U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Licensee:	Commonwealth Edison (ComEd)
Facility:	Braidwood Nuclear Plant, Units 1 and 2
Location:	RR #1, Box 79 Braceville, IL 60407
Dates:	September 7 - October 18, 1996
Inspectors:	C. Phillips, Senior Resident Inspector M. Kunowski, Resident Inspector J. Adams, Resident Inspector T. Esper, Illinois Department of Nuclear Safety
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EXECUTIVE SUMMARY

Braidwood Nuclear Plant, Units 1 & 2
NRC Inspection Report 50-456/96014; 50-457/96014

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

Operations

- The inspectors concluded that prompt action by the Unit 1 reactor operator prevented a significant plant transient after a failure of the master feedwater pump controller. (Section O1.1)

- NRC inspectors identified that on September 10, while performing a Unit 1 diesel generator monthly operability surveillance, the most recent revision of the procedure was not used. A Notice of Violation was issued. (Section O3.1)

- The licensee identified that a non-licensed operator tasked with securing the 1C condensate booster pump shut the pump suction valve instead of the discharge valve as required by procedure, damaging the pump. (Section O4.1)

- The inspectors observed that operations personnel responded to unexpected conditions systematically and efficiently after the failure of the Unit 1B containment spray to start during a surveillance test. (Section O4.2)

- The licensee identified that two non-licensed operators failed to follow a procedure and sprayed about 150 gallons of water into the 1B diesel oil storage tank room during a fire protection surveillance. This licensee identified and corrected failure to follow procedures was a non-cited violation. (Section O4.3)

Maintenance

- The inspectors observed that operators were unable to rack in the Train 'A' Reactor Trip Bypass breaker during the performance of the bi-monthly operability surveillance for the Solid State Protection System (SSPS), Reactor Trip Breaker, and Reactor Trip Bypass (BY) Breaker. The operators emergency exited the surveillance using prescribed steps in the procedure when the problem could not be quickly resolved. Clear procedures, thorough briefings, and precise communications resulted in an unusual situation being well handled. (Section M2.2)

- The licensee identified that two safety injection vent and drain valves and two local leak rate test connectors were not included in surveillance procedure 1(2)BwOS 6.1.1a-1, "Primary Containment Integrity Verification Of Isolation Devices Outside Containment." This issue was

an unresolved item pending a review to determine if there was a violation of technical specification 4.6.1.1. (Section M2.4)

- The inspectors observed that the 1A motor driven feedwater pump had severe oil leakage as high as 17 gpm and concluded that the material condition of the pump was poor. (Section M2.5)

Engineering

- The licensee identified several roll-up fire doors for rooms that contained safety-related equipment that failed to close when outside air ventilation was supplied to the rooms during surveillance testing. When the differential pressure across the doors was removed by securing outside air ventilation, the doors closed normally. The surveillance procedure did not specify ventilation lineup or acceptance criteria and was marked as completed satisfactorily. Five days later, a Problem Identification Form (PIF) was generated but the required plant barrier impairment controls were not initiated for 2 months. The licensee also determined that the Unit 1 roll-up fire doors had never been post-modification tested. This was an unresolved item pending completion of testing of the Unit 1 roll-up fire doors. (Section E2.1)

- The inspectors reviewed the status of temporary alterations. Temporary alterations were found to be installed in accordance with plans and no unauthorized alterations were found. The inspectors concluded that the number of temporary alterations installed greater than 18 months was high (14) and that management controls to ensure that plant problems are fixed permanently and in a timely manner were not effective in these instances. (Section E2.3)

Plant Support

- Based on observations during this inspection period, the inspectors concluded that radiological housekeeping and contamination control was good. No problems were identified. (Section R1.1)

- During this inspection period, security guards were observed performing their daily routines as expected and no problems were identified. (Section S1.1)

Report Details

Summary of Plant Status

Unit 1 entered the period performing a unit shutdown. The unit was shutdown on September 7, 1996, to repair leaking feedwater drain valves off the 'C' and 'D' steam generators. The valves were repaired and the unit returned to service on September 9, 1996. Unit 1 was returned to 100% power and operated routinely until October 11, 1996, when the unit began a ramp down to full shutdown at 3:01 a.m. on October 12, 1996, for a scheduled mid-cycle outage.

Unit 2 operated at or about 100% power for the entire period.

I. Operations

O1 Conduct of Operations

O1.1 Unit 1 Master Feedwater Controller Demand Signal Fails to Zero Output

a. Scope (71707)

At approximately 11:00 a.m., on September 16, 1996, Unit 1 master feedwater pump speed controller (1PK-FW509) demand signal dropped from 78% output to 0% output. As a result, both main feedwater pumps began slowing to minimum speed for the master feedwater controller (3100 rpm). Unit 1 was operating at 100% power at the time of the event. The inspectors interviewed operations, instrument maintenance, and system engineering personnel involved in the event.

b. Observations and Findings

The master feedwater pump controller was in manual at the time of the event because instrument maintenance personnel were performing work on the main steam header pressure transmitter (1PT-507). Pressure transmitter 1PT-507 had been in "test" for about 3 minutes when the output for 1PK-FW509 failed to zero.

At the time of the event, the Unit 1 reactor operator (RO) was closely monitoring the feedwater system due to the work in progress on 1PT-507. The first control room indication of a problem was the "STM/FW FLOW MISMATCH" alarm for all four steam generators. The RO recognized the demand signal at zero and took immediate actions to manually restore the controller output signal. Unit 1 control room personnel also took immediate actions to notify instrument maintenance personnel working on 1PT-507 to stop work.

The RO actions to restore the master feedwater output demand signal were successful and both feedwater pumps returned to the speed required for 100% full power operation. Steam generator levels stabilized and returned to normal level of about 66% narrow range once master feedwater demand was returned to normal. The steam generators level decrease due to the event was about 13%. The Unit 1 reactor trip set point for low

steam generator level was at 33% narrow range. Unit power output was not significantly changed during the event.

The work performed on 1PT-507 should not have affected the master feedwater controller output. The area where the work on 1PT-507 was performed had no circuitry or equipment that could change 1PK-FW509 output. The system engineer verified that no circuitry or equipment around the 1PT-507 work area could have affected 1PK-FW509.

The system engineer believed that a brief failure in an electronic control card for 1PK-FW509 caused the event. The control card in question was replaced and the master controller functioned properly following the replacement. Efforts at the site to identify the failure in the card were unsuccessful and the card was sent to the manufacturer for evaluation.

The system engineer indicated that the rapid speed change had no apparent adverse affects on the main feedwater pumps/turbines. Feedwater pump/turbine parameters after the event were essentially the same as before the event.

c. Conclusions

Feedwater system monitoring by control room personnel and operations department response to the loss of demand signal from 1PK-FW509 were excellent. Prompt actions taken by operating personnel prevented a large steam generator level and unit power transient.

02 Operational Status of Facilities and Equipment

02.1 Engineered Safety Feature System Walkdowns (71707)

The inspectors used Inspection Procedure 71707 to walk down accessible portions of the Residual Heat Removal (RHR) system. Results of the inspection are discussed in Section E2.2.

03 Operations Procedures and Documentation

03.1 Incorrect Revision Used While Performing Monthly Test on the 1B Diesel Generator (DG)

a. Inspection Scope (61726)

The inspectors identified that a non-licensed operator was not using the most current revision of 1BwOS 8.1.1.2.a-2, "Unit One 1B Diesel Generator Operability Monthly (Staggered) and Semi-annual (Staggered) Surveillance," Revision 15. The inspectors interviewed the equipment operator (EO), the RO, and the Unit 1 unit supervisor.

b. Observations and Findings

On September 10, operations personnel were concurrently performing BwOP DG-11, "Diesel Generator Startup," Revision 11 and 1BwOS 8.1.1.2.a-2, "Unit One 1B Diesel Generator Operability Monthly (Staggered) and Semi-annual (Staggered) Surveillance," Revision 15. The inspectors observed that procedural step F1.10 had not been performed; the inspectors questioned the non-licensed operator on whether he had performed the step. In response, the non-licensed operator obtained the copy of the surveillance procedure to see if he had signed off that step. Upon review of his procedure, step F 1.10 was not included in his version of the procedure.

Procedural step F1.10 had the non-licensed operator verify that service water was available to the DG by stroking valve, 1SX169B, "DG service water valve." The non-licensed operator was using 1BwOS 8.1.1.2a-2, Revision 14E1, which was dated June 28, 1996. The most current revision to the procedure was Revision 15, dated September 9, 1996. The inspectors requested the non-licensed operator to inform the control room of the discrepancy. Immediate corrective action taken by the licensee included having control room personnel forward the most current revision to the operator.

The licensee's investigation into the event indicated that the Unit 1 unit supervisor obtained the copy of the surveillance from the controlled file cabinet the night of September 9, reviewed the procedure, then placed a cover sheet on the surveillance. However, the new revision was placed in the cabinet the morning of September 10. As a result, the Unit 1 supervisor was not aware of the new revision. The licensee determined that there was no adverse impact from not performing step F1.10.

c. Conclusions

The failure to use the correct procedural revision to test the 1B DG is a violation of 10 CFR Part 50, Appendix B, Criterion V (50-456/96014-01 (DRP)).

04 Operator Knowledge and Performance

04.1 Condensate Pump Suction Valve Mispositioned

a. Inspection Scope (71707)

The inspectors interviewed operations department managers, walked down the location of 1DC0996 1C condensate booster pump suction valve and reviewed 1BwOP DC/CB2, "Condensate/Condensate Booster System Shutdown," Revision 8.

b. Observations and Findings

On August 30, 1996, a non-licensed operator mispositioned 1CD099C, the 1C condensate booster pump suction valve, during a pump swap to clean strainers. The strainer cleaning evolution required the shutdown of the 1C condensate booster pump. BwOP CD/CB-2, "Condensate/Condensate Booster System Shutdown," Revision 8, Step F.4., required that the discharge valve of the 1C condensate booster pump be shut prior to securing the condensate booster pump. Licensee personnel stated that prior to securing the booster pump a reactor operator noticed 1C condensate booster pump flow go to zero for about 2 minutes and then came back to full flow. The reactor operator called the non-licensed operator in the room and asked if he had repositioned any valves. The non-licensed operator responded that he had not yet repositioned any valves. The evolution was then completed and the 1C condensate booster pump was secured.

On September 4, 1996, the 1C condensate booster pump was restarted and pump output steadily decayed over about 3 hours. Another condensate booster pump was started and the 1C pump was secured. Maintenance trouble-shooting revealed that the pump inboard wearing ring was broken in several pieces and the pump impeller was worn because of the broken wearing ring.

Computer point flow data indicated that the 1C condensate booster pump flow went to zero for about two minutes on August 30. Licensee personnel stated that according to the pump manufacturer a 2 minute disruption of flow could only cause the damage found if the suction valve had been closed because of a loss of cooling medium for the pump.

The licensee conducted awareness briefings for licensed and non-licensed operators on September 12 to discuss several recent events concerning configuration control (discussed in Inspection Report 96012). The inspectors attended one awareness briefing, at which procedure adherence, self-checking, and adherence to operation's department standards were discussed.

Licensee personnel stated that the non-licensed operator reported, on September 15, that he had indeed shut the suction valve instead of the discharge valve but did not think it had caused any damage. The licensee terminated the employment of the non-licensed operator because of his failure to initially disclose his mistake. The licensee did not determine why the non-licensed operator mispositioned the valve, prior to his termination. Licensee management stated that because of the previous events, the operators credibility was questionable and saw no value in further questioning why the valve was mispositioned.

c. Conclusions

The failure to follow the procedure resulted in damage to plant equipment. However, since the condensate/condensate booster systems are not safety-related and do not fall under NRC requirements, no notice of

violation will be issued. The inspectors concluded that awareness briefings conducted on September 12, and the employment termination of the employee were adequate corrective actions.

04.2 Surveillance Run of 1B Containment Spray Pump

a. Inspection Scope (61726)

On September 16, 1996, the 1B containment spray pump was run during performance of procedure 1BwVS 6.2.1.b-2, "American Society of Mechanical Engineers (ASME) Surveillance Requirements for 1B Containment Spray Pump and Check Valves 1CS003B and 1CS011B." The inspector monitored the performance of the test at the 1B containment spray pump and interviewed the system engineer acting as the test director and the plant EO stationed at the containment spray pump during the test. The inspector also performed a review of procedures 1BwVS 6.2.1.b-2 and BwOP CS-5, "Containment Spray System Recirculation to the RWST," for compliance with Updated Final Safety Analysis Report (UFSAR) assumptions and technical specification (TS) surveillance requirements.

b. Observations and Findings

The inspector observed the following:

- The EO at the pump utilized three-way communications techniques every time he talked with the unit RO in the control room.
- The EO used self-checking when operating plant equipment.
- Control room personnel made plant-wide announcements prior to starting or stopping the containment spray pump.
- The system engineer acted as the test director for the surveillance and was present at the pump during performance of the entire test. The system engineer was knowledgeable on operation of the plant equipment and use of test equipment. Test equipment and instrumentation used in the test were within calibration due dates.
- An industrial safety representative was present during performance of the test to ensure site expectations with respect to personnel safety were observed.

An unexpected condition occurred during performance of the test. After the containment spray system was aligned per BwOP CS-5, the control room operator attempted to start the 1B containment spray pump and it did not start. In response to the failure to start, the control room notified the EO stationed at the pump. The operators then began troubleshooting the failure to start.

Control room personnel sent an EO to the 1B containment spray pump breaker to verify that the breaker was properly racked-in and no signs

of breaker problems were evident. After racking the associated breaker out and then in, the operators attempted to start the pump again. It failed to start on the second attempt.

Additional trouble shouting by the licensee found the lifting arm on the valve stem had rotated due to mechanical play and was not making contact with the limit switch. The operator was able to correct the limit switch problem and the interlock was satisfied.

The 1B containment spray pump was subsequently successfully started and run. Operations response to the failure to start was systematic and the operator knowledge of the system provided for quick resolution of the problem.

c. Conclusions

Operations and system engineering support for performance of the rout ne surveillance test on 1B containment spray pump was good. The limit switch for 1SI001B not being fully engaged because of mechanical play only had significance while the pump was in a test mode. The safety features were unaffected. The ability of the pump to start in a normal configuration was not affected.

04.3 Mispositioned Valve Caused Water Release to the 1B Diesel Oil Storage Tank Room

a. Inspection Scope

On September 11, during performance of surveillance test procedure 0BwOS FP.3.1.Q-1, "Diesel Generator Fuel Oil Storage Tank Rooms Foam Systems Main Drain and Alarm Test Quarterly Surveillance," an EO opened 1FP258, the deluge isolation valve, instead of the adjacent 1FP371, system main drain valve. The valve was opened about 48 seconds before the operator realized that he opened the wrong valve. About 150 gallons of fire protection water sprayed into the 1B diesel oil storage tank room. The licensee subsequently removed the water, verified the operability of electrical equipment in the room, and began an investigation. The inspectors reviewed the valve arrangement and the results of the investigation.

b. Observations and Findings

The EO was working with an equipment attendant (EA) during the surveillance. The licensee determined that the EA had read the procedure, but the EO had not. During the surveillance, the EA pointed in the vicinity of the 1FP371 valve and directed the EO to open it, but did not identify the valve by name or number. The EO then opened the 1FP258 valve without checking the valve tag or verifying valve identification with the EA. The workers realized their mistake when no water flowed out the drain hose they had connected near the 1FP371 valve.

For the failures to meet management expectations regarding procedure use, communications, and self-checking, the operators were given time off from work. In addition, the station temporarily halted non-licensed operator work, while non-licensed operators, their immediate supervisors, and shift engineers attended a discussion session on the personnel performance problems manifested in this event and two other recent valve mispositioning events (involving a boric acid tank valve and a diesel oil storage tank valve, discussed in Inspection Report 96012) on September 12.

c. Conclusions

The licensee's investigation of the valve mispositioning was prompt and thorough; however, the three recent events involving valve mispositioning by non-licensed operators were indicative of a weakness in plant configuration control.

TS 6.8.1a required that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1a applies to 0BwOS FP.3.1.Q-1 and therefore, the failure to follow 0BwOS FP.3.1.Q-1 was a violation of TS 6.8.1a. The inspectors concluded that the corrective actions taken by the licensee were adequate. This licensee-identified and corrected violation is being treated as a non-cited violation consistent with Section VII.B1 of the NRC Enforcement Policy (50-456/96014-02 (DRP)).

O8 Miscellaneous Operations Issues (92901)

O8.1 (Closed) Inspection Followup Item (IFI) 95017-04: Inspectors to review surveillance revision for the post-accident neutron monitoring system. The licensee added a quarterly verification of calibration to the surveillance which had consisted of only an 18-month calibration. In addition, a system training module was developed and presented to licensed operators earlier in 1996 during requalification training. The training will be repeated again in 2 years. The inspectors had no further concerns and this item is closed.

II. Maintenance

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Suspected Lubrication Problem with Westinghouse Series DS 480-Volt Breakers

a. Inspection Scope

On September 24, the 1C Reactor Containment Fan Cooling (RCFC) fan failed to automatically start in slow speed during surveillance 1BwOS 6.2.3.A-1, "RCFC Monthly Surveillance," and also did not start when the control room control switch for the fan's low speed

breaker was manually taken to "close." The inspectors observed the performance of the surveillance and the subsequent attempted manual start. The licensee declared the fan inoperable and began an investigation.

On October 10, the Type DS safety-related breaker for the supply ventilation fan for the Unit 1 1B DG room failed to close during a surveillance run of the diesel.

After the RCFC breaker failure, the resident inspectors and Region III electrical specialists followed the licensee's investigation. On October 10 and 11, a telephone conference was held with the NRC headquarters personnel, Regional III electrical specialists, the resident inspectors, and the licensee to discuss the NRC concerns about the operability of the other safety-related breakers.

b. Observations and Findings

Both breakers were Westinghouse series DS 480-volt circuit breaker. The licensee had 12 of the type 416 DS breakers, used as reactor trip and reactor trip bypass breakers, and about 320 of the type 206 DS breakers, 60 of which were safety-related. Of these 60 breakers, there were 12 Unit 1 breakers and 10 Unit 2 breakers that were required to close in an accident scenario.

A licensee investigation found that the RCFC breaker had a failed charging motor cutoff switch, and the DG supply fan breaker had an over heated and failed spring release coil. Both of these breakers plus others had been onsite since initial startup.

In addition, the licensee found that the Westinghouse breaker operations and maintenance manual did not address lubrication of the operating mechanism in these breakers. These along with other breakers had not had the operating mechanisms lubricated at Byron and Braidwood.

The RCFC and the DG supply fan breakers along with others were submitted to Westinghouse for a detailed failure analysis. The results of that investigation is an inspection followup item for possible generic applications (50-456/457/96014-03(DRS)).

Similar issues related to 4.16 kilovolt breakers and some 480 volt breakers were addressed in inspection report 95016. As a result, recently Byron shipped several non-safety related breakers to Westinghouse for refurbishment. Braidwood contracted with Westinghouse to overhaul some breakers onsite and train maintenance personnel on the issues not addressed in the maintenance manual. The licensee has also committed to revise procedures as necessary and train personnel.

c. Conclusions

The inspectors concluded control room personnel responded well to the breaker problem on September 24. The results of the failure

analysis of the two breakers and the operability assessment of the remaining breakers will be followed up on by the Division of Reactor Safety as an Inspection Followup Item.

M2.2 Observation of 2BwOS 3.1.1-20, "Unit Two SSPS, Reactor Trip Breaker, and Reactor Trip Bypass Breaker Bi-Monthly (Staggered) Surveillance (Train A)"

a. Inspection Scope

The inspectors reviewed the procedure and observed the performance of 2BwOS 3.1.1-20, "Unit Two SSPS, Reactor Trip Breaker, and Reactor Trip Bypass Breaker Bi-Monthly (Staggered) Surveillance (Train A)" on September 27 and September 30, 1996. The activities were also reviewed against the UFSAR.

b. Observations and Findings

Prior to the commencement of the surveillance on September 27, the inspector observed a tailgate meeting conducted by the unit supervisor with personnel involved in the performance of the surveillance. The meeting reviewed recent problems that had been encountered with racking in the Unit 2 reactor trip bypass breaker A (BYA) and what action would be taken in the event similar problems were encountered during the performance of the surveillance.

The licensee personnel experienced more resistance than normal on several attempts at racking in the breakers. As authorized by the procedure, an emergency exit was conducted from the procedure.

On September 30 the inspectors observed the successful performance of 2BwOS 3.1.1-20. No problems were encountered during the performance of this surveillance and the operators completed the surveillance well within the 2-hour time requirement that started with the racking in of the Train A Reactor Trip Bypass Breaker.

The inspectors observed the following good work practices during the performance of this surveillance: 1) the unit supervisor anticipated the possibility for additional BYA breaker problems and briefed the crew on the action to be taken in the event they recurred and the ROs consistently checked each other's action prior to performing the action; 2) the ROs and EOs demonstrated good communication skills by using the phonetic alphabet and three way repeatbacks. The inspectors also noted that the surveillance procedure was well written and provided clear directions to the operators. The operators were able to use the procedure to perform the emergency exit (a non-routine evolution) and system restoration without confusion or delay.

c. Conclusion

The inspectors concluded that the pre-surveillance preparation was good, that control room crews demonstrated good team work and good

communication. The inspectors also concluded that the procedure was well written and provided clear guidance for backing out of the process.

M2.3 Safety Injection Motor Operated Valve (SI-8804B) Stroke Test Failure

a. Inspection Scope

During the performance of 2BwOS 0.5.SI.1, "Safety Injection System Valve Stroke Quarterly Surveillance," Revision 1E2, on September 25, 1996, the licensee observed that motor operated valve (MOV) 2SI8804B failed to stroke fully open. Licensee personnel locally verified valve position at 90% open. As a result, the "B" Emergency Core Cooling System (ECCS) train was declared inoperable and a 7-day time clock was started per TS Limiting Condition for Operation 3/4.5.2. The inspectors interviewed the Unit 2 unit supervisor and site engineering staff, and reviewed the following documentation: 1) Unit 2 Control Room Log (9/25/96); 2) 2BwOS 0.5.SI.1, "Safety Injection System Valve Stroke Quarterly Surveillance," Revision 1E2; 3) BwAP 330-10, Attachment B, Revision 2, "Operability Justification;" and 4) Work Package WR 96009031101, "Troubleshoot/Repair, Open Stroke Circuitry For 2SI8804B-L05."

b. Observations and Findings

The inspector found that the Unit 2 operators had observed simultaneous open and closed indications on 2SI8804B position indicating lights during the performance of the open stroke test and the B Train of ECCS was appropriately declared inoperable. The valve was then stroked closed and a fully closed indication was received by the operators. 2SI8804B was then stroked open by the operators. The valve opened and the proper position indication was observed. A stroke time of 14.05 seconds was measured and verified to be less than the operability limit of 15 seconds. The valve was closed and the open stroke time test repeated. A 14.05 seconds opening time was again measured and 2SI8804B was declared operable. The inspectors considered the re-stroking of the valve without conducting an investigation to determine the cause of the problem a poor work practice that could mask the problem.

The inspector reviewed surveillance procedure 2BwOS 0.5.SI.1, Section E, and found that it provided direction to the shift engineer to declare the valve inoperable and initiate corrective action in the event that the valve failed to change position. This section of the procedure further stipulated that for any valve declared inoperable, acceptable operation must be demonstrated after the required corrective action had been performed but before returning the valve to service. However, the problem was vague on what corrective actions should be taken.

The licensee based their operability of 2SI8804B on the postulated cause of oxidized switch contacts in the control circuit, the valve's initial opening to a position of 90%, which meets MOV setup guidelines, and the valve's capability to fully open within the required time during subsequent valve stroke test. The licensee concluded that there was reasonable assurance that 2SI8804B would open and close as required and

no operability concern existed. Diagnostic testing and limit switch maintenance was performed subsequently on October 8 per Work Request (WR) 96009031101, "Troubleshoot/Repair; Open Stroke Circuitry For 2SI8804B-L05." The contact wipe pressure was found to be minimal and was adjusted per the MOV Coordinator's direction. Valve operation, testing, and evaluation system (VOTES) testing was performed and the valve stroked satisfactorily.

c. Conclusion

The inspectors concluded that 2SI8804B was appropriately declared inoperable when the valve failed to change positions correctly, but considered the subsequent re-stroke of valve as a poor operating practice. Retesting of a system or component without conducting an investigation for the cause could possibly mask the conditions responsible for the failure and allow for a future recurrence. 2BwOS 0.5.SI.1, Section E, was vague as to what constituted appropriate corrective action and does not provide what actions to take.

M2.4 Missed Surveillance on Containment Isolation Valves

a. Inspection Scope

On October 4, 1996, the licensee determined that the instrument vent and drain valves for 1(2)PI-929 (Safety Injection) were not included on 1(2)BwOS 6.1.1.a-1, "Unit One (Two) Primary Containment Integrity Verification Of Isolation Devices Outside Containment." The inspectors reviewed the licensee's immediate corrective action and subsequent follow up actions.

b. Observations and Findings

The inspectors found that on October 4, 1996, the licensee entered and exited Limiting Condition for Operation 4.0.3 on both units when it was learned that the instrument vent and drain valves for 1(2)PI-929 were missing from 1(2)BwOS 6.1.1.a-1, "Unit One (Two) Primary Containment Integrity Verification Of Isolation Devices Outside Containment." The licensee verified the vent and drain valves were closed and capped, hung administrative control tags on all valves, and submitted procedure revisions to include the valves in 1(2)BwOS 6.1.1.a-1. The licensee also conducted a review of all containment piping penetrations to ensure no other valves had been missed. The review identified two local leak rate test (LLRT) test connections which were not being checked. The licensee took the same immediate corrective actions for the LLRT test valves as they did for the instrument vent and drains. The licensee also commenced a review to determine what the surveillance requirements were on the valves in question since the Byron Station's equivalent procedure did contain these valves for testing. The inspectors believed that these valves were required to be tested in accordance with the technical specifications. Region III requested the Office of Nuclear Reactor Regulations (NRR) to review this concern.

c. Conclusion

This is an Unresolved Item (50-456/457/96014-04(DRP)) pending a review by NRR of the valves surveillance requirements provided by the licensee.

M2.5 Material Condition of 1A Motor Driven Feedwater Pump

a. Inspection scope

The 1A motor driven feedwater pump was placed in service on September 23 to perform repairs to the 1C turbine driven feedwater pump. The inspectors interviewed control room operators and walked down the 1A motor driven feedwater pump.

b. Observations and Findings

The licensee identified that the 1A motor driven feedwater pump developed a lube oil leak of about 30 gallons per shift. The licensee went through several 55 gallon drums of lubricating oil before a recycling method was established. The day before the 1C turbine driven feedwater pump was restored to service the lube oil leak had increased to about 17 gallons per hour.

Licensee personnel stated that the 1A motor driven feedwater pump had not been run for several years due to a combination of the good reliability of the turbine driven pumps and the amount of vibration that resulted in the shift engineers office when the motor driven pump was run.

c. Conclusions

The inspectors concluded that the material condition of the 1A motor driven feedwater pump was poor.

M8 Miscellaneous Maintenance Issues (92902)

M8.1 (Closed) Licensee Event Report (LER) 50-456/96002: Loss of Operability of Both Trains of Control Room Ventilation due to a Personnel Error. On January 29, 1996, the "B" train of control room ventilation was momentarily rendered inoperable when an electrician inadvertently grounded the 120-volt feed breaker while replacing an indicator light socket on a ventilation local control panel. At the time, the "A" train was technically inoperable, awaiting a post-maintenance test. During the subsequent assessment of B train operability by control room personnel, the breaker was opened twice, again rendering the B train inoperable. With both trains of control room ventilation inoperable, TS 3.0.3 applied. However, B train operability was restored before the TS 6-hour limit to reactor shutdown was reached. The licensee's investigation determined that the electrician had not discussed the work with control room personnel because he considered it minor. This failure to discuss the job with control room personnel was contrary to BwAP 1600-10, "Minor Maintenance

Procedure." The electrician was counselled on the need to follow the procedure and discuss all work with control room personnel. The event and the procedure requirements were also discussed with other electrical maintenance personnel.

TS 6.8.1a requires that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1a applies to BwAP 1600-10 and therefore this event was a violation of TS 6.8.1a. The inspectors concluded that the corrective actions as described in the LER were adequate. This licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy (50-456/96014-05 (DRP)). The inspectors noted, however, that the cover letter for the LER incorrectly listed 10 CFR 73.71(a)(2)(ii) as the reporting basis for the event. The text of the LER correctly listed 10 CFR 50.73(a)(2)(i) as the basis. In addition, the text referred to two different motor control centers as the location of the breaker. These two minor errors indicated that the quality control of the LER could have been improved.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Roll-Up Fire Doors Fail to Close

a. Inspection Scope (37551)

On July 3, mechanical maintenance performed surveillance BwMS 3350-001, "Fire and Security Door Semi-Annual Inspection," Revision 0, and several roll-up fire doors did not go closed as expected with outside air ventilation supplied to the room.

The inspectors reviewed BwMS 3350-001; BwAP 1110-3, "Plant Barrier Impairment Program," Revision 3; BwAP 1100-8, "Fire Protection Program System Requirements," Revision 5; Problem Identification Forms 456-120-96-011 and 450-201-96-2158; and Calculation 3C8-0691-001. In addition, the inspectors interviewed the mechanical maintenance worker that performed the surveillance, the mechanical maintenance first-line supervisor, the fire marshall, and several system and site engineers.

b. Observations and Findings

BwMS 3350-001 tests the following 12 roll-up fire doors:

1A & 1B diesel generator rooms
2A & 2B diesel generator rooms
Unit 1 Division 11 & 12 ESF switchgear rooms
Unit 2 Division 21 & 22 ESF switchgear rooms
Unit 1 non-ESF switchgear rooms
Unit 2 non-ESF switchgear rooms
Unit 1 miscellaneous electric equipment rooms
Unit 2 miscellaneous electric equipment rooms

BwMS 3350-001 did not specify what the ventilation status of the room should have been and did not require that it be documented.

During the performance of BwMS 3350-001 on July 2, 1996, the 2A Diesel Generator roll-up fire door failed to close when the electro thermal linkage was removed with the outside air ventilation supplied to the room. This was due to the high differential air pressure across the door. During the performance of BwMS 3350-001 on July 3, 1996, the doors to the Unit 1 and Unit 2 non-engineered safeguard feature (ESF) switchgear rooms and the Unit 2 Division 21 ESF switchgear rooms also did not go shut with outside ventilation supplied to the room.

On September 3 the licensee determined that a high energy line break analysis (calculation 3C8-0691-001) for the turbine building assumed that the roll-up doors would go shut. The licensee closed all 12 roll-up doors in order to ensure the plants would be in an analyzed condition.

The licensee planned to test the Unit 1 doors under full ventilation flow during the Unit 1 mid-cycle outage scheduled to start October 12.

c. Conclusions

Followup results on this issue by the Region III Division of Reactor Safety (DRS) had not been completed at the end of this inspection. The results of this inspection are an Unresolved Item pending the completion of the testing of the Unit 1 fire doors during the Unit 1 mid-cycle outage and a followup inspection by a DRS fire protection specialist which will be documented in inspection report 96016 (50-456/96014-06 (DRS)).

F2.2 Residual Heat Removal (RHR) System

a. Inspection Scope (71707)

The inspectors reviewed the RHR system design bases in the UFSAR and RHR system lineups and drawings; performed a walkdown of accessible portions of the RHR system for proper system configuration and material condition; and performed a review of the following completed

surveillance procedures for proper completion and to ensure TS requirements were satisfied:

- 1BwVS 5.2.f.3-1 -- Last four completed surveillances
- 2BwVS 5.2.f.3-2 -- Last four completed surveillances
- 1BwOS 5.2.b-2 -- Last completed surveillance
- 2BwOS 5.2.b-2 -- Last completed surveillance

The inspector also interviewed the RHR system engineer, system engineering primary group leader, procedures group supervisor, and plant operating personnel.

b. Observations and Findings

The following items were observed during walkdown of accessible portions of the residual heat removal system:

- The condition of the RHR heat exchanger rooms was good. Rooms were found clean with only small localized contaminated areas.

- Pressure indication on 2PI-RH028, RH Pump 2A Suction Pressure, was found at approximately 10 psig while the other suction pressure gauges for Unit 1 and Unit 2 pumps all indicated approximately 45 psig. Pressure gauge 2PI-RH028 was a low range pressure gauge and was normally isolated. However, it was unlikely that the actual suction pressure was 10 psig when the gauge was isolated. The gauge was routinely aligned for service while doing surveillance tests. After the gauge was placed in service and subsequently isolated, the inspector monitored the pressure indication for several days. The pressure indication began to decrease, indicating a small leak. Upon close inspection of the isolation valve for 2PI-RH028 (2RH032A), boron crystals were observed on the valve body. This indicated a small leak. The condition was reported to the system engineer and an Action Request (AR) was generated.

- The material condition of RHR pump rooms was generally good. AR tags were hung to identify problems.

The following completed surveillance procedures were reviewed and found complete with proper data recorded and all applicable steps completed:

- 1BwOS 5.2.b-2 performed on 8/23/96
- 2BwOS 5.2.b-2 performed on 8/27/96
- 1BwVS 5.2.f.3-1 performed on 5/14/96, 6/13/96, 8/5/96, and 9/5/96
- 2BwVS 5.2.f.3-2 performed on 11/9/95, 2/3/96, and 7/16/96

The completed procedure for 2BwVS 5.2.f.3-2, "ASME Surveillance Requirements for RHR Pump 2RH01PB," performed on April 1, 1996 had some inconsistencies. Step f.1.7 of the procedure recorded the idle suction pressure for the RHR pump. This step was identified as an acceptance criteria step. The acceptance criteria was listed as greater than

24 psig (> 24 psig). The recorded value for the suction pressure was 24 psig. Therefore, the as found suction pressure did not satisfy the listed acceptance criteria.

There was no indication in the completed procedure that any actions were taken at the time to address the acceptance criteria not being satisfied. The test was completed and sent to engineering for review.

On April 3, 1996, temporary procedure change (TPC) 7369 was generated to change the acceptance criteria to greater than or equal to 24 psig (≥ 24 psig). In accordance with BwAP 1300-3, "Preparation and Approval of Temporary Procedures and Temporary changes to Permanent Procedures, TPC 7369 was processed as an "intent change" to the procedure and was reviewed by engineering and operations (senior reactor operator). TPC 7369 also was screened for 10 CFR 50.59 changes and was reviewed by the onsite review committee and station manager prior to implementation. Based on the new acceptance criteria incorporated by TPC 7369, the surveillance test was signed off as complete.

The reason for the acceptance criteria change on TPC 7369 was listed as "typographical error." However, the same step for tests of other RHR pumps also had acceptance criteria listed as > 24 psig.

The inspector interviewed system engineering personnel and the in-service test coordinator as to the bases for calling the change a typographical error correction. The system engineer stated that the required suction pressure was 16 psig and the change had no effect on the pump operation.

However, the reason for calling the change a typographical correction could not be identified by engineering personnel.

The same acceptance criteria change was incorporated into 1BwVS 5.2.f.3-2, ASME Surveillance Requirements for RHR Pump 1RH01PA, on July 16, 1996 using BwAP 1300-8, Minor Corrections of Approved Station Procedures. BwAP 1300-8 allowed for typographical corrections to procedures and specifically prohibited changes that would alter the technical content of a procedure. Procedures changed with BwAP 1300-8 do not undergo a thorough technical review. The change incorporated into 1BwVS 5.2.f.3-2 altered acceptance criteria and should have been considered a change to the technical content of the procedure and, thereby, not been incorporated using BwAP 1300-8.

c. Conclusions

The inspectors concluded that overall material condition of the residual heat removal system was good. Items requiring maintenance on the system were identified by AR tags with the exception of a small leak on 2RH032A, indicating that operations and engineering personnel were monitoring the system adequately.

The inspectors also concluded that the acceptance criteria change to the 1A RHR pump surveillance procedure (1BwVS 5.2.f.3-1) that was incorporated using BwAP 1300-8, did not provide for a thorough engineering review. The acceptance criteria change made to 2BwVS 5.2.f.3-2 was not incorporated into all the procedures that were affected by the change. The inspectors concluded that not changing all the affected procedures at the same time was a poor engineering practice. All procedures relating to the RHR pumps had been corrected and had been reviewed in accordance with BwAP 1300-3.

Technical Specification (TS) 6.8.1.a required that written procedures be established, implemented, and maintained covering activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A. TS 6.8.1.a applied to BwAP 1300-3 and BwAP 1300-8 and therefore the failure to follow BwAP 1300-8 was a violation. This violation however, was of minor safety consequence and is being treated as a non-cited violation consistent with Section IV of the NRC Enforcement Policy (50-456/96014-07 (DRP)).

E2.3 Temporary Alterations on Plant Systems

a. Inspection Scope (37550)

The inspectors continued a review of the temporary alteration process that was started in the previous inspection period. The inspectors reviewed paperwork for several temporary alterations and performed plant walkdowns of several temporary alterations. Temporary alterations were reviewed for compliance with UFSAR and TS requirements. The inspectors also reviewed 10 CFR 50.59 safety evaluations on a sample of temporary alterations.

b. Observations and Findings

The inspectors review of the historical status of temporary alterations revealed the following information:

- On January 1, 1996, a total of 43 temporary alterations were installed and 21 had been in place for greater than 18 months.
- On September 30, 1996, a total of 28 temporary alterations were installed and 14 had been in place for greater than 18 months.

Procedure BwAP 2321, Step C.1, defined a temporary alteration as a change to the plant that was "generally expected to be installed for a specified short duration." Station management had expanded on the definition of "short duration" as one fuel cycle (18 months) or less. Each temporary alteration package had an entry for expected removal date. For the temporary alterations older than 18 months, the expected removal date/event had not been met.

Problems found with temporary alterations include:

- Review of the temporary alteration log and temporary alteration paperwork in the Work Execution Center (WEC) revealed two versions of temporary alteration 92-0-001 were filed in the WEC. One version appeared to be the original and the other appeared to be a copy of the original. The copy had some items lined out and initialed while the original did not. It could not be determined which version of the paperwork was correct. The inspector notified the associated system engineer of this condition and the paperwork was corrected.

- Licensee personnel identified that original paperwork for temporary alteration 96-1-007, which included removal signatures, was not in the WEC and could not be located by plant personnel. PIF 456-201-96-1879 was generated by plant personnel to document that temporary alteration 96-1-007 was misplaced for about 10 days. The original temporary alteration paperwork could not be located and a copy, including all signatures, was reconstituted by site engineering personnel. The temporary alteration was removed from the plant and the associated components were returned to pre-alteration configuration. Investigation of the problem revealed that the original temporary alteration paperwork may have become contaminated and discarded as radioactive waste.

The inspector reviewed 10 CFR 50.59 safety evaluations for a sample of temporary alterations. The evaluations were performed correctly and referenced required licensing and design documents.

The inspector performed a walkdown of several temporary alterations in the plant. The temporary alterations were generally found to be in agreement with installation paperwork and the UFSAR. Examples of minor problems, such as missing valve labels, found by the inspector were quickly corrected by the associated system engineer after being reported. The installation problems that were found were associated with temporary alterations installed for greater than 18 months.

c. Conclusions

Temporary alterations were found to be installed in accordance with plans and no unauthorized alterations were found. Any problems identified were of minor significance and therefore, not being considered as a violation. The inspectors concluded that the number of temporary alterations installed greater than 18 months was high (14) and that the licensee had not met the intent of their controls to not have temporary alterations installed for greater than 18 months. System and site engineering personnel appeared to maintain open temporary alterations as listed in the associated documentation.

IV. PLANT SUPPORT

R1 Radiological Protection and Chemistry (RP&C) Controls (71750)

R1.1 General Observations

a. Inspection Scope

Normal daily tours of the auxiliary building.

b. Observations and Findings

The inspectors observed that the amount of contaminated floor space was low and access to plant equipment was not restricted. Floors were kept clean and rooms were well lit. Contaminated areas and radiation boundaries were clearly marked.

c. Conclusions

Based on observations during this inspection, the inspectors concluded that radiological housekeeping and contamination control was good. No problems were identified.

R8 Miscellaneous RP&C Issues (92904)

R8.1 (Closed) IFI 96008-06: Inspector to review licensee's post-outage evaluation of the cause of higher dose rates and the contribution of rework and emergent work to the higher dose total. The higher dose rates during the recent Unit 2 5th-cycle refueling outage (A2R05) were attributed to an increased deposition of radioactive corrosion products from the core on out-of-core surfaces. This increase occurred due to a reactor coolant pH increase caused by the leakage of lithium from a bypassed chemical and volume control (CV) demineralizer and the effect of decreasing reactor coolant temperature on a low and decreasing concentration of boric acid.

For corrective action, the licensee revised procedure BwOP CV-10, "CV Filters-Isolation and Return to Service," to allow the demineralizer to remain in service when the CV letdown filter was being changed. In addition, the licensee will be lowering the reactor coolant pH slightly during future shutdowns to compensate for the decreasing temperature and boric acid concentration.

Regarding the higher dose total, the licensee identified that about 38 person-rem came from unplanned work added to the outage for various reasons and about 9 person-rem came from increased time spent on planned work. A lessons-learned review was done for A2R05 and incorporated into planning for the recent mid-cycle outage on Unit 1 with greater emphasis on outage scope "freeze" and completing jobs within the scheduled time. This appears to be a good method of reducing radiation exposure.

S1 Conduct of Security and Safeguards Activities (71750)

S1.1 General Observations

a. Inspection Scope

Normal daily tours of the interior and exterior of plant buildings.

b. Observations and Findings

The inspectors observed that security guards performed entry searches of personnel and their belongings well. Security guards responded to two door alarms accidently generated by the inspectors in a timely manor. Guards stationed in the alarm stations were alert and were able to inform the inspectors of malfunctioning equipment and the required compensatory actions.

c. Conclusions

During this inspection period, security guards were observed performing their routines as expected. No problems were identified.

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 October 18, 1996. 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

H. G. Stanley, Site Vice President
T. Tulon, Station Manager
H. Pontious, Nuclear Licensing Administrator
E. Roche, Executive Assistant
W. McCue, Support Services Director
R. Flessner, Site Quality Verification Director
R. Byers, Maintenance Superintendent
D. Miller, Work Control Superintendent
T. Simpkin, Regulatory Assurance Supervisor
H. Cybul, System Engineering Supervisor
J. Meister, Engineering Manager
D. Cooper, Operations Manager
M. Turbak, Independent Safety Engineering Group Supervisor
M. Paevey, Regulatory Performance Administrator
M. Cassidy, Regulatory Assurance - NRC Coordinator

NRC

L. Miller, Chief, Reactor Projects Branch 4
C. Phillips, Senior Resident Inspector
M. Kunowski, Resident Inspector

IDNS

T. Esper

INSPECTION PROCEDURES USED

IP 37550: Engineering
IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 71707: Plant Operations
IP 71750: Plant Support Activities
IP 92901: Followup - Plant Operations
IP 92902: Followup - Plant Maintenance
IP 92904: Followup - Plant Support

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-456/96014-01	VIO	failure to use the correct procedural revision to test the 1B DG
50-457/96014-02	NCV	failure to follow procedures
50-456/457/96014-03	IFI	failure analysis of two breakers and the operability assessment of the remaining breakers
50-456/457/96014-04	URI	review of valves surveillance requirements
50-456/96014-05	NCV	failure to follow procedures
50-456/96014-06	URI	roll-up fire doors fail to close
50-456/96014-07	NCV	failure to follow administrative procedure

Closed

50-456/457/95017-04	IFI	surveillance revision for post-accident neutron monitoring system
50-456/457/96008-06	IFI	post-outage evaluation of cause of high dose rates and contribution of rework and emergent work to higher dose total
50-456/96002-00	LER	loss of operability of both trains of control room ventilation
50-456/96014-02	NCV	failure to follow procedures
50-456/96014-05	NCV	failure to follow procedures

LIST OF ACRONYMS USED

AR	Action Request
ASME	American Society of Mechanical Engineers
BYA	Bypass Breaker A
CFR	Code of Federal Regulations
CV	Volume Control
DG	Diesel Generator
EA	Equipment Attendant
EO	Equipment Operator
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Features
FOTP	Fuel Oil Transfer Pump
IFI	Inspection Followup Item
LER	Licensee Event Report
LLRT	Local Leak Rate Test
MOV	Motor-Operated Valve
NRC	Nuclear Regulatory Commission
PIF	Problem Identification Form
PM	Preventive Maintenance
RCFC	Reactor Containment Fan Cooling
RHR	Residual Heat Removal
RO	Reactor Operator
SSPC	Solid State Protection System
TPC	Temporary Procedure Change
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
VOTES	Valve Operation, Test and Evaluation System
WEC	Work Execution Center