "event free days".
  - Shift personnel are routinely communicating the operators' error free "tools" (i.e., self-check, peer check, procedure adherence, communications, and questioning attitude).
  
- Procedure adherence improvements
  - In-hand usage compliance has been reinforced by all levels of shift management.
  - BAP 340-1, "Use of Procedures for Operating Department", has been extensively revised. Enhancements were derived from Byron management expectations, INPO Lessons Learned, Diablo Canyon benchmarking trip.
  - Byron's "Procedure Writing Group" had been augmented by 2 additional shift personnel (union NSO and union EO).
  
- Shift communications
  - Briefings are used to "avoid haste" by operators. Pace of work is well controlled by MCR personnel.
  - HLA briefings for major evolutions are pre-planned with industry events as lessons learned. Shutdown risks and contingencies are discussed.
  - Posters have been developed by the SCRE's to reinforce management expectations regarding: self-check, peer check, procedure compliance.
  - Supervisor to worker coaching is frequent on routine and non-routine evolutions.

Individual corrective actions with regard to the Notice of Violation is as follows:

a. Inadvertent Boration of Unit 1 Reactor Coolant System

1. A Daily Order was written to inform operators of this event and to re-emphasize the use of self-checking in the performance of their duties.
2. BOP FC-14 was revised (3/25/96) and BOP SI-13 was revised (4/11/96) to include a step providing guidance on the use of orange dots on involved equipment, to heighten the level of awareness to an infrequent evolution and flowpath.
3. A detailed action plan was developed, in conjunction with Braidwood, for resolution of OWA #172, which involves routine actuation of the PW and BA Flow alarms during Reactor Make-up evolutions.

b. Watertight Door for Essential Service Water (SX) Pump Room Found Open

1. The specific procedural requirements and a list of watertight doors from BAP 1100-3 have been added to the Supervisor NSPO (Contractor) training lesson plan.
2. The event was reviewed with the Training Coordinator and added to the lessons learned section of the NPSO lesson plan.

c. Inadvertent Transfer of Water from Unit 2 RWST to SFP

1. The EA's were counselled regarding the requirement to use and follow procedures at all times.
2. BOP FC-7 was revised to include the use of valve line-up checklists in the performance of valve line-ups.

d. Inadvertent Trip of Unit 1B Control Drive Motor Generator (MG)

1. Counseling on the use of self-checking (STAR) was initiated by the FO.

e. Inadvertent Trip of the 2A Emergency Diesel Generator (DG)

1. The NSO was counselled regarding the importance of properly applying STAR and self-checking all work.
2. The NSO has temporarily been removed from licensed activities, pending further evaluation.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATION

a. Inadvertent Boration of Unit 1 Reactor Coolant System

1. A Training Revision Request (TRR #01776) was written to present the event, Operator Workaround (OWA)#172, procedure changes (BOP SI-13, FC-14, and BAR 1-9-A6, 1-9-B6) and other corrective actions/lessons learned to licensed operators. (454-201-96-0442-03)
2. Temporary procedure changes have been made for BAR 1-9-A6 and 1-9-B6 pending resolution of OWA #172, involving the "PW Deviation" and "BA Deviation" alarms. (454-201-96-0442-04)

b. Watertight Door for Essential Service Water (SX) Pump Room Found Open

1. Additional signs will be posted (AR #960027318, 960027320) identifying the doors as watertight and the requirement for their closure. (454-201-96-0490-01)

c. Inadvertent Transfer of Water from Unit 2 RWST to SFP

All corrective actions are complete

d. Inadvertent Trip of Unit 1B Control Drive Motor Generator (MG)

1. BOP 199-EO IN is being revised to eliminate the need for the operator to manipulate the voltmeter selector switch. (454-201-96-0381-01)

e. Inadvertent Trip of the 2A Emergency Diesel Generator (DG)

1. A protective cover is being evaluated for use on the control panel during performance of this surveillance to preclude inadvertent switch actuation. (455-201-96-0110-01)

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on 03/13/96 when Reactor Coolant System was returned to normal boron and temperature.

## ATTACHMENT II

### VIOLATION (454/455-96003-02)

Technical Specification 3.4.6.2.e, "Reactor Coolant System Operational Leakage," Amendment 67, requires in part, that reactor coolant system leakage shall be limited to 40 gpm controlled leakage at a reactor coolant system pressure of 2235  $\pm$  20 psig, and requires reducing the leakage rate to within limits within 4 hours or be in at least Hot Standby within the next 6 hours.

Contrary to the above, on January 25 and again on March 13, 1996, the licensee shifted reactor coolant pump seal water injection filters and allowed the controlled leakage to exceed 40 gpm on Unit 1 by 3.2 gpm on January 25 and 1.9 gpm on March 13. The total time that the Unit 1 was in a condition with controlled leakage more than 40 gpm was about 10 and 9 hours, respectively. (50-454-96003-02(DRP))

This is a Severity Level IV violation (Supplement I).  
(50-454/455-96003-02(DRP))

### REASON FOR THE VIOLATION

Technical Specifications require that total controlled leakage flow to the Reactor Coolant Pump (RCP) seals be equal to or less than 40 gpm at a Reactor Coolant System (RCS) pressure of 2235 psig  $\pm$  20 psig with the 1CV121, CV Pump Discharge Header Flow Control Valve, in the full open position. Tech Spec compliance is demonstrated at power every thirty days by performing 1BOS 4.6.2.1.c-1, RCS Controlled Leakage Monthly Surveillance. This surveillance places the 1CV121 in the full open position and throttles open the 1CV182, Charging Header Back Pressure Control Valve. If the 1CV182 reaches full open and seal flow still exceeds 40 gpm, then the 1CV8369 A,B,C,&D, 1A,B,C,&D RCP Seal Water Injection Flow Control Valves, must be throttled to maintain less than 40 gpm total seal flow. This surveillance is done to ensure that under Safety Injection conditions sufficient flow would be delivered to the Reactor Coolant System.

After the surveillance is completed, the system is returned to normal operating alignment by placing the 1CV121 in Auto to maintain Pressurizer level and throttling the 1CV182 to maintain individual RCP seal flows in the 8 to 13 gpm tolerance range. There are many factors which affect the flow rate the Nuclear Station Operator (NSO) normally sees at the gauges in the Main Control Room (See Attachment A, Seal Injection Parameters). These include an allowed RCS operating pressure band of 40 psig, a difference in pressure/flow characteristics between the 1A and 1B CV Pumps, relative positions of the 1CV121 and 1CV182, the current differential pressure across the Seal Water Injection Filter, and the current positions of each of the Seal Water Injection Flow Control Valves. Once the Seal Injection System is realigned to the normal operating configuration with the 1CV8369A,B,C,&D valves set, the 1CV121 in Auto, and the 1CV182 throttled, there is no clear indication of compliance with Tech Spec Acceptance Criteria.

The Reactor Coolant Pump Seal Injection Filters was raised from 20 to 40 psid in December of 1995. Upon increasing the filter maximum allowable differential pressure, the effect on the system was such that the Seal Water Injection Flow Control Valves had to be adjusted during the next performance of the RCS Controlled Leakage Monthly Surveillance. Subsequently, when the filter was next changed, the increased reduction in overall differential pressure caused the seal injection flow to unknowingly increase beyond the Tech Spec allowable value. This affect on the system was not recognized by the people involved in the evaluation of the filter differential pressure change. The evaluation failed to recognize that the higher filter differential pressure might require repositioning the Seal Water Injection Flow Control Valves and that a subsequent decrease in overall differential pressure due to changing out the filter would cause seal injection flow to increase, possibly more than the Tech Spec limit.

The Root Cause of the 01/25/96 event was Change Management due to omission from the initial evaluation of the potential effects upon the system resulting from changing a filter with the higher differential pressure. The Root Cause of the 03/13/96 event was Ineffective Corrective Actions that followed the 01/25/96 event, which failed to address the concern for the associated Tech Spec requirements, in that it failed to recognize the relationship between the filter differential pressure and the Seal Water Injection Flow Control Valve position.

#### CORRECTIVE STEPS TAKEN AND RESULTS ACHIEVED

BOP CV-10, CV Filters - Isolation And Return To Service, was revised to move the adjustment of the 1/2CV182 to maintain Seal Injection flows at 8 to 10 gpm from the end of the procedure to the beginning of the section for the Seal Injection Filters. This revision, BOP CV-10, rev 4, was approved for use on 02/05/96.

A Daily Order for the Operators was issued on 3/14/96, highlighting information about the new, higher differential pressures being allowed and of the need to perform the Controlled Leakage surveillance any time a change is made that could alter the flow characteristics of the Seal Injection Water System.

To prevent recurrence, main body steps were added to BOP CV-10, (CV Filters - Isolation And Return To Service) and to BAR 1-7-A2 and BAR 2-7-A2, (the alarm response procedures for both units) instructing the Operator to notify the Station Control Room Engineer to initiate performance of 1/2 BOS 4.6.2.1.c-1, Reactor Coolant System Monthly Controlled Leakage Surveillance when a realignment of the filters is performed. Those revisions were approved for use on 3/15/96. This caution, to initiate 1/2 BOS 4.6.2.1.c-1 when a filter is removed from or returned to service, was also included in the Standard Out of Services that are used for changing the filter cartridge on all four Seal Injection Water Filters.

Placards were placed on both units, at the inlet and outlet valve for each filter, at the filter bypass valve, and at each of the four Seal Injection Water Flow Control Valves that direct the operator to contact the Station Control Engineer to initiate 1/2BOS 4.6.2.1.c-1 when any realignment is undertaken. This was completed on 3/14/96.

CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATION

A discussion of the event, focusing on the need to initiate the performance of a surveillance any time the flow characteristics of the Seal Injection System are changed, will be included in the training program for all Licensed Operators. (454-180-96-0001-01)

A discussion of the event, focusing on the deficient initial evaluation for the Filter Setpoint Change which resulted in the event, will be included in the training program for System Engineers. (454-180-96-0001-02)

DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on 03/13/96 when reactor coolant system leakage was brought under the 40 gpm Tech Spec limit.