

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No: 50-454/97005(DRP); 455/97005(DRP)

Licensee: Commonwealth Edison Company

Facility: Byron Generating Station, Units 1 & 2

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

Dates: March 14 through May 1, 1997

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EXECUTIVE SUMMARY  
Byron Generating Station, Units 1 & 2  
NRC Inspection Report 50-454/97005, 50-455/97005

This inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a 7-week period of resident inspection.

Operations

- On March 14, 1997, Unit 2 was shutdown. The inspectors concluded that excellent operator performance was demonstrated during the shutdown activities (Section O1.2).
- The Unit 2 startup and main generator synchronization to the grid was completed in a well controlled manner. The inspector noted judicious troubleshooting, evaluation, and repair of the main generator output circuit breaker control switches (Section O1.3).
- The licensee's handling of the containment leak detection system was considered poor as exemplified by failure to control foreign material intrusion into the drain system and failure to take thorough aggressive followup action on indications that the system was not functioning properly. The early leak detection of a small reactor coolant leak in containment was significantly compromised. The only seismically qualified leak detection system at Byron was inoperable. This condition went unidentified by the licensee for over 5 months. Additionally, appropriate drain grates as described in the Updated Final Safety Analysis Report (UFSAR) had not been installed since plant construction. Three apparent violations were identified (Section O2.2).
- The inspectors considered the questioning attitude of the operations staff regarding the performance of a special test to be judicious and a strength. As a result the procedure was enhanced with contingencies for roll-up door failure and weather (Section O2.3).
- The licensee event report (LER) 50-455/97001, Unit 2 Containment Drain System Clogged Due to Debris, was poor and marginally acceptable due to incomplete, inaccurate, and late information. One apparent violation was identified regarding the inaccurate information in the LER. (Section O8.1).

Maintenance

- Routine maintenance and surveillance activities were well performed (Sections M1.1 and M1.2).
- The licensee and the inspectors noted that silt accumulation in the ultimate heat sink was faster than had been previously observed (Section M1.2).
- The inspectors considered the suspension of a special test involving the auxiliary building ventilation appropriate so as to not exceed technical specification (TS) limitations (Section M1.2).

### Engineering

- The inspectors questioned the adequacy of the licensee's design control process that allowed connecting strip chart recorders electrically to operable equipment without a detailed review. This issue was considered an unresolved item pending further NRC review of the technical adequacy of the temporary alteration program (Section E2.1).
- The inspectors identified a non-functioning control room recorder that had been inoperable since 1994. Although the recorder was not safety-related, the recordings were described in the UFSAR. The inspector's review of the licensee's UFSAR discrepancy identification program determined that the licensee would likely have identified the discrepancy (Section E2.2).
- LER 50-454/95006 documented a missed technical specification surveillance during steam generator (SG) tube inspection in 1995. The licensee identified and corrected violation is considered a non-cited violation (Section E8.3).

### Plant Support

- The inspectors considered the 1997 emergency preparedness exercise to be good (Section P1.1).
- Review of an unresolved item identified a violation for the licensee's failure to mark and protect a memorandum that contained Safeguards Information pertaining to the vehicular barrier system (Section S8.1).

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at power levels up to 97 percent during this inspection period.

Unit 2 was shutdown on March 14, 1997, to investigate and repair a small secondary steam leak on a 2A steam generator hand hole. The unit was restarted on March 19, 1997, and operated at power levels up to 100 percent throughout the rest of the inspection period.

### 1. Operations

#### **O1 Conduct of Operations**

##### **O1.1 General Comments (71707)**

Using Inspection Procedure 71707, the inspectors conducted frequent reviews of ongoing plant operations. In general, the conduct of operations was professional and safety-conscious. Observations indicated that the operations staff was knowledgeable of plant conditions, responded promptly and appropriately to alarms, and performed thorough turnovers. Specific events and noteworthy observations are detailed in the sections below.

##### **O1.2 Unit 2 Shutdown Activities (71707)**

On March 14, 1997, the inspectors observed significant portions of the Unit 2 shutdown. The inspectors observed procedure adherence and noted that operators were cognizant of system configuration and applicable precautions. The operators controlled equipment accurately and efficiently. Operator communication and annunciator response was very good throughout the activities observed. The senior reactor operator (SRO) exhibited strong command and control. The reactor was tripped from low power to demonstrate control rod drop characteristics with no abnormalities identified. The inspectors concluded that the shutdown demonstrated excellent operator performance.

##### **O1.3 Unit 2 Startup Observations (71707)**

###### **a. Inspection Scope**

The inspectors observed significant portions of the Unit 2 startup on March 19, 1997. Observations included "Just-In-Time" training, briefings for reactor startup and synchronizing the generator to the grid, rod withdrawals and approach to criticality, synchronizing the main generator to the grid, and increasing power output.

b. Observations and Findings

The inspectors observed the heightened level of awareness (HLA) briefings and considered them thorough and timely with emphasis on safety, communications, and minimizing operator distractions. One potential problem discussed and reviewed was that source range neutron detection instrument N32 was experiencing small spikes. Contingencies were discussed if the spiking worsened, including tripping the reactor if necessary. The inspector confirmed that only necessary personnel were allowed access to the operating area of the control panels and also observed use of alarm response procedures for unexpected alarms. Good command and control was observed, including three-way communications and explicit chain-of-command as described in the HLAs.

Several attempts were made to synchronize the main generator to the grid over a period of about three shifts (see Section M1.1 for details). Operations staff evaluated the situation, with assistance from representatives in the Operational Analysis Department (OAD). The inspectors noted careful troubleshooting, evaluation, and analysis. This process was well monitored and controlled by station operations personnel. The main generator output circuit breaker control switches were replaced, tested, and the main generator was synchronized to the grid.

c. Conclusions

The inspectors concluded the reactor startup and main generator synchronization to the grid was completed in a well controlled manner. The inspector noted judicious troubleshooting, evaluation, and repair of the main generator output circuit breaker control switches.

**O2 Operational Status of Facilities and Equipment**

**O2.1 Unit 2 Containment Inspection Prior To Startup (71707)**

The inspectors conducted an independent close out inspection of the Unit 2 containment following the licensee's closeout inspections in preparation for the reactor coolant system (RCS) heatup.

The containment appeared clean with an absence of boron crystals due to leaks. The inspectors also noted three drains in the outer circumferential drain trench with the strainers missing, damaged, or out of place as discussed further in Section O2.2. The inspectors concluded that the Unit 2 containment appeared clean and the general material condition of equipment observed appeared good.

**O2.2 Inoperable Unit 2 Containment Floor Drain System (71707)**

a. Inspection Scope

The inspectors reviewed the plugging of the Unit 2 containment floor drain (RF) system. The inspectors discussed the event with engineers and operators. The inspectors also reviewed the applicable sections of the UFSAR, Regulatory Guide 1.45, technical specifications (TS), and the licensee event report (LER).

b. Observations and Findings

Plugged Containment Floor Drain System

On March 15, 1997, while Unit 2 was shutdown for a maintenance outage, the licensee identified standing water in the containment building floor trench. The containment floor drains merged and then entered a flow control box. After the flow control box, water passed through the oil separator, the weir box, and finally entered the sump. Water accumulated in the sump could be removed via sump pumps. After troubleshooting the floor drain system, the licensee identified that the flow control box was clogged. A water hose was used to flush and clear the blockage on March 17, 1997.

Flow detection instrumentation (2RF008) for the containment floor drain leak detection system was provided in the weir box. The licensee's investigation identified that with the flow control box plugged, water was prevented from reaching the weir box. Sump pump run times indicated that the maximum capacity of the floor drain system had been approximately 0.1 gallons per minute (gpm).

Due to a known small secondary steam leak, the licensee was aware of input into the floor drains. However, prior to the Unit 2 shutdown to repair the leak, inspectors questioned inconsistencies between sump run times, actual chart recorder indicated values, and annunciator alarm setpoints. The inconsistencies were not large and mostly resolved by calibrations. The licensee also inspected the weir box screen during the maintenance outage. Foreign material was discovered, including a plastic foreign material exclusion (FME) pipe cap, a metal rod approximately ¼ inch diameter and 3 inches long, a large piece of tape, and several large diameter (about 1 inch) pieces of scale or rust, which may or may not have originated in the floor drain system.

The licensee identified, and the inspectors agreed, that the flow control box was most likely plugged during the previous Unit 2 outage, which ended October 4, 1996. Technical Specification 3/4.4.6, Reactor Coolant System Leakage Detection Systems, action paragraph b. required the containment floor drain to be restored to operable within 7 days or be in hot standby within the next 6 hours if the containment floor drain was inoperable. The inspectors concluded that the containment floor drain system was inoperable from October 4, 1996 to March 14, 1997, approximately 161 days, and therefore was an apparent violation of TS 3/4.4.6 (EEI 50-455/97005-01(DRP)).

The plugged drains were identified by the licensee. However, prior opportunity to identify this condition appeared to exist. Historically, when the RCFCs were shifted, condensation on the heat exchangers was removed via the containment floor drains. Typically a "spike" of about 2 gpm was observed on main control room chart recordings for 2RF008. The indicated leakage spike then trended back to nominally zero during the next 15 minutes. This curve was observed on Unit 2 prior to the previous outage and after the flow control box was cleaned. However, during the period from October 4, 1996, until March 14, 1997, the characteristic curve was not observed.

The inspectors noted that the chart recorder for 2RF008 was on a back panel and that there was no procedural requirement to observe the RCFC response on the chart. The inspectors also noted that when an annunciator alarm for containment leakage (comes in at 1 gpm) was received, operators in the past responded to the alarm and verified the RCFC characteristic trace. Frequently during the period in question, the containment leakage alarm was locked in and as a result the licensee was performing Byron Operations Surveillance (BOS) RF-1, "Containment Floor Drain Monitoring System Non-Routine Surveillance," Revision 0, which required logging the actual strip chart indication every 30 minutes. Therefore, the inspectors concluded that operators had an opportunity to identify that after a shift of RCFCs the characteristic trace did not occur. The inspectors considered this a failure to identify a significant condition adverse to quality and an apparent violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" (EEI 50-455/97005-02(DRP)).

#### Discrepant Floor Drain Grates

Byron UFSAR Section 5.2.5.1 discussed the RF system. Both inspectors and licensee personnel noted that floor drain grates were not installed per design. UFSAR Figure 5.2-3 indicated a particular vendor's bar grate; however, in many cases either a different type grate or screen (usually carbon steel) was installed or nothing covered the drain. The vendor's grates were approximately 5 inches in diameter and the perimeter trench was approximately 4 inches wide. A semi-circle shape should have been created in the concrete during construction for a proper fit, but was not, which indicated the floor grate deficiency had existed since construction. The licensee performed Operability Assessment 97-027, and determined that the floor gratings were not required for operability of the RF system. The inspectors agreed with the assessment; however, the inspectors noted that while the grates may not be required for operability of the system, the lack of the grates was significant in that this was a contributing cause to the floor drains being plugged. The inspectors considered the failure to perform a safety evaluation for the various type of grates installed in lieu of the type specified in the UFSAR prior to March 14, 1997, an apparent violation of 10 CFR 50.59 (EEI 50-455/97005-03(DRP)).

The inspector's review of operator logs determined that the containment gaseous and particulate activity monitoring system was operable except for short periods of filter changes and preventative maintenance (typically 30 to 40 minutes) during the period that 2RF008 was inoperable. Therefore, although the licensee unknowingly entered TS 3.0.3 daily (for filter changes) due to all leak detection systems being inoperable, the time periods never exceeded TS 3.0.3 action requirements.

Corrective actions for the plugged containment floor drains discussed by the licensee included clean out of the flow control box, drain cleaning, and increased flow control box inspections. Installation of new grates was also planned. After trending the performance of the new grates, the increased flow control box inspections and cleaning may be reduced.

c. Conclusions

The licensee's handling of this issue was considered poor as exemplified by failure to control foreign material intrusion into the drain system and failure to recognize indications that the system was not functioning properly. The inspectors concluded that early leak detection of a small leak was significantly compromised. The only seismically qualified leak detection system at Byron was inoperable for over 5 months and went unidentified by the licensee during that time. Additionally, appropriate drain grates as described in the UFSAR had not existed since construction. The UFSAR provided apparently contradicting information regarding the leak detection systems seismic qualifications.

O2.3 Re-Evaluation of Special Test

The inspectors noted that special test SPP 97-010, "ECCS Equipment Room Negative Pressure Test," was delayed due to the questioning attitude of the operations staff. The test was used to determine if the access planned to be cut in Unit 1 containment for the replacement steam generators created a ventilation problem in the auxiliary building, particularly in the emergency core cooling system (ECCS) component rooms. The licensee used the roll-up doors in the fuel handling building to simulate the containment opening.

In discussing the test prior to performance, a unit supervisor stated that failure to meet test requirements would require both units to shut down per TS 3.0.3 requirements because all three charcoal booster fan subsystems of the auxiliary building ventilation system would be inoperable. Further discussion resulted in the test delay to revise the test procedure to better discuss operator actions for test failure and contingency actions for roll-up door failure and outside weather conditions. The inspectors considered the questioning attitude of the operations staff to be judicious and a strength.

O8 Miscellaneous Operations Issues (92700 and 92901)

O8.1 (Closed) LER 50-455/97001: Unit 2 containment drain system clogged due to debris. The circumstances surrounding the clogged containment floor drain are documented in Section O2.2. The inspector reviewed the LER and noted two apparent violations and several weaknesses. The findings included:

- The LER did not declare the containment floor drain system inoperable. However, the LER did identify the flow control device was inoperable (clogged). The safety analysis section discussed the consequences of not having the system operable.
- The LER was issued for Unit 2 being outside the design basis. With the floor drains inoperable since October, 1996, the licensee was also apparently in violation of TS 3/4.4.6, which was reportable under 10 CFR 50.73(a)(2)(i). The LER did not identify the TS violation.
- The LER indicated that it could not be determined when the flow control device became clogged. However, the system engineer reported to the inspectors that RCFC condensation could not be identified on the control room recorder for

2RF008 since the startup after the Unit 2 outage, which ended October 4, 1996. The condensation trace was present prior to the outage; therefore, the inspectors concluded the system was inoperable since the Unit 2 startup on October 4, 1996.

- An operability assessment was prepared to allow startup of Unit 2 without fixing the floor grates. The LER stated that "debris could potentially impact the containment sump RCS leakage weir box. However, any impact on the weir function would be in the conservative direction with respect to indicated RCS leakage and therefore not a concern." The inspectors noted that without the floor drain grates, the potential existed for the flow control device to become clogged and not pass any water to the weir box. The inspectors discussed the LER statement with engineering management. The licensee agreed with the inspector that the LER statement was incorrect as written. The inspectors considered the incorrect statement an apparent violation of 10 CFR 50.9, "Completeness and accuracy of information" (EEI 50-455/97005-04(DRP)).
- The inspectors considered portions of the LER safety analysis weak. The LER stated that "floor drains would ultimately overflow to the RF sump after a period of time before detecting leakage. The sump would then show an increase in level on instrumentation in the control room." The inspectors noted that overflow into the sump depended on the size of a potential leak. For a small leak, this could be a very long period of time. The RF system design was to identify a 1 gallon per minute leak within 1 hour. Also, the LER indicated that radiation monitoring could be used as leak detection; however, the inspectors noted that the radiation monitors were not as described in Regulatory Guide 1.45 (the radiation monitors were not seismic).
- The object(s) that caused the blockage in the flow control box were not found. The floor drain oil separator was checked as indicated in the LER corrective action section; however, because the separator was not drained, only floating objects could have been identified by the inspection documented in the LER. A pump down of the separator was planned for the next refueling outage. The inspectors viewed this as acceptable.

The inspectors considered LER 50-455/97001 poor and marginally acceptable due to incomplete and inaccurate information. This LER is closed and will be tracked under apparent violation 50-455/97005-04(DRP).

08.2 (Closed) LER 50-454/94015 and 94015-01: SRO absent from control room. The LER and LER supplement documented the event of October 14, 1994, when the only SRO present left the main control room. The supplement identified additional corrective actions, including having two SROs in the control room. This event was the subject of escalated enforcement and was documented in Inspection Report 50-454/455/94026(DRS), EA 94-265. Inspection Report 95011 documented closure of the violations, including review of the corrective action. The inspectors did not identify any additional issues during the LER review. This LER and the supplement are closed.

- O8.3 (Closed) VIO 50-454/455/95008-01, 50-454/455/95008-02, 50-454/455/95008-03, EEI 50-454/455/95008-04, LER 50-454/95002: Hydrogen monitors inoperable due to failure to test the water purge cycle of the monitors and the monitors were occasionally not run for greater than the minimum required sample time. These issues were identified as violations in Inspection Report 95008 and a written response was submitted by the licensee on November 22, 1995. After review of the licensee's written response and the LER, an NOV was issued December 11, 1995 (EA 95-197). The NOV cover letter documented a review of the licensee's corrective actions and LER, and concluded that no further action was required. Based on the letter dated December 11, 1995, these items are closed.
- O8.4 (Closed) URI 50-454/455/96004-04, LER 50-454/96005: Operation of safety injection (SI) accumulators outside design basis. Based on an industry identified issue, Byron identified that the plant licensing basis did not consider the effects of having more than 2 SI accumulators cross-tied during a postulated loss of coolant accident. Byron Operating Procedure (BOP) SI-5, "Raising SI Accumulator Level With SI Pumps," allowed the cross-tying of SI accumulators. Although the inspectors and licensee could not find any documentation that stated how many accumulators were tied to the common headers at any one time, operator interviews indicated that more than 2 accumulators may have been cross-tied in the past. As corrective actions, procedure BOP SI-5 was revised to limit filling or draining processes to be performed on one accumulator at a time. Transferring of water from one accumulator to another or equalizing nitrogen pressure between accumulators was limited to modes when the accumulators were not required to be operable. The inspectors reviewed the revised procedure and verified that accumulator filling and draining had been performed one accumulator at a time. These items are closed.
- O8.5 (Closed) LER 50-454/92020-01: On April 3, 1992, the licensee identified that one of the two engineered safety feature (ESF) crossties to Unit 1 was not available. A Unit 2 to Unit 1 crosstie breaker was removed from service for electrical maintenance without considering the TS impact on Unit 1. Unit 1 was unable to crosstie a 4kV ESF bus (bus 141) due to maintenance activities on the Unit 2 crosstie breaker. TS limiting condition for operation (LCO) 3.8.1.1 was not entered and the associated action requirement not met. This event was discussed in Inspection Report 454/92015. A non-cited violation was issued and no new issues were revealed by the LER. The inspector reviewed the licensee's corrective actions and considered this issue closed.

## II. Maintenance

### M1 Conduct of Maintenance

#### M1.1 Maintenance Observations (62707)

##### a. Inspection Scope

The inspectors observed all or portions of the following work requests (WR). When applicable, the inspectors also reviewed TS and the UFSAR for potential issues.

- WR 970023490      Inspect SX Side of Jacket Water Cooler
- WR 960109479      Install cover on Emergency Stop Pushbutton
- WR 960113654      Install Banana Jacks at DG Panel
- WR 960111990      Inspect the B air start receiver
- WR 960111988      Inspect the A air start receiver
- WR 970032763-01      Breaker OCB 10-11 Control Switch Replacement
- WR 970032763-02      Breaker OCB 11-12 Control Switch Replacement
- WR 960036379      Inspect OA SX cooling tower isolation valve MOV  
OSX163A
- WR 960020026      Bi-annual inspection of SX cooling tower fan motors  
OSX03CA

b. Observations and Findings

The inspectors found that the maintenance activities were conducted in accordance with approved procedures and were in conformance with TS. The inspectors observed maintenance supervisors and system engineers monitoring job progress. Quality control personnel were also present when required. When applicable, appropriate radiation control measures were in place.

WR 970032763-01 and -02 involved troubleshooting, evaluation and replacement of the main generator output circuit breaker control switches. As discussed in Section O1.3, the circuit breakers tripped on the first several attempts to synchronize the main generator to the grid. The WR also involved validation of the initial identification that the switches had bad contacts. This work was well controlled and was conducted in accordance with the procedure. Followup testing was completed satisfactorily and the main generator synchronized to the grid.

M1.2 Surveillance Observations (61726)

a. Inspection Scope

The inspectors observed the performance of all or parts of the following surveillance procedures. The inspectors also reviewed plant equipment and surveillance activities against the UFSAR descriptions.

- 2BVS 1.1.1.2-1      Core Reactivity Balance
- 2BVS 2.1.3-1      Quarterly Measurement of Target Axial Flux Differences
- 2BVS 2.2.2-1      Heat Flux Hot Channel Factor Checkout Using Peaking  
Factors
- 2BVS 2.3.2-1      Nuclear Enthalpy Hot Channel Factor Check
- 2BVS 3.1.1-5      Incore-Excore Axial Flux Quarterly Calibration
- 2BVS 3.3.2-1      Moveable Incore Detectors Operability Check
- 2BVS 4.6.2.2-1      Unit 2 Reactor Coolant System Pressure Isolation Valve  
and Cold Leg Injection Isolation Valve Leakage  
Surveillance
- 2BOS MP-1      Unit 2 Main Power Transformer Cooling System  
Nonroutine Surveillance
- OBVS SX-5      Inspection of River Screen House and Essential Service  
Water Cooling Tower Basins

- 2BOS 7.1.2.1.b-1 Motor Driven Auxiliary Feedwater Pump Monthly Surveillance
- 2BVS 0.5-3.AF.1-1 ASME Surveillance Requirements for the Motor Driven Auxiliary Feedwater Pump
- 1BVS 5.2.f.2-1 ASME Surveillance Requirements for Safety Injection Pump 1SI01PA
- SPP 97-010 ECCS Equipment Room Negative Pressure Test
- 2BOS 8.1.1.2.a-2 2B Diesel Generator Operability Monthly and Semi-Annual Surveillance

b. Observations and Findings

The inspectors routinely noted proper authorization from the control room SRO prior to the start of each surveillance. Components removed from service were identified prior to the surveillance and the proper TS LCO was entered. At the completion of the surveillance and after independent verification of system restoration, the TS LCO was cleared. Test instruments used were verified to be calibrated as applicable. The inspectors reviewed completed surveillances and verified the surveillances met the acceptance criteria. Items of interest follow.

Essential Service Water System Silting

The licensee and the inspectors noted during the essential service water tower basin, the ultimate heat sink (UHS), silt inspection performed under OBVS SX-5, that silt was accumulating in the UHS faster than had been previously observed. The silt amounts were within the amount analyzed for a design basis accident. The licensee was working with contractors to re-evaluate the river flow and silt control at the river screen house.

ECCS Equipment Room Pressure Test

The inspectors reviewed special plant procedure, SPP 97-010, "ECCS Equipment Room Negative Pressure Test," Revision 2, and related sections of the UFSAR and TSs. As discussed in Section O2.3, the test simulated the containment opening necessary for SG replacement and its effect on the auxiliary building ventilation system in maintaining the proper negative pressure in the ECCS equipment rooms.

The inspectors observed test performance on April 23, 1997, until the test was suspended due to the test limiting conditions being approached. The test data obtained to that point indicated that the TS negative pressure requirements for the ECCS equipment rooms most likely would have been exceeded had the test continued. The licensee planned to review the test data to evaluate potential alternatives for the containment configuration during SG replacement activities. The inspectors considered that the test procedure was written and performed conservatively so as to not approach any TS LCOs and that the test suspension was appropriate.

**M8 Miscellaneous Maintenance Issues (92903)**

- M8.1** (Closed) VIO 50-454/455/95007-03: Seismically inadequate scaffold over safety-related equipment. The licensee erected scaffolding over the 2A diesel generator in preparation for cable re-route activities. The scaffolding did not meet all of the Byron Administrative Procedure (BAP) 499-3 requirements for seismic scaffolding. The licensee determined that the root cause was that the plant personnel were not fully cognizant of all the seismic requirements in BAP 499-3. Additionally, the licensee determined that specific wording in BAP 499-3 allowed for some misinterpretation of the requirements during installation of the scaffolding. Corrective action included immediate improvement of the existing scaffolding, identification and correction of all other existing scaffolding, and training sessions for operations and maintenance department staffs on seismic scaffolding requirements. The licensee also revised BAP 499-3 to provide clarification of the requirements and added an engineering review of all seismic scaffolds. The inspector observed the corrected scaffolding and verified BAP 499-3 was revised. Additionally, the inspectors have not identified any seismic scaffolding issues since the violation was cited. This item is closed.

**III. Engineering**

**E2 Engineering Support of Facilities and Equipment**

**E2.1 Temporary Alteration Program (37551)**

**a. Inspection Scope**

The inspectors reviewed the troubleshooting of the 125 Vdc bus 211 battery charger. A temporary alteration program review was also conducted as a result of a concern involving the strip chart recorder used for troubleshooting the battery charger. The inspectors reviewed Byron Administrative Procedure (BAP) 330-2 "Temporary Alterations," Revision 13; and BAP 400-9, "Troubleshooting and Maintenance Alterations," Revision 7. The inspectors also discussed the temporary alteration program with engineering, operations, and electrical maintenance management.

**b. Observations and Findings**

On April 14, 1997, the inspectors noted a strip chart recorder was electrically connected to the 125 Vdc bus 211 battery charger. An operator had noticed a momentary dip in bus voltage while completing rounds so a recorder was connected in an attempt to determine if a battery charger problem existed. The licensee considered the battery charger operable with the chart recorder connected. The strip chart recorder had been connected to the battery charger until April 29, 1997.

The inspectors reviewed BAP 330-2 and considered the strip chart to meet the definition of an "electrical jumper." Electrical jumper was defined as "a temporary power feed or other electrical connection/device which bypasses or adds a component within an electrical circuit, thus modifying the circuit design or

configuration." The inspectors discussed the definition of electrical jumper with the licensee. The licensee stated that the strip chart recorder was not an alteration because it was a high impedance device and therefore did not modify the circuit design.

The inspectors were concerned that a device that had the potential to affect an operable safety-related circuit had not received the reviews and evaluations that a temporary alteration would have been subject to in accordance with the licensee's temporary alteration program. The inspectors noted that there were no time restrictions on troubleshooting activities; therefore, a strip chart recorder could be connected indefinitely using a WR and troubleshooting guide as documentation. Additionally, the recorder connected to the battery charger was a multi-channel recorder with 14 leads connected to various points on various components within the battery charger. At the end of the inspection period, the inspectors continued to review the potential failure modes of the strip chart recorder and the licensee's position that a high impedance device did not affect the circuit.

c. Conclusions

The inspectors were concerned that connecting strip chart recorders to operable equipment without a detailed review did not maintain adequate design control. This issue was considered an unresolved item pending further NRC review of the technical acceptability of having the strip chart recorder connected to operable equipment and the adequacy of the licensee's temporary alteration program (50-454/455-97005-05(DRP)).

E2.2 Untimely 10 CFR 50.59 Evaluation on Degraded Control Room Recorder (37551)

a. Inspection Scope

The inspectors noted that control room filter differential pressure (dP) chart recorder, OPDR-VA030, was not operational. The inspectors discussed the issue with operators and system engineering and reviewed applicable UFSAR sections to verify compliance.

b. Observations and Findings

On March 19, 1997, the inspectors noted that control room filter dP chart recorder OPDR-VA030 was not operational. The instrument recorded dP across the high efficiency particulate (HEPA) filters in the accessible area exhaust plenums. It also recorded dP across the upstream HEPA filters in the nonaccessible area exhaust plenum and the fuel handling building exhaust plenum. The inspectors questioned the operators and were told that the chart recorder had not functioned for years. The inspectors noted that although the recorder was not safety-related, the recording of the dPs on the main control panel was described in UFSAR Section 9.4.5.1.2.h.5.

The inspectors discussed the degraded recorder with system engineering and were told that WR 940025831 was written on July 5, 1994, to replace the recorder using design change package (DCP) 9400169. Since the recorder was inoperable for an extensive period of time, the inspectors asked if a 10 CFR 50.59 evaluation

had been performed since the recorder was not functioning as stated in the UFSAR. The licensee had not performed one, but did in response to the inspector's concerns. The inspectors reviewed the 10 CFR 50.59 evaluation and had no concerns.

The inspectors noted that although the recorder was not functioning, the high dP alarm for these areas were still available in the main control room, local dP indications were functioning, and the performance of monthly surveillance OBVS-XDP-1, "Unit 0 Differential Pressure Measurement High Efficiency Particulate (HEPA) Filters," Revision 3, verified dPs on the specific HEPA filters.

c. Conclusions

The inspectors determined that the non-functioning recorder had no safety significance. The inspectors reviewed the licensee's program for identifying UFSAR discrepancies as documented in Appendix III of a February 6, 1997, ComEd letter to the NRC. The licensee's review of old WRs, prior to the inspector's questions, had already placed WR 940025831 on the material condition backlog and forecasted an engineering review of the recorder replacement for June 1997.

**E8 Miscellaneous Engineering Issues (92700 and 92902)**

- E8.1 (Closed) LER 455/94001: Six motor operated valves (MOVs) may not stroke under high dP conditions due to inadequate torque switch setting. Based on a MOV inspection documented in NRC report 96003, the inspectors determined that new torque switch settings were provided for 2 of the valves, which enabled the valves to perform their safety-related function under worst case design-basis dP conditions. To address the other 4 valves, the licensee developed special operating orders for the operators to minimize the dP across each valve to fully close the valves for flood control considerations. Because the 4 valves were normally open, were not required to change position, were not active valves, and were not credited in any UFSAR analysis, the four valves were not required to be in the licensee's MOV program. The inspectors did not have a concern with the licensee's corrective actions. This item is closed.
- E8.2 (Closed) LER 50-454/94012, LER 50-454/95011, LER 50-454/96003: Increased tube degradation in the Byron Unit 1 steam generators (SG). The licensee's inspection classified each of the 4 model D-4 SGs as category C-3 due to more than 1% of the tubes inspected being defective. All defective tubes were removed from service either by plugging the tube or sleeving the defective region in the tube. The inspectors determined that the licensee took appropriate corrective actions and the safety consequences of this issue were minor. The licensee will replace all four Unit 1 SGs during the next refueling outage, B1R08. These LERs are closed.
- E8.3 (Closed) LER 50-454/95006: Missed surveillance during SG tube inspection. On November 27, 1995, the licensee identified that 1C SG tube 34-13 was placed back into service following refuel outage B1R06 without having had additional eddy current inspections performed or being plugged/repared. That tube was being tracked as dented and required additional disposition. Without the additional disposition, Technical Specification 4.4.5.2.d was missed for 1C SG tube 34-13. In response, the licensee plugged the tube during the B1P02 outage in

November 1995. The licensee's corrective actions were appropriate and the safety consequences were minor. 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 (50-454/97005-06(DRP)). This item is closed.

- E8.4 (Closed) IFI 50-454/96003-06: Overpressure protection device for the containment spray chemical additive system found out of service due to a locked closed valve. The licensee's evaluation determined that per ASME Code, Section III, 1974 Edition, Summer 74, Article NC-7111, pressure relief devices were not required where the service limits specified in the design specifications were not exceeded. The licensee's evaluation determined that there was no credible mechanism for the system to be pressurized where the service limit specified in the design specifications were exceeded. The inspectors reviewed and agreed with the evaluation. Byron opened the overpressure protection valve to the containment spray additive tank to be consistent with Braidwood Generating Station for design reconstitution purposes. The inspectors determined that the licensee's corrective actions were appropriate and the safety consequences of the closed valve were minor. This item is closed.

#### IV. Plant Support

##### P1 **Conduct of Emergency Preparedness (EP) Activities**

###### P1.1 1997 EP Exercise (82301)

The resident inspectors observed portions of a practice exercise in preparation for the annual site wide drill and the annual station assembly drill. The inspectors observed performance of the Technical Support Center (TSC). Generally, the licensee's staff in the TSC was orderly and knowledgeable. The station assembly was completed within 30 minutes. The licensee noted several minor areas for improvement during the critique. The inspectors considered the critique self-critical and very good overall.

The inspectors also observed the 1997 exercise on April 16, 1997. The inspectors considered the exercise good overall. Special Inspection Report 97006 contains detailed documentation of the licensee's performance.

##### S8 **Miscellaneous Security and Safeguards Issues (92904)**

- S8.1 (Closed) URI 50-454/455/96010-05: Protection of safeguards information. During the inspector's review of records pertaining to the vehicle barrier system (VBS), the inspector noted a memorandum from the Engineering Department dated March 7, 1996. The memorandum contained several paragraphs that described vulnerabilities with some components of the VBS, some of which were corrected and some which were not corrected. The memorandum was not marked and protected as safeguards information.

Further NRC review of the document contents showed that portions of the memorandum were Safeguards Information as described in 10 CFR 73.21. Specifically, the susceptibility of certain components to be severed and the

vulnerabilities of some gate systems were considered Safeguards Information. Failure to mark and protect the memorandum as Safeguards Information constituted a violation of 10 CFR 73.21 (50-454/455/97005-07(DRS)). This item is closed.

#### V. Management Meetings

##### X1 **Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on May 1, 1997.

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. Kofron, Station Manager  
D. Wozniak, Engineering Manager  
T. Gierich, Operations Manager  
P. Johnson, Engineering Superintendent  
E. Campbell, Maintenance Superintendent  
M. Snow, Work Control Superintendent  
D. Brindle, Regulatory Assurance Supervisor  
K. Passmore, Station Support & Engineering Supervisor  
P. Donavin, Site Engineering Mod Design Supervisor  
T. Schuster, Site Quality Verification Director  
R. Colglazier, NRC Coordinator  
E. Bendis, Shift Operations Supervisor  
J. Heaton, U-0 Operating Engineer  
M. Rasmussen, U-1 Operating Engineer  
W. Walter, U-2 Operating Engineer

## INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering  
IP 61726: Surveillance Observations  
IP 62707: Maintenance Observations  
IP 71707: Plant Operations  
IP 82301: Annual EP Exercise  
IP 92700: Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities  
IP 92901: Followup - Plant Operations  
IP 92902: Followup - Engineering  
IP 92903: Followup - Maintenance  
IP 92904: Followup - Plant Support

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

|                     |     |  |
|---------------------|-----|--|
| EEI 50-455-97005-01 | EEI | Inoperable containment floor drain system  |
| EEI 50-455-97005-02 | EEI | Failure to identify a condition adverse to quality   |
| EEI 50-455-97005-03 | EEI | Failure to perform a safety evaluation for various types of grates in containment floor drain system |
| EEI 50-455-97005-04 | EEI | Failure to provide complete and accurate information in LER 50-455/97001                             |
| 50-454/455-97005-05 | URI | Connecting strip chart recorders to operable equipment without a detailed review                     |
| 50-454/97005-06     | NCV | Missed surveillance during SG tube inspection  |
| 50-454/455-97005-07 | VIO | Failure to mark and protect Safeguards Information   |

### Closed

|                     |     |  |
|---------------------|-----|--|
| 50-454/92020-01     | LER | One of the two ESF crossties to Unit 1 was not available         |
| 50-455/94001        | LER | Six valves may not stroke under dP conditions                    |
| 50-454/94012        | LER | Increased tube degradation in Unit 1 SGs                         |
| 50-454/94015        | LER | SRO absent from control room                                     |
| 50-454/94015-01     | LER | SRO absent from control room - supplement                        |
| 50-454/95002        | LER | U-1 train B hydrogen monitor found inoperable                    |
| 50-454/95006        | LER | Missed surveillance during SG tube inspection                    |
| 50-454/95011        | LER | Increased tube degradation in Unit 1 SGs                         |
| 50-454/96003        | LER | Increased tube degradation in Unit 1 SGs                         |
| 50-454/96005        | LER | Operation of SI accumulators outside design basis                |
| 50-455-97001        | LER | Unit 2 containment drain system clogged due to debris.           |
| 50-454/97005-07     | NCV | Missed surveillance during SG tube inspection                    |
| 50-454/455/95007-03 | VIO | Seismically inadequate scaffolding over safety-related equipment |
| 50-454/455/95008-01 | VIO | 4 examples of TS 3.6.4.1 violations                              |
| 50-454/455/95008-02 | VIO | Apparent violation of TS 6.8.1 and BAP 300-1                     |
| 50-454/455/95008-03 | VIO | Apparent violation of TS 6.8.1 and BOS 0.1-1,2,3                 |
| 50-454/455/95008-04 | EEI | Apparent violation of 10 CFR 50                                  |
| 50-454/455/96010-05 | URI | Protection of safeguards information                             |
| 50-454/455/96004-04 | URI | Cross-tied safety accumulators                                   |
| 50-454/96003-06     | IFI | Overpressure protection device found out of service              |

## LIST OF ACRONYMS USED

|       |                                      |
|-------|--------------------------------------|
| BAP   | Byron Administrative Procedure       |
| BOP   | Byron Operating Procedure            |
| DCP   | Design Change Package                |
| dP    | Differential Pressure                |
| ECCS  | Emergency Core Cooling System        |
| EP    | Emergency Preparedness               |
| FME   | Foreign Material Exclusion           |
| GPM   | Gallons per minute                   |
| HEPA  | High Efficiency Particulate          |
| HLA   | Heightened Level of Awareness        |
| LCO   | Limiting Condition for Operation     |
| LER   | Licensee Event Report                |
| NOV   | Notice of Violation                  |
| OAD   | Operational Analysis Department      |
| PDR   | Public Document Room                 |
| RCFC  | Reactor Containment Fan Coolers      |
| RCS   | Reactor Coolant System               |
| RF    | Containment Floor Drain System       |
| SG    | Steam Generator                      |
| SI    | Safety Injection                     |
| SRO   | Senior Reactor Operator              |
| SSE   | Safe Shutdown Earthquake             |
| TS    | Technical Specification              |
| TSC   | Technical Support Center             |
| UFSAR | Updated Final Safety Analysis Report |
| VBS   | Vehicle Barrier System               |
| WR    | Work Request                         |