

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-454, 50-455

License Nos: NPF-37, NPF-66

Report No: 50-454/97012(DRP); 50-455/97012(DRP)

Licensee: Commonwealth Edison Company

Facility: Byron Generating Station, Units 1 & 2

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

Dates: June 13 through July 24, 1997

Inspectors: S. D. Burgess, Senior Resident Inspector  
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C. K. Thompson, Illinois Department of Nuclear Safety

Approved by: Roger D. Lanksbury, Chief,  
Reactor Projects, Branch 3

EXECUTIVE SUMMARY  
Byron Generating Station, Units 1 & 2  
NRC Inspection Report 50-454/97012, 50-455/97012

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

Operations

- Throughout this inspection period, the operations staff was knowledgeable of plant conditions, responded promptly and appropriately to alarms, and performed thorough turnovers (Section O1.1).
- The inspectors determined that the operations department conservatively declared the fuel handling building filter plenums inoperable until a full operability assessment could be completed by engineering to address revised core peaking factors (Section O1.2).
- The inspectors concluded that licensee management was aware of the amount of overtime worked in the operations department, controlled the overtime appropriately, and was working to reduce the number of hours required by hiring additional staff. Although a significant amount of overtime was worked from January through May 1997, there was no evidence that plant safety was compromised (Section O1.3).
- Beginning in 1997, the licensee began to aggressively track and trend human performance events in the operations department. The inspectors noted that many work control trends had improved, with undesirable trends identified and corrected much earlier than in previous years (Section O8.2). In addition, operations department management communicated human performance expectations when declining trends were noted (Section O1.1).

Maintenance/Surveillance

- Routine maintenance and surveillance activities were well performed (Section M1.1 and M1.2).
- The inspectors identified that Technical Specification (TS) 3.4.3, "Pressurizer," did not require two redundant groups of pressurizer heaters to be operable as specified in the Updated Final Safety Analyses Report (UFSAR). The licensee's corrective action to administratively control the required TS Limiting Condition for Operation (LCO) entry was considered adequate until the station's improved technical specifications were approved by the NRC (Section M1.3).
- Maintenance field monitoring reports and surveillances performed by the site quality verification (SQV) department were thorough and performance based. The SQV report products were beneficial in accurately assessing maintenance performance (Section M7.1).

### Engineering

- The inspectors considered the identification of a potential unreviewed safety question regarding the draft UFSAR reanalysis that increased peaking factor limits, a strength in the performance of engineering reviews (Section E2.1).
- Activities observed by the inspectors to support the steam generator replacement project (SGRP) were well supervised. The mock-up containment wall structure for training workers provided an excellent opportunity for "lessons learned" and was considered a strength. The activities for the on-site transport of the first Unit 1 replacement SG were well planned and executed (Section E2.2).

### Plant Support

- Management attention to improve the process radiation monitoring system resulted in an improving trend in system performance (Section R8.1).
- The inspectors noted that during the replacement SG arrival on site the security force was well coordinated and the searches were complete and thorough (Section S1.1).

## REPORT DETAILS

### Summary of Plant Status

Unit 1 and Unit 2 operated at or near full power during this inspection period.

### I. 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. Operations department management continued to communicate human performance expectations especially when declining trends were noted. Specific events and noteworthy observations are detailed in the sections below.

##### **O1.2 Conservative Operability Determination (71707)**

On July 7, 1997, engineering department personnel identified a potential unreviewed safety question in a draft UFSAR revision. The draft submittal discussed revisions to radiation doses from postulated accidents in the fuel handling building (FHB) due to increasing the peaking factor (discussed further in Section E2.1). Since some of the postulated doses increased, this represented an increase in the consequences of an accident. Until engineering staff could better assess the issue, operations department personnel declared both trains of FHB filter plenums inoperable since the FHB ventilation system would be required to mitigate the consequences of a fuel handling accident. The licensee's original engineering analysis determined that current peaking factor limits and the calculated maximum offsite doses had not changed because the increased peaking factors had not been incorporated into the present core reload design. The inspectors determined that the operations department conservatively declared the FHB filter plenums inoperable until a full operability assessment could be completed by engineering personnel.

##### **O1.3 Overtime Usage (71707)**

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

The inspectors reviewed the licensee's use of overtime for January through May 1997. The inspectors reviewed the UFSAR, NUREG 0737, "Clarification of TMI Action Plan Requirements," Byron Administrative Procedure (BAP) 100-7 "Overtime Guidelines for Personnel," Site Quality Verification (SQV) corrective action record 06-96-026, SQV surveillance 06-97-017, SQV field monitoring report 06-97-04-0073, and randomly selected gate entry records and overtime deviation sheets.

b. Observations and Findings

During discussions with operators and operations management, the inspectors became aware that a significant amount of overtime had been worked by various operators. The licensee stated that the primary reason extra overtime occurred was due to additional (up-grade) training conducted for non-licensed operators and two maintenance outages during February and March 1997. The licensee recently hired additional operators to relieve some of the overtime hours.

The inspectors reviewed the various licensee overtime program evaluations. The licensee monitored the amount of overtime hours worked utilizing BAP 100-7, which required the completion of an overtime deviation form each time an employee's overtime exceeded the limits in procedure guidelines. The licensee's human resources department completed a self-assessment of the actual completion of the deviation forms and the SQV organization periodically audited overtime use. These evaluations identified that a large number of overtime deviations occurred in the operations department. Additionally, SQV noted that although deviation sheets were completed as required, the frequency of these deviations was high. The inspectors considered the SQV audits thorough and insightful.

In addition to the licensee's assessments, the inspectors reviewed overtime deviation forms and a sample of gate entry records. The inspectors did not identify any violations of licensee or NRC requirements. The inspectors did note that many operators averaged approximately 60 hours of work per 7-day period when on shift. The inspectors considered this a significant number of overtime hours but did not observe any plant safety issues related to overtime concerns. The inspectors also reviewed the UFSAR and did not identify any discrepancies.

c. Conclusions

The inspectors concluded that the licensee was aware of the amount of overtime that was worked, controlled the overtime appropriately, and was working to reduce the number of hours required by hiring additional operators. Although a significant amount of overtime was worked during the time period, there was no evidence that plant safety may have been compromised.

08 Miscellaneous Operations Issues (92700 and 92901)

- 08.1 (Closed) LER 50-455/94002: Rod drive 2BD power cabinet urgent failures and subsequent reactor trip during troubleshooting due to a dropped rod control cluster assembly (RCCA). Root cause analyses performed by the licensee indicated that the urgent failures were caused by a bad stationary firing card and the dropped control rod was caused by a failed rack connector socket that carried full current to the stationary regulation card. The licensee replaced the stationary firing card and repaired the rack connector socket. The inspectors reviewed the licensee's corrective actions and considered them effective since there have been no similar events. There was no safety consequences as a result of this event. This issue is closed.

- 08.2 (Closed) IFI 50-454/455-94004-04: Increase in tagout and work control problems. The inspectors reviewed the licensee's investigation and corrective actions in response to the problems noted during the 1994 time-frame. Beginning in 1997, the licensee began to aggressively track and trend human performance events in the operations department. The inspectors noted that many of the work control trends had improved, with declining trends identified and corrected much earlier than in previous years. The inspectors also reviewed recent maintenance evolutions to determine if a problem was still evident and found that while issues with tagouts and work control still existed, the majority were identified prior to work performance. The inspectors also reviewed over 50 SQV field monitoring reports for the past 12 months and found limited examples of tagout or work control issues. Based on the increased management attention to address the issues and the resulting improvements noted, this issue is closed.
- 08.3 (Closed) VIO 50-454/455-95011-01: Failure to accurately record the diesel generator (DG) governor oil level per procedure. The inspectors reviewed the licensee's violation response letter dated February 28, 1996, and the corrective actions taken. Procedure BOP DG-11, "Diesel Generator Startup," was revised to state expected ranges for various required oil levels. The governor lube oil was checked and recorded every 12-hour shift and also before monthly surveillance tests. The frequency of the oil level checks provided assurance that oil level problems would be noted in a timely manner. The inspectors observed numerous routine DG startups where oil level data was collected and recorded as required by procedure. This item is closed.
- 08.4 (Closed) IFI 50-454/455-95003-05: Monitor the licensee's fuel assembly inspection. The licensee identified a leaking fuel assembly during the Unit 2 core off load in February 1995 (B2R05). The reactor coolant system chemistry data indicated the failure was in a highly burned fuel assembly, so ultrasonic inspection (UT) was performed on thrice-burned fuel assemblies discharged from Unit 2 during B2R05. The inspectors reviewed the Fuel Performance Report results and verified that the licensee performed the UT, which identified no failures. The inspectors noted that the licensee continued to take appropriate steps to prevent reloading a leaking fuel assembly as evidenced by the lack of leaking fuel assemblies in either unit. This item is closed.
- 08.5 (Closed) LER 50-455/94003: On September 24, 1994, the "B" train of auxiliary feedwater (AF) automatically actuated while the plant was in Mode 3, Hot Standby. The automatic actuation of AF was due to a failure of the main steam (MS) header pressure controller. The controller failure caused the steam dump valves to open and then rapidly close, causing a transient in steam generator (SG) pressure. The MS pressure transient caused the water level in the 2C SG to drop below the Lo Steam Generator level setpoint, which satisfied the logic to auto start the "B" train of AF. The inspectors verified that the failed controller was replaced, observed that vendor manual precautions were followed during use of the controller, and that the controller was in the calibration program. No new issues were identified in the LER and the event had minimal safety significance. This item is closed.
- 08.6 (Closed) EEI 50-455/97005-01: Inoperable containment floor drain system from October 4, 1996 to March 14, 1997. Based on information the licensee provided to the NRC during a predecisional enforcement conference held on March 14, 1997,

the NRC determined that the subject apparent violation was not substantiated. The details of the conference are documented in a July 22, 1997 letter from the NRC to the licensee. This item is closed.

- 08.7 (Closed) EEI 50-455/97005-02: Failure to identify a significant condition adverse to quality with respect to the plugged containment floor drain system. Based on information the licensee provided to the NRC during a predecisional enforcement conference held on March 14, 1997, the NRC determined that the subject apparent violation was not substantiated. The details of the conference are documented in a July 22, 1997 letter from the NRC to the licensee. This item is closed.
- 08.8 (Closed) EEI 50-455/97005-04: LER 97001 was considered to be incorrect in describing pertinent details of the plugged containment floor drain system. Based on information the licensee provided to the NRC during a predecisional enforcement conference held on March 14, 1997, the NRC determined that the subject apparent violation was not substantiated. The details of the conference are documented in a July 22, 1997 letter from the NRC to the licensee. This item is 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 technical specifications (TS) and the UFSAR for potential issues.

- WR 960075256 Preventive maintenance (PM) on safety injection system crosstie valve 1SI8807A
- WR 960075504 Perform 1 year PM on 2B safety injection pump
- WR 960107018 Erect temporary storage for new SG
- WR 960111939 Install upgrade control system for spent fuel pool bridge crane
- WR 970004081 Remove security barriers to allow passage of new SG
- WR 970028847 Construct mockup containment wall structure for training
- WR 970069134 Recalibrate or replace the 2B DG fuel filter differential pressure switch
- WR 970069136 Troubleshoot and repair 2P DG lube oil temperature switch
- WR 970075256 Perform VOTES testing on 1SI8807A

##### b. Observations and Findings

The inspectors observed 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.

c. Conclusions

The inspectors determined that routine maintenance activities were well performed.

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.

- OBOS 7.7.d.3-1 ECCS Equipment Room Differential Pressure Test
- 1BOS 7.1.2.1.b-2 Diesel Driven Auxiliary Feedwater Pump Quarterly Surveillance
- 1BVS 5.2.f.3-2 ASME Surveillance Requirements for Residual Heat Removal Pump 1RH01PB
- 2BOS 3.2.1-800 ESFAS Instrumentation Slave Relay Surveillance
- 2BOS 8.1.1.2.a-2 2B Diesel Generator Operability Monthly Surveillance
- 2BVS 5.2.F.2-2 ASME Surveillance Requirements for Safety Injection Pump 1SI01PB

b. Observations and Findings

The inspectors noted that proper authorization was routinely obtained from the control room senior reactor operator (SRO) before the start of each surveillance test. Components removed from service as part of the surveillance test were identified prior to commencing the surveillance test 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. Specific noteworthy observations are detailed in the following sections.

M1.3 TS Requirements Failed to Meet Regulatory Requirements (61726)

a. Inspection Scope

During the observation of the Unit 2 engineering safety feature actuation system (ESFAS) instrumentation slave relay surveillance, 2BOS 3.2.1-800, the inspectors noted that the breaker providing engineered safety feature (ESF) power to the "A" train of pressurizer heaters was removed from service. Operating personnel did not enter any TS LCO for the pressurizer. The inspectors also reviewed the regulatory requirements for the pressurizer heaters and discussed the issue with operations and engineering staff.

b. Observations and Findings

At the time the ESF power supply was isolated to both groups of the "A" train pressurizer heaters, the inspectors questioned the licensed operators and the SRO about the applicable TS requirements. The pressurizer has four groups of heaters.



Two groups are powered from one non-vital bus and the other two heater groups are powered from another non-vital bus. Each non-vital bus has the capability to be powered from either one of two Class 1E ESF buses through a cross-tie breaker. Technical Specification 3.4.3 required two groups of pressurizer heaters to be operable. During the surveillance test, two groups of pressurizer heaters were operable but were not powered from redundant supplies. The SRO stated that based on the literal interpretation of the TS, redundant power supplies were not required and any two operable groups satisfied TS 3.4.3 requirements.

The inspectors questioned whether the two heater groups must include redundant power supplies. The inspectors were concerned that in the event of a loss of off-site power (LOOP) and a single failure of the "B" DG concurrent with the performance of this surveillance (with the crosstie breaker out-of-service), power to all pressurizer heaters would be lost. The pressurizer heaters were needed in this situation to ensure that the reactor coolant system remained subcooled for natural circulation core cooling.

The inspectors reviewed the basis for the TS, the UFSAR, the Loss of AC System description by Sargent and Lundy, the Standardized TS, the licensee's emergency procedures, the TS surveillance requirements, and NUREG 0737, "Clarification of TMI Action Plan Requirements." Response E.27 in UFSAR Appendix E, "Requirements Resulting From TMI-2 Accident," stated that one bank (group) of pressurizer heaters from each redundant power supply could be connected to maintain natural circulation after a LOOP. The UFSAR Appendix E response was based on NUREG 0737, Section II.E.3.1, which stated that redundant heater capacity must be provided, and each redundant heater or group of heaters should have access to only one Class 1E division power supply. The subject NUREG further stated that the pressurizer heater changeover from normal offsite power to emergency power was to be accomplished manually from the control room. Based on UFSAR documentation, the inspectors determined that the plant needed two redundant groups of pressurizer heaters available; therefore, TS 3.4.3 did not ensure that requirement was met.

The licensee investigated the issue and agreed with the inspectors that TS 3.4.3 did not correspond with the UFSAR requirement to have redundant pressurizer heater capability. The licensee's corrective actions consisted of revising surveillance procedures 1/2 BOS 3.2.1-800 and 1/2 BOS 4.3.3-1, "Pressurizer Heaters 18-Month Surveillance," to require entry into a 72-hour LCO when the surveillances were performed. An operations daily order and a training request were written to provide complete information on the issue to licensed operations staff.

Since the licensee had already submitted Improved Technical Specifications (ITS) to the NRC, the licensee determined that an amendment to the ITS would need to be submitted. After discussing the matter with the Office of Nuclear Reactor Regulation (NRR), the inspectors determined that the licensee would not be required to submit a TS amendment for the current TS since their ITS submittal was scheduled to be approved in early 1998 and the administrative corrective actions were considered adequate to control the redundant power requirements for the pressurizer heaters in the interim. The licensee had not completed a 10 CFR 50.59

evaluation for this issue at the completion of this inspection. This is considered an inspector followup item (50-454/455-97012-01(DRP)) pending review of the 50.59 evaluation by the inspectors.

c. Conclusion

The inspectors identified that TS 3.4.3, "Pressurizer," did not meet the requirements for two redundant groups of pressurizer heaters to be operable as specified in the UFSAR. The licensee's corrective action to administratively control the required TS LCO entry was considered adequate until the station's ITS were approved by the NRC. The inspectors' review of the licensee's 10 CFR 50.59 evaluation is an inspector followup item.

**M7 Quality Assurance in Maintenance Activities**

**M7.1 Field Monitoring Reports and Surveillance Reviews (62707)**

The inspectors reviewed approximately 50 field monitoring reports on various maintenance activities and a process radiation (PR) monitoring system surveillance as described in Sections O8.2 and R8.1. Overall, the reports were very thorough and performance based. The inspectors considered the SQV report products beneficial in accurately assessing maintenance performance.

**M8 Miscellaneous Maintenance Issues (92700 and 92902)**

**M8.1 (Closed) URI 50-454/455-95003-06:** Second verification for jumpers and lifted leads during the performance of engineering surveillances. The licensee's administrative procedures did not require the use of independent verification on installing and removing jumpers and lifted leads during the performance of engineering surveillances. However, based on the inspectors' concern, independent verification steps were inserted into numerous surveillance procedures. The inspectors reviewed a sample of surveillance procedures and verified that the additional steps were added where appropriate. During the performance of monthly engineering surveillances, the inspectors routinely observed the second verification of installing and removing jumpers and lifted leads. This item is closed.

**M8.2 (Closed) LER 50-454/94009:** Two reactor trips occurred on Unit 1 during a controlled shutdown. The plant was shut down to begin B1R06 refueling outage. The first reactor trip occurred while the plant was at 10% reactor power and was due to a failed circuit card in the solid state protection system (SSPS). The second trip occurred while the plant was in hot standby about 12 hours after the first reactor trip. The second trip was caused by high flux on source range N31 due to pulling fuses that generated a reactor trip signal. The individuals involved assumed that since the detector for source range N31 was de-energized and SSPS was in test, pulling the fuses would have no impact on the plant. The inspectors determined that the second reactor trip was caused by personnel error. However, based on this event, the licensee identified that the same trip scenario could occur during the SSPS bimonthly surveillance test. The surveillance procedures were revised to place the source range instrument channel in bypass instead of pulling fuses. The inspectors verified that the implemented corrective actions were adequate. This item is closed.

### III. Engineering

#### E2 Engineering Support of Facilities and Equipment

##### E2.1 Identification of a Potential Unreviewed Safety Question (37551)

###### a. Inspection Scope

The inspectors reviewed the licensee's 10 CFR 50.59 safety evaluation regarding revisions to doses from postulated accidents in the FHB and corrective actions to a problem identification form (PIF) that documented the finding. The inspectors also discussed the issue with site engineering personnel.

###### b. Observations and Findings

Nuclear Fuels Services (NFS) initiated a UFSAR change associated with a draft UFSAR reanalysis for increased peaking factor limits. The increased peaking factor limits could be used to increase operating margin or allow development of more efficient core reload designs. The draft submittal discussed revisions to doses from postulated accidents in the FHB due to increasing the peaking factor.

Engineering department personnel reviewed the draft UFSAR change prepared by NFS that included revisions to the offsite doses from postulated accidents in the FHB. Some of the doses had increased, which represented an increase in the consequences of an accident and constituted a potential unreviewed safety question. Consequently, NRC approval would be required before the activity could be implemented. Nuclear Fuels Services had not identified the potential unreviewed safety question in the original analysis. Based on an engineering analysis, the licensee determined that the current peaking factor limits and the calculated maximum offsite doses had not changed because the increased peaking factors had not been incorporated into the present core reload design.

###### c. Conclusions

The inspectors considered the identification of a potential unreviewed safety question regarding the draft UFSAR reanalysis that increased peaking factor limits, a strength in the performance of engineering reviews.

##### E2.2 Steam Generator Replacement Project (SGRP) (37551)

###### a. Inspection Scope

The inspectors observed numerous activities associated with the SGRP including construction of the mock-up containment wall structure for training on cutting the containment for SG placement into the containment, construction of temporary buildings to house the new SGs, construction of a permanent building to store the old SGs, and the arrival of the first replacement SG on site via railway. The inspectors also reviewed the licensee's progress in preparing for the Unit 1 SGRP during the Unit 1 refuel outage scheduled for November 1997.

b. Observations and Findings

During the arrival of the first replacement SG on site, the inspectors noted excellent coordination between plant security and SGRP personnel. In order to bring the SG into the site, the security fence had to be removed with security personnel stationed at the openings. The security aspects of the SG arrival is discussed further in Section S1.1. The SG arrived on site without incident. The inspectors considered the coordination and oversight of the on-site transport of the first Unit 1 replacement SG to be a strength.

c. Conclusions

Activities observed by the inspectors to support the SGRP were well supervised. The mock-up containment wall structure for training workers provided an excellent opportunity for "lessons learned" and was considered a strength. The activities for the on-site transport of the first Unit 1 replacement SG were well planned and executed.

**E8 Miscellaneous Engineering Issues (92700 and 92903)**

- E8.1 (Closed) LER 50-454/94003, LER 50-454/94003-01: AF isolation valve exposure to potentially harsh environment due to flood seal removal. The design bases of the flood seal opening located between the main steam tunnel and the AF tunnel was questioned since these flood seal openings have occasionally been removed during operation to allow access to the AF tunnel. The licensee performed analyses and evaluations and demonstrated that essential AF equipment in the tunnel would be capable of providing adequate AF flow when exposed to a high energy line break (HELB) with flooding conditions. These evaluations and analyses also considered the effects of a HELB or flooding on other safety-related cables (other than AF) routed through the AF tunnel. Based upon these evaluations, the inspectors concluded that the capability of AF to deliver flow to the steam generators and the safety function of other systems with cables routed through the AF tunnel following a HELB or flood was not adversely affected by removal of the AF tunnel flood seals. However, the licensee stated that the TS LCO of 4 hours would continue to be entered anytime the flood seals were removed. These items are closed.
- E8.2 (Closed) VIO 50-454/455-94011-01: The AF tunnel watertight closures were not maintained sealed as designed to ensure that equipment was not exposed to the effects of flooding or HELB. As described in Section E8.1, the licensee's analysis demonstrated that the safety function of other systems with cables routed through the AF tunnel following a HELB or flood was not adversely affected by removal of the AF tunnel flood seals. However, the licensee stated that the TS LCO of 4 hours would continue to be entered anytime the flood seals were removed. This item is closed.
- E8.3 (Closed) LER 50-454/94006: Fuel assembly located in wrong region of spent fuel pool (SFP). On July 15, 1994, system engineering personnel identified that fuel assembly U38J was incorrectly located in Region 2 of the SFP and not in a checkerboarded configuration. The fuel assembly did not meet the burnup requirements in TS 5.6.1.1.b.2. This condition was caused by inadequate

verification of fuel assembly moves. This issue was previously discussed in NRC Inspection Report 50-454/455/94015, was identified and corrected by the licensee, and had minimal safety significance. This LER is closed.

- E8.4 (Closed) LER 50-454/96008: Fuel assemblies located in incorrect region of SFP. On May 28, 1996, nuclear engineers confirmed that fuel assemblies F37E, F44E, and G67F were residing in Region 2 of the SFP without meeting the requirements of TS 5.6.1.1.b.2. The assemblies did not meet the minimum burnup requirements, nor were they in a checkerboard configuration. The assemblies were moved to Region 2 on August 18, 1993, when NFS determined that minimum burnup requirements were met. On January 20, 1995, the licensee received a TS license amendment from the NRC that changed the minimum burnup requirements for Region 2. Once the TS amendment was implemented, the licensee performed a review of incumbent fuel assemblies and their eligibility for Region 2 storage with the new minimum burnup, but missed these three fuel assemblies due to inaccurate information in a computer program. The licensee's subsequent review identified the problem and the three fuel assemblies were moved to Region 1 of the SFP. The inspectors determined that this event was not a repeat of the event described in LER 50-454/94006, due to a 1993 computer error versus inadequate engineering department peer checks. The inspectors reviewed the licensee's corrective actions, which included a verification of the computer information for fuel assembly burnup and location requirements, and had no concerns. This issue had minimal safety significance since the UFSAR analysis bounded the misplaced assembly. This item is closed.
- E8.5 (Open) URI 50-454/455-94025-03: Environmental qualification (EQ) of Okonite tape splices under local submergence due to a HELB accident. This item was opened based on a Braidwood finding that also applied to Byron. The licensee for Braidwood submitted documentation that supported the acceptance of Okonite tape splices to the NRC and a safety evaluation report (SER) accepting the EQ Okonite tape splices was written. The licensee for Byron station plans to submit similar documentation to the NRC for review and possible SER issuance. Until documentation is submitted and reviewed by the NRC regarding the EQ acceptability of Okonite tape splices, this item remains open.
- E8.6 (Closed) URI 50-454/455-95007-06: Review the licensee's operational evaluation regarding missing DG lube oil system expansion joint limiter rods. The purpose of the threaded rods is to limit the thrust load on the discharge piping downstream of the expansion bellows that is caused by startup of the lube oil pump and seismic accelerations of the piping. The licensee's engineering group made an immediate determination that the DGs were operable even with the missing expansion limiter rods because the piping stress values were within the ASME Section III, Appendix F allowables. The licensee manufactured and installed the required limiter rods the day after the discrepancy was identified. The inspectors reviewed the licensee's calculation in operability assessment 95-013. The analysis concluded that the lube oil piping system on the DGs was qualified for all postulated operating conditions, including a safe shutdown earthquake, without the limiter rods installed. The licensee determined that the limiter rods may have been mistakenly considered to be shipping or packing items and were removed during original DG installation. The inspectors had no concerns with the licensee's calculation or the root cause determination for this issue. This item is closed.

- E8.7 (Closed) IFI 50-454/455-95009-03: Non-conservative refueling water storage tank (RWST) switchover calculations. During a loss of coolant accident, the emergency core cooling system (ECCS) pumps water into the core from the RWST. Before the RWST is depleted, the ECCS pumps' suction is switched to the containment recirculation sump. The licensee's original switchover calculation erroneously assumed that the entire RWST volume was emptied to the containment when the actual ECCS pumps' suction switchover begins at an RWST level of 46% and not 0%. The licensee's original calculation concluded that sufficient net positive suction head was available based on an assumption that the volume of water in the containment would be greater than actually would exist during post-accident conditions. The inspectors reviewed the calculations that were re-performed by the licensee and concurred that sufficient net positive suction head existed for the ECCS pumps when the RWST switchover occurred. This item is closed.

#### IV. Plant Support

##### R8 Miscellaneous Radiation Protection Issues (92904)

- R8.1 (Closed) IFI 50-454/455-94009-01: Review of PR monitoring system malfunctions and corrective actions. The inspectors reviewed the licensee's corrective actions to improve PR system reliability. The inspectors also reviewed SQV surveillance QAS 06-97-015 completed on June 30, 1997, that assessed the adequacy of maintenance, setpoint control, compensatory actions, and PR system overview. Equipment improvements consisted of accelerated expenditure projects that replaced PR skid pumps with newer style pumps. All new sample pumps have performed very well since installation. The inspectors agreed with the SQV surveillance that based on preventive and corrective maintenance performed since 1994, the trend in PR system performance had improved. This item is closed.

##### S1 Conduct of Security and Safeguards Activities (71750)

###### S1.1 Replacement SG Arrival

On July 15, 1997, the first Unit 1 replacement SG arrived on site via railway. The inspectors observed the security force process the train into the protected area. Observations included the removal of security barriers and implementation of compensatory measures, searching both the train and the train crew, temporary badge issue for the train crew, and posting a guard until complete inspections could be accomplished. The inspectors noted that the security force activities were well coordinated and that the searches were complete and thorough. The inspectors concluded that the arrival of the first replacement SG was well planned.

## 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 July 24, 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, Byron Station Manager  
J. Bauer, Health Physics Supervisor  
D. Brindle, Regulatory Assurance Supervisor  
E. Campbell, Maintenance Superintendent  
J. Fiemster, Mechanical Lead Engineering Supervisor  
R. Freidel, Primary Group System Engineering Lead  
T. Gierich, Operations Manager  
B. Israel, Site Quality Verification Supervisor  
P. Johnson, Engineering Superintendent  
K. Kovar, Nuclear Group System Engineering Lead  
B. Moravec, SGRP Lead  
T. Schuster, Manager of Quality & Safety Assessment  
M. Snow, Work Control Superintendent  
D. Wozniak, Engineering Manager

### INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering  
IP 61726: Surveillance Observations  
IP 62707: Maintenance Observations  
IP 71707: Plant Operations  
IP 71750: Plant Support  
IP 92700: Onsite Follow-up of Written Reports of Nonroutine Events at Power Reactor Facilities  
IP 92901: Followup - Plant Operations  
IP 92902: Followup - Maintenance  
IP 92903: Followup - Engineering  
IP 92904: Followup - Plant Support



## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

50-454/455-97012-01      IFI      Review of licensee's 10 CFR 50.59 evaluation regarding TS 3.4.3.

### Closed

50-455/94002              LER      Rod drive 2BD power cabinet urgent failures and subsequent reactor trip.

50-454/94009              LER      Two reactor trips occurred on Unit 1 during a controlled shutdown.

50-454/94003              LER      AF isolation valve exposure to potentially harsh environment due to flood seal removal.

50-454/94003-01          LER      AF isolation valve exposure to potentially harsh environment due to flood seal removal.

50-454/94006              LER      Fuel assembly located in wrong region of SFP.

50-454/96008              LER      Fuel assemblies located in incorrect region of SFP.

50-455/94003              LER      Automatic actuation of AF.

50-454/455-94004-04      IFI      Increase in tagout and work control problems.

50-454/455-95003-05      IFI      Monitor the licensee's fuel assembly inspection.

50-454/455-95009-03      IFI      Non-conservative refueling water storage tank (RWST) switchover calculations.

50-454/455-94009-01      IFI      Review of PR monitoring system malfunctions and corrective actions.

50-454/455-95011-01      VIO      Failure to accurately record DG governor oil levels.

50-454/455-94011-01      VIO      The AF tunnel watertight closures were not maintained sealed as designed to ensure that equipment was not exposed to the effects of flooding or HELB.

50-454/455-95003-06      URI      Second verification for jumpers and lifted leads during the performance of engineering surveillances.

50-454/455-95007-06      URI      Review the licensee's operational evaluation regarding missing DG lube oil system expansion joint limiter rods.

50-455/97005-01            EEI      Inoperable containment floor drain system from October 4, 1996 to March 14, 1997.

50-455/97005-02            EEI      Failure to identify a significant condition adverse to quality with respect to the plugged containment floor drain system.

50-455/97005-04            EEI      LER 97001 was considered incorrect in describing pertinent details of the plugged containment floor drain system.

### Discussed

50-454/455-94025-03      URI      EQ of Okonite tape splices under local submergence due to HELB accident.

## LIST OF ACRONYMS USED

AF	Auxiliary Feedwater System
BAP	Byron Administrative Procedure
BOP	Byron Operating Procedure
BOS	Byron Operating Surveillance
BVS	Byron Engineering Surveillance
DG	Diesel Generator
ECCS	Emergency Core Cooling System
EQ	Environmental Qualification
ESF	Engineered Safety Feature
ESFAS	Engineered Safety Feature Actuation System
FHB	Fuel Handling Building
HELB	High Energy Line Break
ITS	Improved Technical Specifications
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LOOP	Loss of Off-Site Power
MS	Main Steam System
NFS	Nuclear Fuels Services
NRR	Nuclear Reactor Regulation
PDR	Public Document Room
PIF	Problem Identification Form
PM	Preventive Maintenance
PR	Process Radiation Monitoring System
RCCA	Rod Control Cluster Assembly
RWST	Refueling Water Storage Tank
SER	Safety Evaluation Report
SFP	Spent Fuel Pool
SG	Steam Generator
SGRP	Steam Generator Replacement Project
SQV	Site Quality Verification
SRO	Senior Reactor Operator
SSPS	Solid State Protection System
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
WR	Work Request