U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-454; 50-455
License Nos:	NPF-37; NPF-66
Report No:	50-454/455-98019(DRP)
Licensee:	Commonwealth Edison Company
Facility:	Byron Generating Station, Units 1 and 2
Location:	4450 N. German Church Road Byron, IL 61010
Dates:	August 25 - October 5, 1998
Inspectors:	E. Cobey, Senior Resident Inspector N. Hilton, Resident Inspector B. Kemker, Resident Inspector T. Tongue, Project Engineer C. Thompson, Illinois Department of Nuclear Safety
Approved by:	Michael J. Jordan, Chief Reactor Projects Branch 3

EXECUTIVE SUMMARY

Byron Generating Station Units 1 and 2
NRC Inspection Report 50-454/98019(DRP); 50-455/98019(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 the operator performance during the isolation of System Auxiliary Transformer 142-1 was good. The heightened level of awareness briefings were generally good with some minor weaknesses noted. (Section O1.1)

- The inspectors concluded that configuration control events continued to occur during this inspection period. The inspectors noted that the licensee was aggressively identifying configuration control issues and planning numerous corrective actions to arrest the trend of configuration control events. While some corrective actions had been initiated and completed, the licensee had not yet approved and implemented a comprehensive corrective action plan. (Section O2.1)

- The inspectors concluded that during the performance of Byron Operating Surveillance 3.2.1-901, "Unit Two ESFAS [Engineered Safety Feature Actuation Signal] Instrumentation Slave Relay Surveillance (Train A Steam Line Isolation - K623)," Revision 2, a nuclear station operator (NSO) did not meet licensee management expectations for self-checking and peer-checking, which resulted in the NSO manipulating the wrong test switch during the surveillance test. Consequently, an unexpected engineered safety feature actuation of containment spray valves occurred. A Non-Cited Violation was issued. (Section O4.1)

Maintenance/Surveillance

- The inspectors concluded that observed maintenance activities were generally well conducted. However, the inspectors concluded that non-station Commonwealth Edison maintenance personnel had not been fully integrated into the licensee's maintenance department. Specifically, substation department personnel replaced a bushing on a Unit 1 system auxiliary transformer without a written procedure, contrary to the expectations of senior station management. No violations were identified. (Section M1.1)

- The inspectors concluded that the observed surveillance tests were performed well. Specifically, the surveillance tests met the requirements of Technical Specification (TS); and each of the tested components met their respective acceptance criteria and remained operable. (Section M1.2)

- The inspectors concurred with the licensee's finding that on February 18, 1997, the Unit 1 equipment hatch gallery was not seismically secured to the containment structure

due to an inadequate maintenance procedure and a lack of a questioning attitude on the part of procedure writers and reviewers, work analysts, job supervisors, and workers performing the activity. A Non-Cited Violation was issued. (Section M8.2)

Plant Support

- Several uncontrolled radioactive material events involving low contamination levels had been identified by the licensee and a root cause investigation of the adverse trend was conducted. In addition to specific corrective actions for each event, the licensee identified several broad corrective actions for greater awareness and accountability that were either implemented or planned to be implemented at the end of the inspection period. The inspectors considered the corrective actions acceptable. (Section R1.1)

Report Details

Summary of Plant Status

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

The licensee operated Unit 2 at or near full power until September 18, 1998, when power level was reduced to approximately 22 percent for a repair to a feedwater regulating valve air actuator. On September 19, 1998, the licensee returned Unit 2 to full power and operated at or near full power for the remainder of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Isolation of System Auxiliary Transformer 142-1 for Planned Maintenance

a. Inspection Scope (71707)

The inspectors observed the operating shift's preparations for isolation of System Auxiliary Transformer (SAT) 142-1 and the subsequent electrical line-up switching activities.

b. Observations and Findings

On September 19, 1998, the licensee started a maintenance period for SAT 142-1. The inspectors observed the heightened level of awareness (HLA) briefing and noted that the briefing covered the overall action plan, the chain of command during the electrical line-up shift, contingency actions, and certain individual responsibilities. However, the inspectors also noted that the roles and responsibilities for all of the HLA participants were not covered as was generally done by the licensee. During the subsequent pre-job brief for each specific event, the individual roles and responsibilities for that event were discussed; therefore, the inspectors concluded that although the HLA was not complete, the content was appropriately discussed prior to execution of each evolution.

The surveillance testing conducted prior to shifting the electrical line-up and the electrical switching activities between the diesel generators and the unit cross-ties were completed smoothly and effectively. The inspectors noted that initially, the operators did not plan to use phones during the cross-tie operation, contrary to licensee management's expectations for the conduct of operations that involve communications between unit control rooms. Just before the cross-tie operation began, the on-coming shift non-licensed operators reported into the main control room to discuss upcoming evolutions with their respective unit operators, which caused a momentary, but significant, distraction. The operators recognized the distraction and immediately began using phones.

c. Conclusions

The inspectors concluded that the operator performance during the isolation of SAT 142-1 was good. The heightened level of awareness briefings were generally good with some minor weaknesses noted.

O2 Operational Status of Facilities and Equipment

O2.1 Safety Injection Equalization Valves Found Out of their Expected Position

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the loss of control of the configuration of the Unit 1 and 2 safety injection (SI) pressure equalization valves, 1/2SI122A and B and 1/2SI123A and B. The inspectors interviewed operations department personnel and reviewed Problem Identification Form (PIF) B1998-03827, "SI Equalization Valves Found Closed When They Should Have Been Open," and On-Site Review 96-015, "Operability Assessment Attachment C for Pressure Locking/Thermal Binding Concerns Raised by Generic Letter 95-07 Reviews."

b. Observations and Findings

On September 1, 1998, while returning the residual heat removal system to service following post-maintenance testing, an operator determined that the pressure equalization valves on the residual heat removal pump refueling water storage tank suction isolation valves, 1/2SI122A and B and 1/2SI123A and B, were closed vice open. As a result, the operators restored the system configuration and initiated a prompt investigation.

The licensee's investigation revealed that these equalization valves had been installed as a modification during the last refueling outage on each unit to restore the system design margin in response to the concerns raised in NRC Generic Letter 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves." As part of this modification, the master valve line-up for the system was updated; however, the three partial system valve line-ups had not been updated. Consequently, since partial system valve line-ups had been completed in lieu of the master valve line-up following original installation and testing, 1/2SI122A and B and 1/2SI123A and B had never been opened. The licensee also determined that since the system was operable prior to the installation of the modification, as documented in On-Site Review 96-015, and the modification was intended to restore the system design margin, the system remained operable with the pressure equalization valves closed vice open. The inspectors reviewed the licensee's corrective actions and concluded that they were acceptable.

As documented in NRC Inspection Report 50-454/98017(DRP); 50-455/98017(DRP), the licensee was developing an action plan to address an adverse trend in configuration control events. After reviewing approximately 70 configuration control related issues, the licensee determined that the apparent causes of the 70 events could be divided into

seven apparent causes. The task force recommended approximately 50 different actions to cover those seven causes. Examples of actions recommend by the task force included: numerous actions to improve communications with station employees emphasizing the importance of configuration control; development of clear departmental boundaries for authorization to operate equipment; improvement of tracking mechanisms for components out of their normal position; and, reducing the operations department procedure backlog. At the end of the inspection period, station management was reviewing the recommendations of the task force. The inspectors noted that some of the actions had been initiated and a few of the actions had been completed; however, a significant number of the actions had yet to be committed to by station management.

c. Conclusions

The inspectors concluded that configuration control events continued to occur during this inspection period. The inspectors noted that the licensee was aggressively identifying configuration control issues and planning numerous corrective actions to arrest the trend of configuration control events. While some corrective actions had been initiated and completed, the licensee had not yet approved and implemented a comprehensive corrective action plan.

O4 Operator Knowledge and Performance

O4.1 Inadvertent Engineered Safety Feature (ESF) Actuation Due to Operator Error

a. Inspection Scope (71707)

The inspectors reviewed the circumstances surrounding the inadvertent ESF actuation of containment spray (CS) valves during the performance of Byron Operating Surveillance (BOS) 3.2.1-901, "Unit Two ESFAS [Engineered Safety Feature Actuation Signal] Instrumentation Slave Relay Surveillance (Train A Steam Line Isolation - K623)," Revision 2. The inspectors interviewed operators and reviewed Licensee Event Report (LER) 50-455/98007.

b. Observations and Findings

On August 21, 1998, during the performance of BOS 3.2.1-901, Section F.1.4, the nuclear station operator (NSO) performing the surveillance test manipulated the wrong test switch, Test Switch S846 instead of Test Switch S845. Consequently, the Train A containment spray slave relay, K643, was actuated instead of the Train A steam line isolation slave relay, K623. As a result, the 2A CS pump discharge header isolation valve, 2CS007A, and the 2A CS eductor spray additive valve, 2CS019A, repositioned open and the 2A CS eductor suction valve, 2CS010A, received a confirmatory open signal. However, since the 2A CS pump was started by a separate slave relay, no system flow occurred. The operating shift restored the system configuration, initiated a prompt investigation, and made a 4-hour non-emergency report to the NRC in accordance with 10 CFR 50.72(b)(2)(ii).

The licensee's investigation revealed that the operator error occurred as a result of a lack of attention to detail and adherence to licensee management expectations for conduct of operations. Specifically, the NSO failed to self-check and peer-check during the evolution. In addition, the pre-job brief did not cover lessons learned and potential human error traps which could have prevented the subsequent operator error. Corrective actions identified by the licensee included: (1) restoration of the system configuration; (2) issuance of a daily order requiring 100 percent peer-checks for slave relay surveillance tests; and (3) clarification of roles and expectations for all performance standards to establish consistency among the operating shifts. The inspectors concluded that the licensee's corrective actions were acceptable.

Technical Specification (TS) 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 Operating Surveillance 3.2.1-901 is the implementing procedure for the quarterly slave relay test of the Train A steam line Isolation Slave Relay K623 as required by TS 4.3.2.1. The NSO's operation of Test Switch S846 instead of Test Switch S845 during the performance BOS 3.2.1-901, Section F.1.4, which resulted in an unexpected ESF actuation of CS valves, was a violation of TS 6.8.1.a for failure to implement the procedure. 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 (50-455/98019-01(DRP)).

c. Conclusions

The inspectors concluded that during the performance of Byron Operating Surveillance 3.2.1-901, "Unit Two ESFAS [Engineered Safety Feature Actuation Signal] Instrumentation Slave Relay Surveillance (Train A Steam Line Isolation - K623)," Revision 2, a nuclear station operator (NSO) failed to meet licensee management expectations for self-checking and peer-checking, which resulted in the NSO manipulating the wrong test switch during the surveillance test. Consequently, an unexpected engineered safety feature actuation of containment spray valves occurred. A Non-Cited Violation was issued.

O8 Miscellaneous Operations Issues (92700, 92901)

O8.1 10 CFR 50.54(f) Letter Commitment Review

a. Inspection Scope

The inspectors reviewed the status of commitments pertaining to Commonwealth Edison Company's February 17, 1998, response to the NRC's request for information pursuant to 10 CFR 50.54(f).

b. Observations and Findings

Nuclear Generation Group 3, "Ensure Excellence in Plant Material Condition"

Action Step 2: "Implement the Work Control Planning Process to Further Improve the Ability to Execute Work." On April 3, 1998, the licensee approved and implemented Nuclear Station Procedure (NSP) WC-3005, "Maintenance Planning," Revision 0, which established a standard maintenance planning process at all Commonwealth Edison Company nuclear stations.

Action Step 9: "Implement the On-line Maintenance Process." On June 30, 1998, the licensee approved and implemented NSP WC-3006, "On-Line Maintenance," Revision 0, which established standard administrative controls for performing on-line maintenance on structures, systems, and components important to safety at all Commonwealth Edison Company nuclear stations.

Action Step 10: "Implement the Performance Centered Maintenance Program at all Sites." On August 30, 1998, the licensee had implemented Nuclear Engineering Procedure 09-03, "Performance Centered Maintenance (PCM) Methodology," Revision 0, and Nuclear Engineering Standards G-08, "Performance Centered Maintenance (PCM) Templates Revision Process," Revision 0, for pumps, motors, batteries and battery chargers, check valves, motor operated valves, air operated valves, fans, instruments, transformers, and breakers. The licensee was developing PCM templates for heat exchangers, manual valves, relief valves, solenoid operated valves, and relays.

Nuclear Generation Group 10, "Enhance Communications"

Action Step 5: "Implement Annual Site Communication Plan." On March 28, 1998, the licensee approved and implemented a communication plan which described a list of Byron site specific activities to be accomplished in conjunction with the actions delineated in the document, "Enhance Communication (NGG-10)," dated April 2, 1998.

c. Conclusions

The inspectors concluded that the licensee completed commitments of the Nuclear Generation Group Strategic Reform Initiatives that were reviewed.

O8.2 (Closed) LER 50-455/98007: "Inadvertent Actuation of ESF Signal to Containment Spray Valves Due to Operator Error During Slave Relay Surveillance." This LER is discussed in Section O4.1 of this report. A Non-Cited Violation was issued. This LER is closed.

O8.3 (Closed) LER 50-454/98017: "Line 0621 Trip and Subsequently, Loss of Unit 1 SATs Causing Loss of Offsite Power." On August 4, 1998, Unit 1 experienced a loss of offsite power (LOOP). The event and the licensee's initial findings were documented in NRC Inspection Report 50-454/98017(DRP); 50-455/98017(DRP). The apparent cause was a relay in Line 0621 protection circuit that failed to reset after a fault cleared combined with an early actuation of a local breaker backup (LBB) protective circuit.

The licensee subsequently identified an additional procedural deficiency which was documented in the LER. After Line 0621 had tripped, the main control room annunciator remained lit. The operators believed that the annunciator indicated that Line 0621 was de-energized. After referring to Byron Annunciator Response (BAR) Procedure 0-35-D1 and discussing the line status with Commonwealth Edison's Electric Operations, the operator attempted to close oil cooled circuit breaker (OCB) 5-6. The licensee's investigation identified that the annunciator actually indicated a problem with the control circuit for Line 0621 rather than indicating that the line was de-energized. Therefore, the operator should not have attempted to shut OCB 5-6. However, BAR (0-35-01) did not identify the potential control circuit problem. Additionally, the LBB protection circuit activated sooner than designed, which when combined with the stuck relay, was the actual cause for the LOOP. If the LBB had operated properly, the operator's attempt to shut OCB 5-6 would have resulted in the breaker reopening, but would not have caused the LOOP. As a result, the licensee planned to revise the annunciator response procedures. The inspectors reviewed the licensee's corrective actions and found them to be acceptable. No violations were identified. This LER is closed.

O8.4 (Closed) Violation 50-454/455-97008-01: "Failure to Take Corrective Action Documented in LER 50-454/94014." The inspectors identified in NRC Inspection Report 50-454/97008(DRP); 50-455/97008(DRP) that the licensee had failed to take the corrective actions documented in LER 50-454/94014. The licensee's review indicated that the corrective actions had never been entered into the licensee's tracking system and therefore, the actions were never completed. Due to the period of time between the occurrence (1994) and discovery (1997), the licensee could not conclusively determine the root cause of the event. However, the licensee completed the corrective actions identified in LER 50-454/94014 and verified that the corrective actions documented in all the LERs placed on the docket since 1994 had been entered into the corrective action tracking system. Additionally, the licensee reviewed the existing procedural guidance to personnel responsible for entering actions into the tracking system and determined that the current guidance was sufficient. The inspectors concluded that the licensee's corrective actions were acceptable. This violation is closed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Maintenance Observations

a. Inspection Scope (62707)

The inspectors interviewed operations, engineering, and maintenance department personnel and observed the performance of all or portions of the following work requests (WR). When applicable, the inspectors also reviewed TS and the Updated Final Safety Analysis Report (UFSAR).

- WR 940014881-04 Excavate Install/Remove Line Stop and Backfill
- WR 980090742-01 Troubleshoot Non-urgent Alarm in Rod Drive System

- WR 940008703-01 Remove Furmanite Repair on Flange of North Cooling Bank [Unit 1 System Auxiliary Transformer]
- WR 970069703-01 Install Suction Strainer on the 2B Essential Service Water (SX) Pump Main Lube Oil Pump
- WR 980065491 Inspect/Repair the 2B SX Discharge Strainer.
- WR 98002196 Repair Minor Oil Leak on the 2B SX Outboard Bearing Housing.
- WR 960035956 Remove and Replace the 1B Reactor Containment Fan Cooler High Speed Breaker.

b. Observations and Findings

Unit 1 SAT Bushing Replacement

During the restoration of SAT 142-1 following planned maintenance, the licensee identified that an electrical connection bushing was leaking oil. The licensee decided to replace the bushing due to the risk of damaging the offsite power supply and causing a prolonged loss of offsite power. Potential consequences included a Unit 1 shut down using natural circulation for cooldown if a significant error resulted in damage to both Unit 1 SATs and the damage could not be repaired within the 72-hour limiting condition for operation action requirement.

On September 28, 1998, the licensee de-energized both Unit 1 SATs to minimize the consequences of a crane accident and replaced the leaking bushing on SAT 142-1. The inspectors observed the pre-job brief and noted that nuclear oversight personnel attended and coached the crew on appropriate foreign material exclusion practices. The inspectors noted appropriate crane control and foreign material exclusion practices. However, the inspectors observed that the procedure for replacing the bushing was contained in the temporary leak repair work package and simply stated repair/replace bushing.

During subsequent discussions with the inspectors, maintenance department management agreed that even though the maintenance was conducted by non-station Commonwealth Edison personnel, a written procedure should have been used. In addition, due to the potential consequences of the evolution, the Plant Operations Review Committee (PORC) had reviewed the bushing replacement prior to conducting the evolution; and, the PORC also expected that a procedure would be used. Although the inspectors did not identify a violation of regulatory requirements, the inspectors were concerned that the control of maintenance activities involving non-station personnel did not meet the standards expected of station maintenance personnel.

c. Conclusions

The inspectors concluded that observed maintenance activities were generally well conducted. However, the inspectors concluded that non-station Commonwealth Edison maintenance personnel had not been fully integrated into the licensee's maintenance department. Specifically, substation department personnel replaced an electrical

connector bushing on a Unit 1 system auxiliary transformer without a written procedure, contrary to the expectations of senior station management. No violations were identified.

M1.2 Surveillance Test Observations

a. Inspection Scope (61726)

The inspectors interviewed operations personnel, reviewed the completed test documentation and applicable portions of the UFSAR and TS, and observed the performance of selected portions of the following surveillance test procedures.

• 1BOS 3.2.1-804	Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K609)
• 1BOS 3.2.1-805	Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Safety Injection - K610)
• 1BOS 3.2.1-846	Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Safeguards Actuation Relay (SARA) Parallel Path Test)
• 1BOS 3.2.1-856	Unit One ESFAS Instrumentation Slave Relay Surveillance (Train B Safeguards Actuation Relay (SARB) Parallel Path Test)
• 1BOS 3.2.1-860	Unit One ESFAS Instrumentation Slave Relay Surveillance (Train A Automatic Containment Isolation Phase B - K618, K626)
• 2BOS 7.1.2.1.b-2	Unit 2 Diesel Driven Auxiliary Feedwater Pump Quarterly Surveillance

c. Conclusions

The inspectors concluded that the observed surveillance tests were performed well. Specifically, the surveillance tests met the requirements of TS; and each of the tested components met their respective acceptance criteria and remained operable.

M8 Miscellaneous Maintenance Issues (92700, 92902)

M8.1 (Closed) Unresolved Item (URI) 50-454/455-94025-03(DRP): "Okonite Taped Cable Splices." The environmental qualification of Okonite taped cable splices was originally identified as a concern at Braidwood Station. On November 13, 1995, the NRC approved the use of Okonite taped cable splices at Braidwood. The licensee contended that the same analysis applied to Byron; however, the NRC safety evaluation report did not address Byron Station. Therefore, by letter dated July 30, 1998, the licensee requested approval for the environmental qualification and use of Okonite taped cable splices at Byron based on the Braidwood analysis, which was subsequently approved by letter dated September 28, 1998. This Unresolved Item is closed.

M8.2 (Closed) LER 50-454/97003: "Equipment Hatch Gallery Not Properly Attached to the Containment Structure." On February 18, 1997, during the performance of a Unit 1

containment walkdown, the licensee identified that the equipment hatch gallery was not seismically secured to the containment structure. The licensee determined that the cause of the issue was an inadequate work package and maintenance procedure; and a lack of a questioning attitude on the part of procedure writers and reviewers, work analysts, job supervisors, and workers performing the activity. The licensee's corrective actions included: (1) revising Byron Maintenance Procedure (BMP) 3300-1, "Containment Equipment Hatch Removal and Installation"; to include criteria that would leave the gallery seismically qualified, (2) revising Byron Administrative Procedure (BAP) 400-19, "Maintenance Procedures Writers Guide"; and (3) providing training for maintenance personnel to heighten their awareness of seismic design requirements. The inspectors reviewed the licensee's corrective actions and found them to be 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 procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. The failure of BMP 3300-1, "Containment Equipment Hatch Removal and Installation," to provide appropriate guidance to ensure that the equipment hatch gallery installation satisfied the seismic design requirements was 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 (50-454/98019-02(DRP)). This LER is closed.

M8.3 (Closed) LER 50-454/97009: "Missed Technical Specification Surveillance." This event was discussed in NRC Inspection Report 50-454/97009(DRP); 50-455/97009(DRP) and Violation 50-454/455-97009-01(DRP) was cited. The licensee determined that the cause of the issue was inadequate managerial methods, in that, the applicable surveillances and documentation did not receive adequate critique or technical review. The licensee's corrective actions included: (1) requesting and receiving an amendment to Technical Specifications; (2) performing ultrasonic testing to verify that the chemical and volume control (CV) system piping was vented; (3) revising BOS 5.2.b-1, "ECCS [Emergency Core Cooling Systems] Venting and Valve Alignment"; (4) reviewing selected TS surveillances to verify compliance; and (5) conducting system walkdowns using isometric drawings to identify any additional high point vents. The inspectors reviewed the licensee's corrective actions and found them to be acceptable. This LER is closed.

M8.4 (Closed) LER 50-454/97010: "Faulty Review Causes Failure to Test Relays and Technical Specification 3.0.3 Entry." This event was discussed in NRC Inspection Report 50-454/97009(DRP); 50-455/97009(DRP) and Violation 50-454/455-97009-02 was cited. The licensee determined that the cause of the issue was an inadequate onsite review, performed in 1990, that approved changing the test methodology for the CV system letdown isolation and letdown orifice isolation valves. The licensee's corrective actions included: (1) reviewing all TS slave relay surveillances to verify compliance; (2) evaluating a modification to resolve thermal transients caused by cycling of the letdown line containment isolation valves during testing; and (3) requiring the PORC to review all TS literal compliance issues raised at both Byron and Braidwood

Stations. The inspectors reviewed the licensee's corrective actions and found them to be acceptable. This LER is closed.

M8.5 (Closed) LER 50-454/97013: "Valve Mistakenly Opened Causes Post LOCA [Loss of Coolant Accident] Leakage to Exceed Limit." This event was discussed in NRC Inspection Report 50-454/97009(DRP); 50-455/97009(DRP) and Violation 50-454/455-97009-03 was cited. The licensee concluded that the reason that the valve had been opened could not conclusively be determined; however, the licensee also concluded that BOS 5.2.b-1, "ECCS Venting and Valve Alignment;" was inadequate, in that, it did not identify all possible flow paths to vent the pump. The licensee's corrective actions included reviewing all other ECCS pump venting flow path configurations and revising BOS 5.2.b-1. The inspectors reviewed the licensee's corrective actions and found them to be acceptable. This LER is closed.

M8.6 (Closed) Violation 50-454/455-97009-01(DRP): "Failure to Vent the Chemical and Volume Control (CV) System and the Unit 1 Residual Heat Removal (RH) Heat Exchanger High Point Vent, 1RH027, in Accordance with TS 4.5.2.b(1)." This violation is discussed in Section M8.3 of this report. This violation is closed.

M8.7 (Closed) Violation 50-454/455-97009-02(DRP): "Failure to Perform a Continuity Test for the Slave Relays for the Chemical and Volume Control (CV) System Letdown Isolation Valves, and the CV Letdown Orifice Isolation Valves in Accordance with TS 4.3.2.1." This violation is discussed in Section M8.4 of this report. This violation is closed.

M8.8 (Closed) Violation 50-454/455-97009-03(DRP): "Inadequate Procedure for Venting the Safety Injection Pumps." This violation is discussed in Section M8.5 of this report. This violation is closed.

III. Engineering

E8 Miscellaneous Engineering Issues (37551, 92903)

E8.1 (Closed) IFI 50-454/455-98017-03: "Orientation of Anderson Greenwood Check Valves." The vendor technical manual specified that these valves be oriented in either the vertical position with flow upward or in a horizontal position with the hinge pin mounted vertically. The failure to properly orient these check valves could result in excessive wear and an increased failure rate.

In response to the inspectors questions, the licensee determined that 13 safety-related Anderson Greenwood check valves were mis-oriented, two of which have since been corrected. The licensee also determined that the orientation of an additional six valves was not able to be determined due to existing plant conditions; however, the licensee planned to treat these valves as if they were mis-oriented until the orientation can be conclusively determined. The licensee revised Byron Engineering Surveillance (BVS) XII-8, "Check Valve Visual Inspections," BMP 3100-35, "Anderson-Greenwood Type CV1B Wafer Check Valve Repair," and BMP 3300-9, "Auxiliary Feedwater Check Valve Periodic Inspection," to include specific guidance for the proper orientation of the

valves during reassembly and a hold point for an engineering inspection. Consequently, the orientation of each of these valves should be corrected during the completion of the next scheduled maintenance activity. This Inspector Follow-up Item is closed.

E8.2 (Closed) URI 50-454/455-97022-04: "Potential Unreviewed Safety Question for Operation of a Material Handling System Adjacent to the Spent Fuel Pool." The inspectors questioned the use of a material handling system (MHS) that the licensee had installed in the fuel handling building during the steam generator replacement outage. The inspectors were concerned that the use of the MHS had created the possibility of an accident or malfunction of a different type than any evaluated in the UFSAR, thus creating a potential unreviewed safety question. However, after further NRC review, the inspectors concluded that the licensee's actions were appropriate and the use of the MHS did not create a unreviewed safety question. This unresolved item is closed.

E8.3 (Closed) Violation 50-454/455-97002-07a(DRP): "Unauthorized Modification Found in Unit 1 Containment Building." The inspectors identified an unauthorized modification installed on the service air system in the Unit 1 containment building to supply service air to the refueling machine. Although the service air system was not a safety-related system, the inspectors noted that the modification required a seismic evaluation because of its close proximity to the reactor vessel. Since the design change was not controlled, the seismic evaluation was not performed. 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.

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Radioactive Material Found Outside Radiologically Posted Area

a. Inspection Scope (71750)

During routine inspection activities, the inspectors noted that several events had occurred where radioactive material (RAM) had been inadvertently released from a radiologically posted area (RPA). During interviews with radiological protection (RP) management, the inspectors were informed that a root cause investigation for the adverse trend was being performed. The inspectors reviewed Root Cause Report 454-230-98-CAQS00034, "Radioactive Material (RAM) Found Outside RPA Due To Complacency in Handling and Control of Radioactive Material."

b. Observations and Findings

The licensee identified 14 events between November 1997, and August 6, 1998, where radioactive material was found outside of an RPA. With one exception, all 14 events involved very low levels of contamination, generally near the minimum detectable level

and generally fixed contamination. The one exception involved a mop bucket found uncontrolled in the turbine building after the bucket had been used to decontaminate portions of an RPA in the turbine building. The mop bucket had one spot identified to be 220,000 counts per minute. Poor communication between an RP technician and decontamination personnel was identified as the cause. Two events involved the shipment of unidentified RAM to Braidwood Station for use during the steam generator replacement project and were identified by Braidwood Station personnel. These two events were discussed in NRC Inspection Report 50-454/98010(DRS); 50-455/98010(DRS) and a violation was cited.

c. Conclusions

Several uncontrolled radioactive material events involving low contamination levels had been identified by the licensee and a root cause investigation of the adverse trend was conducted. In addition to specific corrective actions for each event, the licensee identified several broad corrective actions for greater awareness and accountability that were either implemented or planned to be implemented at the end of the inspection period. The inspectors considered the corrective actions acceptable.

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 5, 1998. 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

K. Graesser, Site Vice-President
W. Levis, Station Manager
B. Adams, Regulatory Assurance Manager
J. Bauer, Radiation Protection Manager
T. Gierich, Operations Manager
B. Kouba, Engineering Manager
T. Schuster, Work Control Manager
M. Snow, Maintenance Manager

INSPECTION PROCEDURES USED

IP 37551	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901:	Follow-up Operations
IP 92902:	Follow-up Maintenance
IP 92903:	Follow-up Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-455/98019-01	NCV	Unexpected ESF Actuation of CS Valves
50-454/98019-02	NCV	Inappropriate Maintenance Procedure Resulted in the Equipment Hatch Gallery Not Meeting Seismic Design Requirements

Closed

50-455/98019-01	NCV	Unexpected ESF Actuation of CS Valves
50-455/98007	LER	Inadvertent Actuation of ESF Signal to Containment Spray Valves Due to Operator Error During Slave Relay Surveillance
50-454/98017	LER	Line 0621 Trip and Subsequently, Loss of Unit 1 SATs Causing Loss of Offsite Power
50-454/455-97008-01	VIO	Failure to Take Corrective Action Documented in LER 50-454/94014
50-454/455-94025-03	URI	Okonite Taped Cable Splices
50-454/97003	LER	Equipment Hatch Gallery Not Properly Attached to the Containment Structure.
50-454/98019-02	NCV	Inappropriate Maintenance Procedure Resulted in the Equipment Hatch Gallery Not Meeting Seismic Design Requirements
50-454/97009	LER	Missed TS Surveillance
50-454/97010	LER	Faulty Review Causes Failure to Test Relays and TS 3.0.3 Entry
50-454/97013	LER	Valve Mistakenly Opened Caused Post LOCA Leakage to Exceed Limit
50-454/455-97009-01	VIO	Failure to Vent the CV System and 1RH027 in Accordance with TS 4.5.2.b(1)
50-454/455-97009-02	VIO	Failure to Perform a Continuity Test for the Slave Relays for the CV Letdown Isolation Valves and CV Letdown Orifice Isolation Valves in Accordance with TS 4.3.2.1

50-454/455-97009-03	VIO	Inadequate Procedure for Venting SI Pumps
50-454/455-98017-03	IFI	Orientation of Anderson Greenwood Check Valves
50-454/455-97022-04	URI	Potential Unreviewed Safety Question for Operation of a Material Handling System Adjacent to the Spent Fuel Pool
50-454/455-97002-07a	VIO	Unauthorized Modification Found in Unit 1 Containment Building.

LIST OF ACRONYMS USED

AF	Auxiliary Feedwater System
BAP	Byron Administrative Procedure
BAR	Byron Annunciator Response
BMP	Byron Maintenance Procedure
BOS	Byron Operating Surveillance
BVS	Byron Engineering Surveillance
CS	Containment Spray System
CV	Chemical and Volume Control System
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Feature
ESFAS	Engineered Safety Feature Actuation Signal
HLA	Heightened Level of Awareness
IFI	Inspector Follow-up Item
LBB	Local Breaker Backup
LER	Licensee Event Report
LOCA	Loss of Coolant Accident
LOOP	Loss of Off site Power
MHS	Material Handling system
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
NSO	Nuclear Station Operator
NSP	Nuclear Station Procedure
OCB	Oil filled Circuit Breaker
PCM	Performance Centered Maintenance
PDR	Public Document Room
PIF	Problem Identification Form
PORC	Plant Operations Review Committee
RAM	Radioactive Material
RH	Residual Heat Removal
RP	Radiological Protection
RP&C	Radiological Protection and Chemistry
RPA	Radiologically Posted Area
SAT	System Auxiliary Transformer
SI	Safety Injection
SX	Essential Service Water System
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VIO	Violation
WR	Work Request