

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-454/92006(DRP); 50-455/92006(DRP)

Docket Nos. 50-454; 50-455

License Nos. NPF-37; NPF-66

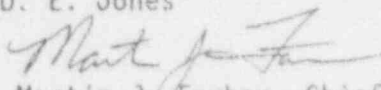
Licensee: Commonwealth Edison Company  
Opus West III  
1400 Opus Place  
Downers Grove, IL 60515

Facility Name: Byron Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: February 19 through March 23, 1992

Inspectors: W. J. Kropp  
C. H. Brown  
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Approved By:  Martin J. Farber, Chief  
Reactor Projects Section 1A

3/27/92  
Date

Inspection Summary

Inspection from February 19 through March 23, 1992 (Report Nos. 454/92006(DRP); 50-455/92006(DRP)).

Areas Inspected: Routine, unannounced safety inspection by the resident and region-based inspectors of operational safety verification, engineered safety feature systems, current material condition, housekeeping and plant cleanliness, radiological controls, security, LER follow-up, Temporary Instruction - Reliable Decay Heat Removal During Outages, shutdown risk assessment, maintenance activities, surveillance activities, engineering and technical support, and refueling activities.

Results: In the thirteen areas inspected, no violations and three unresolved items pertaining to restoration of a high head injection valve (4.b.1), replacement of pressure transmitter (4.b.2), and containment hydrogen monitoring (4.b.3) were identified. The following is a summary of the licensee's performance during this inspection.

Plant Operations

The licensee continues to operate the plant in a good manner with good communications exhibited between the operators and other plant personnel during the outage. The discussion of outage activities by the Outage Coordinator, including potential high risk activities, allowed for a

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consistent approach to identifying those activities that require shift briefings. The discussion also provided an effective communication channel between shift personnel and management in regards to expectations during outage activities.

#### Safety Assessment/Quality Verification

The licensee's performance in this area was considered excellent. The qualitative assessment of shutdown risk by the Onsite Nuclear Safety Group was considered good. Also, the controls established to minimize shutdown risk during outage activities, such as the Outage Coordinator's daily risk assessment shared with shift personnel and the plant's contingency plans for a stuck fuel assembly, were considered excellent.

#### Maintenance and Surveillance

Performance in the maintenance area was considered good overall with one problem identified that pertained to the inadvertent capping of the discharge piping of a hydrogen monitor. However, performance in the surveillance area was not considered commensurate with performance observed during other inspection periods. The activities that pertained to the restoration of a high head injection valve, the replacement of a pressure transmitter, and the inservice testing of a check valve in the hydrogen monitor system, even though not of safety significance by themselves, were considered not indicative of past performance. The inspectors considered the licensee's performance in the surveillance area as mixed.

#### Engineering and Technical Support

The Onsite Review that pertained to an issue regarding the possibility of nonconservative input assumptions for the boron dilution analysis was considered thorough and timely. The inspectors have noted continued progress in the area of Onsite Reviews over several inspection periods. The inspectors considered the licensee's performance as good. The area of engineering and technical support will continue to be monitored by the inspectors to assess the effectiveness of the licensee's actions to sustain continued good performance.

## DETAILS

### 1. Persons Contacted

#### Commonwealth Edison Company (CECo)

- \* R. Pleniewicz, Station Manager
- \* K. Schwartz, Production Superintendent
- \* M. Burgess, Technical Superintendent
- \* J. Kudalis, Services Director
- \* T. Higgins, Assistant Superintendent Operations
- \* T. Gierich, Assistant Superintendent Work Planning
- \* T. Tulon, Assistant Superintendent Maintenance
- \* P. Johnson, Technical Staff Supervisor
- \* D. Johnson, Master, Instrumentation Maintenance
- \* E. Falb, Master, Electrical Maintenance
- \* E. Cremmens, Master, Mechanical Maintenance
- \* E. Zittle, Regulatory Assurance NRC Coordinator

\* Denotes those attending the exit interview conducted on March 23, 1992.

The inspectors also had discussions with other licensee employees, including members of the technical and engineering staffs, reactor and auxiliary operators, shift engineers and foremen, electrical, mechanical and instrument maintenance personnel, and contract security personnel.

### 2. Plant Operations

Unit 1 operated at power levels up to 100% in the load following mode since January 30, 1992.

Unit 2 operated at power levels commensurate with coastdown limits until the unit was shut down for a scheduled 60 day refueling outage on February 28, 1992.

#### a. Operational Safety Verification (71707)

The inspectors verified that the facility was being operated in conformance with the licenses and regulatory requirements, and that the licensee's management control system was effectively carrying out its responsibilities for safe operation.

On a sampling basis the inspectors verified proper control room staffing and coordination of plant activities; verified operator adherence with procedures and technical specifications; monitored control room indications for abnormalities; verified that electrical power was available; and observed the frequency of plant and control room visits by station management.

Shift briefings continue to be thorough with the Outage Coordinators discussing outage activities planned for the shift, including those activities which required special preparation, precaution or control.

b. Engineered Safety Feature (ESF) Systems (71710)

During the inspection, the inspectors selected accessible portions of several ESF systems to verify status. Consideration was given to the plant mode, applicable Technical Specifications, Limiting Conditions for Operation Action Requirements (LCOARs), and other applicable requirements.

Various observations, where applicable, were made of hangers and supports; housekeeping; whether freeze protection, if required, was installed and operational; valve position and conditions; potential ignition sources; major component labeling, lubrication, cooling, etc.; whether instrumentation was properly installed and functioning and significant process parameter values were consistent with expected values; whether instrumentation was calibrated; whether necessary support systems were operational; and whether locally and remotely indicated breaker and valve positions agreed.

During the inspection, the accessible portions of the following ESF systems were walked down:

1

Critical and Volume Control System, Train A

Unit 2

Residual Heat Removal Train B

c. Current Material Condition (71707)

The inspectors performed general plant as well as selected system and component walkdowns to assess the general and specific material condition of the plant, to verify that Nuclear Work Requests (NWRs) had been initiated for identified equipment problems, and to evaluate housekeeping. Walkdowns included an assessment of the buildings, components, and systems for proper identification and tagging, accessibility, fire and security door integrity, scaffolding, radiological controls, and any unusual conditions. Unusual conditions included but were not limited to water, oil, or other liquids on the floor or equipment; indications of leakage through ceiling, walls or floors; loose insulation; corrosion; excessive noise; unusual temperatures; and abnormal ventilation and lighting. Material condition was considered good for Unit 1 with the main control annunciator boards being dark for most of the inspection period. Unit 2



material condition was considered good at the time the unit was shutdown on February 28, 1992 for a scheduled refueling outage.

d. Housekeeping and Plant Cleanliness

The inspectors monitored the status of housekeeping and plant cleanliness for fire protection and protection of safety-related equipment from intrusion of foreign matter. Housekeeping was considered satisfactory overall in the Unit 2 containment with the rest of the plant being considered good. The licensee has emphasized the importance of preventing foreign material from entering the reactor coolant system in meetings with station personnel prior to the Unit 2 outage.

e. Radiological Controls (71707)

The inspectors verified that personnel were following health physics procedures for dosimetry, protective clothing, frisking, and posting, and randomly examined radiation protection instrumentation for use, operability, and calibration.

f. Security

Each week during routine activities or tours, the inspectors monitored the licensee's security program to ensure that observed actions were being implemented according to the approved security plan. The inspectors noted that persons within the protected area displayed proper photo-identification badges and those individuals requiring escorts were properly escorted. The inspectors also verified that checked vital areas were locked and alarmed. Additionally, the inspectors also observed that personnel and packages entering the protected area were searched by appropriate equipment or by hand.

No violations or deviations were identified.

3. Safety Assessment/Quality Verification (40500, 90712, 92700)

a. Licensee Event Report (LER) Follow-up (90712, 92700)

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, that immediate corrective action was accomplished, and that corrective action to prevent recurrence had been or would be accomplished in accordance with Technical Specifications (TS):

(Closed) 454/91006-LL: Testing of the 4160 Volt Engineered Safety Feature Bus Undervoltage Relay Circuits was inadequate. This problem had been identified at another licensee's nuclear

facility. The licensee implemented appropriate testing of the circuits.

(Closed) 454/92001-11: Unit 1 reactor trip when the anti-motoring circuit actuated due to a wrong valve being closed during maintenance activities. The wrong valve was closed due to a labeling error on two valves. The valves had been mislabeled since construction. The licensee replaced the tag and walked down Unit 2 and found the identical mistake. One valve was immediately corrected; the other was inaccessible when the turbine was operating and was placed on the licensee's action tracking system.

In addition to the foregoing, the inspector reviewed the licensee's Deviation Reports (DVRs) generated during the inspection period. This was done in an effort to monitor the conditions related to plant or personnel performance, potential trends, etc. DVRs were also reviewed to ensure that they were generated appropriately and dispositioned in a manner consistent with the applicable procedures and the QA manual.

b. (Closed) Temporary Instruction - Reliable Decay Heat Removal During Outages (TI 2515/113)

The inspectors reviewed and monitored the licensee's activities during the present Unit 2 refueling outage to assess the effectiveness of actions to ensure reliable decay heat removal. Previous inspection reports 454/92002; 455/92002 documented the inspectors' review of the licensee's program for ensuring reliable decay heat removal. The inspectors have concluded that the actions the licensee has established were effective. This conclusion on the effectiveness of implementation was based on review (described in the following paragraph (3.c) of this report) of the licensee's action.

c. Shutdown Risk Assessment

The inspectors reviewed the licensee's shutdown risk qualitative assessment for the Unit 2 refueling outage (B2R03) that commenced on February 28, 1992. The assessment was performed by the Onsite Nuclear Safety Group (ONSG) and assessed seven areas of risk. The areas were 1) Loss of Shutdown Cooling; 2) Loss of RCS Inventory; 3) Reactivity Control/Shutdown Margin; 4) Loss of Fuel Pool Cooling; 5) Loss of Offsite Power; 6) Loss of Fuel Pool/Reactor Cavity Inventory and 7) Fuel Handling Problems. The assessment included a review of industry experience and a review of existing controls for the 345 kV switchyard. Because of the damage done to the upper internals during the last Unit 2 refueling outage, the ONSG also reviewed the potential for a stuck fuel assembly.

The inspectors had one comment that pertained to assessing shutdown activities which could have a risk factor for the

operating Unit 1. Since the design basis for Byron includes some features of both units, such as the availability of one unit's "A" emergency diesel generator for the other unit's motor driven auxiliary feedwater pump; the assessment should address those outage activities that could affect an operating unit. The licensee stated that the assessment did consider those activities, however, some part of the assessment was not documented. The licensee stated that future qualitative shutdown risk assessments would include documenting the results of assessing outage activities which could affect the operating unit. Overall, the inspectors considered the shutdown risk assessment as good.

The licensee has initiated other actions to address shutdown risks. These actions include assigning on the three day outage schedule a risk number to each activity. The numbers assigned were 1 through 4 with a 1 indicating a higher shutdown risk. Also, the licensee has initiated a Outage Coordinator Turnover Sheet that identified work in progress; work pending; LCOARs; methods available for maintaining Reactor Coolant inventory and decay heat removal, and priorities. This turnover sheet included a three day risk assessment evaluation that included a list of activities for each of the three days and those activities which required a briefing prior to initiation of the activity. The turnover sheet is completed by the Outage Coordinator for each shift. The use of the turnover sheet provides for a consistent approach in risk assessment and in the identification of those activities which require shift briefings. The inspectors also noted that during shift briefings in the control room, the Outage Coordinator would discuss the significant aspects of the shutdown risk assessment identified on the turnover sheet. The inspectors considered the licensee's shutdown risk program as an effective tool in reducing risk during outage activities. Discussions with the licensee determined that the shutdown risk program will be evaluated after the present Unit 2 outage and administrative procedures will be written to formally establish the program.

No violations or deviations were identified.

4. Maintenance/Surveillance (62703 & 61726)

a. Maintenance Activities (62703)

Routinely, station maintenance activities were observed and/or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with technical specifications.

The following items were also considered during this review: approvals were obtained prior to initiating the work; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were

maintained; and activities were accomplished by qualified personnel.

Portions of the following maintenance activities were observed or reviewed:

- B66328, 1B SX Pump Mechanical Seal Replacement
- B82052, 2SX002B Check Valve Inspection
- B85936, Pressurizer Pressure Transmitter Installation
- B88835, Installation of Tygon Tube & Ball Valve
- B88836, Installation of Tygon Tube & Ball Valve
- B91666, 1FI-SX042 Gauge Calibration

During the review of work activities for Nuclear Work Requests (NWRs) B88835 and B88836, the inspectors noted that the work packages were not at the work site. The NWRs pertained to the installation of a ball valve and tygon tubing in the residual heat removal system. Although the NWRs were not at the work site, the work did not appear to be adversely affected. Discussions with the foreman determined that the necessary information to perform the activities was obtained from the NWRs and written on paper which was then taken into the potentially contaminated work area. Discussions with the licensee revealed that station procedures do not address the presence of work packages at the immediate work area. Nuclear Station Work Procedure, NSWP-G-01, Revision 3, "Preparation and Processing of Work Packages" states that when the work site is radioactively contaminated or potentially contaminated, documentation may be kept at or near the access point to the area. NSWP-G-01 further states that the Maintenance Supervisor determines which drawings or work instructions are needed at the contaminated work location. The licensee plans to revise the appropriate administrative procedures to establish criteria for the control of NWRs for maintenance activities performed in contaminated areas. The inspectors will continue to monitor this concern as an Unresolved Item (455/92-002-03).

b. Surveillance Activities (61726)

During the inspection period, the inspectors observed Technical Specification required surveillance testing and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that results conformed with technical specifications and procedure requirements and were reviewed, and that any deficiencies identified during the testing were properly resolved.

The inspectors also witnessed or reviewed portions of the following surveillances:

- 1BVS 5.2.F.2-1, "ASME Surveillance Requirements for Safety Injection Pump 1S101PA"
- 1BVS 6.4.1-003, "Functional Test of H2 Analyzer"



- 1BVS 6.4.1-200, " Cal of H2 Containment Monitoring Analyzer"
- 2BHS DG-1, "2A or 2B Generator 18 Month Electrical Inspection"
- 2BIS 3.1.1-206, " Surveillance Calibration of Pressurizer Pressure Protection Channel I (Loop 455)"
- 2BOS 3.2.1.1.a-1, " Train A Manual Safety Injection Initiation and Manual Phase A Initiation Surveillance"

During this inspection period several surveillance issues were identified by the licensee's staff and the inspectors. The following issues were reviewed by the inspectors:

1) Restoration of High Head Injection Valve

On March 3, 1992, the licensee attempted to place the Volume Control Tank on a float through the high head injection valve, 2SI8801A. The valve would not open. Investigation by the licensee determined that on March 1, 1992, after completion of surveillance, 2BOS 3.2.1.1.a-1, " Train A Manual Safety Injection Initiation and Manual Phase A Initiation Surveillance", restoration of thermal overloads on the thermal overload block for valve 2SI8801A as required by the surveillance procedure was initiated. The removal of the thermal overloads had been required by the surveillance procedure to prevent stroking of valve 2SI 8801A. Verification that valve 2SI8801A would have opened was accomplished by verifying the open contactor was energized. While removing the screws from the thermal overload block to replace the thermal overloads one of the screws was inadvertently released from the locking screwdriver and became lodged in the middle compartment of the thermal overload block. To retrieve the screw, the thermal overload block had to be tilted. In order to tilt the block, the electrician performing the work lifted the forward contactor lugs and the reverse contactor lugs from the block. The block was then tilted and the screw removed. The electrician remounted the block and the leads were reconnected, but the forward contactor leads were not relanded. An operator independently verified the thermal overloads were installed but did not notice the forward contactor leads were lifted. The electrician did not initiate the appropriate documentation for performing the work outside the scope of surveillance procedure 2BOS 3.2.1.1.a-1. This matter is considered an Unresolved Item pending further NRC review (455/92006-01 (DRP)).

2) Replacement of Pressure Transmitter

While witnessing the replacement of a pressurizer pressure transmitter (loop 455) in accordance with surveillance procedure 2 BIS 3.1.1-206, the inspector noted that cap screws for a clamp on a Unistrut used to support a conduit feed to the transmitter had been loosened. The inspectors did not find any reference in the surveillance procedure or the Nuclear Work Request (NWR) B85936 to the loosening and/or removal of the Unistrut clamp during the replacement of the transmitter. Further discussion with the maintenance department determined that there were torquing requirements for the cap screws for the clamp. The inspectors determined that the surveillance procedure, 2BIS 3.1.1-206, had been recently revised to include the new option of replacing transmitters by disconnecting the conduit feeds to the transmitter. The previous method of replacement using a Raychem splice was still addressed in the procedure. The inspectors were concerned that the loosening of the clamp on the Unistrut, which was not addressed in the surveillance procedure or NWR, was performed without the restoration requirements for torquing the cap screws. Pending further review by the NRC and the licensee, this matter is considered an Unresolved Item (455/92006-02 (DRP)). To facilitate a timely closure of this item, a written response is requested that addresses the results of the licensee's review with particular emphasis on work performed not addressed by station documents, such as, NWRs or surveillance procedures.

3) Containment Hydrogen Monitoring

On February 19, 1992, the licensee discovered while troubleshooting Train A of the hydrogen monitoring (HM) system that there was a pipe cap on the HM discharge line in the containment. The pipe cap appeared to have been inadvertently installed during the last Unit 1 refueling outage on November 2, 1991 when NWR B88930 was issued to install a pipe cap on a test connection for Train A of the HM downstream of valve, 1PS234A. Valve 1PS234A was located in containment and was used to perform local leak rate testing. Since a pipe cap with a hole was also required on the Train A Hydrogen Monitor discharge pipe in containment, the licensee believes that the pipe cap designated for installation on the test connection, per NWR B88930, was mistakenly placed on the HM discharge pipe. The licensee's initial review indicated that there was still flow through the HM

between November 2, 1991 and February 19, 1992 due to a leak that developed between the flow meter used to adjust HM flow and the discharge line which was capped. The flow through the HM had been adjusted to the required 3 SCFH. The location of the leak allowed the sample flow of 3 SCFH from the containment to the analyzer to occur, thus maintaining operability of Train A of the HM system. The sampling of the containment occurred on a shiftly basis when operators were required by Technical Specifications (TS) to perform a channel check of the HM system. The sample was taken for approximately twenty minutes three times a day which corresponds to 3 SCFH of containment atmosphere a day that was released to the auxiliary building. The licensee reviewed the impact of sampling containment and then discharging an unmonitored sample through the leak path into the auxiliary building. This leak path would exist under accident conditions and during the shiftly channel checks when the operators placed the HM system on line by opening the suction isolation valves and the discharge isolation valve. During a loss of coolant accident the suction and discharge valves would automatically close upon actuation of the safety injection phase "A" containment isolation signal. The licensee determined that the size of the leak path was still within the allowable leak rate.

During a review of surveillance procedure IBIS 6.4.1-003, the inspectors noted that the procedure, in addition to the functional test of the HM, also verified the operability of containment isolation check valve 1PS231A located in the discharge line in accordance with the IST program and TS. The check valve, 1PS231A, was determined operable if flow through the HM system was noted as 3 SCFH on the HM installed flow meter. Since the discharge line was capped and the leak in the HM system was upstream of the check valve, there was no flow through the check valve between November 2, 1991 and February 19, 1992 when the cap was discovered on the discharge line. Therefore the performance of surveillance IBIS 6.4.1-003 was not verifying operability of check valve 1PS231A whenever the surveillance was performed between November 2, 1992 and February 19, 1992. Surveillance IBIS 6.4.1-003 was performed monthly with the TS and IST program requiring verification of operability of check valve, 1PS231A, on a minimum frequency of every quarter. With the pipe cap inadvertently placed on the discharge line of Train A of the HM system on November 2, 1991, the last time surveillance IBIS 6.4.1-003 was performed without the

pipe cap installed was November 1, 1991. Subsequent to discovering the pipe cap on the discharge line, the licensee performed surveillance 1BIS 6.4.1-003 after the pipe cap was removed. The performance of this surveillance adequately verified the operability of valve 1PS231A and was performed within the required frequency (plus the allowed 25%) since the last successful performance of the surveillance on November 1, 1991. Based on this event the inspectors considered surveillance procedure, 1BIS 6.4.1-003, as inadequate to verify operability of check valve 1PS231A in accordance with TS and the IST program. Pending further review by the NRC and licensee, this matter is considered an Unresolved Item (454/92006-03(DRP)). To facilitate a timely closure of this item, the inspectors request a written response from the licensee that discusses the methods utilized to verify operability of other check valves in systems opened to the containment atmosphere where the process medium is air.

No violations or deviations were identified.

5. Engineering & Technical Support (37700)

The inspectors reviewed Onsite Review 92-032 that pertained to an issue regarding the possibility of nonconservative input assumptions for the Modes 3, 4 and 5 boron dilution analysis. Nonconservatisms have been recently identified related to the input assumptions/boundary conditions in analysis of the licensing-basis boron dilution event. The OSR stated that based on an initial assessment conducted by the licensee's Nuclear Fuel Services (NFS) group, the present information available does not indicate that the Boron Dilution Prevention Systems (BDPS) cannot perform the intended function as described in the UFSAR Section 15.4.6.3, and should therefore be considered operable. While continued evaluations are ongoing, NFS recommended that in the interim, the Byron station implement certain conservative actions. These actions would reduce the likelihood of a boron dilution event while providing enhanced opportunity for the operator to mitigate the transient in the event the BDPS system should fail. The BDPS is required to operate in Modes 3, 4 and 5. At present, Unit 1 is in Mode 1 and Unit 2 is in Mode 6. The inspectors do not have a concern at this time with the licensee's actions while NFS continues to evaluate the issues with the boron dilution analysis identified in the Westinghouse letter dated March 4, 1992.

No violations or deviations were identified.

6. Refueling Activities (60710)

During the refueling outage, the inspectors observed the licensee's fuel handling operations and discussed refueling operations with plant



operators and fuel handling personnel. The licensee used approved procedures for fuel accountability and movements. Communications between the control room and fuel handlers were established and effective. The inspectors witnessed fuel handling operations during several shifts from the control room, in the fuel building, and in containment.

During the current Unit 1 outage, all of the fuel was unloaded from the reactor, moved to the spent fuel pool, stored in the spent fuel pool, and then reloaded into the reactor as required for the next fuel cycle.

The licensee's contingency plans in case of a stuck fuel assembly when lifting the reactor upper internals were considered excellent. As a result of the damage to the upper internals during the Unit 2 refueling outage, the licensee placed underwater cameras to monitor the lift. At two feet, the lift was halted and an inspection with the underwater camera was performed. Licensee controls included plans for evacuating the containment of all non-essential personnel in the event of a stuck fuel assembly. The licensee also sent personnel to monitor activities at another nuclear plant when that plant experienced a stuck fuel assembly several days preceding the scheduled lifting of the upper internals at Byron.

No violations or deviations were identified.

#### 7. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. Unresolved items disclosed during the inspection are discussed in paragraphs 4.b.1, 4.b.2 and 4.b.3.

#### 8. Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 during the inspection period and at the conclusion of the inspection on March 23, 1992. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.